

## **Appendix Q–Environmental Sensitivity Analysis**

## Off-Site Sensitivity Analysis

Possible Sensitive Receptors

### Total Sensitivity

- Positive Impact
- Neutral
- Low
- Moderate
- High
- Very High

Site Boundaries

Towns

Roads

Arterial Roads

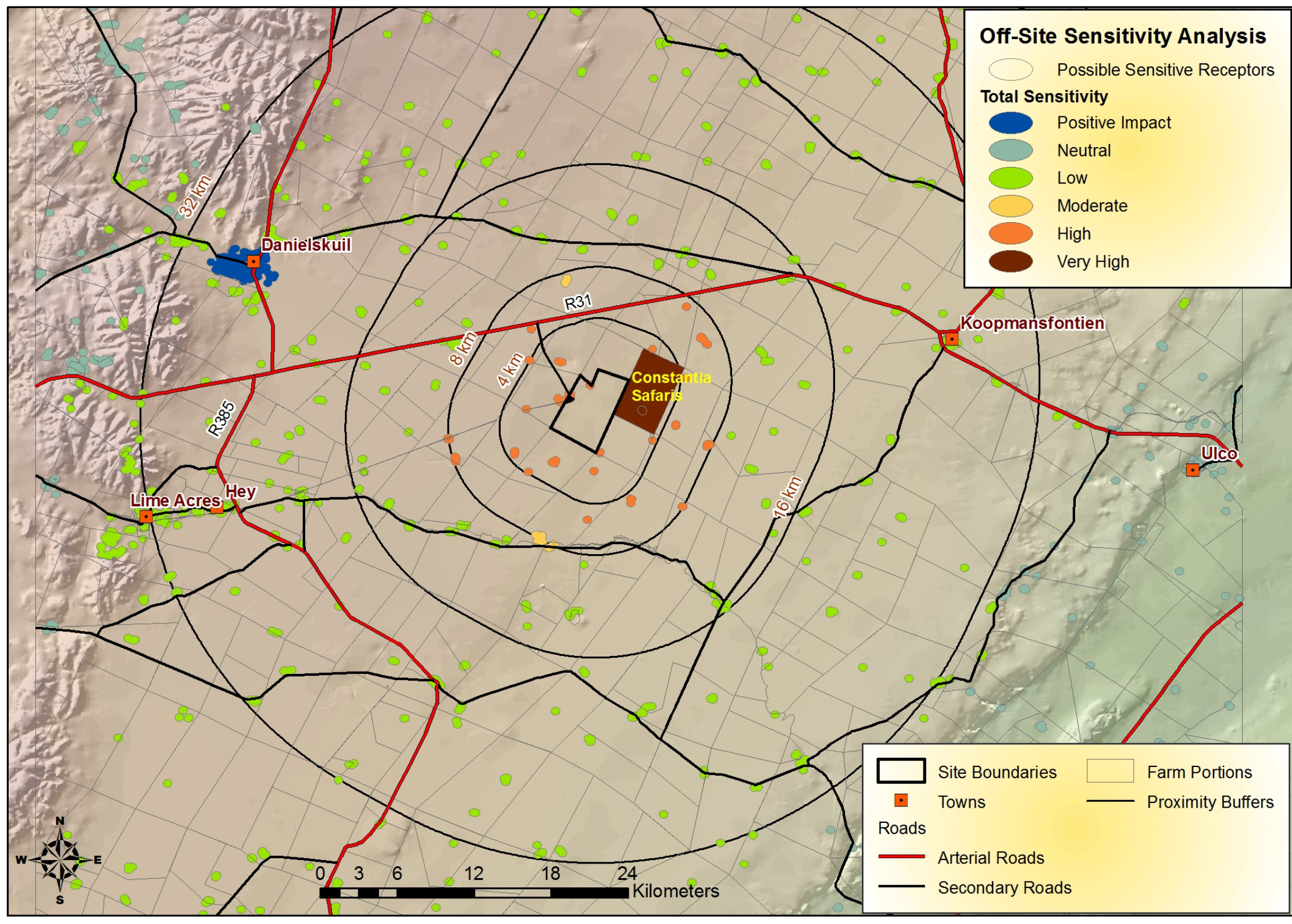
Secondary Roads

Farm Portions

Proximity Buffers



0 3 6 12 18 24 Kilometers

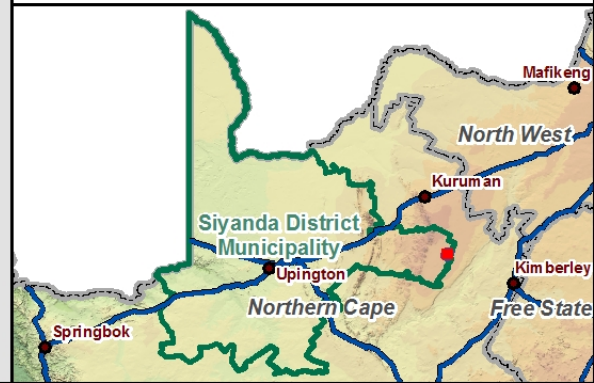
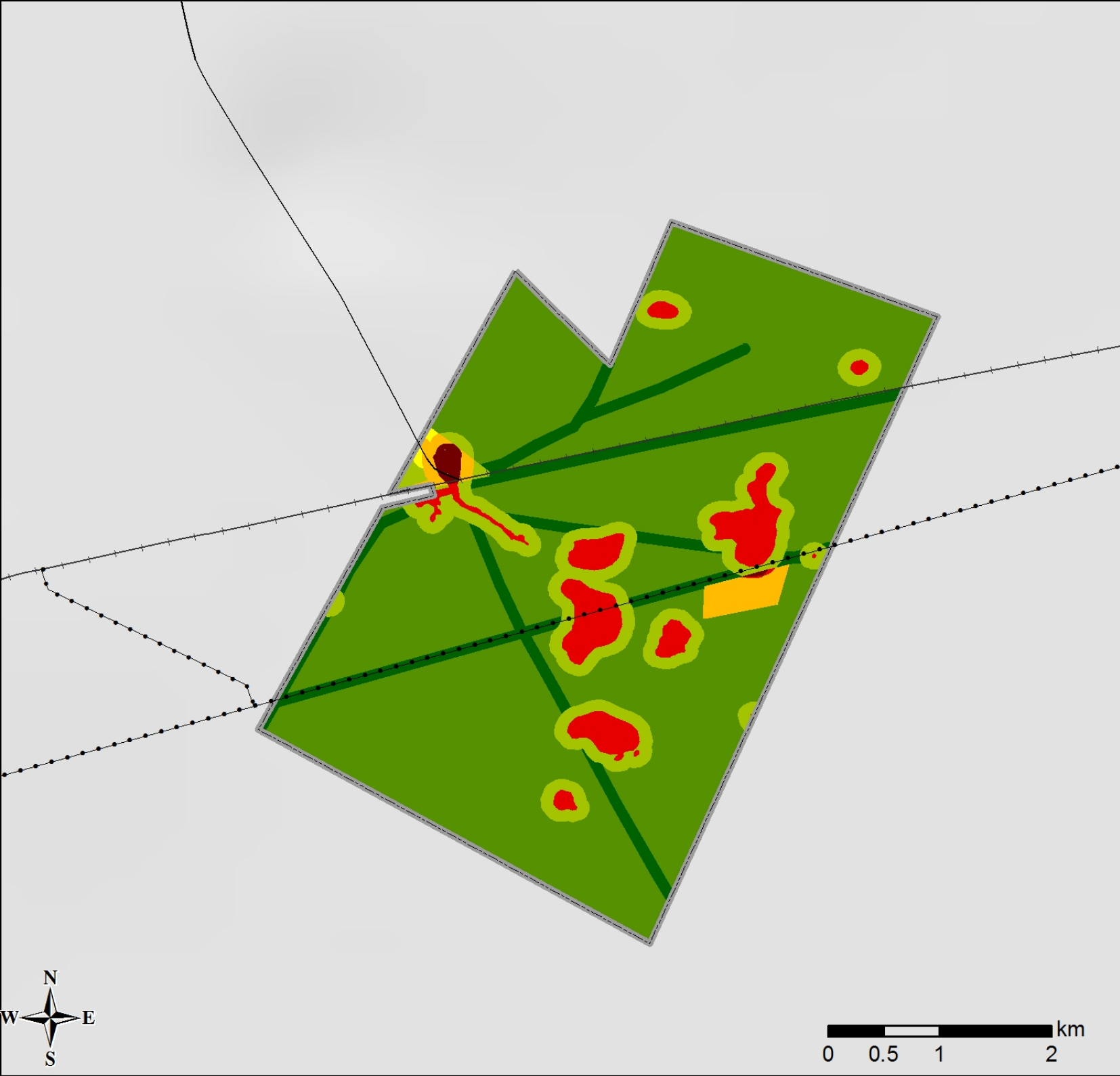
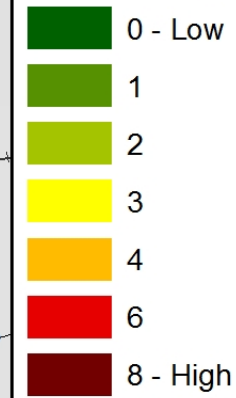


# Arriesfontein

Sensitivity

## Legend

### Sensitivity



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**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED CONCENTRATED  
SOLAR POWER PLANT ON THE FARM 267, NEAR DANIELSKUIL IN THE NORTHERN CAPE**

**DEA REFERENCE: 12/12/20/2646**

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## **Appendix R–Environmental Management Program**



**WorleyParsons**

resources & energy

**EcoNomics™**

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**SOLARRESERVE®**

# **Environmental Management Plan for the proposed Concentrated Solar Power Plant on the Farm 267 - Arriesfontein - near Danielskuil in the Northern Cape.**

**DEA Reference: 12/12/20/2646**

260380PWE – 08-005

18 July 2012

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ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

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## PROJECT 260380PWE - ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

| REV | DESCRIPTION | ORIG            | REVIEW          | WORLEY-<br>PARSONS<br>APPROVAL | DATE       | CLIENT<br>APPROVAL | DATE |
|-----|-------------|-----------------|-----------------|--------------------------------|------------|--------------------|------|
| A   |             | FA<br>Humphries | L<br>Rautenbach | JM Harris                      | 2012-07-30 | N/A                |      |
|     |             |                 |                 |                                |            |                    |      |
|     |             |                 |                 |                                |            |                    |      |



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DEA REFERENCE: 12/12/20/2646

## CONTENTS

|           |   |           |
|-----------|---|-----------|
| <b>1.</b> | <b>INTRODUCTION .....</b>                                     | <b>1</b>  |
| 1.1       | ENVIRONMENTAL MANAGEMENT PROGRAMME.....                       | 3         |
| 1.2       | ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES.....            | 4         |
| 1.3       | LEGAL REQUIREMENTS.....                                       | 5         |
| 1.4       | SCOPE OF THE EMPR.....  | 6         |
| 1.4.1     | LAYOUT OF THE EMPR.....                                       | 7         |
| 1.4.2     | CONSTRUCTION PHASE.....                                       | 7         |
| 1.4.3     | OPERATIONAL PHASE .....                                       | 7         |
| 1.4.4     | CLOSURE AND DECOMMISSIONING PHASE .....                       | 7         |
| <b>2.</b> | <b>THE PROPOSED ACTIVITY .....</b>                            | <b>8</b>  |
| 2.1       | CSP TECHNOLOGY SPECIFIC INFRASTRUCTURE .....                  | 8         |
| 2.2       | OTHER INFRASTRUCTURE .....                                    | 9         |
| <b>3.</b> | <b>INSTITUTIONAL MATTERS .....</b>                            | <b>11</b> |
| 3.1       | SITE ENGINEER .....   | 11        |
| 3.2       | ENVIRONMENTAL MANAGER.....                                    | 11        |
| 3.3       | ENVIRONMENTAL CONTROL OFFICER .....                           | 12        |
| 3.4       | CONTRACTOR'S ENVIRONMENTAL REPRESENTATIVE .....               | 13        |
| <b>4.</b> | <b>GENERAL ENVIRONMENTAL SPECIFICATIONS .....</b>             | <b>14</b> |
| 4.1       | ENVIRONMENTAL COMPLIANCE RECORD .....                         | 14        |
| 4.1.1     | INDUCTION AND ENVIRONMENTAL AWARENESS TRAINING REGISTER ..... | 14        |
| 4.1.2     | COMPLAINTS REGISTER .....                                     | 14        |
| 4.1.3     | STAKEHOLDER LIAISON AND COMMUNICATIONS REGISTER.....          | 15        |
| 4.1.4     | LEGAL REGISTER.....   | 15        |
| 4.1.5     | SITE INSTRUCTIONS.....  | 15        |
| 4.1.6     | METHOD STATEMENTS .....                                       | 15        |
| 4.1.7     | EMERGENCY PREPAREDNESS PLAN .....                             | 16        |



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ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT  
ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

|       |   |    |
|-------|---|----|
| 4.1.8 | SITE DOCUMENTATION .....  | 17 |
| 4.2   | <b>ENVIRONMENTAL NON-COMPLIANCE</b> .....                           | 17 |
| 5.    | <b>CONSTRUCTION PHASE: ENVIRONMENTAL MANAGEMENT PROGRAMME</b> ..... | 18 |
| 5.1   | <b>CONSTRUCTION ACTIVITIES</b> .....                                | 19 |
| 5.1.1 | <b>SITE CAMP ESTABLISHMENT</b> .....                                | 19 |
| 5.1.2 | <b>EARTHWORKS</b> .....   | 28 |
| 5.2   | ENVIRONMENTAL MANAGEMENT AND MITIGATION .....                       | 28 |
| 5.2.1 | AIR QUALITY MANAGEMENT .....  | 28 |
| 5.2.2 | BIODIVERSITY MANAGEMENT .....                                       | 29 |
| 5.2.3 | HYDROLOGY MANAGEMENT .....  | 48 |
| 5.2.4 | WASTE MANAGEMENT .....  | 54 |
| 5.2.5 | HERITAGE MANAGEMENT .....   | 57 |
| 5.2.6 | SOIL & EROSION MANAGEMENT .....                                     | 59 |
| 5.2.7 | <b>TRANSPORTATION MANAGEMENT</b> .....                              | 60 |
| 5.2.8 | <b>TRAFFIC MANAGEMENT</b> .....                                     | 61 |
| 5.2.9 | NUISANCE CONTROL .....  | 63 |
| 5.3   | <b>POLLUTION RISK CONTROL MEASURES</b> .....                        | 65 |
| 5.4   | <b>REHABILITATION AFTER CONSTRUCTION</b> .....                      | 65 |
| 5.4.1 | CONSTRUCTION CAMPS STRUCTURES, FACILITIES AND FENCING .....         | 66 |
| 5.4.2 | ACCESS ROADS .....  | 66 |
| 5.4.3 | EFFLUENT/SEWAGE .....   | 66 |
| 5.4.4 | WATER MANAGEMENT .....  | 66 |
| 5.4.5 | SOILS MANAGEMENT .....  | 66 |
| 5.4.6 | VISUAL MANAGEMENT .....   | 66 |
| 5.4.7 | DUST MANAGEMENT .....   | 66 |
| 5.4.8 | RE-VEGETATION AND HABITAT RESTORATION .....                         | 67 |
| 6.    | <b>OPERATIONAL PHASE ENVIRONMENTAL MANAGEMENT PLAN</b> .....        | 68 |
| 6.1   | GENERAL OPERATIONAL MANAGEMENT ACTIVITIES .....                     | 68 |





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ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT  
ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

|       |   |           |
|-------|---|-----------|
| 6.1.1 | CSP PLANT .....   | 68        |
| 6.1.2 | OFFICES AND ADMINISTRATIVE BUILDINGS.....               | 68        |
| 6.1.3 | SITE ACCESS & SECURITY .....                            | 69        |
| 6.1.4 | ABLUTION FACILITIES.....                                | 69        |
| 6.1.5 | WORKSHOP .....  | 69        |
| 6.1.6 | VEHICLE SERVICE AREA & WASH BAY .....                   | 70        |
| 6.1.7 | WASTE DISPOSAL FACILITY OPERATION AND DEVELOPMENT ..... | 70        |
| 6.2   | <b>ENVIRONMENTAL MANAGEMENT AND MITIGATION .....</b>    | <b>71</b> |
| 6.2.1 | <b>AIR QUALITY MANAGEMENT .....</b>                     | <b>71</b> |
| 6.2.2 | <b>BIODIVERSITY MANAGEMENT .....</b>                    | <b>71</b> |
| 6.2.3 | <b>HYDROLOGY MANAGEMENT .....</b>                       | <b>87</b> |
| 6.2.4 | <b>SOIL MANAGEMENT .....</b>                            | <b>87</b> |
| 6.2.5 | <b>TRANSPORTATION MANAGEMENT .....</b>                  | <b>88</b> |
| 6.2.6 | <b>TRAFFIC MANAGEMENT .....</b>                         | <b>88</b> |
| 6.2.7 | <b>NUISANCE MANAGEMENT .....</b>                        | <b>89</b> |
| 7.    | <b>AUDITING.....</b>                                    | <b>1</b>  |
| 7.1   | INTERNAL AUDITS .....                                   | 1         |
| 7.2   | EXTERNAL AUDITS.....                                    | 1         |
| 7.3   | REPORTING/PUBLIC COMPLAINTS .....                       | 2         |
| 8.    | <b>REHABILITATION AND DECOMMISSIONING PLAN.....</b>     | <b>1</b>  |

## Appendices

APPENDIX A–DECOMMISSIONING REPORT

APPENDIX B– BIODIVERSITY EMP CONTRIBUTIONS

APPENDIX C–TRAFFIC & TRANSPORTATION REVIEW

APPENDIX D–STORMWATER MANAGEMENT PLAN



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ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

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## ENVIRONMENTAL MANAGEMENT PLAN FOR THE THREE (3) PHASE PHOTOVOLTAIC POWER PLANT PROPOSED FOR THE FARM 267, ARRIESFONTEIN IN THE NORTHERN CAPE.

| KEY PROJECT INFORMATION           |   |                                 |
|-----------------------------------|---|---------------------------------|
| DEA REFERENCE NUMBER:             | 12/12/20/2646   |                                 |
| NEAS REF NR:                      | DEA/EIA/0000850/2011  |                                 |
|                                   | DEA/EIA/0000848/2011  |                                 |
|                                   | DEA/EIA/0000854/2011  |                                 |
| TITLE:                            | Arriesfontein Concentrated Solar Power Plant 100 MW Development                                       |                                 |
| APPLICANT:                        | SolarReserve SA (Pty) Ltd<br>Office L6-1B<br>SinoSteel Plaza<br>Rivonia Road<br>Sandton<br>Tel: (011) |                                 |
| REPORT STATUS:                    | Environmental Management Programme (EMPRr) for public review  |                                 |
| SITE INFORMATION:                 | The Farm Arriesfontein 267, Barkley Wes RD  |                                 |
| GEOGRAPHICAL COORDINATES          | S28.28808<br>E23.78031  |                                 |
| SG CODE:                          | C007000000026700000   |                                 |
| AUTHORS:                          | F. Humphries  |                                 |
| SUB-CONSULTANTS:                  |   |                                 |
| ORGANISATION                      | NAME  | SPECIALISTS ASSESSMENT          |
| Airshed Professionals             | Gerrit Kornelius  | Air Quality Assessment          |
| Endangered Wildlife Trust         | Andrew Pearson  | Avifaunal Assessment            |
| Bathusi Environmental Consulting  | Riaan Robbeson  | Biodiversity Assessment         |
| MSJ                               | Nino Welland  | Geo Technical Assessment        |
| SRK                               | Des Visser & Chris Esterhuyse   | Geo Hydrological Assessment     |
| KnightPieshold                    | Gus Roland  | Hydrological Assessment         |
| Professional Grave Solutions      | Wouter Fourie   | Heritage Assessment             |
| Urban-Econ:Development Economists | Elena Broughton   | Socio-Economic Assessment       |
| Agriculture Resource Council      | Gary Patterson  | Soils & Agriculture Potential   |
| Grant Thornton                    | IllanaDoubel  | Tourism Assessment              |
| MetroGIS                          | Dawie jv Vuuren   | Visual & Sensitivity Assessment |
| Wetland Consulting Services       | Dieter Kassier  | Wetland Assessment              |



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## Acronyms

|          |   |
|----------|---|
| ARC-ISCW | Agricultural Research Council Institute for Soil, Climate and Water   |
| ARI      | Acute Respiratory Infections  |
| BID      | Background Information Document                                       |
| CAGR     | Compounded Annual Growth Rate   |
| CAR      | Co-ordinated Avifaunal Road-count                                     |
| COPD     | Chronic Obstructive Pulmonary Disease                                 |
| CSP      | Concentrated Solar Power  |
| CWAC     | Co-ordinated Waterbird Count  |
| DEA      | Department of Environmental Affairs                                   |
| DNI      | Direct Normal Irradiance  |
| DTEEA    | Department of Economic Development, Tourism and Environmental Affairs |
| EC       | Electrical Conductivity   |
| ECO      | Environmental Control Officer   |
| EDI      | Electro-deionization  |
| EHS      | Environmental, Health and Safety                                      |
| EIA      | Environmental Impact Assessment                                       |
| EIAR     | Environmental Impact Assessment Report                                |
| EMP      | Environmental Management Programme                                    |
| ERM      | Environmental Resources Management                                    |
| GDP      | Gross Domestic Product  |
| GHG      | Green House Gas   |
| GN       | Government Notice   |
| GRU      | Groundwater Resource Units  |
| I&APs    | Interested & Affected Parties   |
| IDP      | Integrated Development Plan   |
| IPP      | Independent Power Producer  |
| NEMA     | National Environmental Management Act                                 |
| NERSA    | National Energy Regulator of South Africa                             |
| NGOs     | Nongovernmental Organizations   |
| NGDB     | National Groundwater Database   |
| QDGS     | Quarter Degree Square   |
| RO       | Reverse Osmosis   |
| SAHRA    | South African Heritage Resources Agency                               |
| SANBI    | South African Biodiversity Institute                                  |
| SDF      | Spatial Development Framework   |
| ToR      | Terms of Reference  |
| WUL      | Water Use License   |



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## Abbreviations

|        |   |
|--------|---|
| CA:    | Competent Authority                             |
| CEMP:  | Construction Environmental Management Programme |
| CER:   | Contractor's Environmental Representative       |
| EMP:   | Environmental Management Programme              |
| ECO:   | Environmental Control Officer                   |
| SAHRA: | South African Heritage Resources Association    |
| SE:    | Site Engineer                                   |
| IAP:   | Interested and Affected Party                   |
| MSDS:  | Material Safety Data Sheet                      |
| OEMP:  | Operational Environmental Management Programme  |
| WMCO:  | Waste Management Control Officer                |
| WML:   | Waste Management License                        |
| CA:    | Competent Authority                             |
| CER:   | Contractor's Environmental Representative       |
| EMP:   | Environmental Management Programme              |



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ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

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## Definitions and Terminology

### AUDIT:

A systematic and objective evaluation in terms of the conditions set out in the Site Documentation on a regular (periodic) basis. The degree of compliance is recorded in monthly audit reports. An audit aims to ensure that all regulatory requirements are adhered to.

### BUILDING AND DEMOLITION WASTE:

Refers to waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition (*NEM: WA, Act No. 59, 2008*).

### BUND:

An artificial containment wall (embankment) designed to contain spillages of a hazardous nature such as chemicals and hydrocarbons.

### BATCH PLANT:

A containment area centrally located where cement, water and other related aggregates are mixed to produce concrete and / or cement. The design of this area has to adhere to the specifications set out in the Draft EMP.

### COMPETENT AUTHORITY

The Competent Authority is the authority responsible for the issuing of the Waste Management License of the site in terms of Section 20(b) of the National Environmental Management: Waste Act (Act 59 of 2008). In this instance, the "Competent Authority" means the Head of Department (HoD) of the Mpumalanga Department of Economic Development, Environment and Tourism, or someone within the Department designated by the HoD or the Member of the Executive Council responsible for Environment in the Mpumalanga Provincial Government as the competent person.

### CONTRACTOR'S ENVIRONMENTAL REPRESENTATIVE (CER):

The CER is employed by the contractor to ensure the contractor complies with the environmental standards, specifications, as well as the conditions and stipulations contained within the Site Documentation. The CER is available on site at all times and has the experience and/or knowledge to deal with environmental issues.

### CONTAMINATION



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**DEA REFERENCE: 12/12/20/2646**

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The release/spillage of a substance into an environment where it is not normally found, which is detrimental to that environment, its ecosystems and to humans.

**CONTAMINATED:**

Means the presence in or under any land, site, buildings or structures of a substance or micro-organism above the concentration that is normally present in or under that land, which substance or micro-organism directly or indirectly affects or may affect the quality of soil or the environment adversely (*NEM: WA, Act No. 59, 2008*).

**CONTRACTOR:**

The individual and/or company that are responsible for the development and/or construction activities related to the proposed project. The Contractor is further responsible for the implementation of and compliance with the conditions and stipulations contained within the in Site Documentation.

**CONSTRUCTION SITE CAMP:**

The construction site camp refers to the designated area where the contractor's offices (temporary), and associated infrastructure will be located during the construction period of the proposed project.

**CORRECTIVE (OR REMEDIAL) ACTION:**

Reactive response required to address an action that is in conflict with the requirements of the Site Documentation. The need for corrective action may be determined through monitoring, audits or management review.

**DOMESTIC WASTE:**

Means waste, excluding hazardous waste that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes; (*NEM: WA, Act No. 59, 2008*).

**ENVIRONMENT:**

Means the surrounding within which a human exist and that are made up of:

- The land, water and atmosphere of the earth;
- Micro-organism, plant and animal life;
- Any part or combination of (i) and (ii) and the interrelationships among and between them; and





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ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

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- The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing (*NEMA Act 107 of 1998*):

#### **ENVIRONMENTAL AUDIT:**

Means work done to identify and evaluate compliance of the statement and the residual environmental impact of an existing activity, the effectiveness of mitigation measures and the functioning of monitoring mechanisms; (*Environmental Impact Assessment Act 6 of 2005 - Chapter 65:07*)

#### **ENVIRONMENTAL CONTROL OFFICER (ECO):**

The ECO is an independently appointed person that will operate independently to objectively monitor the implementation of the EMP and the conditions as stipulated in the RoD on a regular basis.

#### **ENVIRONMENTAL IMPACT:**

Change in an environment resulting from the effect of an activity on the environment, whether positive or negative. Impacts may be the direct consequence of an individual's or organisation's activities or may be indirectly caused by them (*DEAT, 1998*).

#### **ENVIRONMENTAL IMPACT ASSESSMENT (EIA):**

The process of examining the environmental effect of development (*DEAT, 1998*). The EIA assesses the possibility, range and impact that a specific type of development may have on the natural environment during the design, planning and implementation of a project.

#### **GENERAL WASTE:**

Waste that does not pose an immediate hazard or threat to the environment or health, and includes:

- domestic waste;
- building and demolition waste;
- Business waste: and
- inert waste. (*NEM: WA, Act No. 59, 2008*).

#### **HARM:**

Means interference with the ecological systems of which the living organisms form part and in case of a living person includes harm, distress or annoyance to any of his senses or damage to his property. (*Waste Management Act, Act 15, 1998. CHAPTER 65:06*)



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ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

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## HAZARD:

Means a source of or exposure to danger (*NEMA Act107 of 1998*)

## HAZARDOUS WASTE:

Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment (*NEM: WA, Act No. 59, 2008*).

## SITE DOCUMENTATION

In this document, "Site Documentation" refers to all relevant documentation pertaining the licensing, operation and management of the site:

- Environmental Authorisation;
- Waste Management License;
- Site Operation, Management and Maintenance Plan (latest approved version);
- Site Design Documentation(latest approved version);
- Environmental Management Programme; and
- Written instructions from the CA.

## SOLID WASTE:

All waste, including construction debris, chemical waste, excess cement/concrete, wrapping material, timber, tins and cans, drums, wire, nails, domestic , dead organic waste, asphalt products (*City of Cape Town: Standard Environmental Specification Version 6:2007*).

## INTERESTED AND AFFECTED PARTY (I&AP):

Individuals and/or peer groups that are and/or maybe affected albeit positive or negative by the proposed activity. IAP's include authorities, local communities, environmental interest groups, and the general public.

## MITIGATION:

Measures designed to avoid, reduce or remedy the proposed adverse impacts (DEAT, 1998).

## MONITORING:



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**DEA REFERENCE: 12/12/20/2646**

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The repetitive and continued observation, measurement and evaluation of environmental criteria to follow changes over a period of time and to assess the efficiency of control measures (*DEAT, 1998*).

#### **PREVENTATIVE ACTION:**

A predetermined action to address potential problems before they develop into situations which would be contrary to the requirements of the EMP. Preventative action is most often determined from the results of monitoring and audits during management review.

#### **PROJECT APPRAISAL:**

The collection and evaluation of detailed information concerning a proposed project, usually to assess risk associated with it.

#### **POLLUTION:**

Means any contamination or change in the environment caused by:

- Substances;
- Radioactive or other waves; or
- Noise, odours, dust or heat

Emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or organ of state, where that change has an adverse effect on human health or wellbeing or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future (*NEMA Act107 of 1998*).

#### **SITE ENGINEER/RESIDENT ENGINEER (SE):**

The SE is the Consulting Engineers'/Project Proponents' representative onsite. Has the authority to issue instructions and oversees the operations of the contractor. Upon request from the EO/ECO the SE has the mandate whereby, in emergency circumstances, he may override the instructions of the contractor.



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## **1. INTRODUCTION**

WorleyParsons RSA (Pty) Ltd has been appointed as independent consultants to undertake an Environmental Impact Assessment for the proposed establishment of a Concentrated Solar Power Project (CSP) plants in the Daniëlskuil area of the Northern Cape Province.

The objective of the project is to generate electricity via solar power to feed into the national grid by means of the Concentrated Solar Power Plant which will generate 100 MW.

The proposed development requires that an Environmental Authorisation (EA) be issued by the National Department of Environmental Affairs (DEA) as the Competent Authority (CA). As per the regulations, all relevant provincial authorities and environmental stakeholders have been consulted.

The development will be carried out under the Environmental Regulations, promulgated in June 2010 under the National Environmental Management Act (Act 107 of 1998) (NEMA). Relevant environmental and built environment legislation was consulted as part of the EIA process and compliance hereof is assured.

Due to the ever increasing and growing demand for energy as well the need to find more sustainable and environmentally friendly energy resources have prompted developers to explore new energy generation options. In an effort to utilise renewable energy resources, SolarReserve SA (Pty) Ltd (hereafter referred to as SolarReserve SA) is proposing to construct a 325 MegaWatt (MW) Solar Power Park on the Farm Arriesfontein 267, Barkley West RD, Siyanda District Municipal Region, comprising of both Photovoltaic (PV) and Concentrated Solar Power (CSP) Technology.

This Environmental Management Programme is structured to only deal with the CSP technology developments and the associated impacts and remediation mechanism identified during the Environmental Impact Assessment (EIA).

Layout alternatives have been investigated and these relate to the location of the associated infrastructure on the site. These are illustrated below:



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**DEA REFERENCE: 12/12/20/2646**

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**ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

## 1.1 ENVIRONMENTAL MANAGEMENT PROGRAMME

This Environmental Management Programme (EMPr) is compiled in accordance with the Integrated Environmental Management (IEM) philosophy which aims to achieve a desirable balance between conservation and development (DEAT, 1992). The IEM is a vital mechanism of the NEMA that promotes integrated environmental management of activities which may have the potential to significantly impact on the environment, as well as to prescribe a best-case methodology for safeguarding that environmental management principles are integrated in a sustainable manner into each phase of the project development process. The IEM furthermore promotes and provides access to various environmental management tools relevant for each level of decision making throughout the development process.

The primary aim of the IEM guidelines are to allow for –

- informed decision-making;
- accountability for information on which decisions are taken;
- accountability for decisions taken;
- a broad meaning given to the term environment (i.e. one that includes physical, biological, social, economic, cultural, historical and political components);
- an open, participatory approach in the planning of proposals;
- consultation with interested and affected parties;
- due consideration of alternative options;
- endeavour to mitigate negative impacts and enhance positive aspects of proposals;
- endeavour to ensure that the 'social costs' of development proposals (those borne by society, rather than the developers) be outweighed by the 'social benefits' (benefits to society as a result of the actions of the developers);
- democratic regard for individual rights and obligations;
- compliance with these principles during all stages of the planning, implementation and decommissioning of the proposals (i.e. from 'cradle to grave'), and
- The opportunity for public and specialist input in the decision-making process.





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**ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

## 1.2 ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES

The Environmental Management Programme (EMPr) specifies all the potential environmental impacts, control and mitigation measures, performance criteria and relevant reporting and monitoring procedures. The EMPr forms a crucial part of the conditions for approval and ensures that the project proponent remains accountable for compliance issues. It must form part of the construction contractual agreements by means of inclusion in the environmental specifications that form part of the contract between the client and the contractor.

The EMPr aims to facilitate appropriate environmental input during all phases of the project, during the construction activities as well as the future operational activities associated with the proposed project. To achieve this, the EMPr must define the management measures required to promote positive environmental consequences and reduce adverse environmental impacts of the project and define the objectives of such measures and describes how they will be achieved. This is achieved by making recommendations for the planning and design, specify the limitations the contractor must abide by during construction, detail the issues that should be taken cognisance of and indicate specific actions that must be undertaken so as to ensure that the environment is not unnecessarily damaged.

In addition the EMPr provides a clear indication of the environmental management requirements of each of the role players involved during the construction phase of the development. Guidance for the implementation of the EMPr is provided including the management of method statements which are required to be implemented to achieve compliance with the Environmental Specifications. Corrective actions and penalties in the event of non-compliance with the EMPr are also defined.

The objectives of the EMPr are to:

- Ensure compliance with the competent and regulatory (commenting) authority's conditions, requirements and guidelines albeit it local, provincial, national and/or international;
- Verify environmental performance by measuring compliance and/or non-compliance with legal requirements and standards;
- Provide a mechanism that can respond to unforeseen events;
- Provide feedback in terms of compliance for continual improvement in environmental performance;
- Identify and present a range of suitable mitigation measures that has the ability to reduce and mitigate the potential impacts to minimal or insignificant level when implemented;



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### **ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

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- Detail specific actions deemed essential for the mitigation of environmental impact pertaining to the project;
- Identify measures and mechanisms that could optimise beneficial impacts and possibly reverse impacts in the long run;
- Create communication structures that addresses the concerns and complaints of the I&APs with regards to the development;
- Establish a method of monitoring and auditing environmental management practises during every phase of the development;
- Ensure that safety recommendations are complied with; and
- Specific time periods within which the measures contemplated in the final environmental management programme must be implemented, where appropriate.

The point of departure for this EMPr is to ensure a pro-active rather than re-active approach to environmental performance by addressing potential problems before they occur - limiting corrective action requirements during the development phases. It can thus be stated that the purpose of an EMPr is to provide management measures designed specifically for the Developers, Engineers and Contractors to ensure that potential environmental impacts are minimised and reduced to an acceptable level. It must also be ensured that the EMPr is maintained and upheld as a dynamic document in order for the project team to add or improve on issues that might be considered left out or not relevant to the project. In such instances the approving authority may authorise the ECO to make such changes.

## **1.3 LEGAL REQUIREMENTS**

Construction, operation and decommissioning of the proposed development must be done in accordance with industry best practices. The EMPr forms an integral part of contractual documents and advises the contractor of his duties in terms preventing, mitigating and possible reversal of environmental impacts identified during the EIA which may be caused by construction, operation or decommissioning activities associated with the PV development.

The Contractor needs to take note that obligations imposed by the approved EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project.



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### **ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

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The Contractor shall identify and comply with all South African environmental legislation, including associated regulations and all local by-laws relevant to the project. Fundamental legislation currently applicable to the design, construction, operation and decommissioning phases of the project must be complied with. Applicable legislation pertaining to the proposed CSP development include but is not limited to the following–

- The Constitution of South Africa (Act 108 of 1996);
- National Environmental Management Act (Act 107 of 1998);
- EIA Regulations GNR 543, 544, 545, 546
- National Water Act (Act 36 of 1998);
- National Environmental Management: Biodiversity Act (Act 10 of 2004);
- National Heritage Resources Act (Act 25 of 1999);
- National Environmental Management: Air Quality Act (Act 39 of 2004);
- National Environmental Management: Waste Act (Act 58 of 2009);
- National Environmental Management: Protected Areas Act (Act 57 of 2003);
- National Forest Act (Act 43 of 1983);
- Conservation of Agricultural resources Act (Act 43 of 1983);
- National Veldt and Forest Fire Act (Act 101 of 1989);
- Hazardous Substances Act (Act 15 of 1973);
- Occupational Health and Safety Act (Act 85 of 1993);
- Relevant provincial legislation, municipal by-laws and ordinances.

## **1.4 SCOPE OF THE EMPR**

The EMPr sets out the various methods which will allow for proper management of and implementation of environmental controls that will allow the contractor and development project team to operate, construct



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ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

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and decommission the project within the relevant environmental parameters. The EMPr is a dynamic document subject to influence and change as the project develops and evolves.

#### 1.4.1 Layout of the EMPr

The EMPr has been divided into three (3) development phases. Each phase is subject to its own specific set of environmental issues and/or impacts, unique to that period of CSP Plant and associated infrastructure's development. The three (3) phases of the development include –

#### 1.4.2 Construction Phase

The majority of impacts will occur during the construction and pre-construction phase of the project due to the development of the site as a whole. Impacts that occur during construction must be mitigated via the implementation contingency plans identified during the EIA and the pre-construction planning phase.

These impacts can be mitigated through the various mitigation measures and mechanisms outlined in this section of the EMPr.

#### 1.4.3 Operational Phase

The section of the EMPr pertaining to the Operational Phase of the CSP development identifies and provides mechanisms and management principles by which potential impacts can be reduced, minimised, controlled or reversed.

#### 1.4.4 Closure and Decommissioning Phase

This section will provide a short narrative on the proposed methods and mechanisms that will be employed to reduce, minimize and possible reverse environmental impacts incurred during the life of the project. This section will most certainly require re-evaluation at the time of decommissioning.

Please note a Decommissioning Report will also be submitted in this regard.



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**ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

## **2. THE PROPOSED ACTIVITY**

SolarReserve SA intends to construct and operate a Concentrated Solar Power Plant in the Kgatelopele Local Municipality, in the Northern Cape. The proposed Arriesfontein Solar Power Park entails the construction and operation of one (1) CSP development, three (3) PV developments, associated infrastructure and services for the provision of renewable electricity to the national power grid. This EMP pertains specifically to the CSP development.

This Greenfields project entails the transformation of agricultural land to accommodate the proposed Solar Power plant, associated infrastructure and services. The infrastructure proposed for the entire Solar Power Plant (project) includes but is not limited to inter alia:

### **2.1 CSP TECHNOLOGY SPECIFIC INFRASTRUCTURE**

The CSP Technology proposed for the Solar Power Park entails the use of a central receiver tower which is equipped with an integrated thermal storage system. The proprietary receiver and storage components are provided through an exclusive license with United Technologies Corporation's subsidiary Hamilton Sundstrand Rocketdyne ("UTC" or "Rocketdyne"). The integrated salt storage technology proposed was demonstrated successfully at the SolarReserve LLC's Solar Two facility in Barstow, CA (built and operated jointly by the US Department of Energy and Rocketdyne) in the late 1990's.

SolarReserve's CSP technology generates power from sunlight by focusing the sun's thermal energy as collected by the heliostat field i.e. sun tracking mirrors onto a central receiver tower. The molten salt is circulated through tubes in the receiver, collecting the energy of the sun. Once the molten salt has been heated to a temperature of 560 degrees Celsius it is routed to an insulated storage tank i.e. the "hot" tank, where it can be stored with minimal energy losses. The heated, molten salt is routed from the "Hot" tank to a heat exchanger for the production of energy. Steam is produced by the heat exchanger and expanded through the standard Rankin cycle steam turbine which rotates a generator to produce electricity.

The molten salt is hereafter circulated back to the "cold" storage tank and the cycle repeated. Due to the energy storage ability of the proposed technology, a CSP plant of this nature, sized at 100 MW, can generate electricity for up to 24 hours a day during the summer months and between 12 to 16 hours a day in the spring, autumn and winter months. The proposed plant will utilise hybrid cooling technology to condense the water used during the steam cycle. Implementing this cooling technology allows for the use of considerably less water compared to that of a wet cooled solar thermal power plant.



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### **ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

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The proposed CSP developments will entail the following infrastructure:

The technology infrastructure requirements of this technology include –

- A collector field consisting of approximately between 10 300 and 17 500 dual-axis tracking heliostats, each approximately between 64 m<sup>2</sup> - 116 m<sup>2</sup>, providing approximately 1 200 000 m<sup>2</sup> of reflective surface area;
- An approximately 200 meter tall slip-form concrete tower and thermal receiver rated at approximately 565 MW thermal (MWt);
- A thermal to electric power block with an approximately 115 MW reheat and multiple extractions high temperature subcritical steam turbine and generator;
- Two molten salt thermal storage tanks;
- An air-cooled condenser and/or a cooling tower for the steam cycle in order to minimise the consumption of water;
- An evaporation pond consisting of three compartments with a combined area of approximately 8.0 ha, to completely contain all rejected water from the water treatment system and the steam cycle;
- Two liquid gas auxiliary burners for start-up;
- Two emergency diesel generators.

## **2.2 OTHER INFRASTRUCTURE**

In order for the applicant to operate the proposed facilities it is necessary that auxiliary infrastructure also be assessed and previewed in this report. Auxiliary infrastructure that will be defined as part of the PV development includes, but is not limited to the following items –

- Water reticulation and purification works. This includes water reticulation from the Sedibeng;
- Vaal Gamagara Bulk Water Supply Pipeline for industrial water use, and a water treatment and purification system to provide water for both domestic and process use;





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**ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

- Sewer reticulation and treatment works;
- Roads and storm water infrastructure;
- Substation/Switching station of approximately 100 m x 100 m and overhead power lines (please note the authorisation of the overhead distribution lines will be applied for separately from this EIA);
- Construction camp - accommodation and sanitation facilities for approximately 600 people (both CSP and PV allocation), with respect to the PV development it is estimated that approximately 350 people will have to be accommodated in the proposed man-camp ;
- Administrative and office buildings;
- Visitors centre;
- Equipment and materials lay down area;
- Assembly Plant;
- Concrete batching plant;
- Vehicle workshops and wash bays;
- Fuel storage area;
- Temporary general waste storage facility; and
- Hazardous material storage facility.



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**ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

### **3. INSTITUTIONAL MATTERS**

This document aims to identify and allocate responsibility to the various persons responsible for ensuring environmental compliance is achieved during construction, operation and decommissioning. This section of the document will delineate the function and responsibility of each designation that plays a role in terms of managing the environment.

Overall responsibility for the implementation of the EMPr lies with Applicant, SolarReserve SA, whom will enforce the relevant applications by means of the appointed Site Engineer/Manager/Agent.

#### **3.1 SITE ENGINEER**

The Site Engineer (SE), a registered professional engineer appointed by the Applicant, and is the Applicant's representative on site.

- The SE has the authority to issue instructions,
- Is responsible to oversee the operations of the contractor.
- Mandate to issue or override the instructions of the contractor upon request from the EM/ECO and in emergency circumstances.

#### **3.2 ENVIRONMENTAL MANAGER**

The Environmental Manager(EM) is the primary person responsible for monitoring and ensuring compliance and correct implementation of all mitigation measures and provisions contained within the Site Documentation on a daily basis. It will be the responsibility of the SE to appoint an EM to assume the responsibility for implementing the management guidelines contained in this document in context to the projects' background. The EM is not independent but acts on behalf of the SE to enforce environmental compliance.

The EM is responsible for –

- The EM has to ensure that all the necessary authorisations/permits/licenses are in place.



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### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

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- Guide and advise the engineering and construction teams on environmental issues during construction and site establishment (preparation);
- Convey the contents of the EMPr and EA to the contractor project team;
- Undertake and present environmental awareness and induction training prior to the site handover to contractors and the workforce;
- Facilitating open communication lines between the Applicant, project team, the DEA and other authorities;
- Ensure all proposed changes are communicated (in writing) to the Competent Authority (CA) for consideration and approval;
- Present action plans to mitigate and address possible environmental risks or problems in order to avoid costly work-stoppages and/or further environmental damage;
- Report significant environmental incidents and provision of action plans that will address problems or complaints received from the public;
- Issue a “cease work” instruction in exceptional circumstances
- Undertake periodic audits of construction activities in order to determine compliance with the EA, he EMPr and other licenses as well as to allow for the identification of problem/risk areas.

### 3.3 ENVIRONMENTAL CONTROL OFFICER

The Environmental Control Officer (ECO) will be responsible for ensuring that all conditions as stipulated in the Site Documentation is adhered to. It is the responsibility of the Applicant to appoint an ECO. The ECO will operate independently to objectively monitor the implementation of the conditions and stipulations contained within the Site Documentation. The ECO needs to be present on site prior to site establishment for record purposes. The tasks of the ECO will include the following –

- It is the responsibility of the ECO to monitor the degree of compliance to environmental legislation and the conditions stipulated in the Site Documentation by means of regular compliance audits.
- The ECO has the authority to stop works if in his/her opinion the operation imposes a serious threat to the environment or if an incident has occurred due to neglect or disregard. Any non-compliance



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**ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

recorded in terms of the conditions and stipulations of the Site Documentation, constitutes as a breach of Contract allowing the ECO to suspend part or all of the works, as required.

- The ECO will be the official liaison between the Authorities and the Applicant, and must handle all sensitive information originating from whistle blowers and incidents and report these to the regulating authorities.
- In order for the ECO to perform his/her tasks accordingly, he/she needs to be suitably qualified/experienced.

### 3.4 CONTRACTOR'S ENVIRONMENTAL REPRESENTATIVE

The Contractor's Environmental Representative (CER) is employed by the contractor to ensure the contractor complies with the environmental standards, specifications, as well as the conditions and stipulations contained within the Site Documentation.

- The CER has to be available on site at all times and will have the experience and/or knowledge to deal with all environmental issues arising during construction.
- It is furthermore the responsibility of the CER to communicate the contents of the Site Documentation to all staff working for and / behalf of the contractor.
- The person appointed as CER will have to be knowledgeable in the concepts of integrated environmental and waste management, have a sound background on environmental and waste management legislation and be suitably qualified / experienced.
- The CER needs to ensure that all personnel working for and/or on behalf of the contractor understands the concept of integrated environmental and waste management and the various issues specific to the site they are working on. The CER has the prerogative to issue non-conformances to the contractor, hazard and risk certificates and fines if deemed suitable.



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ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

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## 4. GENERAL ENVIRONMENTAL SPECIFICATIONS

### 4.1 ENVIRONMENTAL COMPLIANCE RECORD

The CER has to develop and implement an Environmental Control System for the site whereby all records will be kept on all matters environmental. Records shall include the following key documents, however is not limited to these:

#### 4.1.1 Induction and Environmental Awareness Training Register

It is the responsibility of the Contractor to ensure that any and all staff undergo training and understand the requirements of the Site Documentation. This allows staff to keep the environmental obligations in check.

- Environmental Induction/training will be compulsory to all personnel. All new personnel appointed in the duration of construction phase will undergo environmental induction before they commence duties on the site.
- Environmental Induction/training may take the form of toolbox talks, demonstrations, media or a written test – whereby the employees' understanding of issues pertaining to his/her job is explained and assessed. The degree of specialised training/induction is dependent on the function performed by the employee and will be determined by the CER. This training must be presented at the level of the employees.
- All levels of management and employees need to undergo environmental training.
- Training attendance record needs to be kept and available for review by the ECO. Copies/samples of the toolbox talks/induction material also need to be available for review by the ECO. It is proposed that a graphic list of potentially dangerous animals be compiled and presented to all workers as part of site induction.

#### 4.1.2 Complaints Register

A Complaints Register needs to be on site at all times. This register has to be easily accessible to all stakeholders and I&APs and made available for review to the ECO during Audits. The Register has to illustrate what measures have been implemented / taken in order to address the complaint as well as indicate what the timeline was in resolving the complaint.



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**ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

#### **4.1.3 Stakeholder Liaison and Communications Register**

Copies of all documents referring to stakeholder liaisons need to be kept on record (preferably signed) and maintained. Stakeholders need to be informed of any large scale construction activities i.e. blasting or the bringing in of large scale equipment or vehicles, that may disrupt their daily lives, in advance and in writing. These communications need to be made available to the ECO during Auditing.

#### **4.1.4 Legal Register**

A legal register needs to be onsite and accessible to any and all personnel whose actions may have a significant impact on the environment. It is the responsibility of the CER to ensure that the legal register is kept updated with regards to each piece of legislation that has relevance on site.

#### **4.1.5 Site Instructions**

The Environmental Compliance Record has to capture all site instruction issued by the CER that relates to the EMP and or any conditions depicted in all environmental authorisations and license. These instructions will also be used for the issuing of stop-work-orders and or fines by the ECO and CER.

#### **4.1.6 Method Statements**

The Contractor shall provide Method Statements for approval by the ECO/EM and the SE prior to work commencing on aspects of the project deemed or identified to be of greater risk to the environment and/or which may not be covered in sufficient detail in the construction phase of the EMP, when called upon to do so by the SE or ECO.

A Method Statement is a “live document” in that modifications are negotiated between the Contractor and the ECO/project management team, as circumstances unfold. All Method Statements will form part of the construction phase of the EMP documentation and are subject to all terms and conditions contained within the construction phase of the EMP.

Note that a Method Statement is a ‘starting point’ for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment.

Changes to, and adaptations of Method Statements can be implemented with the prior consent of all parties.





## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

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A Method Statement describes the scope of the intended work in a step-by-step description in order for the ECO and the Engineer to understand the Contractors intentions. This will enable them to assist in devising any mitigation measures, which would minimize environmental impact during these tasks. For each instance where it is requested that the Contractor submit a Method Statement to the satisfaction of the Engineer and ECO, the format should clearly indicate the following:

- **What** - a brief description of the work to be undertaken;
- **How** - a detailed description of the process of work, methods and materials;
- **Where** - a description/sketch map of the locality of work (if applicable); and
- **When** - the sequencing of actions with due commencement dates and completion date estimates.
- **Who** – The person responsible for undertaking the works described in the Method Statement;
- **Why** – a description of why the activity is required.

All Method Statements are to be to the satisfaction of the ECO, Engineer and, where practical and deemed necessary, should be endorsed as being acceptable by the environmental representative of the Relevant Authority.

#### 4.1.7 Emergency Preparedness Plan

The EM has to ensure that there is an Emergency Preparedness Plan on site that provides a detailed explanation of what should be done in the various emergency situations. This plan has to be known to all persons working on site and has to also provide emergency contact information. The plan is to be reviewed annually and after each emergency and or accident.

The plan needs to address, amongst other the following:

- Vehicle/Machinery Fire & Malfunction;
- Veld fire;
- Destruction of habitat or animal fatalities;
- Natural Disasters such as floods;



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**ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

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- Industrial action;
- Hydrocarbon spillages.

#### **4.1.8 Site Documentation**

A copy of the Site Documentation has to be available on site and easily accessible to any and all persons working for and or on behalf of the contractor. Issues and conditions of the Site Documentation need to be explained to employees.

#### **4.2 ENVIRONMENTAL NON-COMPLIANCE**

Any non-compliance with the EMPr, the recommendations and conditions contained in the EA and or Site Designs (as amended and approved by the CA from time to time), as well as any written instruction issued by the CA will be treated as serious. Liability rests with the Applicant- for non-compliance with the said documentation. A penalties schedule will be developed by the CER in conjunction with the applicant and be implemented in the instance of non-compliance by any contractor working on site, such that the applicant has a means to ensuring that their risk in respect of non-compliance by these contractors can be managed.



SOLARRESERVE SA (PTY) LTD

ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

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## 5. CONSTRUCTION PHASE: ENVIRONMENTAL MANAGEMENT PROGRAMME

The Construction Environmental Management Program (C-EMPr) serves as the Contractors' guideline for environmental management pertaining to all construction activities which are to be undertaken. The C-EMPr will specify the control measures that need to be implemented by the contractor and project team prior and during the construction phase. These measures will be implemented where practical based on the scale and complexity of the construction activities associated with a power plant.

General conditions with regards to the placement of the CSPplant and its associated infrastructure:

- All CSP and related infrastructure shall be constructed within the authorized footprint, as per the layout diagrams approved by the DEA.
- Infrastructure should avoid sensitive environments as per the EIAR;
- Vegetation removal needs to be kept to a minimum – vegetation may only be removed or damaged within infrastructure footprint areas;
- Ensure that as far as possible infrastructure avoid wetlands, watercourses, pans and riparian areas, where possible;
- Ensure that where it is possible, infrastructure is not placed within 32m of drainage lines, riparian zones, pans or water courses;
- No vehicles are allowed to drive on site except on designated on-site roads;
- Ensure that as far as possible, infrastructure should avoid crossing
- Implementation of an effective stormwater management plan and measures with respect to all areas to be compacted, access roads etc.
- Appropriate stormwater design that allows dirty water to be captured and contained on site, whilst clean water is diverted away from site;
- Appropriate stormwater design that allows for water surface water velocity to be slowed down as to reduce and prevent onsite erosion and downstream sedimentation;
- All heritage and archeological sites as identified during the EIA and depicted in the EIAR is to remain undeveloped; and



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ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Prior to commencement of any activity, the entire affected area must be visited by an Environmental Officer qualified to rescue significant indigenous species of flora and these should be transplanted to areas that will not be disturbed.

## 5.1 CONSTRUCTION ACTIVITIES

### 5.1.1 Site Camp Establishment

The construction site camp is a dedicated area which will house all buildings, offices, lay down yards, vehicle wash areas, fuel storage areas, batching areas and other infrastructure that is required for the execution of the project.

#### 5.1.1.1 Site Demarcation and Layout Plan

The location, design and layout of the construction camp has to be determined by the SE and the Contractor alongside the CER in order to ensure a minimal impact on the environment. Refer to the site layout (draft) submitted to the Department for an indication of areas suitable for establishment.

- The site camp has to be established in an area with no or negligible environmental impact (i.e. in an area that has a low sensitivity rating according to the sensitivity analysis conducted on the site).
- The site will be clearly demarcated by means of a fence and notice boards. The demarcated area needs to be indicated on the engineering site layout plans.
- The Contractor shall take all reasonable measures to limit the extent of the area of disturbance due to construction activities (the area must be earmarked for construction activities, and the activities must be confined to that).
- All areas identified as no-go areas needs to be clearly cordoned off and indicated as such on the site layout plans. · In sensitive environments, or where access into no-go areas takes place, then a perimeter fence must be erected around the works area.
- In terms of impacts on soil and agricultural potential it is preferable that infrastructure be positioned to the area indicated in the specialist soils assessment in the EIA as land type Fc4 due to the predominance of shallower, calcareous soils in the east.



## **SOLARRESERVE SA (PTY) LTD**

### **ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

- Maintain the site demarcations until the construction phase has been completed and work ceases.
- Maintain animal migration routes and corridors as indicated in the specialist EIAR and/or as per the ECO's specifications.
- Minimize the visual and aesthetical impact of construction by establishing any and all activities or operations that, away from sensitive receptors. In the event that this is not possible, the impact needs to be ameliorated to reduce the adverse effect. These actions will be specified by the ECO for implementation.
- No physical alteration of vegetation or natural features are allowed. In the event of identifying a specie for removal do not paint it, rather mark it by using pegs, beacons or rope and droppers.

#### **5.1.1.2 Fencing & Security**

In order to minimize environmental impacts it is the responsibility of the contractor to take all reasonable measures to limit the extent of the area of disturbance due to construction activities (the area must be earmarked for construction activities, and the activities must be confined to that) by fencing the area off.

- The contractor shall maintain in good order all fencing and or barriers during the construction period.
- A photographic record has to be kept of the site before site camp is established.
- The construction site will be properly demarcated and fenced and people will not be allowed to move outside the demarcated areas.

#### **5.1.1.3 Site Access**

Access to the construction site camp needs to be controlled and restricted at all times in order to ensure safeguarding of equipment and the environment and additionally restrict and avoid trespassing.

- The entrance to the site camp needs to be manned by a guard and a lockable gate is to be supplied.
- Unauthorized entry to the camp site must be prohibited.
- No additional access roads may be constructed without the consent of the CER, landowners and SE – only existing roads and access roads planned for the proposed facility are to be used. If



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

temporary roads are created during the construction phase of the project they have to be decommissioned by the SE upon project completion and rehabilitated to natural state.

#### 5.1.1.4 Construction Camp Structures and Facilities

As the construction camp and associated facilities i.e. man-camp is permitted only as a temporary fixture the following needs to be adhered to –

- The Contractor shall submit a method statement for site clearance to the SE and ECO for approval prior the removal of any vegetation.
- All required amenities shall be installed at site camp prior to the workforce moving onto site.

#### **MAN-CAMP**

- No permanent structures will be permitted within the construction site camp – only prefabricated structures such as containers and prefabricated living, dining and ablution quarters will be allowed. Cement slabs are allowed as foundation for these structures – however upon decommissioning these slabs have to be removed and the compacted soils ripped and rehabilitated. The Contractor will be held accountable for the implementation of these measures.
- The Contractor shall establish the construction camp, offices, workshops and other infrastructure as per the agreed site layout plan in a manner that does not adversely affect the environment;
- Energy sources are to be provided by the contractor for all cooking and heating personnel.
- No open fires will be allowed on site at any given time during construction. All activities that may pose a fire risk needs to identified and suitable measures must be put in place to prevent these and possible damages.
- During the induction training it is the responsibility of the contractors to inform staff of all fire risks and fire prevention and emergency procedures in the event of fire. Firefighting equipment shall be supplied by the Contractor at easily accessible and earmarked locations.

#### **EATING AREAS**

- The Contractor's employees shall only eat in designated areas indicated by the Contractor and approved by the Engineer.



## **SOLARRESERVE SA (PTY) LTD**

### **ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

- Food preparation shall be done in a specifically demarcated area on site and no open fires are permitted, without exception. Adequate heating and food preparation sources/areas have to be provided for employees in order to ensure no fires will be made on site. The Contractor shall provide adequate scavenger-proof and weatherproof refuse bins in this area.
- Eating areas need to be regularly serviced and cleaned to ensure the highest possible hygiene standards are enforced, and to prevent animals from entering the man-camp.

#### ***ABLUTION FACILITIES***

- The construction site camp shall have the necessary ablution facilities at the commencement of construction activities. It is the responsibility of the contractor to inform the workforce to make use of the supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities.
- The modular sewer treatment facility will be installed and maintained by a reputable service provider. It will be installed in an area of low sensitivity as indicated by the sensitivity analysis contained in the EIA Report. Cement slabs are allowed as foundation for these structures – however upon decommissioning these slabs have to be removed and the compacted soils ripped and rehabilitated. The Contractor will be held accountable for the implementation of these measures.
- The location of the portable chemical latrines, prefabricated ablution facilities and modular sewer treatment facility must be approved by the Engineer prior to establishment.
- There must be at least one latrine per 20 employees on site. The Contractor must provide the toilets in terms of the Health and Safety By-laws which will dictate on the number of toilets to be provided and is responsible for their maintenance and servicing on a daily basis. The contractor must take all reasonable precautions to ensure that no spillages occur when the toilets are cleaned or emptied.
- Any disposal of waste from toilets on site is strictly prohibited. The toilets must be maintained and kept clean at all times.
- It is strictly prohibited to perform bodily functions anywhere other than in toilets. Toilets must be inspected for leaks daily and leaking toilets must be repaired immediately or removed from site.



## **SOLARRESERVE SA (PTY) LTD**

### **ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

- Toilets provided by the contractor must be easily accessible and a maximum of 50 m from the works area to ensure they are utilised. All toilets will be located within the contractor's camp. Should toilets be needed elsewhere, their location must first be approved by the EM.
- No toilets should be allowed within the 1:100 flood lines; wetland riparian and other sensitive water course areas.
- Toilets out on site must be secured to the ground and have a sufficient locking mechanism operational at all times.

#### **POTABLE WATER**

- Safe drinking water for human consumption (domestic quality) shall be available at the site offices and other convenient locations on site. All water used on site shall be sourced from a legal source i.e. the Vaal Gamagara Pipeline and compliance with all recognized standards for potable water is mandatory.

#### **DOMESTIC WASTE MANAGEMENT**

- The site needs to be equipped with clearly marked waste disposal areas. All domestic type waste is to be collected in a waste bin/skip and shall be disposed of at a registered municipal landfill site. All records/certificates of disposal shall be kept on file for auditing purposes.
- The disposal of waste shall be in accordance with relevant legislation.
- Under no circumstances may any waste be burnt on site.

#### **BATCHING AND CEMENT MIXING AREA**

- The batching plant needs to be designed by the SE along with the CER inputs in order to ensure that the plant is not placed in an area of low sensitivity in line with the findings from the sensitivity analysis contained in the EIA Report.
- Measures need to be put in place to mitigate possible contamination originating from the batching plant – by means of berm or bund walls. The contractor has to ensure that a designated area is cordoned off as a batching area.
- Under no circumstances is contaminated water allowed to leave the confines of the containment system. Only uncontaminated surface runoff is allowed to leave the site.





## **SOLARRESERVE SA (PTY) LTD**

### **ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

- Concrete and or cement are under no circumstances to be mixed on raw soil – plastic liners and / or mixing trays will be used at all times. The batching area has to be indicated on the site layout plan and batching will only occur here.
- Accidental spillage of cement/concrete has to be cleaned up immediately and remediation measures implemented.

#### ***WORKSHOP***

- Any workshops or maintenance or production area must be located inside the demarcated construction camp area and be provided with an impermeable surface to ensure that no contamination of the soil takes place.
- For the control of surface water runoff, the area must be constructed with bunded walls and sloped to a catchment drain.
- When servicing equipment, drip trays must be used to collect the waste oil and other lubricants.
- All waste material must be disposed of in accordance with national, regional and local laws, regulations and by-laws.
- The waste material must be stored and removed off site in terms of the Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste and disposed of at an approved waste disposal site.
- Where possible, appropriate material shall be re-used or recycled. Wash water must also be collected if the possibility exists that lubricants and solvents will be transported by the wash water.

#### ***VEHICLE SERVICE AREA & WASH BAY***

- This designated area will be assigned for the purpose of servicing and washing of construction vehicles – vehicles/equipment will only be serviced within this area.
- This area has to have an impermeable surface, and be enclosed.
- The area has to be equipped with a drainage system – whereby the spilled hydrocarbons are channeled into a sump, to be treated or gathered for disposal at a licensed hazardous waste disposal site.



## **SOLARRESERVE SA (PTY) LTD**

### **ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

- All vehicles/equipment need to be kept in good working order to ensure that there are no oil/fuel leakages. Drip trays will be used during vehicle servicing at all times.
- Emergency spill response kits need to be on site at all times – and all personnel needs to have a complete understanding of their function and how to use them.

#### ***EQUIPMENT MAINTENANCE & STORAGE***

- All vehicles, plant and equipment shall be kept in good working order and serviced regularly in line with manufacturer's specifications. Leaking equipment must be repaired immediately or removed from the site.
- All maintenance of equipment and vehicles shall be performed in the workshop or other suitable designated area.
- The Contractor shall demarcate an area in which equipment and vehicles may be stored. The location of this area shall be approved by the Engineer.
- The Contractor must take measures to ensure that the surface of the designated area is not contaminated as a result of hydrocarbon leaks from any machinery or vehicles. These areas need to be covered with gravel and protected by means of drip trays.
- The construction vehicles must be operated in compliance with Regulation 21 of the Construction Regulations, 2003.

#### ***MATERIAL STORAGE AND HANDLING***

##### ***General Storage & Handling***

- The contractor needs to ensure that an area is cordoned off as the designated materials delivery, handling and storage area, within the site camp. Materials need to be protected from the elements by means of cover. Products such as cement need to be stored in a covered area on an impermeable surface to prevent spillage and wastage.
- All materials need to be stored within the construction site camp, with the lay-down area adhering to the specifications stipulated by the CER and SE. The material lay-down/storage area needs to be clearly marked and indicated on the site map.
- The Contractor is responsible for ensuring that any materials delivery service providers and/or construction vehicle operators are informed of all procedures and restrictions (e.g. which access



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

roads to use, “no go” areas, speed limits, dust control, etc.) required to comply with the EMP before they arrive at site and off load any materials.

- The Contractor shall ensure that the service providers and/or construction vehicle operators are supervised during off-loading by someone with an adequate understanding of the requirements of the EMP. The person must be authorised to take the necessary actions if the service providers do not adhere to the requirements of the EMP.

#### ***Hazardous Storage and Handling***

- The Contractor shall comply with all relevant national, regional and local legislation with regard to the transport, use and disposal of hazardous materials.
- The Contractor shall provide the Engineer with a list of all hazardous materials that may be used on site, together with the storage, handling and disposal procedures of the materials. This information shall be made available to everyone on site.
- The location of the hazardous material store shall be within the demarcated construction camp area or other suitable designated area. Prior to establishment the Engineer shall approve the location and design of the store. It should preferably be located within an area of low environmental sensitivity.
- All materials classified as hazardous need to be stored in a locked down storage area/container and access needs to be controlled.
- The temporary storage area for spent hazardous materials needs to be enclosed by walls (bunded), under cover (roof) and located on an impermeable surface. The relevant Material Safety Data Sheets (MSDS) needs to be on site and accessible to all parties working with or near the hazardous materials.
- The contractor needs to keep record of all hazardous material on site. A Standard Operating Procedure (SOP) for the handling, storage and disposal of hazardous materials needs to be implemented and enforced by the CER. It is the responsibility of the contractor to ensure that all applicable SOP are drafted, signed off and implemented on site. The contractor will after drafting of the SOP's submit these to the RE for approval and sign-off before implementation.
- In the event of an emergency, all personnel working for and on behalf of the contractor needs to be aware of and trained with regard to the Emergency Remediation Procedure.



SOLARRESERVE SA (PTY) LTD

ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

### ***Fuel (Petrol & Diesel ) and Oil Storage***

- The contractor shall ensure the establishment of designated fuel storage and refueling bay within the construction camp site. The refueling bay needs to be on an impermeable surface, enclosed with bund walls that can capture 110% of the fuel storage tanks' capacity. The bay also needs to be fitted with a hydrocarbon drainage system in the event of a leak or spill.
- This area needs to be equipped with an emergency spill kit and all personnel needs to be trained in handling and clean-up an incident or spill.
- No underground fuel or diesel storage is allowed – fuel will be transported to the site as and when required and stored in the temporary fuel storage tank.
- The refueling of vehicles is allowed within the designated refueling bay area within construction camp compound. Where this is not possible, the Contractor shall notify the Engineer and get approval of the refueling method to be used. Refueling shall be carried out by means of pumps with hoses that enter the fuel receptacle, or gravity fed hoses fed from elevated tanks. The use of hand held funnels are strictly prohibited.

#### ***5.1.1.5 Site Safety Measures***

- The site needs to be access controlled at all times to prohibit trespassing and unlawful use of equipment.
- Fire extinguishers need to be located practically across the site, easily and readily accessible in the event of an accidental/uncontrolled fire.
- Emergency response procedures need to be in place in the event of fire, or hydrocarbon spillages etc.
- No open fires will be allowed on site.

#### ***5.1.1.6 Site Clearing***

Site clearing shall be phased, as and when required and may only take place in areas designated for construction activities and demarcated as such.

- Areas unaffected by the construction activities must remain intact and untransformed in order to reduce and limit the possibility of erosion.



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Any spoils removed from the site will be removed appropriately and disposed of at a likened municipal landfill site.
- Areas at risk of erosion i.e. wetland and riparian zones or steep areas, needs to be equipped with silt fences and erosion control measures.
- All topsoil removed during construction needs to be stockpiled in a designated area.
- No allowance is made for the removal of vegetation outside the immediate works/construction areas. No shrub or tree may be felled, topped, cut or pruned that falls outside the boundaries of the constructor site. Nor may any shrub or tree be felled for wood purposes.

#### 5.1.2 Earthworks

- All earthworks have to be done in such a manner that least impacts the environment. Prior to the proposed earthworks the ECO has to walk the site with the contractor and SE to establish which fauna and flora has to be marked and conserved.
- No earthworks machinery and/or equipment will be allowed outside of the demarcated construction area. Construction/earthwork activities will be closely monitored by the CER.
- All equipment and earthworks vehicles need to be kept in good working condition in order to reduce the risk of accidental hydrocarbon spillages/leakages.

## 5.2 ENVIRONMENTAL MANAGEMENT AND MITIGATION

### 5.2.1 Air Quality Management

#### 5.2.1.1 Dust Management

- The Contractor shall be held responsible for all dust control measures on site and has to ensure no nuisance is caused to the any neighboring communities or landowner.
- Vegetation has to be retained where possible in order to reduce fugitive dust.



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- In order to mitigate the potential nuisance dust anticipated during the construction phase it is proposed that all road surfaces (internal gravel roads) are to be damped and or chemically stabilized prior to use. This action has to be continuous throughout the construction phase.
- A speed limit of 30 km/h must not be exceeded on any internal gravel roads.

#### 5.2.1.2 Emissions Management

- All vehicles need to be in a good working order and subject to regular servicing as to limit gaseous emissions.
- Ablution facilities need to be cleaned and serviced on a regular basis in order to reduce potential odor nuisance.
- The man-camp shall have an allocated cooking areas and all cooking activities shall be undertaken in this demarcated area. This action is to safeguard the site against runaway or uncontrolled fires. Operational fire-fighting equipment shall be available at all times at designated areas.
- Fire breaks will be created around the site's perimeter in the event of a runaway and or uncontrolled fire.

#### 5.2.2 Biodiversity Management

- The Applicant must appoint an Environmental Control Officer (ECO) prior to start of construction. Responsibilities should include, but not be limited to, ensuring adherence to EMP guidelines, guidance of activities, planning, reporting.
- The Contractor shall conduct a detailed walkthrough of moderately suitable habitat for vegetation species to be relocated if required.
- Areas that are earmarked for the construction of structures i.e. construction site offices etc. needs to be cleared of bushes, trees and plants. However this will be done in consultation with the CER as to ensure biodiversity is maintained and vegetation is conserved prior to the commencement of construction works. No trees or vegetation will be damaged/removed outside the construction servitude area.
- Construction sites/camps need a detailed ecological assessment prior to construction.



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Demarcate construction areas by semi-permanent means in order to control movement of personnel, vehicles, providing boundaries for construction sites in order to limit spread of impacts.
- No painting or marking of rocks or vegetation to identify locality or other information shall be allowed, as it will disfigure the natural setting. Marking shall be done by steel stakes with tags, if required.
- Marking of plants should be done by means of semi-permanent (removable) marker tape.
- Access is to be established by vehicles passing over the same track on natural ground. Multiple tracks are not permitted.
- Vehicular traffic shall not be allowed in permanently wet areas, no damage shall be caused to wet areas. Where necessary, alternative methods of construction shall be used to avoid damage to wet areas.
- Prohibit construction of new access roads. Use should be made of existing roads, ensuring proper maintenance/ upgrade. Alternative methods of construction/ access to sensitive areas are recommended.
- The Contractor shall select a suitable level area free of rock and large bushes as lay down area.
- The Contractor shall select an area a suitable distance from any sensitive environmental features as a construction camp.
- Allow for a suitable buffer in order to provide some protection of sensitive areas against peripheral impacts, wetland related habitat types in particular. All areas that were ascribed a High Ecological Sensitivity should be buffered against potential impacts. Guidelines of the wetland specialist should be implemented in this regard;
- Disturbance of vegetation must be limited to areas of construction.
- Ensure off-site storage of hazardous materials or storage thereof in properly constructed facilities with the required safety measures in order to prevent accidental spillage, contamination or pollution.
- The Contractor is required to develop prior to construction an emergency maintenance operational plan to deal with any event of contamination, pollution or spillages, particularly in sensitive areas.



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Under no circumstances are contractors allowed to use the cleared vegetation or trees as fire wood or for any other purposes – these off-cuts need to be disposed of at a suitable site.
- Vehicular traffic should not be allowed after dark in areas which are not properly lit in order to limit accidental killing of nocturnal animals.
- No animals may be poached ,trapped, snared or killed during the construction phase of the project – nor will fishing in the water bodies be permitted. The use of pesticides is strictly forbidden. No animals shall be killed unless an immediate threat to human health is perceived.
- The Contractor shall conduct a search and rescue operation in all affected areas to remove animals from aardvark dens or old termite mounds prior to the commencement of construction activities (vegetation clearing and ground leveling). Reptiles and small mammals that utilizes these micro-habitat should be captured and released in suitable nearby areas.
- Dangerous animals should be handled by a competent person.General avoidance of snakes is the best policy if encountered. Snakes should preferable not be killed or harmed and allowed to move freely. Ensure that proper procedures are in place in the incident of a snake bite - a snake handler and/ or anti venom serum needs to be readily available and easily accessible. Additionally correct PPE (shoes) needs to be worn when working in the field.
- Any animals rescued or recovered needs to be relocated to a suitable habitat asway from the development and its infrastructure.
- Restrict construction operations to one area (where possible) as to allow smaller mammals, reptiles, amphibians and avifaunal species the opportunity to move into nearby undisturbed areas.

#### 5.2.2.1 *Avi-Faunal Management*

- Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. Sensitive zones described elsewhere in this report, should be avoided where possible. It is difficult to mitigate properly for this as some disturbance is inevitable.
- During Construction, if any of the “Focal Species” identified in the EIA Report are observed to be roosting and/or breeding in the vicinity, the Endangered Wildlife Trust is to be contacted for further instruction.





## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Wherever possible, lines connecting turbines should be placed underground. Mark relevant sections of line (i.e. within the Medium-High Sensitivity zones) with appropriate marking devices. The exact spans will be finalised as part of the EMP phase, once power-line routes are finalised and pylon positions are pegged.
- Wherever possible, lines connecting turbines should be placed underground Any overhead power lines which are built, and which are 132kV or lower, should use a “bird friendly” monopole structure, fitted with a bird perch, as per Eskom standard guidelines

#### 5.2.2.2 Alien and Invasive Species Management

The objective of these measures and procedures is to establish a viable method for the removal of alien and invasive plant species from the construction site and areas surrounding and related to project activities.

- All areas included within the development footprint as well as neighbouring areas of natural habitat shall be regularly inspected and monitored for the presence of weeds and invasive plant species;
- Quality records of all monitoring surveys and actions shall be kept on record to assist with planning and combating weeds and invasive species;
- Corrective actions shall be taken to ensure the successful control of the presence and propagation of weeds and invasive species within all areas under the control of the project;
- Method statements regarding the control and ‘lessons learnt’ must be updated to reflect variations from original methodology and practical implications. This shall form part of the record keeping process;
- Performance indicators should include:
  - A suitable monitoring program (at least seasonably);
  - Maintenance program review (annually or when required);
  - Program efficiency
  - Process integrity; and
  - Level of participant knowledge and implementation.



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

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The use of fire as an alien and invasive vegetation management tool is not allowed. Only mechanical or chemical methods are deemed acceptable. Acceptable methods used to control AIPs (Alien and Invasive Plants) include:

– ***Mechanical methods - felling, removing or burning invading alien plants;***

Chopping, Slashing & Felling - An axe, hand-held or tractor-driven chainsaw, circular saw or brush cutter could be used, depending on local site requirements and the species under consideration. Stumps are treated immediately with an approved chemical weed killer. A tractor driven saw and mill can also be used to cut the bush at ground level (and then to convert the material into food pellets or charcoal). A tractor equipped with a circular saw can clear a large area fairly quickly.

Digging or bulldozing - This is an effective method for uprooting plants, but is expensive and also causes considerable soil disturbance.

Ring barking or girdling - Bark of the tree is removed around the trunk with an axe or a power-driven saw. The damaged area should preferably be treated with an approved herbicide. The trees will usually die within one to three years.

– ***Chemical methods - using environmentally safe herbicides;***

Herbicides can be used effectively to control a range of AIP's. The use of herbicides, however, should be considered a last resort due to severe management requirements. When using herbicides, the following considerations are important:

- Efficacy;
- Toxicity;
- Active period;
- Neighbouring effects and recipients;
- Environmental safety;
- Training/ safety of staff;
- Volatility;
- Precautions for safe use; and



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Economic justification.

It is strongly recommended that a specialist in the use of these chemicals be consulted before any herbicides are used. Chemical control methods are expensive and should only be considered under specific circumstances. Although herbicides are registered for most of the troublesome invader plants, there are still species for which products have not yet been registered specifically. The chemical treatment of AIP's is therefore strongly recommended to be done when the chemicals have enough selectivity to control the target plant species. The following basic approaches are employed when using herbicides to control AIP's:

**Foliar application** - Chemicals are applied with a hand-operated spray apparatus, or a power-driven one mounted on trailer, tractor, truck or aircraft.

**Stem-notching and application** - Effective on trees with a trunk diameter of less than 150mm. Downward-sloping notches are made around the lower 300 to 500 mm of the trunk. The chemical is either sprayed or painted onto that area. The plants should die after a period varying from six months to three years.

**Stump treatment** - Trees and shrubs are cut off approximately 200 mm above ground level. The stumps are treated immediately with an approved herbicide (which is sometimes mixed with diesel oil). Application of plant applied herbicides can be selective, particularly when applied by hand, and there is little danger of untreated trees being exposed to the herbicide. Trees which are cut back and treated are immediately killed by the treatment. Plant applied herbicides also makes it possible to establish whether or not the appropriate number of trees have been retained. These procedures are time-consuming, labour intensive and more expensive than other methods.

**Soil treatment** - The chemical is applied in the form of a water-soluble liquid or powder to the soil around the base of the trunk, or is buried in the soil in the case of pellets. The chemical is then dispersed during the rainy season and taken up by the roots of the target plant. Depending on the rainfall, it may take two to three years for the plants to die, because the rainwater needs to carry the material into soil profile. It therefore takes time to evaluate the success of any treatment. The chemicals can be applied at any time of the year, and in any kind of weather. The chemicals will also prevent the establishment of seedlings, due to their approximate active period of four years. This also means that little coppice formation and regrowth from the roots take place, which limits the need for follow-up treatment to a minimum. The chemicals can be applied selectively by hand, and the pellets are safer to the handler than the spray.

The most important disadvantages of applying chemicals to the soil are that their effectiveness decreases as the clay and organic content of the soil increases and the acidity decreases to create



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

higher pH levels. In soils with more than 20% clay, the required application levels can become uneconomical.

Some chemicals remain active for long periods of time, and some are not target specific and may kill a variety of non-targeted plant species. Tree roots often extend well beyond the perimeter of their canopy, and so trees at some distance from the treated trees may be affected even by selective application.

- **Biological control** - using species-specific insects and diseases from the alien plant's country of origin. To date 76 biocontrol agents have been released in South Africa against 40 weed species; and
- **Integrated control** - combinations of the above three approaches. Often an integrated approach is required in order to prevent enormous impacts.
- Alien and/or invasive flora species may be removed by the contractor upon instruction from the CER. Complaints regarding the destruction of and/or damage to indigenous flora need to be reported to the ECO and recorded in the complaint log.

#### 5.2.2.3 Plant Rescue and Protection Management

- The Contractor shall limit damage to protected tree species as far as possible. Adapt layout plans to avoid any excessive damage to protected tree species.
- All individuals/ stands of protected trees must be clearly and visibly marked prior to the start of construction or maintenance procedures.
- Cutting/ pruning/ damaging of any Protected tree species should not be allowed at any circumstances, unless a permit has been obtained for this purpose.
- The removal or picking of any protected or unprotected plants shall not be permitted and no horticultural specimens (even within the demarcated working area) shall be removed, damaged or tampered with unless agreed to by the ECO.
- Obtain necessary and required approval per application for damage/ removal/ cutting/ pruning of Protected tree species from Department of Forestry, as per National Forests Act (Act No. 84 of 1998) under Government Notice GN 1012 of 2004 and GN 767 of 2005 as well as NCDENC.



**SOLARRESERVE SA (PTY) LTD**

**ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

Over and above the aforementioned the following needs to be incorporated with regards to potential Plant Rescue and Protection Plan –

### ***PROTECTED TREES***

A plant rescue and protection plan will allow for the maximum transplant of conservation important species from areas to be transformed. These recommendations must be implemented by the Environmental Control Officer (ECO) of the project, or any suitably qualified entity delegated by the ECO. It is imperative that the recommended rescue operation be conducted prior to the onset of the construction phase, particularly the clearing of vegetation and removal of topsoils.

Costs associated with the excavation and replanting with trees increases significantly as the size of the individuals increase. Therefore, to allow of the relocation of the maximum number of protected trees, it is recommended that only individuals that are of relative small size (less than approximately 1.5m in height) be excavated by means of physical labour.

Every attempt should be made to incorporate larger individuals of protected trees into the planned development wherever possible. It is however accepted that this will not always be possible and a measure of loss of trees is a normal result of any development in a natural environment.

Before transplanting an individual, evaluate whether or not the tree or shrub is likely to be a successful transplant. Transplanting stresses trees and shrubs and such stress may cause plants to die or to become unattractive. Shrubs generally have better transplant tolerance than trees.

The following actions are recommended for the relocation of protected tree species:

- Preparation
  - Transplanting is much more successful when the specimen is dormant. The ideal time to relocate trees and shrubs is therefore during late winter or early spring. This will allow the trees to develop more roots before the following winter and dormancy period. It is not advisable to relocate trees during the summer as it is generally too hot;
  - Survey the target area by foot and mark all individuals that need to be relocated with a marker tape (danger tape);
  - Ensure that individuals that are marked for transplant are free from obvious damage, infections, pests, etc. that might facilitate burden recovery subsequent to replanting;



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Locate suitable areas where excavated individuals can be replanted. Specific reference is made to areas where a need for screening or landscaping is necessary;
- Prepare suitable replant sites by excavating hollows of suitable sizes (based on excavated individuals); Do not plant trees too close to infrastructure as laterally spreading roots may cause damage to walls and foundations;
- It is assumed that replanted individuals will remain after decommissioning of the planned development and the creation of a natural distribution pattern is preferred. Preparation of relocation sites should therefore not follow straight lines, but rather in a haphazard manner in order to avoid the creation of unnaturally straight lines.
- The width of a hollow/ relocation site should at least be 1.5 times the size of the excavated plant;
- Do not break up the bottom of the hollow as this could lead to rotting of the roots;
- Ensure proper spacing for transplanted individuals, keeping the growth forms and physical measurements of adult individuals in mind;
- Ensure that sufficient topsoil is available to successfully replant individuals, ensuring that the root systems of relocated individuals are sufficiently covered;
- Obtain temporary plant containers prior to excavation. Use can be made of plastic containers that can be easily loaded;
- Make use of burlap to cover the root system and prevent the loss of soil around the smaller roots;
- Ensure the availability of water for watering of plants;
- Make use of physical labour as mechanical means are mostly damaging to the individual.
- Excavation
  - Dig a moat around the tree and water the soils beforehand (1 to 2 days). This will facilitate the digging process as well as ensuring root protection during the transplant process;
  - Tag the direction the individual is facing before it is removed and ensure that this is matched during the replant (called "sun orientation"). An example would be to mark or tie a ribbon to



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- the north side of the tree before removing it, and planting with this side again facing north. Consistent orientation may help to prevent sunscald injury to stems;
- Estimate the width and depth of the rootball by doing some exploratory digging around the plant;
  - Excavate identified individuals, ensuring that minimal damage to the root system is done - excavate soils within a radius of approximately 30cm around the stem of the individual to a suitable depth, ensuring that as much as possible of the root system is kept intact;
  - With larger individuals it would be necessary to cut through some of the larger roots; ensure that all cuts are clean. Crushed or shredded roots caused by dull blades will develop more dieback than clean cut roots;
  - Place the excavated individual onto a burlap/ canvas, which is then tied to the base of the individual in order to preserve soil around the root system; Do not allow roots to dry during the transplanting process, it is therefore important to keep the roots of the tree wet from the time it is excavated. Wetting the canvas will also ensure preservation of the roots;
  - Place excavated shrub in a temporary container for replanting purposes.
  - Replanting
    - Place trees upright in excavated hollows;
    - Ensure as suitable depth ( that the base of the tree will not be covered with soil) as this will lead to infection, bark rot and fungal infections;
    - No fertilizers or manure should be mixed with the fill soil, as this could cause root damage. Some manure may be used;
    - Shovel the excavated soil back into the hole. Stamp soil down firmly and provide some water during the process in order to eliminate air pockets. The formation of air pockets could cause the tree or shrub to shift after transplanting;
    - Mound up the soil in a ring around the newly transplanted tree or shrub, forming a berm that will catch water like a basin during initial watering. This will help keeping the new transplant's roots well watered until it becomes established.



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

#### – Care & Maintenance

- Too much or too little water after transplanting will result in a higher mortality rate. The site should be thoroughly watered immediately after planting. Thereafter, the soil must be regularly monitored to prevent drying out;
- If rainfall is inadequate, the soil around the plant's roots should be deeply watered approximately every 10-14 days. Test the soil moisture content by digging 10cm next to the plant. Wet/ moist soil at that depth verifies watering is not needed at that time;
- Provision of mulch will help conserve moisture, moderate soil temperature and control weeds. This should ideally be placed on the soil surface over the tree or shrub root system;
- If transplants appear to need fertilizer during the first few years, a totally soluble complete fertilizer should be applied;
- Pruning may be required, which will depend on the size of the root ball and plant canopy, health of the plant, and the species transplanted. Insect infested stems or those infected with disease should be removed during transplanting. Additional pruning of shrubs may be required to balance the leaf area with the reduced size of the root system, but further pruning of deciduous trees should be postponed for at least one year after transplanting;

Mechanical support for trees may be necessary when the tree is tall, slow to recover or heavily foliated. Most small trees and shrubs do not require staking or other support and will develop strong trunks faster if allowed to move freely. For trees that do require mechanical support, staking may be used. Two stakes can be placed opposite of each other and the tree anchored to the stakes with a nonabrasive material, such as a soft, broad, fabric strap. Any support provided to a tree should be removed as soon as the tree can stand alone, usually after the first growing season.

- Monitor the growth/ recovery of relocated individuals. Loss of leaves after transplanting is likely to occur; this is often an indication of the stress which the plant was under during transplant;
- All plant material shall be kept free from dead wood, broken branches or otherwise harmful or objectionable branches or twigs;
- All pruning wounds greater than 12 mm diameter must be painted with approved tree wound paint;





## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Secateurs and other cutting equipment shall be kept sterilised to avoid spreading fungal infestations; and
- Ensure that all transplanted individuals are kept free of pests and infections.

#### **PROTECTED AND OTHER BULB SPECIES**

Excavation and relocation of bulb and other species should follow a similar protocol than for protected tree species. The timely identification, location and removal of individuals prior to any surface disturbance is strongly recommended.

It is strongly recommended that bulbs, geophytes and succulent plants that might be present within the development footprints are transplanted, but care must be taken that the habitat in which they are transplanted are similar to the area from where they were taken. Specific reference is made to soil conditions, shade patterns, slope, moisture regime, etc.

#### **5.2.2.4 Re-vegetation and Habitat Rehabilitation Plan**

Rehabilitation is designed to restore an adequate cover of vegetation in areas where surfacedisturbances resulted during the construction and operational phases of the project. Vegetation has been reported to be the single most important habitat component for allspecies of animals. Therefore, re-vegetating and rehabilitating degraded areas through acomprehensive landscaping effort will benefit the potential faunal species that may findrefuge on the site.

Only indigenous plant species, preferably species that are endemic to the natural vegetation of the area, should be used for landscaping and rehabilitation purposes. As far as possible,plants naturally growing on the development site, but would otherwise be destroyed duringclearing for development purposes, should be rescued for rehabilitation and revegetationpurposes.

here possible, trees naturally growing on the site should be retained as part ofthe landscaping, with specific emphasis on *Acacia erioloba*, *Olea europaea* subsp. *africana*, *Searsia lancea* and *Ziziphus mucronata*. Measures to ensure that these trees survive thephysical disturbance from the development should be implemented wherever possible.

- Materials: Brush-cut mulch
- Woody vegetation that is cleared from development footprints must be stockpiled and reduced to mulch;



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- The Contractor shall cut bush to a height of 400 mm above ground level from designated areas. This vegetation shall then be passed through chipping machine and be stockpiled for later use as mulch;
- Mulch shall be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants;
- Vegetative material, shall be reduced by either mechanically means (chipper) or by hand-axing to sticks no longer than 100mm. The chipped material shall be mixed with the topsoil at a ratio not exceeding 1:1;
- No harvesting of vegetation outside the area to be disturbed by construction activities shall occur;
- Every effort must be made to ensure the retention of as much seed as possible in mulches made from indigenous vegetation; mulches must be collected in such a manner as to restrict the loss of seed; and
- Brush-cut mulch shall be stored for as short a period as possible, and seed released from stockpiles shall be collected for use in the rehabilitation process.
- Materials: Wood chips
  - Wood chips (including bark) must be utilised as mulch during re-vegetation and rehabilitation of the site;
  - The chips must not be longer than 50 mm in length or breadth and must be free of seeds;
  - Wood must be chipped during winter;
  - Half-composted chips shall be utilised in preference to non-composted chips; and
  - Indigenous seed shall always be added to wood chip mulches.
- Materials: Compost
  - Compost must be utilised as mulch during re-vegetation and rehabilitation of the site;
  - The must shall be well decayed, friable and free from weed seeds, dust or any other undesirable materials; and



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Seed free, half-composted material, such as mulled-bark, must be used as an additive to extend indigenous mulch. No more than 50% compost shall be used under these circumstances.
- Shrubs & Trees
  - Indigenous plants shall be obtained either from the Site prior to clearing or from an area in close proximity to and of the same veld type as the Site, as indicated by the Site Manager/ ECO;
  - Each plant should be handled and packed in an approved manner for that species or variety, and all necessary precautions should be taken to ensure that plants arrive on Site in a proper condition for successful growth;
  - Trucks used for transporting plants shall be equipped with covers to protect the plants from windburn. Plants shall be protected from wind during the transportation thereof;
  - No plants or plants with exposed roots shall be subjected to prolonged exposure to drying winds and sun, or subjected to water logging or force-feeding at any time after purchase;
  - The Contractor shall ensure that the plants are in a good condition and free from plant diseases and pests; the Contractor shall immediately remove plants containing any diseases and/ or pests from the Site;
  - All plants supplied by the Contractor shall be healthy, well formed, and well rooted. Roots must not show any evidence of having been restricted or deformed at any time;
  - Potting materials used must be weed free;
  - Ensure sufficient topsoil around each plant to prevent desiccation of the root system;
  - Plants that are temporarily stored on site prior to planting they shall be maintained to ensure that the root systems remain moist.
- Grass
  - Sods
    - Appropriate indigenous vegetation sods shall be decided upon between the Contractor, the ECO and the Site Manager;



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Sodds can be obtained directly from the veld. Veld sods shall contain at least a 50mm topsoil layer and the roots shall be minimally disturbed. They shall be obtained from the near vicinity of the site from an area selected by the Site Manager. The soil shall be compatible with that removed from the area to be revegetated;
- Grass sods must be clean of invasive plants or weeds; and
- Sodds must be obtained from a source approved by the Site Manager; rejected sods shall be removed from the site immediately.
- Seeds
  - Commercially available seed mixes that are specifically adapted and developed for this area should be sourced from a reputable contractor.
  - The seed mix quantities and purity levels of commercial grass mixes must be specified and approved by the Site Manager;
  - Seed shall be utilised for the cultivation of material for re-vegetation;
  - Seed shall be utilised for direct sowing;
  - Seed must be pre-dried then stored under cool, dry, insect free conditions until required either for cultivation in the nursery or in the rehabilitation process. Only viable, ripe seed shall be used;
  - A record of stock relevant to the project that is held in the nursery shall be provided to the Site Manager on a monthly basis;
  - Seed shall be stored at the Contractors expense; and
  - Facilities should be available to store seed, collected or required on-site, in rodent and insect-free, cool (7 - 10 °C), dry, conditions.
- Harvested Seeds

It is important to consider the issue of genetics in the selection of seeds and seedlings. The following guidelines are recommended to provide practical assistance when collecting seeds for use in rehabilitation/restoration projects:



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Collect in a nearby area, preferably not further than 10 km from the Site;
  - Collect from as many "wild" growing plants as possible to ensure variation. Seeds should not always be gathered from a favourite or easy-to-access site, nor should they be picked only from well-laden or easy-to-reach specimens (all of which might result in lack of variation);
  - Collect seed from several localities to ensure genetic variability;
  - If the planting program is to be ongoing, identify each seed collection locality so that different areas can be used in the subsequent years;
  - Be careful not to over harvest individual plants/ areas as this might negatively impact on the local seed bank available for natural regeneration in the area of collection;
  - Following harvesting, the seed shall be dried under cool airy conditions. Seed must be insect free and shall be stored in containers under cool conditions that are free of rodents or insects. Bottles are generally an effective storage method. Wet, mouldy or otherwise damaged seed is not acceptable;
  - Seed harvested by hand from selected species, should be treated and stored separately;
  - Seed gathered by vacuum harvester or other approved mass collection method, from suitable shrubs or from the plant litter surrounding the shrubs, shall be kept apart from individually harvested seed; and
  - Harvested seed obtained by means of vacuum harvesting, shall be free of excessive quantities of organic and/ or substrate material.
- 
- **Site-Specific Nursery**
    - On-site nursery facilities shall be erected for the holding of rescued plant material and the propagation of appropriate species for revegetation. The nursery shall be suitably located and constructed under the supervision of the Site Manager;
    - An off-site nursery shall be made available for the holding of rescued plant material and the propagation of appropriate species for revegetation. The plants shall be cultivated and stored separately from other material in the nursery;



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- The site-specific nursery shall be utilised for the cultivation and maintenance of the stocks of living plant material required for the revegetation and rehabilitation of the Site;
- The nursery, including irrigation, water shall be free of Phytophthora;
- Soil used to cultivate or grow plants shall be weed free;
- The area where plants are stored shall be kept free of weeds;
- A record of stock relevant to the project that is held in the nursery shall be provided to the Site Manager on a monthly basis.
- Woody vegetation removed during the earthworks need to be spread evenly across the veldt as to provide biomass for micro-organisms and habitats for small animals – this may also be stockpiled for the rehabilitation phase of the project.
- The Contractor should compile and implement environmental monitoring program, the aim of which should be ensuring long-term success of rehabilitation and prevention of environmental degradation. Environmental monitoring should be conducted at least twice per year (Summer, Winter).
- Removal of vegetation/ plants shall be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilized as soon as is practically possible.
- Remove and store topsoil separately in areas where excavation/ degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate regrowth of species that occur naturally in the area.

#### 5.2.2.5 Open Space Management Plan

At this stage, it is not envisaged that any significant open spaces will be created during the development and operation of the plant. Comments included in this report are therefore only provided in an advisory manner. Should open spaces be developed at a later stage, more details about the management thereof should be sought.

Human activities affect parcels of remaining natural habitat (open spaces) and should therefore be managed accordingly. Open spaces present the opportunity to protect and restore the biological diversity present in an affected area, but the proximity of open spaces to developed areas makes managing of natural resources challenging. Without proper management, the diverse native plant communities will



**SOLARRESERVE SA (PTY) LTD**

**ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

degrade due to invasive species, changing water quality and water table levels, lack of wildfires, and other factors associated with human altered landscapes.

### ***OPPORTUNITIES & BENEFITS***

Benefits from open spaces are certainly environmental in nature, but also social, physical, emotional, educational and economic. A well-managed open space can contribute to a sense of peace, provide opportunities for wildlife viewing as well as passive recreation, protection and rehabilitation of ecosystems. Other opportunities include:

- Sense of stewardship for the land;
- Observation and enjoyment of wildlife;
- Relief from development;
- Educational resource;
- Corridors for wildlife;
- Connections between communities;
- Encouraging favourable vegetation;
- Public understanding & involvement; and
- Volunteer involvement & ownership.

### ***CHALLENGES***

Challenges to open spaces in a natural setting such as the proposed development would include the following:

- Noxious weed management;
- Staffing/funding for maintenance;
- Public education & input about open space management techniques, etc.;
- Wildlife disturbance;



**SOLARRESERVE SA (PTY) LTD**

**ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

- Domestic pets;
- Dumping;
- Drainage;
- Fire;
- Law enforcement; and
- Feeding of wildlife.

## ***RECOMMENDATIONS***

As a minimum, a management plan should contain details of the following:

- Open space design – the collaborative result between a qualified ecologist and landscape architect. Note that this effort might need to be submitted to authorities for consideration and/ or approval;
- Vegetation management - procedures and control measures should be established and implemented for the protection of specific individual plants (protected size and/or listed species) and vegetation communities;
- Landscape management - details regarding the ongoing management and treatment of surfaces adjacent to planting areas, requirements for management of landscape feature;
- Fauna management - details of the provision of long-term fauna management devices such as fauna friendly fencing, fauna exclusion fencing, fauna crossings and underpasses, traffic calming strategies, signage and domestic animal exclusion. Also include proposed measures for the provision or enhancement of specific fauna habitat, for example nest boxes, specific vegetation plantings (structure, feed or habitat plants), ground hollows, etc. Ongoing fauna management proposals must address fauna habitat areas, movement corridors and proposed feral and domestic animal control;
- Bushfire management plan - details of fire management and prevention strategies to be implemented (fire hazard mitigation measures). This should include temporary measures proposed during the construction phase and final management strategies; and
- Maintenance monitoring and reporting.





SOLARRESERVE SA (PTY) LTD

ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

**GENERAL RECOMMENDATIONS INCLUDE:**

- All open space systems should be fenced off;
- All construction and operational-related impacts (including service roads, temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment/building materials/vehicles or any other activity) should be excluded from the open space system;
- Access of vehicles to the open space system should be prevented and access of people should be controlled, both during the construction and operational phases;
- Movement of indigenous fauna should however be allowed (i.e. no solid walls, e.g. through the erection of palisade fencing);
- Encourage the retention of surface waters that approximate pre-development conditions, also retaining natural plant communities;
- By restoring affected areas to a previous natural status, desirable (natural) wildlife will be encouraged to utilize the land;
- Discourage invasive and nuisance wildlife; and
- Simulate environmental conditions of surrounding areas with specific reference to fires.

## **5.2.3 Hydrology Management**

### *5.2.3.1 Water For Human Consumption*

Potable water will be available at readily accessible points on site – this includes the construction area.

### *5.2.3.2 Water Resources and Wetland Management*

- No person on site is permitted to use any open water body or natural water source within the confines of the site for the purpose of washing, swimming or bathing.
- Construction activities will not be permitted within 32 meters of any of the onsite wetlands or riparian areas identified in the Wetland Assessment and EIAR.



## **SOLARRESERVE SA (PTY) LTD**

### **ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

- As far as is reasonably possible, work in watercourses and wetland/riparian areas shall take place outside of the expected rainy season and allow sufficient time should be allowed for rehabilitation processes to take effect prior to the commencement of the rainy season. This includes work requiring the diversion of rivers or sections of rivers, the stabilisation of eroded drainage lines and any construction activities involving the crossing of watercourses and wetland areas.
- All watercourses and wetland/riparian areas shall be protected from potential spills of pollutants. In the event of a spill, the Contractor shall take prompt action to clear polluted areas and prevent spreading of the pollutants. Liability with regards to the rehabilitation and clearance of polluted areas lies with the contractor
- Any work proposed in close proximity to the watercourses or wetland/riparian areas, by machinery and vehicles shall be undertaken at slow speed and with clean vehicles (no leaks, etc.) and along a single track.

Sedimentation needs to be limited during the construction phase – the following measures need to be implemented -

- Major vegetation clearing activities and earthworks should be undertaken during the dry season as far as practically possible.
- The footprint of vegetation clearing should be limited to the direct footprint of the proposed developments where practical. The construction servitude should be fenced off prior to the commencement of construction activities and all construction activities should be limited to this servitude.
- Access roads and construction roads should include regular low levels humps to slow down storm water flow and direct storm water off the road surfaces and into adjacent grassland at regular intervals to minimise erosive energy of storm water runoff.
- Storm water infrastructure should include sediment traps.

Water quality deterioration will be eradicated if the Contractor applies the following:

- All potentially polluting and hazardous substances used and stored on site should be stored in clearly demarcated areas.
- Storage areas for diesel, oil and other polluting substances must have adequate spillage containment measures to contain any spills within the direct area of the spill. Ideally, all potentially



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

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polluting substances should be stored in bunded areas of sufficient capacity to contain the full volume plus 10% of the storage containers.

- All re-fuelling areas and workshops should make use of drip trays to capture fuel and oil spills during re-fuelling or during vehicle maintenance and repairs.
- Storm water should be diverted around the storage areas of polluting substances to prevent contamination of clean storm water.
- Sufficient quantities of spill clean-up materials (e.g. Drizit or Spillsorb) should always be available on site. Once used, absorbent material and contaminated soil should be disposed of at a registered hazardous waste disposal site.
- The following guidelines apply to the use of polluting substances on site, and specifically to the use of cement and concrete:
- Carefully control all on-site operations that involve the use of cement and concrete.
- Limit cement and concrete mixing to single sites where possible.
- Use plastic trays or liners when mixing cement and concrete: Do not mix cement and concrete directly on the ground.
- Dispose of all visible remains of excess cement and concrete after the completion of tasks. Dispose of in the approved manner (solid waste concrete may be treated as inert construction rubble, but wet cement and liquid slurry, as well as cement powder must be treated as hazardous waste)

In order to reduce increased flows within a watercourse the Contractor shall not discharge any dirty or contaminated water into a watercourse.

#### 5.2.3.3 Groundwater Resources

- The evaporation ponds should preferably be placed in the south-eastern part of the farm and far away from lineaments, drainage channels and pans;
- Heliostats and PV panels can be placed all over the area as these do not pose a groundwater pollution hazard;



## **SOLARRESERVE SA (PTY) LTD**

### **ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

- The newly drilled boreholes ANE1 and ANE2 can be used for water supply to the proposed CSPP. These boreholes can be equipped and managed as follows:
- All existing boreholes (used and unused) must be properly sealed at the surface to prevent surface pollution of the groundwater. This measure will also prevent bees from invading the borehole
- In order to safeguard the groundwater supplies from contamination and equipment from theft and damage, a zone of protection in an area of at least 50 m x 50 m, centred on the actual borehole should be established. The following measures must be applied in this protection zone:
  - No pit latrines, VIP's, soak-aways or septic tanks – to prevent effluent from percolating into the aquifer and borehole;
  - No storage of fuel, lubricants or other hazardous substances without a leak prove;
  - Production boreholes for domestic use must be equipped with a sanitary seal – to prevent contaminated surface water and spilled fuel from percolating down the casing into the borehole;
  - The concrete collar around borehole casing must be at least 100 mm higher than the floor or surface level to prevent spilled fuel, water from leakages, wash water, etc to enter the borehole;
  - No ponding of surface water must be allowed, i.e. the area must be sloped for surface water to drain away from this zone;
  - Vegetation, other than trees and large bushes, should be maintained in this zone – Note: Roots of bushes and trees growing near boreholes often grows into the borehole where it can cause considerable problems;
  - The borehole and pumping equipment must be housed in a lockable pump house. For this purpose a removable cage manufactured out of galvanised steel mesh and corrugated steel sheets is recommended. This cage, rather than a brick building, is recommended as it can be readily removed in case the borehole is damaged or if it needs to be re-developed and cleaned.
  - The production boreholes, as well as other monitoring boreholes in the area, must be properly sealed to prevent entry of reptiles, insects, birds and small rodents.



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- The entire area should be properly fenced with a lockable gate to prevent unauthorised entry and to exclude animals. The gate must be positioned and of such a type that allows easy vehicle access.
- A signboard must be erected on the gate warning people of the dangers and that unauthorised entry is not allowed.

#### 5.2.3.4 Stormwater Management

The fact that the site is positioned well away from significant watercourses largely limits the hydrological impacts to issues pertaining to site stormwater control. Responsible civil engineering design of stormwater management will mitigate any impacts. It is recommended that a storm water management plan be included in the final EMP.

The following mitigation measures need to be taken into consideration during the compilation of the storm water management plan. These measures are aimed at preventing sedimentation and pollution of any watercourses:

- Activities on the banks of water bodies will be avoided as far as possible;
- Watercourse crossings and stormwater management infrastructure will be implemented along access roads. The infrastructure should not alter the flow of water in the watercourses;
- Adequate measures will be implemented to reduce the contamination of clean runoff with dirty plant runoff;
- Soil erosion control measures, such as protection berms, will be employed where necessary;
- Containment and stormwater management measures will be implemented by the contractor to prevent the loss of topsoil;
- Land clearing will be kept to a minimum and limited to development areas – only large trees and shrubs to be removed;
- No development may be located within 100 m of a watercourse or within the 1:50 year floodlines. This may not be appropriate to this project area;
- Any surface water storage will be subjected to significant rates of evaporation. Stored surface water should be used as it becomes available or should be stored in a covered reservoir;



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- The proposed stormwater measures for both the PV Plant and the CSP Plant will include the draining of each drainage area by means of suitably sized grass lined earth channels positioned within the terraces (for the CSP Plant) and at intervals between the central- 10 -pivots (for the PV plant if required) & within the proposed road reserves so as to direct the stormwater towards those identified detention areas.
- The proposed detention of the surface stormwater run-off will have a dual role. Firstly to assist with the retention of silt being transported off the various sites (especially during the construction phases) and secondly, to assist with the retention of any accidental oil spills which could occur from within the plant. We don't anticipate the velocities to be high at all based on the natural slope of the land.

Appropriate pollution control measures should be incorporated into the design and costing of the proposed development. These include:

- Oil traps to minimise hydrocarbon pollution of surface and groundwater;
- Bunding of all facilities that store hazardous materials;
- Adequate washing and ablution facilities; and
- Site specific stormwater Management - The plant design will have to be sensitive to peak rainfall.

#### Road Drainage

- The description of the required roads as indicated in the Technical Description are gravel roads, both for the main access road to the plant and for the internal road network between the PV panels and across the CSP Plant terraces.
- It is our recommendation that both the access road and all internal roads be graded and shaped with a crossfall towards the high side of the 'road reserve',
- allowing stormwater to flow into graded channels adjacent and parallel to each road, and gravitate towards the proposed detention areas.
- Where these road networks cross a defined drainage line, as in the case, between the 'railway yard' dam and the one natural 'pan', a suitably sized culvert has to be installed to accommodate the expected flows. (Refer to Section 5.5 in the Stormwater Management Plan). The discharging of stormwater through culverts must include energy dissipaters at the exits to reduce any possible chances of erosion on the down side of the structure.



SOLARRESERVE SA (PTY) LTD

ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Stormwater channels and chutes that channel stormwater incrementally from the PV panel areas and CSP Plant terraces will occasionally cross internal gravel access roads. Concrete lined, low level causeways should be constructed to reduce any erosion to the roads in these areas.

## 5.2.4 WASTE MANAGEMENT

### 5.2.4.1 Solid and General Waste

It is the responsibility of the contractor to implement a refuse control system which applies to all waste generated on site for:

- Building rubble
- Solid general waste
- Cement bags and wrapping materials
- Surplus food, packaging and organic waste
- Hazardous waste/materials.

General waste management practices that need to be enforced during construction include –

- The site will be kept neat and tidy at all times. No littering by construction workers will be allowed, during the construction period. Fines shall be implemented for persons found littering – this fine system will be implemented by the CER. It is the responsibility of the contractor to provide litter collection facilities for safe disposal at a licensed waste disposal sites.
- Solid waste shall only be stored in the designated general waste storage area in covered, tip proof waste skips for disposal. The burying and/or burning of refuse/waste is at no time permitted within the construction site. It is the responsibility of the contractor to ensure that there are enough refuse bins placed around site. These bins need to be closed, in order to protect the contents from the elements i.e. restrict leaching and emptied on regular basis. Temporary waste storage facilities need to be equipped with waste skips, to be emptied on a weekly basis. The waste skips need to be placed on an impermeable surface and enclosed.
- The mixing of general waste and hazardous materials is not permitted – waste separation needs to occur before waste is placed in the waste skips.



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- The contractor is responsible for keeping the site neat and tidy – no refuse is to be found on site outside bins/skips allocated for these purposes.
- The contractor is responsible for the removal and disposal of any and all general solid waste generated during the construction phase of the project to the active workforce of the licensed waste disposal site. Record of this has to be kept for the ECO Audit.
- The contractor is responsible for providing and maintaining a Method Statement for the management of solid waste. The Method statement should provide all the necessary information on the method of handling and storing of waste on site, the transport and disposal thereof at a licensed landfill site.
- All waste generated on site needs to be separated and temporarily stored according to its classification.
- Illegal dumping of waste will not be tolerated, this action will result in a fine and possibly legal action. Proof of authorized disposal needs to be available.
- All waste bins and skips need to be clearly marked by waste classification. Bins and skips furthermore need to have a secured lid to prevent animals from gaining access, and placed on an impermeable surface to prevent leachate from escaping.
- Enough bins and skips need to be strategically positioned on site to handle the volumes of wastes generated on site.

#### 5.2.4.2 Hazardous Waste Management

- The temporary storage area for spent hazardous materials needs to be enclosed by walls (bunded), under cover (roof) and located on an impermeable surface.
- All spent hazardous material needs to be disposed of at a licensed hazardous waste disposal facility. The contractor will also have to provide the ECO with the disposal certificates for these.
- The spoiling of tar or bituminous products on the site, overembankments, in borrow pits or any burying, will not be allowed, under any circumstances.
- Unused or rejected tar or bituminous products shall be returned to the supplier's.





## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Used oil, lubricants, cleaning materials, etc. from the maintenance of vehicles and machinery shall be collected in holding tanks and sent back to the supplier or removed from site by a specialist oil recycling company for disposal at a DWAF approved hazardous waste site. Or when possible be removed from site and sold to an approved used oil recycling company.
- Illegal dumping of hazardous waste will not be tolerated, this action will result in a fine and possibly legal action. Proof of authorized disposal needs to be available.
- All waste bins and skips need to be clearly marked by waste classification. Bins and skips furthermore need to have a secured lid to prevent animals from gaining access, and placed on an impermeable surface to prevent leachate from escaping.

#### 5.2.4.3 Effluent Management

- All sewage/effluent water originating from the site camp office shall be disposed of in such a manner as not to adversely affect the surrounding water sources (streams, rivers, wetlands, etc.). No wastewater shall be allowed to enter the drainage system.
- Sanitary arrangements should be to the satisfaction of the CER, the local authorities and all applicable legal requirements. It is essential that sewage be managed appropriately by means of a modular sewer treatment works and that all required authorisations are obtained from the local authorities in terms of the disposal of the effluent. The contractor is responsible for recording the volumes of sewage effluent disposed of on a weekly/monthly basis and ensure that it complies with the volumes as agreed upon by the Authorities.
- Adequate ablution facilities needs to be provided for construction workers. This responsibility falls within the scope of the contractor.
- The facilities need to be serviced on a regular basis in order to reduce the potential risk of surface or groundwater pollution.
- Sanitary arrangements must be to the satisfaction of the EM and local authorities.
- Washing and acts of excretion/urination is not permitted anywhere on site, except within the facilities provided. During the construction period it is the contractors' responsibility to supply and maintain chemical toilets. Sanitation facilities will be supplied by the contractor for the workers at a



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

maximum ratio of 1:20. Sanitation facilities will be located within the contractors' camp and readily accessible to all employees.

- The contractor will ensure that these facilities are maintained on a weekly basis to maintain a good hygiene status. Toilet paper will be provided by the contractor. The discharge of any other materials and or waste within the sanitation system will be prohibited. Toilets will be secured and provided with a closing mechanism.
- These facilities will be placed at points no closer than 100 meters from environmentally sensitive areas, drainage lines, wetlands or water bodies

#### 5.2.5 HERITAGE MANAGEMENT

During the construction phase, it is important to recognize any significant material being unearthed, making and to make the correct judgment on which actions should be taken.

- Should an archaeological/paleontological site or cultural material be discovered during construction (or operation), such as burials or grave sites, the project needs to be able to call on a qualified expert to make a decision on what is required and if it is necessary to carry out emergency recovery. SAHRA will be informed and may give advice on procedure. The developers will therefore have a contingency plan so that operations could move elsewhere temporarily while the material and data are recovered. The project thus needs to have an archaeologist/paleontologist available to do such work. This provision can be made in an archaeological/paleontological monitoring program.
- A responsible archaeologist/paleontologist will be appointed in the event of the unearthing of a heritage and/or archeological artifact. This person does not have to be a permanent employee, but needs to sit in at relevant meetings, for example when changes in design are discussed, and notify SAHRA of these changes. The archaeologist will inspect the site and any development recurrently, with more frequent visits to the actual workforce and operational areas.
- In addition, feedback reports will be submitted by the archaeologist to the client and SAHRA to ensure effective monitoring. This archaeological monitoring and feedback strategy will be incorporated into this Environmental Management Plan (EMP) of the project.

##### 5.2.5.1 Graves

- In the case where a grave is identified during construction the following measures will be taken.



## **SOLARRESERVE SA (PTY) LTD**

### **ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

- Mitigation of graves will require a fence around the cemetery with a buffer of at least 20 meters.
- If graves are accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find. To remove the remains a rescue permit will be applied for with SAHRA and the local South African Police Services must be notified of the find.
- Where it is then recommended that the graves be relocated a full grave relocation process that includes comprehensive social consultation will be followed.
- The grave relocation process will include:
  - A detailed social consultation process, that will trace the next-of-kin and obtain their consent for the relocation of the graves, that will be at least 60 days in length;
  - Site notices indicating the intent of the relocation
  - Newspaper Notice indicating the intent of the relocation
  - A permit from the local authority;
  - A permit from the Provincial Department of health;
  - A permit from the South African Heritage Resources Agency if the graves are older than 60 years or unidentified and thus presumed older than 60 years;
  - An exhumation process that keeps the dignity of the remains intact;
  - An exhumation process that will safeguard the legal implications towards the developing company;
  - The whole process will be done by a reputable company that are well versed in relocations;
  - The process will be conducted in such a manner as to safeguard the legal rights of the families as well as that of the developing company.

#### **5.2.5.2 Archaeological Artefacts**



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Should any archaeological artifacts be exposed during excavation, the construction and or operation in the vicinity of the finding must be stopped. Artifacts may not be destroyed.
- The archaeological site shall be marked and fenced off and the South African Heritage Resource Agency must be contacted within 48 hours.

#### 5.2.6 SOIL & EROSION MANAGEMENT

- Topsoil is regarded as the top 300 mm of soil and needs to be stockpiled at a designated point – clearly indicated on the site layout plan. Removed topsoil needs to be handled as little as possible – preferably only twice – once upon removal and once during rehabilitation. Soil stockpiles are not allowed to be higher than 2.5 meters.
- Areas designated for stockpiling needs to be indicated on the site layout plan and managed accordingly.
- Contaminants need to be stored away from stockpiles, and they need to be kept free from refuse, biological material and hydrocarbons. Soil stabilisation measures i.e. soil wetting or chemical stabilisation, needs to be implemented at all cleared areas and stockpile areas.
- In the unlikely event of unearthing a heritage/cultural artefact during the construction phase of the project – it has to be reported to the CER and ECO immediately. The EM also has to ensure that the SAHRA is notified in order to undertake the required investigation.
- Foundation construction methodology needs to be specified within a method statement which needs to be as per the engineering specifications.

##### 5.2.6.1 Erosion Management

- In order to reduce the risk of erosion the applicant has to design and implement a stormwater management system for the site. The system has to be designed in such a manner that the clean and dirty surface runoff is separated and diverted of site.
- Care should be taken by the Contractor to limit construction, maintenance and inspection activities in areas of high slopes, drainage lines, etc. to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion, destabilizing of substrate.
- The Contractor shall implement strict erosion monitoring and management procedures in all areas where slopes are present.



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

#### 5.2.6.2 Borrow Pits

- No borrow pits shall be developed without the approval of an Borrow Pit EMP by the Department of Mineral and Energy (DME) in terms of the Mineral and Petroleum Resources Development Act(MPRDA).
- If borrowpits are required, these shall at all times be operated according to the regulations promulgated in terms of the MPRDA and the conditions stipulated in the approved EMP.

#### 5.2.7 TRANSPORTATION MANAGEMENT

Materials and equipment will be brought in from the Port of Durban, KwaZulu Natal, National roads and provincial highways will be used as the primary route for transport. A new access will be constructed to join the gravel road with the R31 – primary road passing the site. It is not expected, except for 2x40 MW transformers to be brought in, that any abnormal loads, or trucks will be required. All large scale transport items will be freighted in consultation with the relevant National and Provincial Road Authorities.

- Transporters of fine materials must ensure that their operation does not pose a nuisance through the spillage of material or the creation of dust. The Contractor shall remedy, at his own expense, dust generation and spillage where it occurs to an acceptable level along the transport routes. It is recommended that the load haul of all transport vehicles be covered with tarpaulins.
- Deliveries shall be scheduled for off-peak hour traffic time schedules as to have a minimum impact on traffic along the routes taken.
- All trucks and vehicles removing spoil from the site shall have the load areas covered by a tarpaulin to prevent rocks and spoil from falling onto the roadsurfaces, or causing a nuisance to persons in the vicinity.
- Access of all material delivery vehicles will be strictly controlled, especially in the event of rainy or wet weather in order to circumvent compaction and possible damage to topsoil structures and road surfaces.
- Safety requirements shall be met under all circumstances – by all parties. All equipment transported to the site shall be clearly labeled with respect to their potential hazards according to specifications. Safety labeling on the containers and trucks shall be in place for each vehicle accessing site.



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- The Contractor shall ensure that all the necessary precautions are put in place against damage to the environment and injury to persons are taken in the event of an accident.
- All routes to be used for any transportation purposes, fuels, materials, equipment etc. needs to be communicated to the local community.
- For the transportation of fuel and or hazardous materials the contractor needs to ensure that the supplier and or transportation company has obtained the relevant permits for transporting the materials and has the relevant approvals for the transport routes to be used.
- The Contractor shall submit a method statement for approval to the RE and EM, detailing how traffic will be accommodated along the road during the construction period. Cognisance must be taken of no-go areas, utilisation of existing public and farm roads, etc. The method statement should furthermore contain details pertaining to stop-go locations, estimated delays, start date and duration, etc.
- No new bypass or traffic accommodation routes shall be cleared or established without the approval of the RE and EM – and if necessary the required Departmental approvals.

#### 5.2.8 TRAFFIC MANAGEMENT

- Construction routes must be clearly defined and reflected on the site layout map.
- Internal roads to be constructed of on-site sourced materials. Roads will be used for maintenance of solar modules.
- All access and internal roads will be maintained by means of annual scraping and stabilization.
- Traffic enforcement officers to assist when abnormal trucks are moving loads to the site, and in the event of a large convoy bringing in equipment of materials.
- Construction of a new-bell access with acceleration and deceleration lanes in order to allow safe turning and access to larger container/transport vehicles.
- Flagmen will be stationed at the access point and apply standard Road Safety measures as legislated.
- Access of all construction vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure.



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Dust suppression and damping down of gravel-type roads must be implemented to reduce dust.
- Soils compacted by construction vehicles shall be ripped to loosen compacted layers and re-graded to even running levels once construction has been completed.
- Existing roads will be used where possible. No temporary access roads will be permitted, unless negotiated with the ECO or EM and affected land owners. No deviation from approved access roads or transportation routes will be allowed.
- All temporary roads required shall be decommissioned by the Contractor and rehabilitated using stockpiled topsoil. Temporary access roads that might be required must be rehabilitated prior to the contractor leaving the site. Should these roads trigger the threshold specified in the EIA Regulation, Environmental Authorisation must be obtained. Topsoil shall be removed as described under Soil Management prior to the construction of these temporary road.
- The accommodation of traffic is an important aspect on the roads identified for upgrade/maintenance. Where required, temporary works to facilitate the accommodation of traffic during construction, should be completed first as road closures will be avoided as far as possible.
- Strategic positioning of entry and exit points to ensure as little impact/ effect as possible on the traffic flow.
- Adequate and appropriate traffic warning signage will be placed along the route to be used by the construction vehicles from the access road to the site.
- If a new access road is required, construction must be done in accordance to design and contract specifications. Drainage channels shall be suitably designed to ensure erosion does not occur, especially at the outflow points. The new access road shall be designed to allow for the natural flow of water where required.
- Access and on-site roads will be maintained at all times and kept in good condition. Potholes, corrugations and stormwater damage needs to be repaired as soon as these develop or occur.
- The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken in the event of an accident.
- All drivers need to be in possession of an appropriate valid driver's license for the task at hand. Drivers will furthermore not be permitted to drive a vehicle under the influence of alcohol or narcotic substances.



SOLARRESERVE SA (PTY) LTD

ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

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## 5.2.9 NUISANCE CONTROL

### 5.2.9.1 Visual Impact Mitigation

The contractor will be responsible for reducing the aesthetical impact of the proposed project on the visual receptors.

- Adopt responsible construction practices aimed at containing the construction activities to specifically demarcated areas thereby limiting the removal of natural vegetation to the minimum;
- Limit access to the construction sites to existing access roads;
- Rehabilitate all disturbed areas to acceptable visual standards;
- Maintain the general appearance of the facility in an aesthetically pleasing way;
- Dust suppression techniques should be in place at all times during the construction and operational phases;
- Install light fixtures that provide precisely directed illumination to reduce light “spillage” beyond the immediate surrounds of the power block but which still illuminate the buildings/roads;
- Avoid high pole top flood and security lighting in these areas.

### 5.2.9.2 Noise Management

- Construction site yards, workshops, concrete batching plants, and other noisy fixed facilities should be located well away from noise sensitive areas.
- Use of low-noise generation construction machinery. Noise control measures on construction machinery must, however, be agreed with the manufacturer.
- Where possible, stationary noisy equipment (for example compressors, pumps, pneumatic breakers) should be encapsulated in acoustic covers, screens or sheds. Proper sound insulation can reduce noise by up to 20 dBA. Portable acoustic shields should be used in the case where noisy equipment is not stationary (for example drills, angle grinders, chipping hammers, poker vibrators).





## **SOLARRESERVE SA (PTY) LTD**

### **ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.**

**DEA REFERENCE: 12/12/20/2646**

---

- Curtailing the uses of reverse-warning signals on site vehicles in certain areas and at certain times. Consideration of alternative safety measures may be necessary when taking such a measure.
- All construction vehicles, plant and equipment are to be kept in good repair, for example, cover sheets should not vibrate or rattle; wheels, rollers and pulleys should not squeak.
- Truck traffic should be routed away from noise sensitive areas, where possible.
- Noisy operations should be combined so that they occur where possible at the same time.
- Instruction of employees on low-noise work methods, for example, the handling of structural steel and the use radiotelephony rather than shouting for communication.
- Blasting operations (if required) are to be strictly controlled with regard to the size of explosive charge in order to minimise noise and air blast, and timings of explosions. The number of blasts per day should be limited, blasting should be undertaken at the same times each day and no blasting should be allowed at night.
- Machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum.
- Construction activities are to be contained to reasonable hours during the day and early evening. Night-time activities near noise sensitive areas should not be allowed. No construction should be allowed on weekends from 14h00 on Saturday afternoons to 06h00 the following Monday morning.
- With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the contractor should liaise with local residents and owners on how best to minimise impact, and the local population should be kept informed of the nature and duration of intended activities.
- As construction workers operate in a very noisy environment, it must be ensured that their working conditions comply with the requirements of the Occupational Health and Safety Act (Act No 85 of 1993). Where necessary ear protection should be worn.
- Portable acoustic shields to be used on noisy equipment.

#### **5.2.9.3 Lighting Management**



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Ensure that proper planning is undertaken regarding the placement of lighting structures and that light fixtures only illuminate areas inside the substation sites. Undertake regular maintenance of light fixtures.
- Day-night switches have to be used at the construction site camp in order to minimise energy wastage.
- The Contractor shall furthermore ensure that lighting is kept to a minimum, and that light masts are positioned away to minimise light pollution and intrusion especially into adjacent private properties.

## 5.3 POLLUTION RISK CONTROL MEASURES

It is also the responsibility of the contractor to minimise and where practicable avoid pollution contaminating the site and surrounding property and natural environments. Pollution risks may arise from factors such as the site's layout, drainage and the activities that will be undertaken during the operational phase.

- The contractor has to compile a pollution risk control sheet wherein all the pollution sources/risks are identified and the ways in which he/she plans to manage and or mitigate these risks.
- These mitigation measures can be procedural or structural in nature. Structural control measures would typically be of a physical nature and are designed to control the movement of possible contaminants around the site, such as designated batching areas, material storage and handling areas etc. Bund walls, stormwater canals and enclosed-sump systems can all be categorised under structural control measures.
- Procedural control measures are verbal or written instructions on how to carry out certain operations such as Standard Operating Procedures (SOP's) for the handling of spills, the decanting of fuel/hazardous materials and refuse management.

## 5.4 REHABILITATION AFTER CONSTRUCTION

In the instance that the temporary construction camp and facilities fall outside the ultimate footprint of the solar panel fields and the land requires remediation it is the responsibility of the contractor to rehabilitate the construction site camp and the construction servitude once construction has ceased. Rehabilitation must be scheduled to take place as soon as possible after construction has been completed with



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ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

acceptable cover being achieved after 3-6 months. Only indigenous vegetation may be used for the rehabilitation plan.

#### 5.4.1 Construction Camps Structures, Facilities and Fencing

Upon decommissioning all structures, facilities and fencing are to be removed from site. Cement / concrete slabs allowed for foundation structures are to be removed and the compacted soils to be ripped and rehabilitated through grassing.

#### 5.4.2 Access Roads

All access roads used during the course of the project are to be rehabilitated to their previous states.

#### 5.4.3 Effluent/Sewage

All prefabricated ablution facilities and temporary chemical latrines are to be removed from the site and any resultant waste disposed of at the municipal sewage treatment works.

#### 5.4.4 Water Management

Stormwater trenches utilised for the purpose of the site camp are to be levelled and grassed to prevent erosion. The construction servitude is to be grassed to prevent erosion.

#### 5.4.5 Soils Management

All soils that were compacted during construction phase of the project needs to be ripped, the topsoil to be re-spread and the entire area re-grassed. All topsoil which has been removed or disturbed during the construction phase must be replaced, levelled and grassed to stabilise the construction area and prevent erosion and dust.

#### 5.4.6 Visual Management

The visual impact of the construction servitude and site camp will be mitigated by means of landscaping and grassing the area with grass indigenous to the area.

#### 5.4.7 Dust Management



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**DEA REFERENCE: 12/12/20/2646**

---

With regards to dust management the construction camp site and construction servitude is to be grassed with grass indigenous to the area.

#### **5.4.8 Re-vegetation and Habitat Restoration**

Please refer to Section 5.2.2.4 for guidance and Appendix B - Biodiversity EMP Contributions for the proposed Arriesfontein Solar Thermal Energy Power Plant near Daniëlskuil, Northern Cape Province.



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ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

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## 6. OPERATIONAL PHASE ENVIRONMENTAL MANAGEMENT PLAN

The Operational Environmental Management Programme (O-EMP) serves as the Contractor and SE's guideline to ensure that sound environmental management practices are implemented during the operational phase of the project. The O-EMP will specify the control measures that need to be implemented and maintained by the contractor during the operation of the proposed plant.

### 6.1 GENERAL OPERATIONAL MANAGEMENT ACTIVITIES

All registers and procedures as developed for the construction phase need to still be maintained on site and accessible. Any and all complaints need to be logged in the complaints register and brought under the attention of the CER. Procedures for the remediation of accidental spills and incidents still apply and need to be implemented upon the occurrence of the incident.

All operational management procedures as described in the Site Documentation need to be implemented. These reports will be accessible on site at all times. The solar power facility is to be kept neat and tidy at all times – housekeeping should be in good standing order. All equipment and materials need to be stored according to the storage procedure developed by the CER.

#### 6.1.1 CSP PLANT

- Regular inspection of the CSP Plant is required to ensure that the plant operates effectively and to monitor the plants' operational status. This exercise will also allow for general environmental issues to be observed.

#### 6.1.2 Offices and Administrative Buildings

- All items pertaining to the C-EMP is applicable with regards to the Offices and related administration buildings.
- No persons will be allowed to reside on site during the operational phase of the project .
- All vehicles will be allocated a dedicated parking area on site. No parking of vehicles will be allowed outside of the designated area.



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ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

### 6.1.3 Site Access & Security

- The site will be accessed via the existing gravel road. Effective access control must be ensured by having the site fenced to a minimum height of 1.8 meters, with gates of the same height at all entrances.
- The entrances will at all times be monitored by staff.
- The gravel road will be maintained by the operator to ensure it is in proper condition. The access gate to the facility must be manned at all operating hours. The gates must be locked when not in operation.
- The Applicant is responsible for the maintenance of the fence surrounding the proposed PV plant.
- The fence needs to be inspected on a regular, monthly basis and maintenance needs to be done when required. All repairs are to be done within the confines (boundary) of the site.

### 6.1.4 Ablution Facilities

- Washing and acts of excretion/urination is not permitted anywhere on site, except within the facilities provided. The contractor will ensure that these facilities are maintained on a weekly basis to maintain a good hygiene status. Toilet paper will be provided by the operator.
- The discharge of any other materials and or waste within the sanitation system will be prohibited.
- During operations staff will be utilizing the proper ablution and sanitary facilities. These must be linked to the sewer treatment system which comprises of a modular sewer treatment plant with sufficient capacity to process all the sewage generated on the plant.

### 6.1.5 Workshop

- When operating the workshop on site the same principles as during the construction phase would apply.
- No soil and land contamination would be tolerated and proper impermeable bunded areas with the required oil water separator mechanisms is required from the applicant.
- When servicing equipment, drip trays must be used to collect the waste oil and other lubricants.



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### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- All waste material must be disposed of in accordance with national, regional and local laws, regulations and by-laws. The waste material must be stored and removed off site in terms of the Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste and disposed of at an approved waste disposal site.
- Where possible, appropriate material shall be re-used or recycled. Wash water must also be collected if the possibility exists that lubricants and solvents will be transported by the wash water.

#### 6.1.6 Vehicle Service Area & Wash Bay

- This designated area will be assigned for the purpose of servicing and washing of operational vehicles – vehicles/equipment will only be serviced within this area.
- This area has to have an impermeable surface, and be enclosed. The area has to be equipped with a drainage system – whereby the spilled hydrocarbons are channelled into a sump, to be treated or gathered for disposal at a licensed hazardous waste disposal site.
- All vehicles / equipment need to be kept in good working order to ensure that there are no oil/fuel leakages. Drip trays will be used during vehicle servicing at all times.
- Emergency spill response kits need to be on site at all times – and all personnel needs to have a complete understanding of their function and how to use them.

#### 6.1.7 Waste Disposal Facility Operation and Development

- An appropriately bunded area will be demarcated and designed to contain general waste in designated bins.
- General waste must be sorted at source and removed weekly to a licensed waste disposal / landfill facility.



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ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

## 6.2 ENVIRONMENTAL MANAGEMENT AND MITIGATION

### 6.2.1 AIR QUALITY MANAGEMENT

#### 6.2.1.1 Dust

- Dust control measures need to be implemented during the operational phase. Surface roads must be maintained adequately for all weather conditions. Un-surfaced roads must be regularly graded and watered to control dust.
- All vehicles must abide by the traffic regulations and that the speed limit imposed on site.

#### 6.2.1.2 Emissions

- All equipment and vehicles must be maintained in good working condition.
- No fires are permitted on site during operations.

### 6.2.2 BIODIVERSITY MANAGEMENT

It is crucial that biodiversity is managed during the operational phase of the project. This allows for no indigenous fauna and flora to be removed, however invasive species need to be managed as per instruction by the SE. It is also recommended that the facility site be monitored for alien and invasive species at all times.

- The damage of flora outside the site boundary should be avoided at all times – if damage does occur it needs to be reported to the CER for remediation. Under no circumstances are employees allowed to trap and/or kill animals.
- No fires are allowed on site – under any circumstances and no one may cut vegetation (grass and shrubs) unless absolutely required. No clearing of vegetation or soil by grading machinery shall be undertaken.
- Ensure proper surface restoration and re-sloping in order to prevent erosion, taking cognisance of local contours and landscaping.
- Exposed areas with slopes less than 1:3 should be rehabilitated with a grass mix that blends in with the surrounding vegetation;





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### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

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#### 6.2.2.1 Avifaunal Management

- Any overhead power lines which are built within the site, and which are 132kV or lower, should use a “bird friendly” monopole structure, fitted with a bird perch, as per Eskom standard guidelines in order to prevent electrocution.

#### 6.2.2.2 Alien and Invasive Species Management

The objective of this procedure is to establish a viable method for the removal of alien and invasive plant species within the areas used during operations:

- All areas included within the development footprint as well as neighbouring areas of natural habitat shall be regularly inspected and monitored for the presence of weeds and invasive plant species;
- Quality records of all monitoring surveys and actions shall be kept on record to assist with planning and combating weeds and invasive species;
- Corrective actions shall be taken to ensure the successful control of the presence and propagation of weeds and invasive species within all areas under the control of the project;
- Method statements regarding the control and ‘lessons learnt’ during the construction phase must be updated to reflect variations from original methodology and practical implications. This shall form part of the record keeping process;
- Performance indicators should include:
  - A suitable monitoring program (at least seasonably);
  - Maintenance program review (annually or when required);
  - Program efficiency
  - Process integrity; and
  - Level of participant knowledge and implementation.

Only mechanical or chemical methods are deemed acceptable for the removal of AIP's

- Mechanical methods - felling, removing or burning invading alien plants;



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### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

Chopping, Slashing & Felling - An axe, hand-held or tractor-driven chainsaw, circularsaw or brush cutter could be used, depending on local site requirements and the species under consideration. Stumps are treated immediately with an approved chemical weedkiller. A tractor driven saw and mill can also be used to cut the bush at ground level (and then to convert the material into food pellets or charcoal). A tractor equipped with a circular saw can clear a large area fairly quickly.

Digging or bulldozing - This is an effective method for uprooting plants, but is expensive and also causes considerable soil disturbance.

Ringbarking or girdling - Bark of the tree is removed around the trunk with an axe or a power-driven saw. The damaged area should preferably be treated with an approved herbicide. The trees will usually die within one to three years.

- Chemical methods - using environmentally safe herbicides;

Herbicides can be used effectively to control a range of AIP's. The use of herbicides, however, should be considered a last resort due to severe management requirements. When using herbicides, the following considerations are important:

- Efficacy;
- Toxicity;
- Active period;
- Neighboring effects and recipients;
- Environmental safety;
- Training/ safety of staff;
- Volatility;
- Precautions for safe use; and
- Economic justification.

It is strongly recommended that a specialist in the use of these chemicals be consulted before any herbicides are used. Chemical control methods are expensive and should only be considered under specific circumstances. Although herbicides are registered for most of the troublesome invaders



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### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

plants, there are still species for which products have not yet been registered specifically. The chemical treatment of AIP's is therefore strongly recommended to be done when the chemicals have enough selectivity to control the target plant species. The following basic approaches are employed when using herbicides to control AIP's:

**Foliar application** - Chemicals are applied with a hand-operated spray apparatus, or a power-driven one mounted on trailer, tractor, truck or aircraft.

**Stem-notching and application** - Effective on trees with a trunk diameter of less than 150mm. Downward-sloping notches are made around the lower 300 to 500 mm of the trunk. The chemical is either sprayed or painted onto that area. The plants should die after a period varying from six months to three years.

**Stump treatment** - Trees and shrubs are cut off approximately 200 mm above ground level. The stumps are treated immediately with an approved herbicide (which is sometimes mixed with diesel oil). Application of plant applied herbicides can be selective, particularly when applied by hand, and there is little danger of untreated trees being exposed to the herbicide. Trees which are cut back and treated are immediately killed by the treatment. Plant applied herbicides also makes it possible to establish whether or not the appropriate number of trees have been retained. These procedures are time-consuming, labour intensive and more expensive than other methods.

**Soil treatment** - The chemical is applied in the form of a water-soluble liquid or powder to the soil around the base of the trunk, or is buried in the soil in the case of pellets. The chemical is then dispersed during the rainy season and taken up by the roots of the target plant. Depending on the rainfall, it may take two to three years for the plants to die, because the rainwater needs to carry the material into soil profile. It therefore takes time to evaluate the success of any treatment. The chemicals can be applied at any time of the year, and in any kind of weather. The chemicals will also prevent the establishment of seedlings, due to their approximate active period of four years. This also means that little coppice formation and regrowth from the roots take place, which limits the need for follow-up treatment to a minimum. The chemicals can be applied selectively by hand, and the pellets are safer to the handler than the spray.

The most important disadvantages of applying chemicals to the soil are that their effectiveness decreases as the clay and organic content of the soil increases and the acidity decreases to create higher pH levels. In soils with more than 20% clay, the required application levels can become uneconomical.

Some chemicals remain active for long periods of time, and some are not target specific and may kill a variety of non-targeted plant species. Tree roots often extend well beyond the perimeter of their



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### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

canopy, and so trees at some distance from the treated trees may be affected even by selective application.

- Biological control - using species-specific insects and diseases from the alien plant's country of origin. To date 76 biocontrol agents have been released in South Africa against 40 weed species; and
- Integrated control - combinations of the above three approaches. Often an integrated approach is required in order to prevent enormous impacts.
- Alien and/or invasive flora species may be removed upon instruction from the CER. Complaints regarding the destruction of and/or damage to indigenous flora need to be reported to the ECO and recorded in the complaint log.
- Monitoring the potential spread of declared weeds and invasive alien vegetation to neighboring land and protecting the agricultural resources and soil conservation works are regulated by the Conservation of Agricultural Resources Act, No. 43 of 1983 and should be addressed on a continuous basis;
- All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).

#### 6.2.2.3 Plant Rescue and Protection Management

##### **PROTECTED TREES**

A plant rescue and protection plan will allow for the maximum transplant of conservation important species from areas to be transformed. These recommendations must be implemented by the EM and ECO of the project. It is imperative that the recommended rescue operation be conducted prior to the onset of the construction phase, particularly the clearing of vegetation and removal of topsoils.

Costs associated with the excavation and replanting with trees increases significantly as the size of the individuals increase. Therefore, to allow for the relocation of the maximum number of protected trees, it is recommended that only individuals that are of relative small size (less than approximately 1.5m in height) be excavated by means of physical labour. Every attempt should be made to incorporate larger individuals of protected trees into the planned development wherever possible. It is however accepted that this will not always be possible and a measure of loss of trees is a normal result of any development in a natural environment. Before transplanting an individual, evaluate whether or not the tree or shrub is likely to be a



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### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

successful transplant. Transplanting stresses trees and shrubs and such stress may cause plants to die or to become unattractive. Shrubs generally have better transplant tolerance than trees.

The following actions are recommended for the relocation of protected tree species throughout the operational phase. Please note however it is not anticipated that these actions will be required.

- Preparation
  - Transplanting is much more successful when the specimen is dormant. The ideal time to relocate trees and shrubs is therefore during late winter or early spring. This will allow the trees to develop more roots before the following winter and dormancy period. It is not advisable to relocate trees during the summer as it is generally too hot;
  - Survey the target area by foot and mark all individuals that need to be relocated with a marker tape (danger tape);
  - Ensure that individuals that are marked for transplant are free from obvious damage, infections, pests, etc. that might facilitate burden recovery subsequent to replanting;
  - Locate suitable areas where excavated individuals can be replanted. Specific reference is made to areas where a need for screening or landscaping is necessary;
  - Prepare suitable replant sites by excavating hollows of suitable sizes (based on excavated individuals); Do not plant trees too close to infrastructure as laterally spreading roots may cause damage to walls and foundations;
  - It is assumed that replanted individuals will remain after decommissioning of the planned development and the creation of a natural distribution pattern is preferred. Preparation of relocation sites should therefore not follow straight lines, but rather in a haphazard manner in order to avoid the creation of unnaturally straight lines.
  - The width of a hollow/ relocation site should at least be 1.5 times the size of the excavated plant;
  - Do not break up the bottom of the hollow as this could lead to rotting of the roots;
  - Ensure proper spacing for transplanted individuals, keeping the growth forms and physical measurements of adult individuals in mind;



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Ensure that sufficient topsoil is available to successfully replant individuals, ensuring that the root systems of relocated individuals are sufficiently covered;
- Obtain temporary plant containers prior to excavation. Use can be made of plastic containers that can be easily loaded;
- Make use of burlap to cover the root system and prevent the loss of soil around the smaller roots;
- Ensure the availability of water for watering of plants;
- Make use of physical labour as mechanical means are mostly damaging to the individual.
- Excavation
  - Dig a moat around the tree and water the soils beforehand (1 to 2 days). This will facilitate the digging process as well as ensuring root protection during the transplant process;
  - Tag the direction the individual is facing before it is removed and ensure that this is matched during the replant (called "sun orientation"). An example would be to mark or tie a ribbon to the north side of the tree before removing it, and planting with this side again facing north. Consistent orientation may help to prevent sunscald injury to stems;
  - Estimate the width and depth of the rootball by doing some exploratory digging around the plant;
  - Excavate identified individuals, ensuring that minimal damage to the root system is done - excavate soils within a radius of approximately 30cm around the stem of the individual to a suitable depth, ensuring that as much as possible of the root system is kept intact;
  - With larger individuals it would be necessary to cut through some of the larger roots; ensure that all cuts are clean. Crushed or shredded roots caused by dull blades will develop more dieback than clean cut roots;
  - Place the excavated individual onto a burlap/ canvas, which is then tied to the base of the individual in order to preserve soil around the root system; Do not allow roots to dry during the transplanting process, it is therefore important to keep the roots of the tree wet from the time it is excavated. Wetting the canvas will also ensure preservation of the roots;



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Place excavated shrub in a temporary container for replanting purposes.
- Replanting
  - Place trees upright in excavated hollows;
  - Ensure as suitable depth ( that the base of the tree will not be covered with soil) as this will lead to infection, bark rot and fungal infections;
  - No fertilizers or manure should be mixed with the fill soil, as this could cause root damage. Some manure may be used;
  - Shovel the excavated soil back into the hole. Stamp soil down firmly and provide some water during the process in order to eliminate air pockets. The formation of air pockets could cause the tree or shrub to shift after transplanting;
  - Mound up the soil in a ring around the newly transplanted tree or shrub, forming a berm that will catch water like a basin during initial watering. This will help keep the new transplant's roots well watered until it becomes established.
- Care & Maintenance
  - Too much or too little water after transplanting will result in a higher mortality rate. The site should be thoroughly watered immediately after planting. Thereafter, the soil must be regularly monitored to prevent drying out;
  - If rainfall is inadequate, the soil around the plant's roots should be deeply watered approximately every 10-14 days. Test the soil moisture content by digging 10cm next to the plant. Wet/ moist soil at that depth verifies watering is not needed at that time;
  - Provision of mulch will help conserve moisture, moderate soil temperature and control weeds. This should ideally be placed on the soil surface over the tree or shrub root system;
  - If transplants appear to need fertilizer during the first few years, a totally soluble complete fertilizer should be applied;
  - Pruning may be required, which will depend on the size of the root ball and plant canopy, health of the plant, and the species transplanted. Insect infested stems or those infected with disease should be removed during transplanting. Additional pruning of shrubs may be



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

required to balance the leaf area with the reduced size of the root system, but further pruning of deciduous trees should be postponed for at least one year after transplanting;

Mechanical support for trees may be necessary when the tree is tall, slow to recover or heavily foliated. Most small trees and shrubs do not require staking or other support and will develop strong trunks faster if allowed to move freely. For trees that do require mechanical support, staking may be used. Two stakes can be placed opposite of each other and the tree anchored to the stakes with a nonabrasive material, such as a soft, broad, fabric strap. Any support provided to a tree should be removed as soon as the tree can stand alone, usually after the first growing season.

- Monitor the growth/ recovery of relocated individuals. Loss of leaves after transplanting is likely to occur; this is often an indication of the stress which the plant was under during transplant;
- All plant material shall be kept free from dead wood, broken branches or otherwise harmful or objectionable branches or twigs;
- All pruning wounds greater than 12 mm diameter must be painted with approved tree wound paint;
- Secateurs and other cutting equipment shall be kept sterilised to avoid spreading fungal infestations; and
- Ensure that all transplanted individuals are kept free of pests and infections.

#### **PROTECTED AND OTHER BULB SPECIES**

Excavation and relocation of bulb and other species should follow a similar protocol than for protected tree species. The timely identification, location and removal of individuals prior to any surface disturbance is strongly recommended. It is strongly recommended that bulbs, geophytes and succulent plants that might be present within the development footprints are transplanted, but care must be taken that the habitat in which they are transplanted is similar to the area from where they were taken. Specific reference is made to soil conditions, shade patterns, slope, moisture regime, etc.

#### **6.2.2.4 Re-vegetation and Habitat Rehabilitation Plan**

Rehabilitation is designed to restore an adequate cover of vegetation in areas where surface disturbances resulted during the construction and operational phases of the project. Vegetation has been





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### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

reported to be the single most important habitat component for all species of animals. Therefore, re-vegetating and rehabilitating degraded areas through a comprehensive landscaping effort will benefit the potential faunal species that may find refuge on the site.

Only indigenous plant species, preferably species that are endemic to the natural vegetation of the area, should be used for landscaping and rehabilitation purposes. As far as possible, plants naturally growing on the development site, but would otherwise be destroyed during clearing for development purposes, should be rescued for rehabilitation and revegetation purposes.

Where possible, trees naturally growing on the site should be retained as part of the landscaping, with specific emphasis on *Acacia erioloba*, *Olea europaea* subsp. *africana*, *Searsia lancea* and *Ziziphus mucronata*. Measures to ensure that these trees survive the physical disturbance from the development should be implemented wherever possible.

- Materials: Brush-cut mulch
  - Woody vegetation that is cleared from development footprints must be stockpiled and reduced to mulch;
  - The Contractor shall cut bush to a height of 400 mm above ground level from designated areas. This vegetation shall then be passed through chipping machine and be stockpiled for later use as mulch;
  - Mulch shall be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants;
  - Vegetative material, shall be reduced by either mechanically means (chipper) or by hand-axing to sticks no longer than 100mm. The chipped material shall be mixed with the topsoil at a ratio not exceeding 1:1;
  - No harvesting of vegetation outside the area to be disturbed by construction activities shall occur;
  - Every effort must be made to ensure the retention of as much seed as possible in mulches made from indigenous vegetation; mulches must be collected in such a manner as to restrict the loss of seed; and
  - Brush-cut mulch shall be stored for as short a period as possible, and seed released from stockpiles shall be collected for use in the rehabilitation process.



## SOLARRESERVE SA (PTY) LTD

### ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONCENTRATED SOLAR POWER PLANT ON THE FARM 267 - ARRIESFONTEIN - NEAR DANIELSKUIL IN THE NORTHERN CAPE.

DEA REFERENCE: 12/12/20/2646

---

- Materials: Wood chips
  - Wood chips (including bark) must be utilised as mulch during revegetation and rehabilitation of the site;
  - The chips must not be longer than 50 mm in length or breadth and must be free of seeds;
  - Wood must be chipped during winter;
  - Half-composted chips shall be utilised in preference to non-composted chips; and
  - Indigenous seed shall always be added to wood chip mulches.
- Materials: Compost
  - Compost must be utilised as mulch during revegetation and rehabilitation of the site;
  - The must shall be well decayed, friable and free from weed seeds, dust or any other undesirable materials; and
  - Seed free, half-composted material, such as mulled-bark, must be used as an additive to extend indigenous mulch. No more than 50% compost shall be used under these circumstances.
- Shrubs & Trees
  - Indigenous plants shall be obtained either from the Site prior to clearing or from an area in close proximity to and of the same veld type as the Site, as indicated by the Site Manager/ECO;
  - Each plant should be handled and packed in an approved manner for that species or variety, and all necessary precautions should be taken to ensure that plants arrive on Site in a proper condition for successful growth;
  - Trucks used for transporting plants shall be equipped with covers to protect the plants from windburn. Plants shall be protected from wind during the transportation thereof;
  - No plants or plants with exposed roots shall be subjected to prolonged exposure to drying winds and sun, or subjected to water logging or force-feeding at any time after purchase;



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DEA REFERENCE: 12/12/20/2646

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- The Contractor shall ensure that the plants are in a good condition and free from plant diseases and pests; the Contractor shall immediately remove plants containing any diseases and/ or pests from the Site;
- All plants supplied by the Contractor shall be healthy, well formed, and well rooted. Roots must not show any evidence of having been restricted or deformed at anytime;
- Potting materials used must be weed free;
- Ensure sufficient topsoil around each plant to prevent desiccation of the root system;
- Plants that are temporarily stored on site prior to planting they shall be maintained to ensure that the root systems remain moist.
- Grass
  - Sods
    - Appropriate indigenous vegetation sods shall be decided upon between the Contractor, the ECO and the Site Manager;
    - Sods can be obtained directly from the veld. Veld sods shall contain at least a 50 mm topsoil layer and the roots shall be minimally disturbed. They shall be obtained from the near vicinity of the site from an area selected by the Site Manager. The soil shall be compatible with that removed from the area to be revegetated;
    - Grass sods must be clean of invasive plants or weeds; and
    - Sods must be obtained from a source approved by the Site Manager; rejected sods shall be removed from the site immediately.
  - Seeds
    - Commercially available seed mixes that are specifically adapted and developed for this area should be sourced from a reputable contractor.
    - The seed mix quantities and purity levels of commercial grass mixes must be specified and approved by the Site Manager;
    - Seed shall be utilised for the cultivation of material for revegetation;



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DEA REFERENCE: 12/12/20/2646

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- Seed shall be utilised for direct sowing;
  - Seed must be pre-dried then stored under cool, dry, insect free conditions until required either for cultivation in the nursery or in the rehabilitation process. Only viable, ripe seed shall be used;
  - A record of stock relevant to the project that is held in the nursery shall be provided to the Site Manager on a monthly basis;
  - Seed shall be stored at the Contractors expense; and
  - Facilities should be available to store seed, collected or required on-site, in rodent and insect-free, cool (7 - 10 °C), dry, conditions.
- Harvested Seeds

It is important to consider the issue of genetics in the selection of seeds and seedlings. The following guidelines are recommended to provide practical assistance when collecting seeds for use in rehabilitation/restoration projects:

- Collect in a nearby area, preferably not further than 10 km from the Site;
- Collect from as many "wild" growing plants as possible to ensure variation. Seeds should not always be gathered from a favourite or easy-to-access site, nor should they be picked only from well-laden or easy-to-reach specimens (all of which might result in lack of variation);
- Collect seed from several localities to ensure genetic variability;
- If the planting program is to be ongoing, identify each seed collection locality so that different areas can be used in the subsequent years;
- Be careful not to over harvest individual plants/ areas as this might negatively impact on the local seed bank available for natural regeneration in the area of collection;
- Following harvesting, the seed shall be dried under cool airy conditions. Seed must be insect free and shall be stored in containers under cool conditions that are free of rodents or insects. Bottles are generally a effective storage method. Wet, mouldy or otherwise damaged seed is not acceptable;



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DEA REFERENCE: 12/12/20/2646

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- Seed harvested by hand from selected species, should be treated and stored separately;
  - Seed gathered by vacuum harvester or other approved mass collection method, from suitable shrubs or from the plant litter surrounding the shrubs, shall be kept apart from individually harvested seed; and
  - Harvested seed obtained by means of vacuum harvesting, shall be free of excessive quantities of organic and/ or substrate material.
- Site-Specific Nursery
  - On-site nursery facilities shall be erected for the holding of rescued plant material and the propagation of appropriate species for revegetation. The nursery shall be suitably located and constructed under the supervision of the Site Manager;
  - An off-site nursery shall be made available for the holding of rescued plant material and the propagation of appropriate species for revegetation. The plants shall be cultivated and stored separately from other material in the nursery;
  - The site-specific nursery shall be utilised for the cultivation and maintenance of the stocks of living plant material required for the revegetation and rehabilitation of the Site;
  - The nursery, including irrigation, water shall be free of Phytophthora;
  - Soil used to cultivate or grow plants shall be weed free;
  - The area where plants are stored shall be kept free of weeds;
  - A record of stock relevant to the project that is held in the nursery shall be provided to the Site Manager on a monthly basis.

Over and above the aforementioned, the following items also requires attention –

- Woody vegetation removed during the earthworks need to be spread evenly across the veldt as to provide biomass for micro-organisms and habitats for small animals – this may also be stockpiled for the rehabilitation phase of the project.
- The Contractor should compile and implement environmental monitoring program, the aim of which should be ensuring long-term success of rehabilitation and prevention of environmental



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DEA REFERENCE: 12/12/20/2646

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degradation. Environmental monitoring should be conducted at least twice per year (Summer, Winter).

- Removal of vegetation/ plants shall be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilized as soon as is practically possible.
- Remove and store topsoil separately in areas where excavation/ degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate regrowth of species that occur naturally in the area.
- The revegetated areas should be temporarily fenced to prevent damage by grazing animals;
- Damage to re-vegetated areas should be repaired promptly;
- Re-vegetated areas showing inadequate surface coverage (less than 30 % within eight months after re-vegetation) should be prepared and re-vegetated from scratch;
- Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow the grasses to properly establish;

#### 6.2.2.5 Open Space Management Plan

At this stage, it is not envisaged that any significant open spaces will be created during the development and operation of the plant. Comments included in this report are therefore only provided in an advisory manner. Should open spaces be developed at a later stage, more details about the management thereof should be sought.

Human activities affect parcels of remaining natural habitat (open spaces) and should therefore be managed accordingly. Open spaces present the opportunity to protect and restore the biological diversity present in an affected area, but the proximity of open spaces to developed areas makes managing of natural resources challenging. Without proper management, the diverse native plant communities will degrade due to invasive species, changing water quality and water table levels, lack of wildfires, and other factors associated with human altered landscapes.

As a minimum, a management plan should contain details of the following:

- Open space design – the collaborative result between a qualified ecologist and landscape architect. Note that this effort might need to be submitted to authorities for consideration and/ or approval;



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DEA REFERENCE: 12/12/20/2646

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- Vegetation management - procedures and control measures should be established and implemented for the protection of specific individual plants (protected size and/or listed species) and vegetation communities;
- Landscape management - details regarding the ongoing management and treatment of surfaces adjacent to planting areas, requirements for management of landscape feature;
- Fauna management - details of the provision of long-term fauna management devices such as fauna friendly fencing, fauna exclusion fencing, fauna crossings and underpasses, traffic calming strategies, signage and domestic animal exclusion. Also include proposed measures for the provision or enhancement of specific fauna habitat, for example nest boxes, specific vegetation plantings (structure, feed or habitat plants), ground hollows, etc. Ongoing fauna management proposals must address fauna habitat areas, movement corridors and proposed feral and domestic animal control;
- Bushfire management plan - details of fire management and prevention strategies to be implemented (fire hazard mitigation measures). This should include temporary measures proposed during the construction phase and final management strategies; and
- Maintenance monitoring and reporting.
- All open space systems should be fenced off;
- All construction and operational-related impacts (including service roads, temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment/building materials/vehicles or any other activity) should be excluded from the open space system;
- Access of vehicles to the open space system should be prevented and access of people should be controlled, both during the construction and operational phases;
- Movement of indigenous fauna should however be allowed (i.e. no solid walls, e.g. through the erection of palisade fencing);
- Encourage the retention of surface waters that approximate pre-development conditions, also retaining natural plant communities;
- By restoring affected areas to a previous natural status, desirable (natural) wildlife will be encouraged to utilize the land;



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DEA REFERENCE: 12/12/20/2646

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- Discourage invasive and nuisance wildlife; and
- Simulate environmental conditions of surrounding areas with specific reference to fires.

## 6.2.3 HYDROLOGY MANAGEMENT

### 6.2.3.1 Water For Human Consumption

- The facility will be equipped with piped water which will be available at readily accessible points on site. The potable water systems must be inspected for leakages on monthly basis to ensure no water is wasted.

### 6.2.3.2 Stormwater Management

- The facility operator will be responsible for the maintenance of the stormwater system put in place during the construction and operational phase. This is especially crucial for the workshop areas. It is necessary that surface runoff be managed appropriately in order to simultaneously address erosion control measures. The stormwater and drainage system needs to be cleaned of debris on a bi-weekly basis.
- **Control Pollution:** Standard procedures to control and minimise surface and groundwater pollution will be implemented, as recommended for the construction phase. The strategy to minimise contamination and pollution is to separate the clean and dirty runoff. The runoff entering the project area is considered clean together with possible sections within the project area while plant areas are considered dirty.
- **Water Conservation Program:** A water conservation programme will be developed and implemented. The program will monitor water use and runoff. The project experiences very low rainfall. As such measures will be taken to store rainfall and surface runoff from within the project area. This water will then be treated and reused in the plant. It is unlikely that rain harvesting will meet the demands of the project but it will assist in reducing the overall demand.

## 6.2.4 SOIL MANAGEMENT

- The various soil protective/management measures that were installed during the construction phase of this project have to be upheld and properly maintained.

### 6.2.4.1 Erosion Management





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**DEA REFERENCE: 12/12/20/2646**

---

- Please refer to Section 5.2.3.4 and 5.2.6– the same principals for Stormwater Management and Soil Erosion apply to the operational phase as depicted in the construction phase.

## **6.2.5 TRANSPORTATION MANAGEMENT**

During the Operational Phase it is not expected that any transportation/logistic related impacts will be generated.

However in the event that these should occur – refer to mitigation measures identified in Section 5.2.7 of this EMP.

## **6.2.6 TRAFFIC MANAGEMENT**

- Access of all vehicles should be strictly controlled.
- Dust suppression and damping down of gravel-type roads must be implemented to reduce dust generation.
- Soils compacted by construction vehicles shall be ripped to loosen compacted layers and re-graded to even running levels once construction has been completed.
- Existing roads will be used where possible. No deviation from approved access roads or transportation routes will be allowed.
- All temporary roads shall be decommissioned by the Contractor and rehabilitated using stockpiled topsoil. Topsoil shall be removed as described under Soil Management prior to the construction of these temporary road.
- Strategic positioning of entry and exit points to ensure as little impact/ effect as possible on the traffic flow.
- Adequate and appropriate traffic warning signage will be placed along the route to be used by the construction vehicles from the access road to the site.
- Access and on-site roads will be maintained at all times and kept in good condition. Potholes, corrugations and stormwater damage needs to be repaired as soon as these develop or occur.



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DEA REFERENCE: 12/12/20/2646

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- All drivers need to be in possession of an appropriate valid driver's license for the task at hand. Drivers will furthermore not be permitted to drive a vehicle under the influence of alcohol or narcotic substances.
- The Applicant shall ensure that the supplier remedy, at his own expense, dust generation and spillage where it occurs to an acceptable level along the transport routes. It is recommended that the load haul of all transport vehicles be covered with tarpaulins.
- Deliveries shall be scheduled for off-peak hour traffic time schedules as to have a minimum impact on traffic along the routes taken.
- Access of all material delivery vehicles will be strictly controlled, especially in the event of rainy or wet weather in order to circumvent compaction and possible damage to topsoil structures and road surfaces.
- Safety requirements shall be met under all circumstances – by all parties. All equipment transported to the site shall be clearly labeled with respect to their potential hazards according to specifications. Safety labeling on the containers and trucks shall be in place for each vehicle accessing site.
- All internal and access roads will be scraped annually and stabilization mechanism put in place during maintenance.

#### 6.2.7 NUISANCE MANAGEMENT

The CER is to ensure that the following nuisance control measures are to be implemented and maintained throughout the lifespan of the operation.

##### 6.2.7.1 Visual Impact

As per the conditions of the C-EMP the visual impact will be mitigated by means of:

- Adopting responsible construction practices aimed at containing the construction activities to specifically demarcated areas thereby limiting the removal of natural vegetation to the minimum;
- Limiting access to the site to existing access roads;
- Rehabilitating all disturbed areas to acceptable visual standards;



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DEA REFERENCE: 12/12/20/2646

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- Maintaining the general appearance of the facility in an aesthetically pleasing way;
- Dust suppression techniques should be in place at all times during the construction and operational phases;
- Installing light fixtures that provide precisely directed illumination to reduce light “spillage” beyond the immediate surrounds of the power block but which still illuminate the buildings/roads;
- Avoiding high pole top flood and security lighting in these areas.

#### 6.2.7.2 Noise Management

- Noise pollution emanating from the facility during operation will not generate excessive noise but where possible, very noisy activities should not take place at night (between the hours of 20h00 to 06h00).
- It must be ensured with the washing of the heliostats at night that noise levels from the high-pressure hose system (compressor) on the trucks are minimised.
- Acoustic limiting measures to be included in design of substation.
- High Pressure Washing Systems - Washing to occur during reasonable working hours.

#### 6.2.7.3 Lighting

- Adequate lighting will be installed around buildings. Ensure that proper planning is undertaken regarding the placement of lighting structures and that light fixtures only illuminate areas inside the substation sites. Undertake regular maintenance of light fixtures.
- Lighting around buildings will be fitted with day- night switches to reduce the visual impact and also minimise electricity usage.
- Shielding light sources with physical barriers (vegetation, walls, or structures)
- Use downward directional fixtures;
- Use minimum lumen or wattage in fixtures;
- Use down-lighters, or shielded fixtures;



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**DEA REFERENCE: 12/12/20/2646**

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- Use Low Pressure or low impact lighting;
- Making use of motion detectors on security lighting.



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DEA REFERENCE: 12/12/20/2646

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## 7. AUDITING

### 7.1 Internal Audits

Internal auditing must be conducted quarterly by the applicant. Official audit reports must be compiled by the relevant auditor and the findings of these audits must be available to the external auditor and the authorities. Non-conformances raised during audits must be addressed and closed-out to ensure further compliance.

### 7.2 External Audits

The applicant must appoint an independent external auditor to audit the site annually and this auditor must compile an audit report documenting the findings of the audit. Findings raised in audits must be addressed and corrective actions included for auditing in quarterly compliance audits. The external audit report must be submitted by the applicant to the CA on an annual basis.

The external auditor team must consist of the following persons:

- An Environmental Assessment Practitioner with ECO experience; and
- A Professional Registered Engineer.

The external audit report must:

- Specifically state whether the landfill site is in compliance with the Site Documentation, with specific reference to whether the conditions of the EA are adhered to;
- Include an interpretation of all available data and test results regarding the operation of the site and all its impacts on the environment;
- Specify target dates for the implementation of the recommendations by the applicant to achieve compliance;
- Contain recommendations regarding non-compliance or potential non-compliance and must specify target dates for the implementation of the recommendations by the applicant and whether corrective action taken for the previous audit non conformities was adequate; and
- Show monitoring results graphically and conduct trend analysis.



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**DEA REFERENCE: 12/12/20/2646**

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## **7.3 Reporting/Public Complaints**

SolarReserve SA must compile a complaints register, recording all complaints and action taken for reporting to the authorities when requested.



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**DEA REFERENCE: 12/12/20/2646**

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## **8. REHABILITATION AND DECOMMISSIONING PLAN**

Progressive rehabilitation, as outlined within the Site Documentation, must be undertaken under the supervision of the SE.

A concept closure and rehabilitation report and rehabilitation plan is contained in Appendix A



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## Appendix A–Decommissioning Report





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## Appendix B– Biodiversity EMP Contributions



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## **Appendix C—Traffic & Transportation Review**



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**DEA REFERENCE: 12/12/20/2646**

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## **Appendix D—Stormwater Management Plan**

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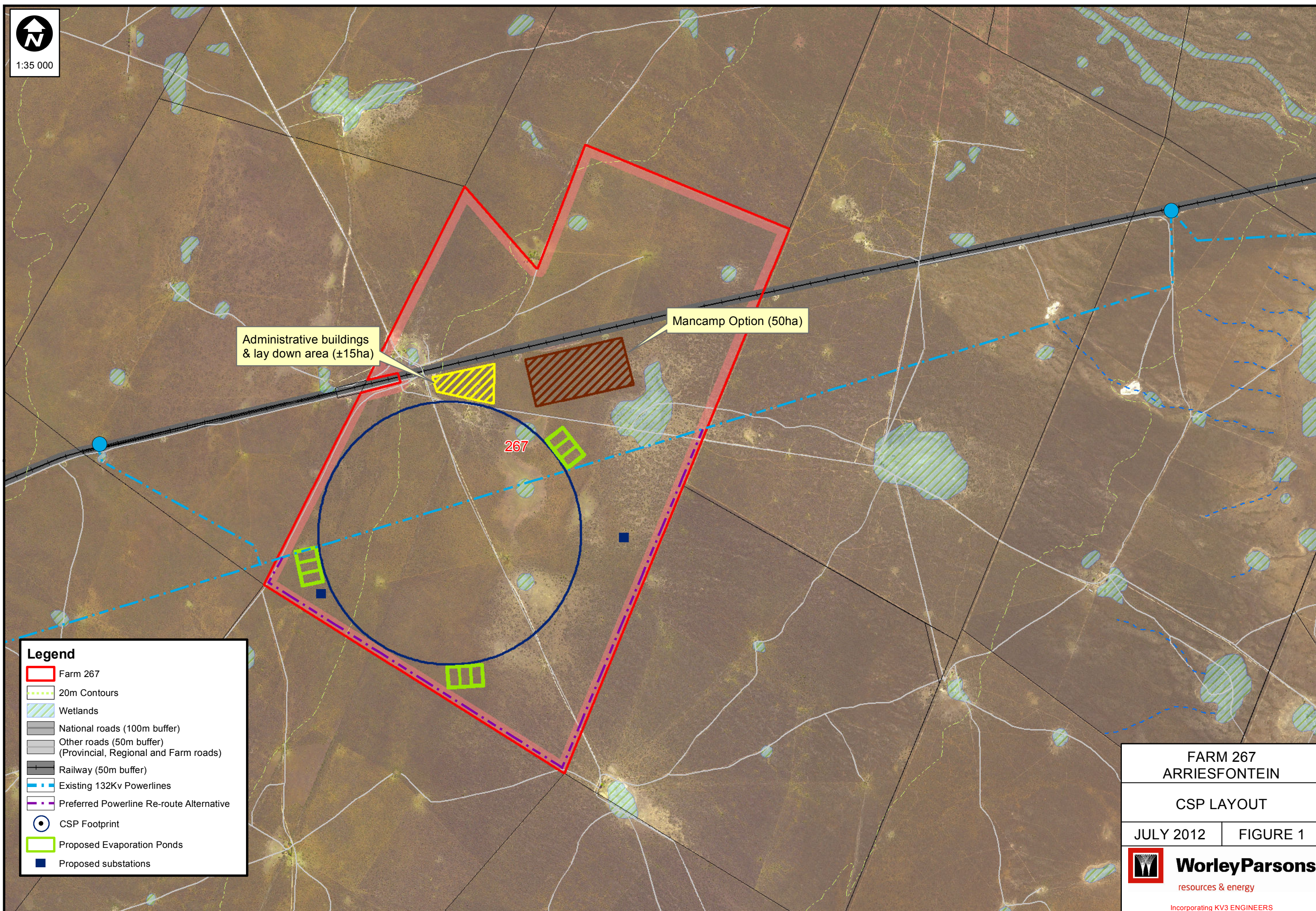
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SOLAR POWER PLANT ON THE FARM 267, NEAR DANIELSKUIL IN THE NORTHERN CAPE**

**DEA REFERENCE: 12/12/20/2646**

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## **Appendix S–Site Layout**





**Legend**

- Farm 267
- 20m Contours
- Wetlands
- National roads (100m buffer)
- Other roads (50m buffer)  
(Provincial, Regional and Farm roads)
- Railway (50m buffer)
- Existing 132Kv Powerlines
- Preferred Powerline Re-route Alternative
- CSP Footprint
- Proposed Evaporation Ponds
- Proposed substations

|  |          |
|--|----------|
| FARM 267<br>ARRIESFONTEIN  |          |
| CSP LAYOUT   |          |
| JULY 2012  | FIGURE 1 |
|  <b>WorleyParsons</b><br>resources & energy<br><small>Incorporating KV3 ENGINEERS</small> |          |



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**DEA REFERENCE: 12/12/20/2646**

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## **Appendix T–Title Deeds**

# Deeds Office Property

**windeed**

PLAAS 267, 267, 0 (REMAINING EXTENT) (Kimberley)

## GENERAL INFORMATION

|                    |                     |
|--------------------|---------------------|
| Deeds Office       | Kimberley           |
| Date Requested     | 2011/08/15 14:10:44 |
| Information Source | Deeds Office        |
| Reference          |                     |

## PROPERTY INFORMATION

|                       |                      |
|-----------------------|----------------------|
| Property Type         | Farm                 |
| Farm Name             | PLAAS 267            |
| Farm Number           | 267                  |
| Portion               | 0 (REMAINING EXTENT) |
| Local Authority       | NOT AVAILABLE        |
| Registration Division | BARKLY WES RD        |
| Province              | NORTHERN CAPE        |
| Diagram Deed          | GWQ10/48             |
| Extent                | 1838.2486H           |
| Previous Description  |                      |

## OWNER INFORMATION

### Owner 1 of 1

|                     |                                   |
|---------------------|-----------------------------------|
| Person Type         | Individual                        |
| Name                | CLOETE LEVINA CATHARINA MAGDALENA |
| ID Number           | 4909250171004                     |
| Title Deed          | T2097/1995                        |
| Registration Date   | 1995/08/01                        |
| Purchase Price      | ESTATE                            |
| Purchase Date       | -                                 |
| Share               |                                   |
| Microfilm Reference |                                   |
| Multiple Properties | False                             |
| Multiple Owners     | False                             |

## ENDORSEMENTS

No documents to display

## HISTORIC DOCUMENTS (2)

| # | Document  | Description | Owner                   | Amount  | Microfilm |
|---|-----------|-------------|-------------------------|---------|-----------|
| 1 | T503/1945 | TRANSFER    | VENTER LEVINA CATHARINA | Unknown |           |
| 2 | T503/1945 | TRANSFER    | VENTER STEPHANUS        | Unknown |           |

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**DEA REFERENCE: 12/12/20/2646**

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## **Appendix U–CAA Authorisation**



**SOUTH AFRICAN**



**CIVIL AVIATION  
AUTHORITY**

Physical Address:  
Ikhaya Lokundiza  
Treur Close  
Waterfall Park  
Bekker Street  
Midrand

Postal Address:  
Private Bag X 73  
Halfway House  
1685

Telephone Number:  
+27 11 545 1000  
  
Fax Number:  
+27 11 545 1465

E-mail address:  
mail@caa.co.za  
  
Website address:  
www.caa.co.za

18 January 2012

WorleyParsons  
PO Box 36155  
Menlo Park  
0102

Enquiries: Chris Isherwood  
isherwoodc@caa.co.za

**CAA-2011-11-Sol 016  
CA15/2/Lime Acres**

**Approved:** Arriesfontein CSP solar facility  
Site Name: Farm 267 RD

Ref: 260380-PWE-CAA  
File: 260380-PWE

Latitude: 28 17 57.32S  
Longitude: 23 46 44.00E  
215m thermal tower

After evaluating the site position and reviewing the information received in November 2011, the CAA has **no objection** to the proposed Solar Energy facility development, with a proposed maximum height of 215m for the thermal tower.

Day and night markings apply to all structures exceeding 45m above the ground in South Africa by default (refer SA-CAR Part 139.01.33),

Kindly contact the writer if more information is required.

  
**Gary Newman**

**Manager: Procedure Design and Cartography  
For SA Civil Aviation Authority**

**Tel: 011 545 1202**

**Fax: 011 545 1282**

**email: [newmang@caa.co.za](mailto:newmang@caa.co.za)**

**website: [www.caa.co.za](http://www.caa.co.za)**

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**DEA REFERENCE: 12/12/20/2646**

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## **Appendix V–Water Use Authorisation**

0535629330


**Sedibeng  
WATER**
**Private Bag X5, Bothaville, 9660**

 ☎ (nat.) 056 515 0200  
 (intl.) +27 56 515 0200

 ☎ (nat.) 056 515 0369  
 (intl.) +27 56 515 0369

 www.sedibengwater.co.za  
 ceosec@sedibengwater.co.za

 Winner of  
 Century Quality  
 International  
 ERA Award

**Solar Reserve SA (Pty) Ltd  
 159 Rivonia Road  
 SANDTON  
 2191**
**Attention :Mr M Govender**

Dear Sir

**RE: APPLICATION FOR WATER SUPPLY TO SOLAR RESERVE SA (Pty) Ltd**

Your application for Water Supply from the Vaal Gamagara scheme dated 31 October 2011 refers.

 We wish to confirm that your application for water supply is successful. We have further been advised by our Northern Cape Acting Regional Manager: Mr. S Sithole that you have indicated on Application for the supply of water that you will need 349 440 m<sup>3</sup> of water per annum (Operational phase 6720 m<sup>3</sup> \*52 weeks). We therefore confirm that the 349 440 m<sup>3</sup> of water is the amount approved by Sedibeng Water for your consumption.

We also want to inform you that as a new customer you will be expected to contribute towards the infrastructure upgrade in order to meet future water demands on a permanent basis. More information regarding the infrastructure upgrade will be communicated with you in due course.

Yours faithfully,

**R.T. TAKALANI  
 ACTING CHIEF EXECUTIVE**

**WISA**  
 Water Institute of SA  
 Chief Executive Award

 Award winner in  
 the Northern Cape

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**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED CONCENTRATED  
SOLAR POWER PLANT ON THE FARM 267, NEAR DANIELSKUIL IN THE NORTHERN CAPE**

**DEA REFERENCE: 12/12/20/2646**

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## **Appendix W–Design Report**



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## **Basis of Design Report**

### **Brine Evaporation Ponds for the Arriesfontein Solar Reserve Project**

26038D-PW0 – 1

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### PROJECT 26038D-PW0 - BASIS OF DESIGN REPORT

| REV | DESCRIPTION   | ORIG    | REVIEW    | WORLEY-<br>PARSONS<br>APPROVAL | DATE       | CLIENT<br>APPROVAL | DATE |
|-----|---------------|---------|-----------|--------------------------------|------------|--------------------|------|
| A   | Design Report | R Relou | G le Roux | C<br>Liebenber<br>g            | 2012-07-30 | N/A                |      |
|     |               |         |           |                                |            |                    |      |
|     |               |         |           |                                |            |                    |      |
|     |               |         |           |                                |            |                    |      |



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BASIS OF DESIGN REPORT

BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

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## CONTENTS

|           |  |           |
|-----------|--|-----------|
| <b>1.</b> | <b>BACKGROUND .....</b>  | <b>1</b>  |
| 1.1       | INTRODUCTION.....  | 1         |
| 1.2       | SCOPE OF WORK.....   | 1         |
| <b>2.</b> | <b>DESCRIPTION OF THE SITE.....</b>                                    | <b>2</b>  |
| 2.1       | LOCATION AND GENERAL DESCRIPTION.....                                  | 2         |
| 2.2       | TOPOGRAPHY AND DRAINAGE.....   | 2         |
| 2.3       | VEGETATION AND LAND USE.....   | 2         |
|           | Figure 1: Locality Map Arriesfontein Solar Reserve.....                | 3         |
| 2.4       | CLIMATIC DATA.....   | 4         |
| 2.5       | GEOLOGY .....  | 4         |
| 2.6       | HYDROGEOLOGY .....   | 5         |
| 2.7       | GROUND WATER RESOURCE POTENTIAL .....                                  | 6         |
| 2.8       | DEPTH TO WATER TABLE AND INFERRED GROUNDWATER FLOW<br>DIRECTIONS ..... | 6         |
| 2.9       | GROUND WATER QUALITY .....   | 7         |
| 2.10      | AQUIFER VULNERABILITY .....  | 7         |
| 2.11      | WASTE CLASSIFICATION .....   | 8         |
| 2.11.1    | Classification of samples.....   | 9         |
| 2.11.2    | Comparison with wastewater standards.....                              | 9         |
| 2.11.3    | Comparison with domestic use guidelines. ....                          | 9         |
| <b>3.</b> | <b>CONCEPT DESIGN .....</b>  | <b>10</b> |
| 3.1       | DESIGN CRITERIA.....   | 10        |
| 3.2       | DESIGN CALCULATIONS .....  | 11        |
| 3.3       | DESIGN LAYOUT .....  | 11        |
| 3.4       | EVAPORATION POND DESIGN .....  | 11        |
| 3.5       | LINER DESIGN .....   | 12        |
|           | Figure 2: Evaporation Pond Liner Detail .....                          | 12        |



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**BASIS OF DESIGN REPORT**

**BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT**

---

|       |   |    |
|-------|---|----|
| 3.6   | EVAPORATION POND POSITIONING (CANDIDATE SITE SELECTION) ..... | 12 |
| 3.7   | DESIGN ALTERNATIVES.....                                      | 13 |
| 3.7.1 | Atomizers .....   | 13 |
| 3.7.2 | Crystallisation .....   | 13 |
| 3.7.3 | Other Technologies .....                                      | 13 |
| 4.    | BASIS OF DESIGN DRAWINGS .....                                | 14 |
| 5.    | CAPITAL COST ESTIMATE .....                                   | 15 |
| 6.    | SUMMARY .....   | 16 |
|       | ANNEXURE A GEOHYDROLOGICAL IMPACT SCOPING REPORT .....        | 18 |
|       | ANNEXURE B WASTE CLASSIFICATION REPORT .....                  | 19 |
|       | ANNEXURE C DESIGN CALCULATIONS .....                          | 20 |
|       | ANNEXURE D: BASIS OF DESIGN DRAWINGS .....                    | 21 |





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**BASIS OF DESIGN REPORT**

**BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT**

---

## **1. BACKGROUND**

### **1.1 INTRODUCTION**

SolarReserve SA (Pty) LTD (hereafter referred to as SRSA), has endeavoured to construct the Arriesfontein Solar Power Plant, which entails the construction of a Central Receiver Power plant. The development is situated in the Northern Cape on the Farm Arriesfontein267, Barkley Wes RD. The proposed development will fall under the Kgatelopele Local and Siyanda District Municipal Area. Electricity generated will be fed into the national power grid. The nature of the proposed development is two-fold and will entail the construction of a Central Receiver Tower or Concentrated Solar Power plant (hereafter referred to as CSP Plant) and a Photovoltaic Plant (hereafter referred to as PV Plant) on the same property.

The purpose of this report will be primarily for documenting of the basis of design for the final waste disposal facility for the CSP plant. The final waste product from the entire plant will be an effluent (brine) that will be handled in a zero discharge method i.e. the final effluent will be evaporated by means of an evaporation pond. The information in this report will be used for the planning and licensing of the said facility.

### **1.2 SCOPE OF WORK**

WorleyParsons RSA is required under this appointment to provide the basis of design and positioning of the evaporation ponds for the CSP plant for planning and licensing purposes. The basis of design has to be in line with the requirements of the Local and the National Environmental Authorities.

The basis of design included the following tasks:

1. Waste Classification,
2. Pond sizing and positioning,
3. Liner Design, and
4. Design report and quantities estimation



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BASIS OF DESIGN REPORT

BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

---

## **2. DESCRIPTION OF THE SITE**

### **2.1 LOCATION AND GENERAL DESCRIPTION**

The proposed development is located on a portion of the Farm Arriesfontein 267, Barkley Wes RD, Siyanda District Municipal Region and is located approximately 32km south-east of the town of Daniëlskuil along the Sishen-Kimberley railway line. The location of the development can be seen in Figure 1.

### **2.2 TOPOGRAPHY AND DRAINAGE**

The area, in which the project is located, comprises slightly undulating, bare ground, consistent with a semi-arid region. There are small, isolated rock outcroppings scattered throughout the catchment. Generally the catchment area is cover with tuft grasses and small shrubs. All streams within the catchment are considered ephemeral and tend to flow only for short periods following heavy rainfall.

The catchment area has an arid climate with a mean annual rainfall of generally less than 350 mm. The site experiences low annual runoff, significantly high runoff rates can be experienced due to the short duration, high intensity rainfall events that can occur in the region. During such events significant runoff will report to the minor streams on the site and appropriate surface water management will be required to minimise erosion.

### **2.3 VEGETATION AND LAND USE**

The site is historically agricultural land for use as grazing for livestock. The site is mainly grasslands with small shrubs and small trees.



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**BASIS OF DESIGN REPORT**

**BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT**

---

**Figure 1: Locality Map Arriesfontein Solar Reserve**



## SOLARRESERVE SA (PTY) LTD

### BASIS OF DESIGN REPORT

#### BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

## 2.4 CLIMATIC DATA

The climate of the area is typical of a semi-arid with very hot summers and cold winters. Temperature data for Kimberley, 140km east of the site (as supplied by the South African Weather Service), for the period 1961-2000 indicates that January is the hottest month with an average maximum daily temperature of 32°C and June the coldest with an average maximum daily temperature of 18.4°C. During July the average minimum daily temperature drops to only 2.5°C. The maximum temperature reached during this period was 40.9°C and the lowest -8.1°C.

The average monthly precipitation and standard deviation (SD) values for the study area, as provided by the South African Weather Service, are summarized in Table 1 below. The site falls within the summer rainfall area with a mean annual precipitation (MAP) of 458 mm.

**Table 1: Monthly Precipitation for the Arriesfontein**

| Average monthly precipitation in mm at Measuring Station Coordinates: S28°18' E023°22' |      |      |      |      |      |     |     |     |      |      |      |      |              |
|--|------|------|------|------|------|-----|-----|-----|------|------|------|------|--------------|
| Month  | Jan  | Feb  | Mar  | Apr  | May  | Jun | Jul | Aug | Sep  | Oct  | Nov  | Dec  | Year         |
| Mean:  | 73.9 | 87.1 | 88.8 | 48.5 | 17.1 | 5.9 | 4.1 | 6.4 | 12.8 | 25.3 | 35.7 | 52.4 | <b>458.2</b> |
| Standard Deviation:  | 40.3 | 44.6 | 43.5 | 30.8 | 16.3 | 8.8 | 7.2 | 9.8 | 14.9 | 21.1 | 24.9 | 32.0 | <b>94.2</b>  |

## 2.5 GEOLOGY

The geology of the study area are significantly covered by recent deposits of mainly red to pale coloured windblown sand of the Gordonia Formation, surface limestone and some rock rubble. These deposits occur along the flat laying areas and are generally thin, seldom exceeding 10 m in vertical thickness in this area. However, thick recent deposits can occur along drainage channels and in some pans where leaching of the dolomite took place. Closer to the Asbestos Hills the rubble can reach a vertical thickness of >70 m as indicated by exploration drilling supervised by the author during the 1990s. During this exploration drilling a NW-SE striking palaeo-river channel was intersected on the farm Beadle, 22 km west of Arriesfontein. The exploration borehole intersected some surface limestone on top followed by banded ironstone gravel. Dolomitic bedrock was only intersected at 60 mbgl. Diamonds are presently mined from these alluvial deposits.

A salt pan located on the farm Soutpan, 17 km south of Arriesfontein has formed as a result of Dwyka sediments that have collapsed in a sinkhole. The Dwyka sediments are 80 m thick at this location (Based on a hydrocensus survey conducted by the author during the early 1990s).



## SOLARRESERVE SA (PTY) LTD

### BASIS OF DESIGN REPORT

#### BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

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Arriesfontein homestead is located between the parallel NE-SW striking dolerite dykes which can likely be linked to faults in the dolomitic rocks of the Lime Acres Member of the Ghaap Plateau Formation, Campbell Group. Rocks of this Member consist mainly of dolomite with interbedded limestone, chert and chert breccia. Though not indicated on geological maps, drilling programmes have indicated that thin interlayers of black shale occur in the dolomite and limestone. These layers are seldom >1 m in vertical thickness and weathers negative due to its relative softness. The interbedded chert formations occur as layers and lenses, whilst the limestone occurs mostly as lenses.

Dolerite dykes seldom outcrop, but can in most cases be identified on surface by prominent treelines and calcrete ridges. These linear ridges can protrude >1m above the surrounding flat areas. A prominent chert layer occurs east of the farm. This layer forms the base of the Lime Acres Member, with the Fairfield Member, consisting mainly of re-crystallized dolomite, underneath.

The general dip of the sediments in this area is 2° to the west, but the dip steepens westwards towards the Asbestos Hills. On the eastern flank of the Asbestos Hills rock dips of >6° west can be countered.

For more information please refer to **Annexure A: Arriesfontein Solar Power Plant Scoping Report: Preliminary Groundwater Assessment**, SRK Consulting, November 2011.

## 2.6 HYDROGEOLOGY

Groundwater in this area occurs mainly in semi-confined fractured-rock aquifers, also known as secondary aquifers. These aquifers are formed by jointing and fracturing of the otherwise solid bedrock by compressional and tensional forces that operates in the earth's crust from time to time. The fractures are formed by faulting, folding, intrusion of dolerite dykes and other geological forces. Slightly acidic rainwater infiltrates along these joints and fractures and slowly dissolves the alkaline rocks to eventually form solution cavities. Solution cavities commonly also form on contact zone of dolomite with other rock types like chert and black shale.

Unconfined intergranular aquifers (also known as primary aquifers) occur in and near drainage channels and in some pans where the groundwater levels are shallow and within the unconfined unconsolidated sediments and weathered zone. These areas have been leached by water and are characterized by loose, unconsolidated material extending to well below 10 mbgl. The unconsolidated deposits and weathered zone on the site are, however, limited in both horizontal and vertical extend



## SOLARRESERVE SA (PTY) LTD

### BASIS OF DESIGN REPORT

#### BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

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and consist mainly of clay and silt. These result in a poorly developed, low yielding primary aquifer that is vulnerable to droughts. Therefore the primary aquifer in this area can be regarded as insignificant.

For more information please refer to **Annexure A: Arriesfontein Solar Thermal Energy Power Plant Scoping Report: Preliminary Groundwater Assessment**, SRK Consulting, November 2011.

## 2.7 GROUND WATER RESOURCE POTENTIAL

The site falls within the western part of the Quaternary Drainage Region D92A for which the amount of water available under General Authorisation (GA) is listed under Zone A of the Groundwater Taking Zones, where no water may be taken from this drainage regions except as set out under Schedule 11 and small industrial users<sup>2</sup> (DWAf, 2004).

Three Groundwater Management Units (GRU's) were defined for this area. These are based on surface drainage, measured groundwater elevations and lineaments such as faults and dykes. Current abstraction based on the hydrocensus data was subtracted from this value to determine the current Groundwater Exploitation Potential. The GRA2 data indicate that the three Arriesfontein GRU's (C92A-1, C92A-2 and C92A-3) has a combined estimated average mean recharge of ~188 000 m<sup>3</sup>/a for dry periods and ~282 000 m<sup>3</sup>/a for wet periods. The average groundwater exploitation potential for these GRUs is ~528 000 m<sup>3</sup>/a for dry periods and ~566 000 m<sup>3</sup>/a for wet periods. The volume of water that is potentially stored in the aquifers of the three GRUs is ~17.6 million m<sup>3</sup>, whilst the potential storage of the upper 5 m is ~1.2 million m<sup>3</sup>.

The mean annual recharge in the Arriesfontein area decreases from the north-west of the property towards the south-east. Average annual recharge values vary between 11 mm/a in the extreme north-western corner of the property and 9 mm/a in the south-eastern corner thereof.

## 2.8 DEPTH TO WATER TABLE AND INFERRED GROUNDWATER FLOW DIRECTIONS

The hydrocensus data indicate that the depth to water level at the site varies between ground surface (Arriesfontein spring) and ~30 mbgl. The groundwater elevations generally mimics the surface elevation contours and generally flows from higher lying to lower lying areas. The inferred flows are from the higher lying areas north and north-west of the property towards the lower lying Riet River south thereof. The general direction of groundwater flow can be diverted by NE-SW striking dolerite dykes to form springs in low lying areas.



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BASIS OF DESIGN REPORT

BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

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## 2.9 GROUND WATER QUALITY

The groundwater salinity, expressed as Electrical Conductivity (EC) in mS/m, throughout the area falls in the range 70-300 mS/m. Field measured ECs at equipped boreholes and the spring at Arriesfontein vary between 76 and 173 mS/m, which correlates well with this suggested value. Based on field measured ECs only the groundwater from borehole AFN5 is unsuitable for long term human consumption. The variable groundwater quality is likely caused by pollution from over flowing dams and kraals.

## 2.10 AQUIFER VULNERABILITY

Aquifer vulnerability as determined by evaluating seven parameters, namely:

- Depth to groundwater;
- Recharge;
- Aquifer media;
- Soil media;
- Topography;
- Impact on vadose zone; and
- Hydraulic conductivity.

Aquifer vulnerability is defined as the likelihood for contamination to reach a specified position in the groundwater system after being introduced at some point above the uppermost aquifer. The aquifers at Arriesfontein are classified as having very high vulnerability to contamination. Though not indicated on the map, the lowest vulnerability occurs in the southern part of the farm where the groundwater levels are deeper, whilst the highest vulnerability occurs at the homestead where the groundwater level is very shallow and leached zones associated with the well-defined dyke allow rapid vertical infiltration of contaminated surface water. In view of this aquifer vulnerability, care should be taken to establish the facilities with the highest contamination risk, e.g. the evaporation ponds, as far as possible away from the high risk areas, i.e. dykes and areas with shallow groundwater levels. Best position for these facilities will be in the southern and south-eastern parts of the site where the aquifer vulnerability will be lowest due to relative deep water levels.



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**BASIS OF DESIGN REPORT**

**BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT**

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For more information please refer to **Annexure A**: Arriesfontein Solar Thermal Energy Power Plant Scoping Report: Preliminary Groundwater Assessment, SRK Consulting, November 2011.

## **2.11 WASTE CLASSIFICATION**

The Counsel for Scientific and Industrial Research (CSIR) was approached to do the waste classification for the brine that is going to be disposed of on site. The following is the findings from the study the CSIR conducted.

According to the 2<sup>nd</sup> edition of the Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste (1998) most waste disposal scenarios assume a solid with no significant head of liquid on the liners of the disposal site.

The sample originates from borehole water and is assumed to contain mostly major cations and anions and little if any heavy and trace metals. Only results for these were available.

The main concern for consideration should be the protection of ground and surface waters. Impacts could include human health (drinking), aquatic ecosystems, and commercial users (e.g. irrigation).





SOLARRESERVE SA (PTY) LTD

BASIS OF DESIGN REPORT

BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

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### 2.11.1 Classification of samples.

The Brine sample did not delist for either the 1 or 100 ha scenarios. Even though the suitability of the classification criteria of the minimum requirements to liquid wastes is not ideal the classification shows that the liquid as such is still hazardous (moderate hazard, Hazard rating 3).

The brine is an inorganic process wastes or residues and was classified as class 6 (Poisonous (toxic) substances) according to the SABS 0228 code.

### 2.11.2 Comparison with wastewater standards.

The elements analysed and found in brine were compared with the general and special limits for wastewater discharge published in terms of the National Water Act (Act no. 36 of 1998) (NWA). The nitrate/nitrite content does meet the general limit and the fluoride exceeds the limit only by 0.6 mg/l as F, but the main concern is the total salt load. When the maximum loads allowed is compared with the calculated TDS content it is clear that disposal of the Brine as a wastewater will not be allowed. Using the estimated values the Brine exceeds the maximum level allowed by 3 to 4 times. Such levels will also contribute to “shock loads” where the salinity of the surface water can change significantly. Typically the published limits only allow an increase in dissolved solids content of approximately 300 to 450 mg/l.

Total dissolved solids is not necessarily toxic, but can affect natural aquatic systems negatively with effects on individual species, the overall community present in the system and on microbial and ecological processes. Though an index like the sodium absorption ratio (SAR) is a complex issue, high salt content in surface or groundwater increases the likelihood of negative effects if the water is used for irrigation.

### 2.11.3 Comparison with domestic use guidelines.

Human health factors in case of drinking are typically aesthetic for example in the case of chloride and sodium above 200 mg/l, where taste and corrosion is the most serious concern.

However sulphate levels of above 400 mg/l can cause diarrhoea as well as a bitter taste as do magnesium at levels above 200 mg/l. At 10 mg/l as N the Nitrate/nitrite level of 10 mg/l as N can cause blue baby syndrome (Methaemoglobinaemia) in infants.



## SOLARRESERVE SA (PTY) LTD

### BASIS OF DESIGN REPORT

### BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

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Total dissolved solid (TDS) content levels of more than 3 000 mg/l contribute to corrosion and taste problems, but can also have clear short-term health effects as it disturbs the human body's salt balance. Similarly potassium can cause serious problems for infants and individuals with renal problems.

Fluoride is also present at the threshold level of 1.5 mg/l as F for dental mottling and softening of enamel in continuous users.

For more information please refer to **Annexure B: Opinion Report for the Classification and Disposal of Evaporation Pond Brine Effluent from the Arriesfontein Solar Reserve**, CSIR, August 2011.

## 3. CONCEPT DESIGN

### 3.1 DESIGN CRITERIA

The design criteria considered for the concept design and positioning of the evaporation pond for the CSP plant were as follows:

- The Hybrid Cooled zero discharge system will be used for the CSP plant,
- The Hybrid Cooled zero discharge system will produce an average daily flow of effluent (brine) to the evaporation ponds of 164 m<sup>3</sup>/day ,
- A design safety factor of 15% was used for the sizing of the evaporation pond,
- The effluent (brine) total dissolved solids (TDS) was taken as 5 000 mg/l,
- The specific gravity of the effluent (brine) was taken as 1.28 ton/m<sup>3</sup>,
- Annual rainfall for the area was used at 400 mm/annum,
- S-pan evaporation for the area was noted between 2 200 mm/annum and 2 600 mm/annum, the worst case scenario was used at 2 200 mm/annum,
- The evaporation pond must be designed in such a way that maintenance can take place without disrupting the normal processes of the CSP plant,



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### BASIS OF DESIGN REPORT

#### BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

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- The evaporation ponds must limit the possible contamination of the aquifer for the project, this will be done by the design and construction of an efficient barrier system, a leak detection system, monthly monitoring and pollution prevention measures.
- The effluent (brine) is classified with a hazardous rating of 3 and therefore the ponds will be lined with a triple liner and double drainage system as required by the Department of Water Affairs (DWA).

### 3.2 DESIGN CALCULATIONS

The evaporation pond was designed using the above mentioned design criteria. The full calculation sheet is attached in **Annexure C**.

### 3.3 DESIGN LAYOUT

The preferred location for the evaporation pond is to be placed preferably in the south-eastern part of the farm and far away from lineaments, drainage channels and pans. Access to the pond will be created by the centre line of the heliostat circle that runs in a vertical and horizontal line from the power block. The access road will have a gravel surface. The effluent will be piped or channelled to the evaporation pond as the south-eastern part corner of the site is at a lower position than the plant and therefore a gravity feed can be achieved. The evaporation pond was designed in three (3) compartments that would enable maintenance on any of the three (3) compartments without disrupting the normal operations of the CSP plant. The three (3) compartments will have a small emergency overflow to each of the other compartments. The flow to each of the compartments will be controlled via a splitter box at the top end of the evaporation ponds. A limited amount of silt is to be expected to enter the ponds as no surface water will enter the system. Oil will be separated out of the effluent stream before it reaches the evaporation ponds.

### 3.4 EVAPORATION POND DESIGN

The evaporation pond will be separated into three compartments. Each compartment is sized at 112 m (b) x 200 m (l), giving a total size of 6.7 ha. The three (3) compartments will have an overflow linking each compartment to the other. A 4 m access road will be constructed around each compartment in order to allow access for a small vehicle to move around the compartments. The side slopes of the evaporation pond will be 1(h):2(l) on the inside slope of the pond and 1(h):3(l) on the outside slope. The total depth of the evaporation pond is 1.2 m that includes a 300 mm freeboard



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### BASIS OF DESIGN REPORT

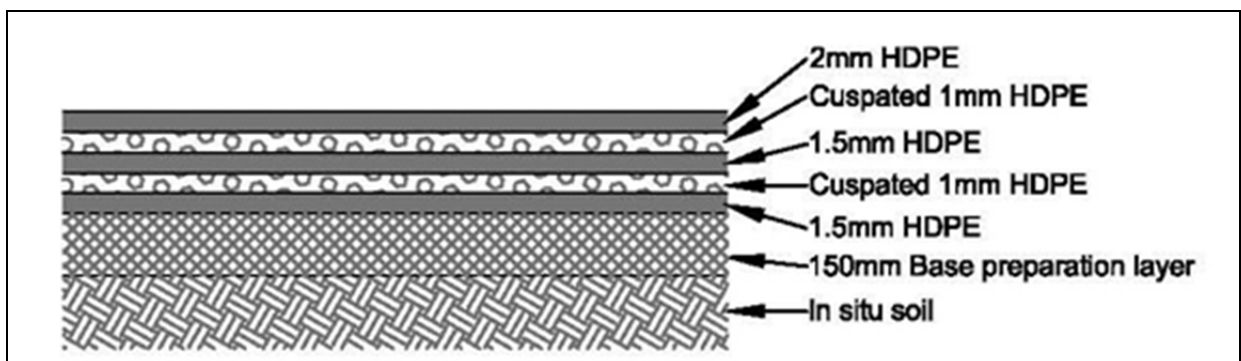
#### BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

and a 105 mm allowance for crystalline salt build up. The crystalline salt build for the evaporation pond was calculated at 233 m<sup>3</sup>/annum. Over a 30 year life span of the CSP plant this calculates to approximately 105 mm depth in each compartment of the evaporation pond. The evaporation pond compartments will be used all three at the same time, however the pond size was designed that one of the compartments can be shut off for maintenance. This allowance for maintenance was calculated using the highest rainfall month.

### 3.5 LINER DESIGN

A meeting was held with DWA and the liner requirement recommended by the department is a triple liner system with two (2) drainage layers. The site will be lined with a 2 mm High Density Polyethylene (HDPE) liner as a primary liner and two 1.5 mm HDPE liners that would serve as a secondary and tertiary liner. The three (3) layers of this liner should have a cusped drainage layer in between that drains toward a leakage detection system. Figure 2: Evaporation Pond Liner Detail shows the recommended liner detail.

**Figure 2: Evaporation Pond Liner Detail**



### 3.6 EVAPORATION POND POSITIONING (CANDIDATE SITE SELECTION)

All care was taken to position the ponds where it could cause the least amount of damage to the environment in the case of a liner failure or unexpected event. From the initial studies (annexure A and annexure it was indicated that the south – east corner of the site was preferable to construct an evaporation pond due to the aquifer vulnerability being the lowest in that area. However three(3) possible pond locations were selected over the entire site in order to ensure that the most suitable could be selected without disrupting the development of the CSP or PV project options. The candidate sites for the evaporation pond were numbered EPCSA through to EPCSC. The CSP and



## SOLARRESERVE SA (PTY) LTD

### BASIS OF DESIGN REPORT

#### BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

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the PV and the candidate site positioning can be seen in the following figure 3. The first candidate site for the evaporation pond (EPCS A) is the preferred location in terms of a technical perspective as it is the closest to the vertical centre line of the heliostat rings and therefore the closest to the access road. A detailed geo-hydrological study was conducted in order to confirm the locations suitability for the establishment of the evaporation pond. The positioning to the sites can be seen on the attached drawings in Annexure D

### 3.7 DESIGN ALTERNATIVES

#### 3.7.1 Atomizers

Atomizers mechanically disperse the effluent over the evaporation ponds increasing evaporation timeframes and reducing evaporation pond sizing. This is accomplished utilizing atomizing heads, cyclones and pumps to spray the brine over the evaporation pond. This technology was not considered during concept design due to the site having sufficient space for a conventional evaporation pond. This technology will also bring additional complexity to the operation of the evaporation pond in terms of personnel and mechanical and electrical installations.

#### 3.7.2 Crystallisation

The brine is released into a vessel where the pressure falls, the remaining water boils off and the salts crystallize. The salt cake, which is a fraction of the original waste stream, is then disposed of in landfill. This technology was not favoured due to the high cost and complexity of implementation for such systems as well as the disposal requirements of the salt cakes adding to the complexity of managing the waste products. Evaporation still remains the most suitable option.

#### 3.7.3 Other Technologies

Other technologies exist that could be used for the final treatment of this type of effluent (brine). These technologies were not considered for this project as they have not been applied in South Africa. The other technologies that exist are:

- i. **Deep well injection** - Deep well injection is presently applied worldwide for disposal of industrial, municipal and liquid hazardous wastes. In recent years this technology has been given serious consideration as an option for brine disposal from land based desalination plants. Deep well injection has been applied successfully for brine disposal from several



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### BASIS OF DESIGN REPORT

### BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

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membrane plants in Florida; however this method of brine disposal has not been used in South Africa.

- ii. **Solar ponds** - Development of salt gradient solar ponds as a renewable energy source began in Israel more than thirty years ago. Although limited in scope, successful power generation by this technology has been demonstrated primarily in arid and semi-arid parts of the world. Recent technical papers have also appeared, describing experimental studies in Italy and Switzerland, in which solar ponds are coupled with thermal desalination systems. In these experimental studies, the pond is used as a heat source for small multistage flash evaporator units.

**Reference:** Glater, J, and Cohen, Y, "Brine Disposal from Land Based Membrane Desalination Plants: A Critical Assessment," (2003).

#### 4. BASIS OF DESIGN DRAWINGS

The design drawings are supplied in **Annexure D** of the report. The following drawings are included:

| DRAWING NUMBER   | TITLE                   |
|------------------|-------------------------|
| 26038D PW0 - D01 | Basis of Design Details |



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BASIS OF DESIGN REPORT

BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

## 5. CAPITAL COST ESTIMATE

A conservative (30%) estimate was made for the capital cost output for the construction of the evaporation pond. The following table shows the estimate:

**Table 2: Capital cost estimate**

### Evaporation pond

| Item                   | Unit           | Qty   | Rate       | Total                 |
|------------------------|----------------|-------|------------|-----------------------|
| Bulk Earthworks        | m <sup>3</sup> | 67000 | R 40.00    | R 2 680 000.00        |
| Restricted Earth Works | m              | 500   | R 120.00   | R 60 000.00           |
| Concrete overflows     | m <sup>3</sup> | 48.15 | R 3 600.00 | R 173 340.00          |
|                        |                |       |            | <b>R 2 913 340.00</b> |

### Pond Lining

| Item                          | Unit           | Qty    | Rate     | Total                  |
|-------------------------------|----------------|--------|----------|------------------------|
| Earthworks (base preparation) | m <sup>3</sup> | 10500  | R 50.00  | R 525 000.00           |
| HDPE liner (2mm)              | m <sup>2</sup> | 70000  | R 55.00  | R 3 850 000.00         |
| HDPE liner (1.5mm)            | m <sup>2</sup> | 70000  | R 50.00  | R 3 500 000.00         |
| HDPE liner (1.5mm)            | m <sup>2</sup> | 70000  | R 50.00  | R 3 500 000.00         |
| Cusped HDPE                   | m <sup>2</sup> | 140000 | R 30.00  | R 4 200 000.00         |
| Geotextile                    | m <sup>2</sup> | 24000  | R 30.00  | R 720 000.00           |
| 160 perforated pipe installed | m              | 500    | R 850.00 | R 425 000.00           |
| 53mm Aggregate                | m <sup>3</sup> | 250    | R 800.00 | R 200 000.00           |
|                               |                |        |          | <b>R 16 920 000.00</b> |

### Summary

|                   |                        |
|-------------------|------------------------|
| <b>Total</b>      | R 19 833 340.00        |
| P&G's 15%         | R 2 975 001.00         |
| Contingencies 10% | R 2 280 834.10         |
| <b>Total</b>      | <b>R 25 089 175.10</b> |

Therefore the capital cost estimate (30%) for the construction of the evaporation pond is **R 25 089 175.10** (excluding 14% VAT).



## SOLARRESERVE SA (PTY) LTD

### BASIS OF DESIGN REPORT

#### BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

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## 6. SUMMARY

- The site is located the Farm Arriesfontein 267, Barkley Wes RD, Siyanda District Municipal Region and is approximately 32 km south-east of the town of Daniëlskuil along the Sishen-Kimberley railway line.
- The site comprises of slightly undulating, bare ground, consistent with a semi-arid region. There is small, isolated rock outcroppings scattered throughout the catchment. Generally the catchment area is cover with tuft grasses and small shrubs. All streams within the catchment are considered ephemeral and tend to flow only for short periods following heavy rainfall.
- The site is historically agricultural land for use as grazing for livestock. The site is mainly grasslands with small shrubs and small trees.
- The climate of the area is typical of a semi-desert with very hot summers and cold winters.
- The geology of the study area are significantly covered by recent deposits of mainly red to pale coloured windblown sand of the Gordonia Formation, surface limestone and some rock rubble. These deposits occur along the flat laying areas and are generally thin, seldom exceeding 10 m in vertical thickness in this area.
- Groundwater in this area occurs mainly in semi-confined fractured-rock aquifers, also known as secondary aquifers.
- The aquifers at Arriesfontein are classified as having low to very high vulnerability to contamination. The lowest vulnerability is the south-western part of the farm with the highest the north-eastern and eastern parts, i.e. the areas close to the large fault zone.
- The classification criteria of the minimum requirements to liquid wastes show that the liquid is hazardous (moderate hazard, Hazard rating 3).
- The evaporation pond was designed in three compartments that would enable maintenance on any of the three compartments without disrupting the normal operations of the CSP plant.
- The three (3) compartments will have a small emergency overflow to each of the other compartments.





## SOLARRESERVE SA (PTY) LTD

### BASIS OF DESIGN REPORT

#### BRINE EVAPORATION PONDS FOR THE ARRIESFONTEIN SOLAR RESERVE PROJECT

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- Each compartments is sized at 112 m (b) x 200 m (l), giving a total size of 6.7 ha.
- A 4 m access road will be constructed around each compartment in order to allow access for a small vehicle to move around the compartments.
- The side slopes of the evaporation pond will be 1(h):2(l) on the inside slope of the pond and 1(h):3(l) on the outside slope.
- The total depth of the evaporation pond is 1.2 m that includes a 300 mm freeboard and a 105 mm allowance for crystalline salt build up. The crystalline salt build for the evaporation pond was calculated at 233 m<sup>3</sup>/annum. Over a 30 year life span of the CSP plant this calculates to approximately 105 mm depth in each compartment of the evaporation pond.
- The site will be lined with a 2 mm High Density Polyethylene (HDPE) liner as a primary liner and two 1.5 mm HDPE liners that would serve as a secondary and tertiary liner. The three layers of this liner should have a cusped drainage layer in between that drains toward a leakage detection system.
- The capital cost estimate (30%) for the construction of the evaporation pond is **R 25 089 175.10** excluding 14% VAT.



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## **ANNEXURE AGEOHYDROLOGICAL IMPACT SCOPING REPORT**



# **WorleyParsons**

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## **ANNEXURE BWASTE CLASSIFICATION REPORT**



# WorleyParsons

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## **ANNEXURE C DESIGN CALCULATIONS**



# **WorleyParsons**

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## **ANNEXURE D: BASIS OF DESIGN DRAWINGS**

**SOLARRESERVE SA (PTY) LTD**

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED CONCENTRATED  
SOLAR POWER PLANT ON THE FARM 267, NEAR DANIELSKUIL IN THE NORTHERN CAPE**

**DEA REFERENCE: 12/12/20/2646**

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## **Appendix X–Draft Waste Application**



## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

|  |
|--|
|  |
|  |
|  |

File Reference Number:  
NEAS Reference Number:  
Date Received:

(For official use only)

12/12/20/ or 12/9/11/L

DEAT/

Application for integrated environmental authorisation and waste management licence in terms of the-

- (1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010; and
- (2) National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 718 of 2009.

### PROJECT TITLE

**Arriesfontein Solar Power Plant: Phase 4: 100 MW CSP Development**

## PART A: INFORMATION AND APPLICATION PROCESS

### 1. DEFINITIONS

Definitions in this form are as per the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the Environmental Impact Assessment ("EIA") Regulations, 2010, the National Environmental Management: Waste Act, 1998 (Act No. 59 of 2008) ("NEMWA") and the Schedule contained in Government Notice 718, published on 3 July 2009 in terms of section 19 of NEMWA.

### 2. APPLICABILITY OF INTEGRATED ENVIRONMENTAL AUTHORISATION PROCESS

The integrated environmental authorisation process only apply in instances where the **Minister** is both the-

- (a) competent authority for the environmental authorisation applied for in terms of NEMA and the EIA Regulations, 2010; and
- (b) the licencing authority for the waste management licence in terms of NEMWA.

Kindly refer to paragraph 3.2 of this part of the application to determine in which instances the Minister would be the competent authority in terms of NEMA and the licencing authority in terms of NEMWA.

### **3. APPLICATION PROCESS EXPLAINED:**

#### **3.1 Integrated environmental authorisation process:**

3.1.1 The environmental authorisation process prescribed for listed activities under Listing Notices 1, 2 and 3 published in Government *Gazette* Numbers R544, R545 and R546 respectively and the waste licensing process for listed activities contained in the Schedule in Government Notice 718, 2009 published in terms of section 19 of NEMWA are as defined in the Environmental Impact Assessment (EIA) Regulations made under section 24(5) of the National Environmental Management Act, 2008 (Act No. 107 of 1998) ("NEMA").

3.1.2 This integrated application form is the official form in terms of regulation 12(2)(a) of the EIA Regulations, 2010 and must accompany every integrated environmental authorization application pertaining to-

- listed activities in terms of NEMA; and
- waste activities in terms of NEMWA.

#### **3.2 Competent Authority (Where to submit applications)**

3.2.1 The Minister of Water and Environmental Affairs is the-

- competent authority in respect of the activities listed in Listing Notices 1, 2 and 3, published in Government *Gazette* numbers R544, R545, and R546 respectively, in terms of NEMA if the activity-
  - (a) has implications for international environmental commitments or relations;
  - (b) will take place within an area protected by means of an international environmental instrument, other than-
    - (i) any area falling within the sea-shore or within 150 meters seawards from the high-water mark, whichever is the greater;
    - (ii) a conservancy;
    - (iii) a protected natural environment;
    - (iv) a proclaimed private nature reserve;
    - (v) a natural heritage site; and
    - (vi) the buffer zone or transitional area of a world heritage site;
  - (c) has a development footprint that falls within the boundaries of more than one province or traverses international boundaries;
  - (d) Is undertaken, or is to be undertaken by-
    - (i) A national department;
    - (ii) A provincial department responsible for environmental affairs or any other organ of state performing a regulatory function and reporting to the MEC; or



- (iii) A statutory body, excluding any municipality, performing an exclusive competence of the national sphere of government; or
- (e) Will take place within a national proclaimed protected area or other conservation area under control of a national authority.
- licencing authority in respect of all activities listed in both categories of the Schedule contained in Government Notice 718, 2009 published in terms of section 19 of NEMWA where –
  - (a) Unless otherwise indicated by the Minister by notice in the *Gazette*, the waste management activity involves the establishment, operation, cessation or decommissioning of a facility at which hazardous waste has been or is to be stored, treated or disposed of;
  - (b) The waste management activity involves obligations in terms of an international obligation, including the importation or exportation of hazardous waste;
  - (c) The waste management activity is to be undertaken by-
    - (i) A national department;
    - (ii) A provincial department responsible for environmental affairs; or
    - (iii) A statutory body, excluding any municipality, performing an exclusive competence of the national sphere of government;
  - (d) The waste management activity will affect more than one province or traverse international boundaries; or
  - (e) Two or more waste management activities are to be undertaken at the same facility and the Minister is the licencing authority for any of those activities.

However, despite the above-mentioned legislative provisions, the Minister and an MEC may agree that an application for a waste management activity or an environmental authorisation in respect of the above-mentioned activities, where the Minister is the competent/licencing authority, may be dealt with by the relevant MEC within whose province the activity(ies) will take place. Similarly the Minister and the MEC may agree that an application for an environmental authorisation or a waste management activity where the MEC has been identified as the competent/licencing authority, may be dealt with by the Minister. [Section 24C(3) of NEMA and section 43(3) of NEMWA]

The integrated application for environmental authorisation must be submitted by lodging an application with the National Department of Environmental Affairs. The application must be marked for the attention of:

The Director: Environmental Impact Evaluation

Private Bag X447

Pretoria 0001

Tel: 012 310 3230

### 3.3 Making an Application

- 3.3.1 This application form is current as of 1 September 2010. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority. It is the applicant's responsibility to download the current version of the application form from the website of the Department at <http://www.deat.gov.za>.
- 3.3.2 The application must be typed within the spaces provided in the form. The sizes of the spaces provided are not necessarily indicative of the amount of information to be provided. Spaces are provided in tabular format and will extend automatically when each space is filled with typing.
- 3.3.3 The applicant must clearly mark confidential sections of the information submitted in the application form and supporting documents. Unless protected by law, all information filled in on this application will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this application on request, during any stage of the application process.
- 3.3.4 The applicant must fill in all relevant sections of this form. Incomplete applications will not be processed. The applicant will be notified of the missing information in the acknowledgement letter that will be sent within 14 days of receipt of the application.
- 3.3.5 Incomplete applications may be returned to the applicant for revision.
- 3.3.6 Sections in the form that do not apply to the applicant must be marked "not applicable". However, the use of the phrase "not applicable" in the form must be done with circumspection. Should it be done in respect of material information required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the Regulations.
- 3.3.7 Where applicable **black out** the boxes that are not applicable in the form.
- 3.3.8 This application form (together with four hard copies of this application form), must be handed in at the offices of the relevant competent authority as determined by the relevant Acts and Regulations and as indicated in this application form. All application forms must be signed as stipulated in the form. Applications that are not signed or completed accordingly will not be considered.
- 3.3.9 No faxed or e-mailed applications will be accepted.

3.3.10 There is currently no prescribed fee.

### 3.4 Appointment of an EAP

- The applicant must appoint an EAP in terms of EIA Regulations, 2010;
- The EAP must comply with general requirements as given in EIA regulations, 2010; and
- The EAP may be disqualified in terms of EIA Regulations, 2010.

### 3.5 Criteria for determining whether basic assessment or scoping is to be applied to applications

#### 3.5.1 NEMA activities

- (a) Basic assessment must be applied to an application if the authorisation applied for is in respect of an activity listed in Listing Notices 1 and/or 3 published in Government *Gazette* Numbers R544 and R546, 2010 respectively and which must follow the process described in sections 21-25 of the EIA Regulations, 2010; and
- (b) Scoping and Environmental Impact Reporting Process ("S&EIR") must be applied to an application if the authorisation applied for is in respect of an activity listed in Listing Notice 2 published in Government Gazette Number R545, 2010 and which must follow the process described in sections 26-35 of the EIA Regulations, 2010.

#### 3.5.2 NEMWA activities

- (a) Basic assessment, in terms of sections 21-25 of the EIA Regulations, 2010, must be applied to an application if the authorisation applied for is in respect of an activity listed in Category A of the Schedule contained in Government Notice 718, published on 3 July 2009, in terms of section 19 of NEMWA; and
- (b) S&EIR, in terms of sections 26-35 of the EIA Regulations, 2010, must be applied to an application if the authorisation applied for is in respect of an activity Category B of the Schedule contained in Government Notice 718, published on 3 July 2009, in terms of section 19 of NEMWA.

#### 3.5.3 Combination of NEMA and NEMWA activities

Should any of the NEMA or NEMWA activities applied for require the application of the S&EIR process, the S&EIR process will be applied to this application for integrated environmental authorisation.

Queries must be addressed to the contact hereunder:

**Departmental Details**

**Postal address:**

Department of Environmental Affairs  
Attention: Director: Environmental Impact Evaluation  
Private Bag X447  
Pretoria  
0001

**Physical address:**

Department of Environmental Affairs  
Fedsure Forum Building (corner of Pretorius and Van der Walt Streets)  
2<sup>nd</sup> Floor North Tower  
315 Pretorius Street  
Pretoria  
0002

Queries should be directed to the Directorate: Environmental Impact Evaluation at:

Tel: 012-310-3290

Fax: 012-320-7539

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## PART B: GENERAL

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### 1. DESCRIPTION OF PROJECT

The entire project will entail the following (full detail of the project can also be appended):

This phase of the proposed project entails the proposed construction and operations of a solar thermal-electric power generation plant. The technology to be implemented in this phase of the proposed development is a Concentrated Solar Central Receiver Tower Power (CSP) Plant. This is proposed 32 km outside Danielskuil in the Northern Cape Province. The proposed CSP plant will aim to generate of a maximum installed capacity of up to 100 MW in addition to the other proposed project phases. The plant requires approximately 8 km<sup>2</sup> (8 ha) of terrain with little relief to satisfy construction needs. The key factor, however, is the amount of thermal storage required, as this determines the number of heliostats to be installed.

The CSP Plant being considered employs the molten salt-type, Central Receiver technology. This technology is based on the concept of thousands of large tracking mirrors (known as heliostats) which track the sun and reflect the beam radiation to a common focal point. This focal point (the receiver) is located well above the heliostat field in order to prevent interference between the reflected radiation and the other heliostats.

A heliostat is a mirror mounted on a pedestal by which the sun is steadily reflected onto one spot – the receiver. Heliostats are arranged in an elliptical formation around the focal point with the majority of the reflective area weight to the more effective side of the heliostat field (southern side in South Africa).

It is estimated that the collector field will consist of between 10 300 and 17 500 dual-axis tracking heliostats, each approximately between 64 m<sup>2</sup> - 116 m<sup>2</sup>, providing approximately 1 200 000 m<sup>2</sup> of reflective surface area in order to generate the power output of approximately 100 MW, while also enabling approximately 18 hours (base load) of energy storage.

The central receiver is situated on the top of the central tower. This receiver is in essence a heat exchanger which absorbs the concentrated beam radiation, converts it to heat and transfers the heat to the working fluid (i.e. molten salt) which is in turn used to generate steam for conventional power generation.

Power is generated through a conventional Rankine cycle (steam turbine process). The working fluid is a salt mixture. The cold salt is pumped up the central tower at approximate 300°C and flows through the central receiver where it is heated to approximately 550°C after which it can be stored for use in the conventional power generation process (maintaining 98% thermal efficiency).

#### Purpose of application:

The intention of Solar Reserve SA is to develop large-scale energy projects to generate electricity and reduce the dependence on non-renewable fossil fuel resources. Emergency load shedding in 2007 and 2008 highlighted the challenges facing South Africa in terms of electricity generation, transmission and distribution. The National

Energy Response Plan (NERP), drafted at the time, acknowledged the role that independent power producers (IPPs) could play in ensuring sustainable electricity generation.

The demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand can be attributed to Increasing economic growth and social development within Southern Africa and places significant pressure on South Africa's existing power generation capacity.

Coupled with the rapid advancement in community development, is also the growing awareness of environmental impact, climate change and the need for sustainable development. Due to the nature of the activities associated with the proposed project it cannot be constructed or operated without the required environmental authorisations in terms of inter alia NEMA, NEMWA and NWA.

## 2. FLOW CHART OF OPERATIONS

Please provide a brief description of the activities and operations at the site. Provide a flow chart of the operation showing all inputs and outputs of the process. Give particulars of the source, location, nature, composition and quantity of emission to the atmosphere, surface water, sewer, and ground-water including noise emissions. Solid waste must be in tons and specify units for liquids and gases.

The CSP plant primarily comprises of four subsystems as follows:

- Solar Collector Field - consists of all systems and infrastructure related to the control and operation of the heliostats;
- Molten Salt Circuit - includes the thermal storage tanks for storing low and high temperature liquid salt, a central solar-thermal tower receiver, pipelines and molten salt to steam heat exchangers;
- The Power Block – consists of the steam turbine and generator, as well as the air-cooled condenser and associated feedwater system; and
- Auxiliary facilities and infrastructure - consists of the switch yard, step-up transformers, power transmission lines, access routes, water supplies and facility start-up generators (gas or diesel-fired – dependent on detailed design).

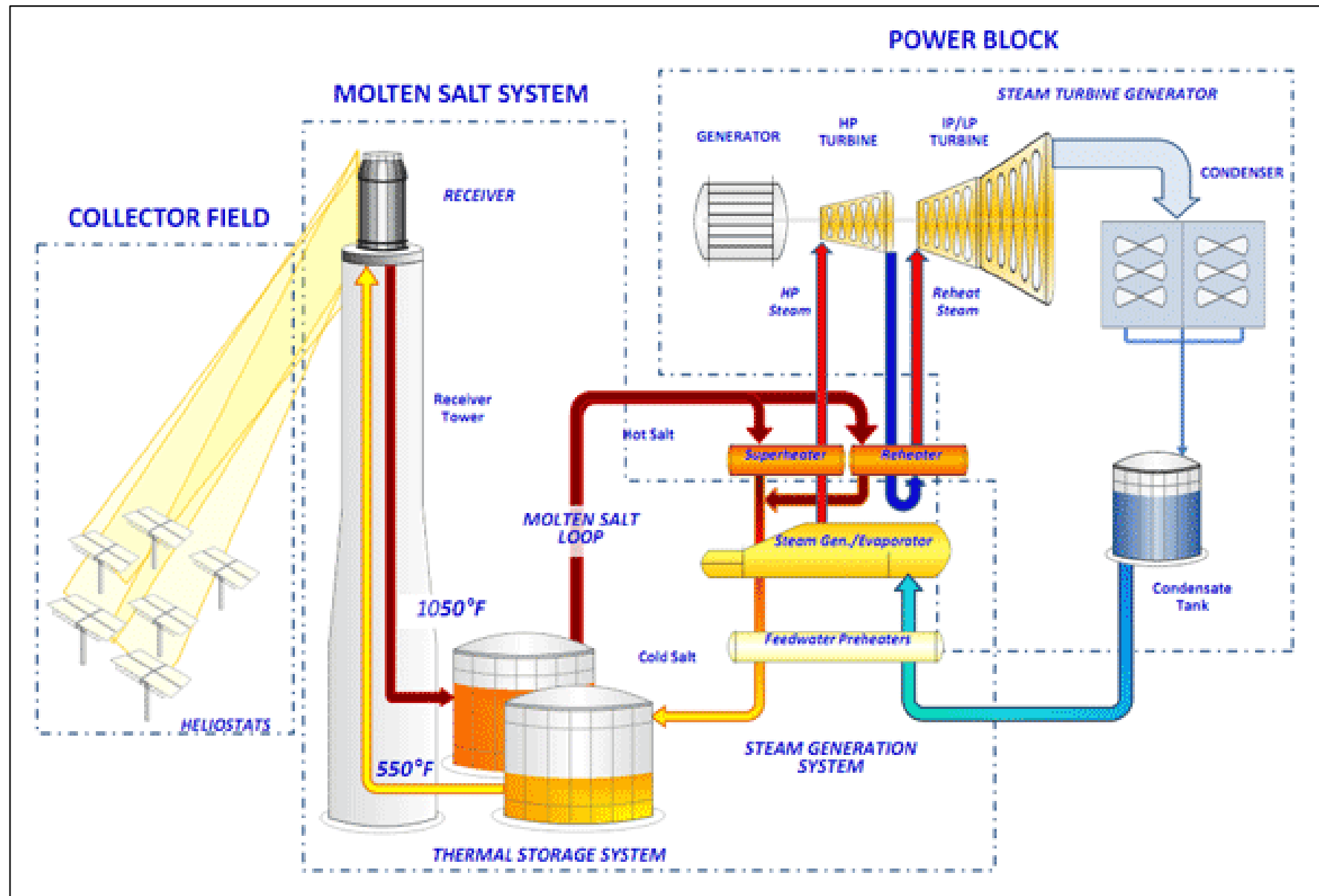
The particulars relating to the source, location, nature, composition and quantity of emission to the atmosphere, surface water, sewer, and ground-water including noise emissions is unknown at this point in time and will be confirmed during the Scoping Phase of the project when more detailed investigations and designs would have been conducted.

The following diagram shows a process flow of the proposed plant. Inputs into the process includes:

- Water;
- Salt;
- Gas or diesel; and
- Sunlight.

Outputs include:

- Electricity;
- Waste water;
- Emissions from the gas or diesel combustion,
- Brine or salt pellets; and
- Salt.





### 3. BACKGROUND INFORMATION

|                        |   |       |                    |
|------------------------|---|-------|--------------------|
| Project applicant:     | SolarReserve South Africa (Pty) Ltd.  |       |                    |
| Trading name (if any): | SolarReserve South Africa (Pty) Ltd.  |       |                    |
| Contact person:        | Terence Govender  |       |                    |
| Physical address:      | Office L6 B-1, 6th Floor, SinoSteel Plaza,<br>159 Rivonia Rd,<br>Sandton,<br>South Africa |       |                    |
| Postal address:        | Office L6 B-1, 6th Floor, SinoSteel Plaza,<br>159 Rivonia Rd,<br>Sandton,<br>South Africa |       |                    |
| Postal code:           | 2191  | Cell: | +27(0)83 449 0433  |
| Telephone:             | +27(0) 11 784 7539  | Fax:  | +27(0) 11 784 7549 |
| E-mail:                | Terence.Govender@solarreserve.com   |       |                    |

|                 |                                   |       |                   |
|-----------------|-----------------------------------|-------|-------------------|
| Landowner:      | Levina Catharina Magdalena Cloete |       |                   |
| Contact person: | Mr. Gerrie Cloete                 |       |                   |
| Postal address: | P.O. Box 156,<br>Danielskuil      |       |                   |
| Postal code:    | 8405                              | Cell: | +27(0)76 178 7949 |
| Telephone:      | Not Available                     | Fax:  | Not Available     |
| E-mail:         | Not Available                     |       |                   |

In instances where there is more than one landowner, please attach a list of landowners with their contact details to this application.

Ownership of the property (mark only one with an X)

|  |  |                               |   |
|--|--|-------------------------------|---|
| Property owned by applicant (100% Share value)           |  | Property leased by applicant  | X |
| Property owned by applicant (Share value less than 100%) |  | The property is communal land |   |

|  |   |       |                   |
|--|---|-------|-------------------|
| Local authority in whose jurisdiction the proposed activity will fall: | Kgatelopele Local Municipality                            |       |                   |
| Nearest town or districts:   | Danielskuil   |       |                   |
| Contact person:  | Mr. Gustav von Mollendorf<br>(Municipal Manager - Acting) |       |                   |
| Postal address:  | PO Box 43,<br>Danielskuil                                 |       |                   |
| Postal code:   | 8405  | Cell: | +27(0)82 567 4116 |
| Telephone:   | +27(0)53 384 8600   | Fax:  | +27(0)53 384 0326 |
| E-mail:  | corporateman@kgatelopele.gov.za                           |       |                   |

In instances where there is more than one local authority involved, please attach a list of local authorities with their contact details to this application.

|                                      |                                     |
|--------------------------------------|-------------------------------------|
| <b>Siyanda District Municipality</b> |                                     |
| <b>Mr. F Ruppig</b>                  |                                     |
| <b>Technical Services</b>            |                                     |
| <b>Postal Address:</b>               | <b>Private Bag X 5875</b>           |
|                                      | <b>Upington</b>                     |
|                                      | <b>8800</b>                         |
| <b>Physical Address:</b>             | <b>cnr Hill and Le Roux Street,</b> |
|                                      | <b>Upington</b>                     |
| <b>Contact Details</b>               | <b>Tel: +27(0)54 337 2939</b>       |
|                                      | <b>Cell: +27(0)78 885 3647</b>      |
|                                      | <b>Email: fr@siyanda.gov.za</b>     |

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

Property  
description/physical  
address:

**Farm Arriesfontein 267, Barkley Wes RD**

(Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.

|  |
|--|
|  |
|  |

In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.

Current land-use where the site is situated:

|                    |          |                    |  |
|--------------------|----------|--------------------|--|
| Industrial         |          | Recreation         |  |
| <b>Agriculture</b> | <b>X</b> | Commercial         |  |
| Residential        |          | Mining & quarrying |  |
| Forestry           |          | Wilderness areas   |  |
| Wetlands           |          | Nature area        |  |
| Open spaces        |          |                    |  |

Other current land-use.....

Current land-use  
zoning:

**Agriculture**

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

Is a change of land-use or a consent use application required?  
Must a building plan be submitted to the local authority?

|            |  |
|------------|--|
| <b>YES</b> |  |
| <b>YES</b> |  |

Locality map:

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

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

#### 4. SITE IDENTIFICATION AND LINKAGE, LOCATION AND LANDUSE

4.1 Please indicate all the Surveyor-general 21 digit site (erf/farm/portion) reference numbers for all sites (including portions of sites) that are part of the application.

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 7 | 0 | 0 | 0 | 0 | 0 |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1 |   |   | 2 |   |   | 3 |   |   |   |   |   | 4 |   |   |   |   |   | 5 |   |   |

**LEGEND:**

1. Refers to the Surveyor's-General Office
2. Major Code (Registration Division)
3. Minor code
4. Property No (i.e. Farm No./Erf No./Holding Area No./Scheme No.)
5. Portion Number

(if there are more that 6, please attach a list with the rest of the numbers)

(These numbers will be used to link various different applications, authorisations, permits etc. that may be connected to a specific site)

4.2 If the property type is not surveyed, complete the following:

Full name of leader of village, community or tribal authority

Local Authority

Magisterial District

Tribal Authority/Council

|  |
|--|
|  |
|  |
|  |
|  |

PART C: LISTED ACTIVITIES APPLIED FOR IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE ENVIRONMENTAL IMPACT REGULATIONS, 2010

1. ACTIVITIES APPLIED FOR TO BE AUTHORISED

For an application for authorisation that involves more than one listed or specified activity that, together, make up one development proposal, all the listed activities pertaining to this application must be indicated.

| Indicate the number and date of the relevant notice: | Activity No (s) (in terms of the relevant or notice) : | Describe each listed activity as per the detailed project description (and not as per wording of the relevant Government Notice):  |
|--|--|--|
| GNR. 544,<br>18 June 2010                            | (9)  | The construction of facilities or infrastructure exceeding 1 000 meters in length for the bulk transportation of water, sewage or stormwater –<br><ul style="list-style-type: none"> <li>(i) with an internal diameter of 0,36 meters or more; or</li> <li>(ii) with a peak throughput of 120 litres per second or more.</li> </ul>  |
|  | (10)   | The construction of facilities or infrastructure for the transmission or distribution of electricity –<br><ul style="list-style-type: none"> <li>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</li> </ul>   |
|  | (11)   | The construction of:<br><ul style="list-style-type: none"> <li>(i) canals;</li> <li>(ii) channels;</li> <li>(iii) bridges;</li> <li>(iv) dams;</li> <li>(v) weirs;</li> <li>(vi) bulk storm water outlet structures;</li> <li>(vii) marinas;</li> <li>(viii) jetties exceeding 50 square metres in size;</li> <li>(ix) slipways exceeding 50 square metres in size;</li> <li>(x) buildings exceeding 50 square metres in size; or</li> <li>(xi) infrastructure or structures covering 50 square metres or more</li> </ul> <p>where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a</p> |

|                           |      |   |
|---------------------------|------|---|
|                           |      | watercourse, excluding where such construction will occur behind the development setback line.  |
|                           | (12) | The construction of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 19 of Notice 545 of 2010;   |
|                           | (13) | The construction of facilities or infrastructure for the storage, or for the storage and handling of dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic meters;   |
|                           | (22) | Construction of a road, outside urban areas;<br>(i) where no reserve exists where the road is wider than 8 meters.  |
| GNR. 545,<br>18 June 2010 | (1)  | The construction of facilities for the generation of electricity where the electricity output is 20 megawatts or more.  |
|                           | (3)  | Construction of facilities or infrastructure for the storage, or storage and handling of dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic meters;  |
|                           | (15) | Physical alteration of undeveloped, vacant or derelict land for residential, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more.   |
|                           | (26) | Commencing of an activity, which requires an atmospheric emission license in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), except where such commencement requires basic assessment in terms of Notice of No. R544 of 2010.   |
| GNR. 546,<br>18 June 2010 | (2)  | The construction of reservoirs for bulk water supply with a capacity of more than 250 cubic metres.<br><br>(a) In Eastern Cape, Free State, KwaZulu Natal, Limpopo, Mpumalanga and Northern Cape Provinces<br>(i) Outside urban areas, in:<br><i>(bb) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority;</i> |

|  |      |   |
|--|------|---|
|  | (14) | <p>The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for</p> <p>:</p> <p>(1) The undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act no 59 of 2008) in which case the activity is regarded to be excluded from this list;</p> <p>(a) In Eastern Cape, Free State, KwaZulu Natal, Limpopo, Mpumalanga and Northern Cape Provinces</p> <p>(i) All areas outside urban area</p> |
|  |      |   |
|  |      |   |
|  |      |   |
|  |      |   |
|  |      |   |

Please note that any authorisation that may result from this application will only cover activities specifically applied for.

## 2. TYPE OF APPLICATION REQUIRED FOR ABOVE-MENTIONED ACTIVITIES

### 2.1 Application for Basic Assessment

Is this an application for conducting a basic assessment (as defined in the Regulations)?

|                                     |    |
|-------------------------------------|----|
| <input type="checkbox"/>            | NO |
| <input checked="" type="checkbox"/> | X  |

Please indicate when the basic assessment report will be submitted:

|  |
|--|
|  |
|--|

### 2.2 Application for Scoping and Environmental Impact Reporting (S&EIR) assessment

Is this an application for S&EIR (as defined in the Regulations)?

|                                     |     |
|-------------------------------------|-----|
| <input checked="" type="checkbox"/> | YES |
| <input type="checkbox"/>            | X   |

Please indicate when the S&EIR Report (including the Plan of Study for EIA) will be submitted:

**SCOPING REPORT – JANUARY /FEBRUARY 2012**  
**ENVIRONMENTAL IMPACT ASSESSMENT REPORT – APRIL 2012**

The S&EIR report will be submitted after consultation with the competent authority:

|                                     |     |
|-------------------------------------|-----|
| <input checked="" type="checkbox"/> | YES |
| <input type="checkbox"/>            | X   |

**PART D: ACTIVITIES APPLIED FOR IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008 AND THE ENVIRONMENTAL IMPACT REGULATIONS, 2010**

**SECTION 1: TYPE OF APPLICATION AND FACILITY:**

**1.1 Indicate the type of facility/operation and fill in the required sections only**

| TYPE OF ACTIVITY                   | MARK | SECTIONS OF THE FORM TO BE FILLED IN |
|------------------------------------|------|--------------------------------------|
| Recycling and/or recovery Facility |      | All except Section 5                 |
| Storage and or transfer Facility   | X    | All except Section 5                 |
| Treatment facility                 | X    | All except Section 5                 |
| Disposal facility                  |      | All                                  |

**1.2 Activities applied for:**

An application may be made for more than one listed or specified activity that, together, make up one development proposal. All the listed activities that make up this application must be listed.

| INDICATE THE NO. & DATE OF THE RELEVANT NOTICE: | ACTIVITY NUMBERS (AS LISTED IN THE WASTE MANAGEMENT ACTIVITY LIST) : | DESCRIBE EACH LISTED ACTIVITY (and not as per the wording of the relevant Government Notice):   |
|---|--|---|
| GNR. 718,<br>03 July 2009                       | Category B (1)   | The storage including the temporary storage of hazardous waste in lagoons.  |
|   | Category B (5)   | The treatment of hazardous waste using any form of treatment regardless of the size or capacity of such a facility to treat such waste. |
|   | Category B (11)  | The construction of facilities for activities listed in Category B  |

NB: Authorisation issued will only cover activities applied for and listed above. Activities added in the middle or after the processing of this authorisation may mean a totally new application.

**1.3 TYPE OF APPLICATION REQUIRED FOR ABOVE-MENTIONED ACTIVITIES**

**1.3.1 Application for Basic Assessment**

Is this an application for conducting a basic assessment (as defined in the Regulations)?

|  |    |
|--|----|
|  | NO |
|  | X  |

Please indicate when the basic assessment report will be submitted:

**NOT APPLICABLE**

### 1.3.2 Application for Scoping and Environmental Impact Reporting (S&EIR) assessment

Is this an application for S&EIR (as defined in the EIA Regulations, 2010) reporting?

**YES**

**X**

Please indicate when the S&EIR Report (including the Plan of Study for EIA) will be submitted:

**SCOPING REPORT – MARCH 2012**

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT – AUGUST 2012**

The scoping report will be submitted

**YES**

after consultation with the competent authority:

**X**

## 1.4 Size of Site and Classification

Size of facility for a waste management activity

**6.7 Ha**

Area where the waste management activity takes place

**Farm Arriesfontein 267, Barkley Wes RD**

Classification of facility in terms of climatic water balance

**Negative Water Balance**

Classification of Facility in terms of the type and the quantity of waste received

**To be confirmed**

## 1.5 Operational times

| PERIOD          | FROM         | UNTIL |
|-----------------|--------------|-------|
| Weekdays        | <b>24hrs</b> |       |
| Saturdays       | <b>24hrs</b> |       |
| Sunday          | <b>24hrs</b> |       |
| Public holidays | <b>24hrs</b> |       |

## SECTION 2: WASTE QUANTITIES

2.1 Indicate or specify types of waste and list the estimated quantities expected to be managed daily (should you need more columns, you are advised to add more)

| Hazardous waste        | Non hazardous waste    | Total waste handled (tonnes per day) |
|------------------------|------------------------|--------------------------------------|
| <b>To be confirmed</b> | <b>To be confirmed</b> | <b>To be confirmed</b>               |

Source of information supplied in the table above Mark with an "X"



Determined from volumes  
Determined with weighbridge/scale  
Estimated

|     |
|-----|
| TBC |
| TBC |
| TBC |

## 2.2 Recovery, Reuse, Recycling, treatment and disposal quantities:

Indicate the applicable waste types and quantities expected to be disposed of and salvaged annually:

| TYPES OF WASTE | MAIN SOURCE (NAME OF COMPANY) | QUANTITIES      |                       | ON-SITE RECOVERY REUSE RECYCLING TREATMENT OR DISPOSAL | OFFSITE RECOVERY REUSE RECYCLING TREATMENT OR DISPOSAL | OFFSITE DISPOSAL |
|----------------|-------------------------------|-----------------|-----------------------|--|--|------------------|
|                |                               | TONS/MONTH      | M <sup>3</sup> /MONTH | method & location                                      | method location and contractor details                 |                  |
| Salt           | SolarRe-serve (Pty) Ltd       | To be confirmed | To be confirmed       | Reverse osmosis and evaporation in a lagoon            | To be confirmed  | To be confirmed  |

## SECTION 3: GENERAL

### 3.1 Prevailing wind direction (e.g. NWW)

|                  |                 |
|------------------|-----------------|
| November – April | To be confirmed |
| May - October    | To be confirmed |

### 3.2 The size of population to be served by the facility

|                 | Mark with "X" | Comment         |
|-----------------|---------------|-----------------|
| 0-499           |               | To be confirmed |
| 500-9,999       |               | To be confirmed |
| 10,000-199,999  |               | To be confirmed |
| 200,000 upwards |               | To be confirmed |

### 3.3 The geological formations underlying the site:

To be confirmed during Scoping Phase

|           |  |           |  |
|-----------|--|-----------|--|
| Granite   |  | Quartzite |  |
| Shale     |  | Dolomite  |  |
| Sandstone |  | Dolerite  |  |

Other \_\_\_\_\_

## SECTION 4: COMPETENCE TO OPERATE SITE

It is imperative that the holder of the waste management licence is a fit person in terms of section 59 of the NEMWA (59 of 2008). To assess the holder's competence to operate the site, please disclose the following:

#### 4.1 Legal compliance

Has the applicant ever been found guilty or issued with a non compliance notice in terms of any national environmental management legislation?

Has the applicant's licence in terms of the Waste Act 2008 ever been revoked?

Has the applicant ever been issued with a non compliance notice or letter in terms of any South African Law?

| YES/NO | DETAILS |
|--------|---------|
| NO     |         |
| NO     |         |
| NO     |         |

***NB:** Details required above include any information that the applicant wants the Department to take into consideration in determining whether they are a "fit person" and this includes reasons why the offence happened and measures in place to prevent recurrence*

#### 4.2 Technical competence

What technical skills are required to operate the site?

To be confirmed

How will the applicant ensure and maintain technical competency in the operation of the site?

To be confirmed

#### 4.3 Details of applicant's experience and qualification along with that of relevant employees must be summarised as shown in the table below:

| NAME            | POSITION        | DUTIES AND RESPONSIBILITIES | QUALIFICATIONS AND EXPERIENCE |
|-----------------|-----------------|-----------------------------|-------------------------------|
| To be confirmed | To be confirmed | To be confirmed             | To be confirmed               |

#### 4.4 Financial Provisions

Provide a plan of estimated expenditure for the following:

|                          | ATTACHED/NOT ATTACHED | SECTION OF THE REPORT WHERE IT IS ATTACHED |
|--------------------------|-----------------------|--|
| Environmental Monitoring | To be confirmed       |  |

|   |                 |  |
|---|-----------------|--|
| Provision and replacement of infrastructure | To be confirmed |  |
| Restoration and aftercare                   | To be confirmed |  |

## SECTION 5: LANDFILL PARAMETERS

### Please Note:

The proposed activity does not involve the construction or operation of a landfill and hence this Section of the application is not applicable.

### 5.1 The method of disposal of waste:

Land-building ☐ Land-filling ☐ Both ☐

### The dimensions of the disposal site in metres

|              | At commencement | After rehabilitation |
|--------------|-----------------|----------------------|
| Height/Depth |                 |                      |
| Length       |                 |                      |
| Breadth      |                 |                      |

### 5.2 The total volume available for the disposal of waste on the site:

| Volume Available    | Mark with "X" | Source of information (Determined by surveyor/ Estimated) |
|---------------------|---------------|---|
| Up to 99            |               |   |
| 100-34 999          |               |   |
| 35 000- 3,5 million |               |   |
| >3,5 million        |               |   |

### 5.3 The total volume already used for waste disposal:

- (a) Will the waste body be covered daily  
(b) Is sufficient cover material available  
(c) Will waste be compacted daily

|     |
|-----|
| YES |
| YES |
| YES |

|    |
|----|
| NO |
| NO |
| NO |

If the answers (a) and/or (b) are No, what measures will be employed to prevent the problems of burning or smouldering of waste and the generation of nuisance?

### 5.4 The Salvage method

Mark with an "X" the method to be used.

|                        |                          |
|------------------------|--------------------------|
| At source              | <input type="checkbox"/> |
| Recycling installation | <input type="checkbox"/> |
| Formal salvaging       | <input type="checkbox"/> |
| Contractor             | <input type="checkbox"/> |
| No salvaging planned   | <input type="checkbox"/> |

## 5.5 Fatal Flaws for the site:

Indicate which of the following apply to the facility for a waste management activity:

|  |             |    |
|--|-------------|----|
| Within a 3000m radius of the end of an airport landing strip                 | YES         | NO |
| Within the 1 in 50 year flood line of any watercourse                        | YES         | NO |
| Within an unstable area(fault zone, seismic zone, dolomitic area, sinkholes) | YES         | NO |
| Within the drainage area or within 5 km of water source                      | YES         | NO |
| Within an area with shallow and/or visible water table                       | YES         | NO |
| Within an area adjacent to or above an aquifer                               | YES         | NO |
| Within an area with shallow bedrock and limited available cover material     | YES         | NO |
| Within 100 m of the source of surface water                                  | YES         | NO |
| Within 1km from the wetland  | YES         | NO |
| Indicate the distance to the boundary of the nearest residential area        | _____metres |    |
| Indicate the distance to the boundary of the industrial area                 | _____metres |    |

## 5.6 Wettest six months of the year

|                 |  |
|-----------------|--|
| November- April |  |
| May -October    |  |

## 5.7 For the wettest six month period indicated above, indicate the following for the preceding 30 years

|                                       | Total rainfall for 6 months | Total A-pan evaporation for 6 months | Climatic water balance |
|---------------------------------------|-----------------------------|--------------------------------------|------------------------|
| For the 1 <sup>st</sup> wettest year  |                             |                                      |                        |
| For the 2 <sup>nd</sup> wettest year  |                             |                                      |                        |
| For the 3 <sup>rd</sup> wettest year  |                             |                                      |                        |
| For the 4 <sup>th</sup> wettest year  |                             |                                      |                        |
| For the 5 <sup>th</sup> wettest year  |                             |                                      |                        |
| For the 6 <sup>th</sup> wettest year  |                             |                                      |                        |
| For the 7 <sup>th</sup> wettest year  |                             |                                      |                        |
| For the 8 <sup>th</sup> wettest year  |                             |                                      |                        |
| For the 9 <sup>th</sup> wettest year  |                             |                                      |                        |
| For the 10 <sup>th</sup> wettest year |                             |                                      |                        |

### 5.8 Location and depth of ground water monitoring boreholes:

[illegible]

### 5.9 Location and depth of landfill gas monitoring test pit:

[illegible]

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## PART E: DECLARATION BY THE APPLICANT

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### 1. The Applicant

I, **Terrence Govender**, declare that I -

- am, or represent<sup>1</sup>, the applicant in this application;
- have appointed / will appoint (delete that which is not applicable) an environmental assessment practitioner to act as the independent environmental assessment practitioner for this application / will obtain exemption from the requirement to obtain an environmental assessment practitioner<sup>2</sup>;
- will provide the environmental assessment practitioner and the competent authority with access to all information at my disposal that is relevant to the application;
- will be responsible for the costs incurred in complying with the Environmental Impact Assessment Regulations, 2010, including but not limited to –
  - costs incurred in connection with the appointment of the environmental assessment practitioner or any person contracted by the environmental assessment practitioner;
  - costs incurred in respect of the undertaking of any process required in terms of the Regulations;
  - costs in respect of any fee prescribed by the Minister or MEC in respect of the Regulations;
  - costs in respect of specialist reviews, if the competent authority decides to recover costs; and
  - the provision of security to ensure compliance with conditions attached to an environmental authorisation, should it be required by the competent authority;
- will ensure that the environmental assessment practitioner is competent to comply with the requirements of these Regulations and will take reasonable steps to verify whether the EAP complies with the Regulations;
- will inform all registered interested and affected parties of any suspension of the application as well as of any decisions taken by the competent authority in this regard;
- am responsible for complying with the conditions of any environmental authorisation issued by the competent authority;
- hereby indemnify the Government of the Republic, the competent authority and all its officers, agents and employees, from any liability arising out of the content of any report, any procedure or any action which the applicant or environmental assessment practitioner is responsible for in terms of these Regulations;
- will not hold the competent authority responsible for any costs that may be incurred by the applicant in proceeding with an activity prior to obtaining an environmental authorisation or prior to an appeal being decided in terms of these Regulations;

---

<sup>1</sup> If this is signed on behalf of the applicant, proof of such authority from the applicant must be attached.

<sup>2</sup> If exemption is obtained from appointing an EAP, the responsibilities of an EAP will automatically apply to the person conducting the environmental impact assessment in terms of the Regulations.

- will perform all other obligations as expected from an applicant in terms of the Regulations;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

---

Signature of the applicant<sup>3</sup>/ Signature on behalf of the applicant:

---

Name of company (if applicable):

---

Date:

---

<sup>3</sup> If the applicant is a juristic person, a signature on behalf of the applicant is required as well as proof of such authority.