












# PROPOSED CONSTRUCTION OF A 75MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY

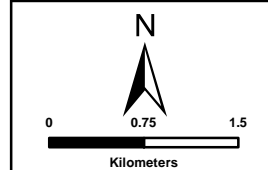
SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE

SENDAWO SOLAR  
DEVELOPMENT PROJECTS

## Legend

-  National Routes
-  Railway Line
-  Existing High Voltage Power Lines (400kV)
-  Existing Substation
-  Proposed Sendawo Application Site
- Proposed PV Development Areas**
-  Proposed Sendawo Solar 1 Development Area
-  Proposed Sendawo Solar 2 Development Area
-  Proposed Sendawo Solar 3 Development Area
- Proposed 400kV Power Line Corridor Alternatives (500m)**
-  Alternative 2A
-  Alternative 2B
-  Proposed 400kV Substation Site

SOURCE:  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
NGI, 2015



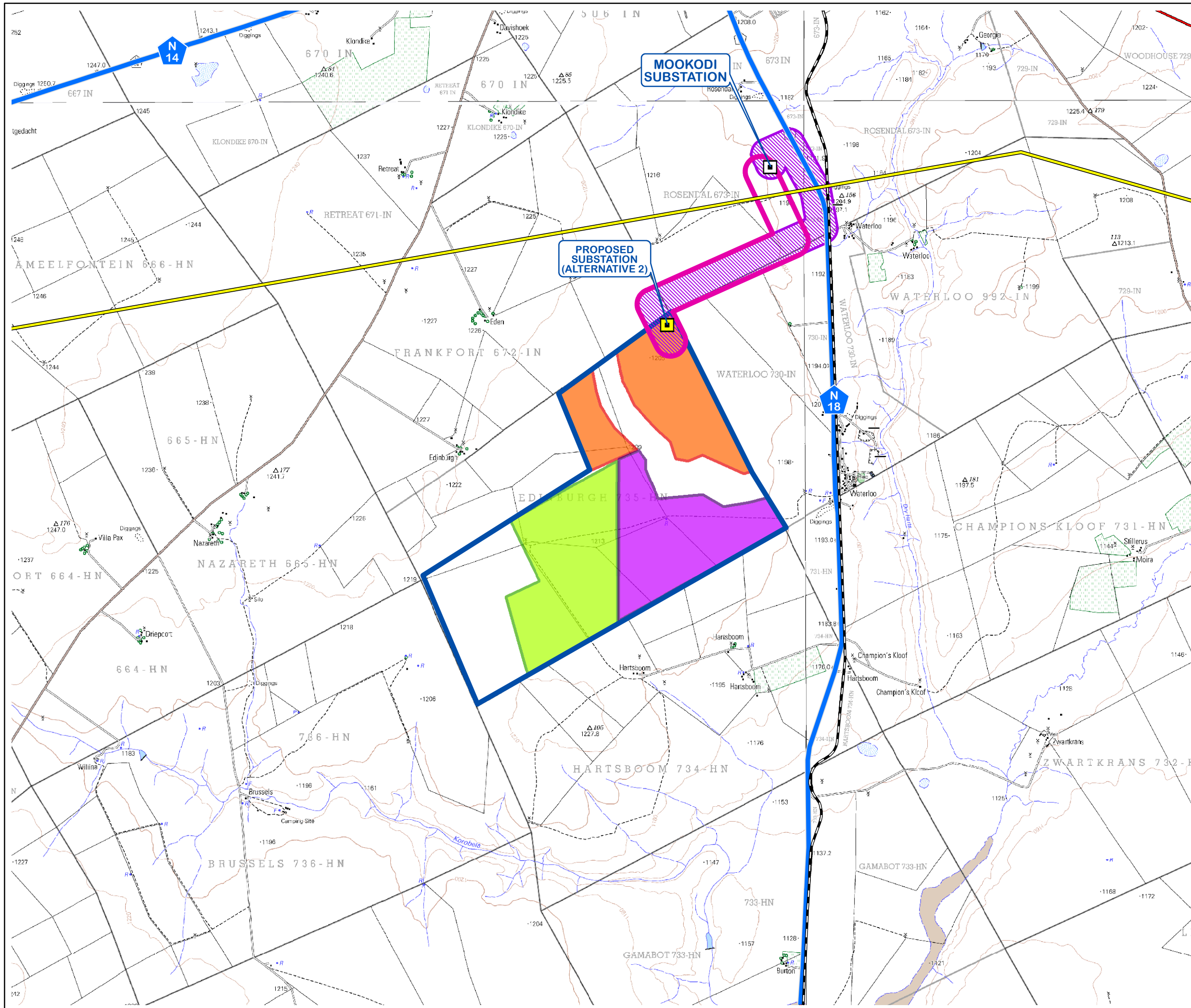
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Project No 13303	Prepared By KLS	Date 27/05/2016
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Map Ref No 13303S/EA1_08	Revision 0	Date
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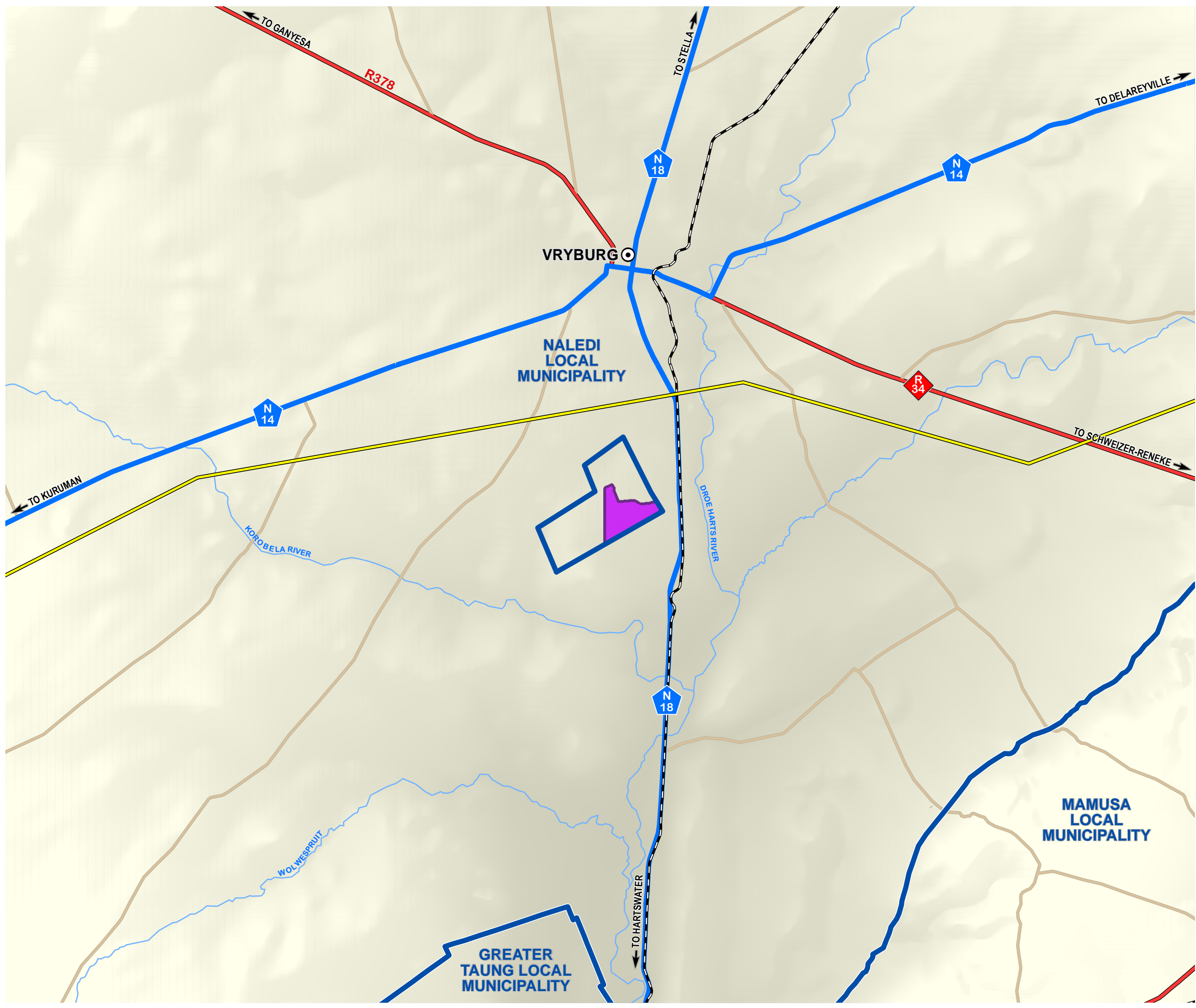
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A 75MW SOLAR  
PHOTOVOLTAIC (PV)  
ENERGY FACILITY**

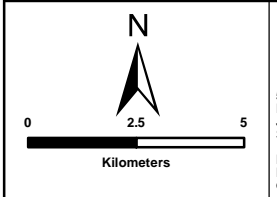
**SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE  
REGIONAL CONTEXT**



**Legend**

- Local Municipal Boundaries
- National Routes
- Main Roads
- Secondary Roads
- Railway Line
- Existing High Voltage Power Lines (400kV)
- Main Rivers
- Main Towns
- Proposed Sendawo Application Site
- Proposed Sendawo Solar 1 Development Area

SOURCE:  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
NGI, 2015



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Map Ref No 13303S/EA1_02	Revision 0	Date








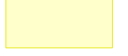
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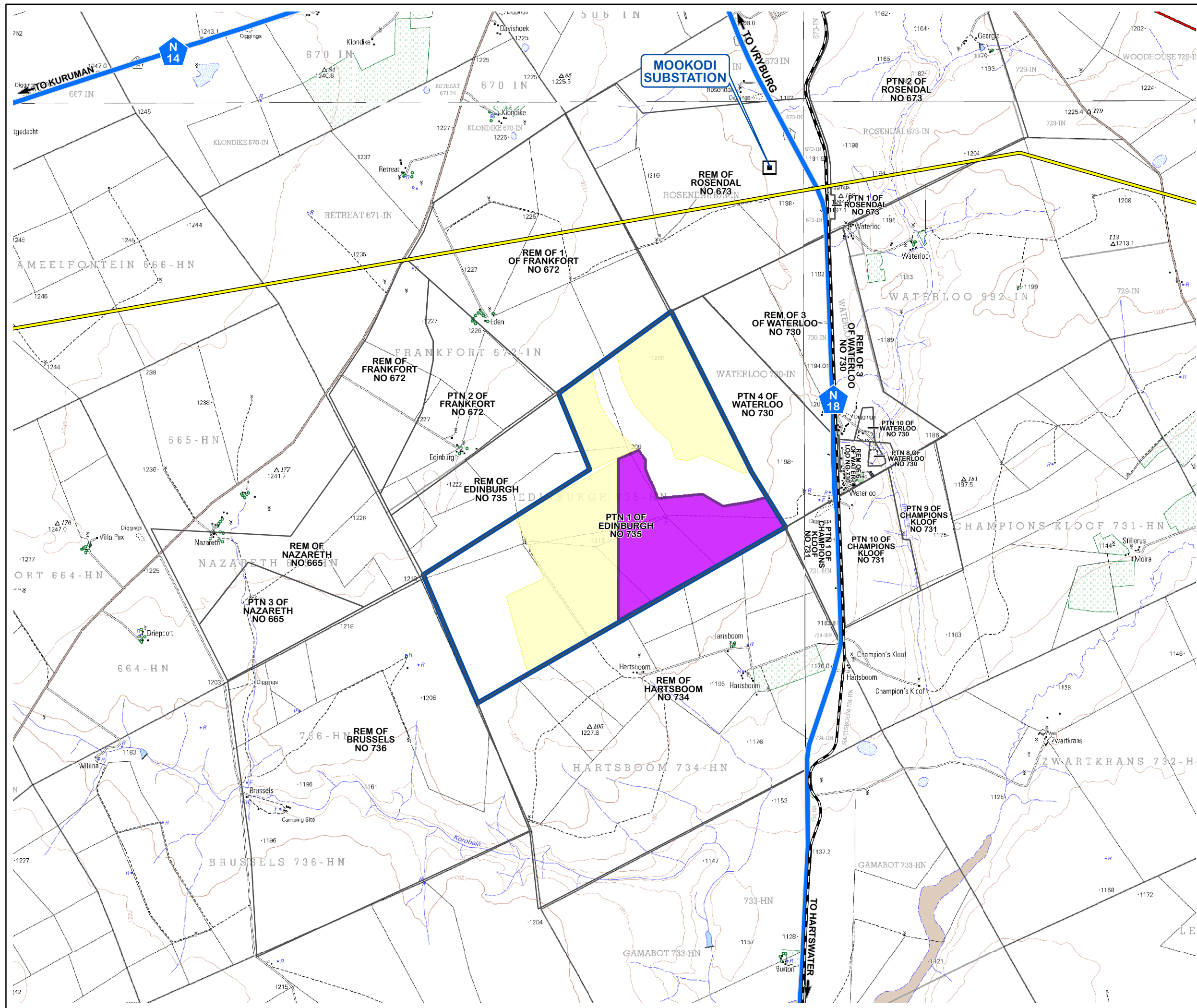
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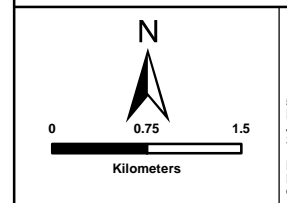
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**SENDAWO SOLAR 1 NEAR VRYBURG**  
**NORTH WEST PROVINCE**  
**SITE LOCALITY**

**Legend**

-  National Routes
-  Railway Line
-  Existing High Voltage Power Lines (400kV)
-  Existing Substation
-  Adjoining Farm Boundaries
-  Proposed Sendawo Application Site
-  Proposed Sendawo Solar 1 Development Area
-  Other Proposed Solar PV Facilities



SOURCE:  
 ESKOM, 2012  
 BIOTHERM ENERGY, 2015  
 NGI, 2015



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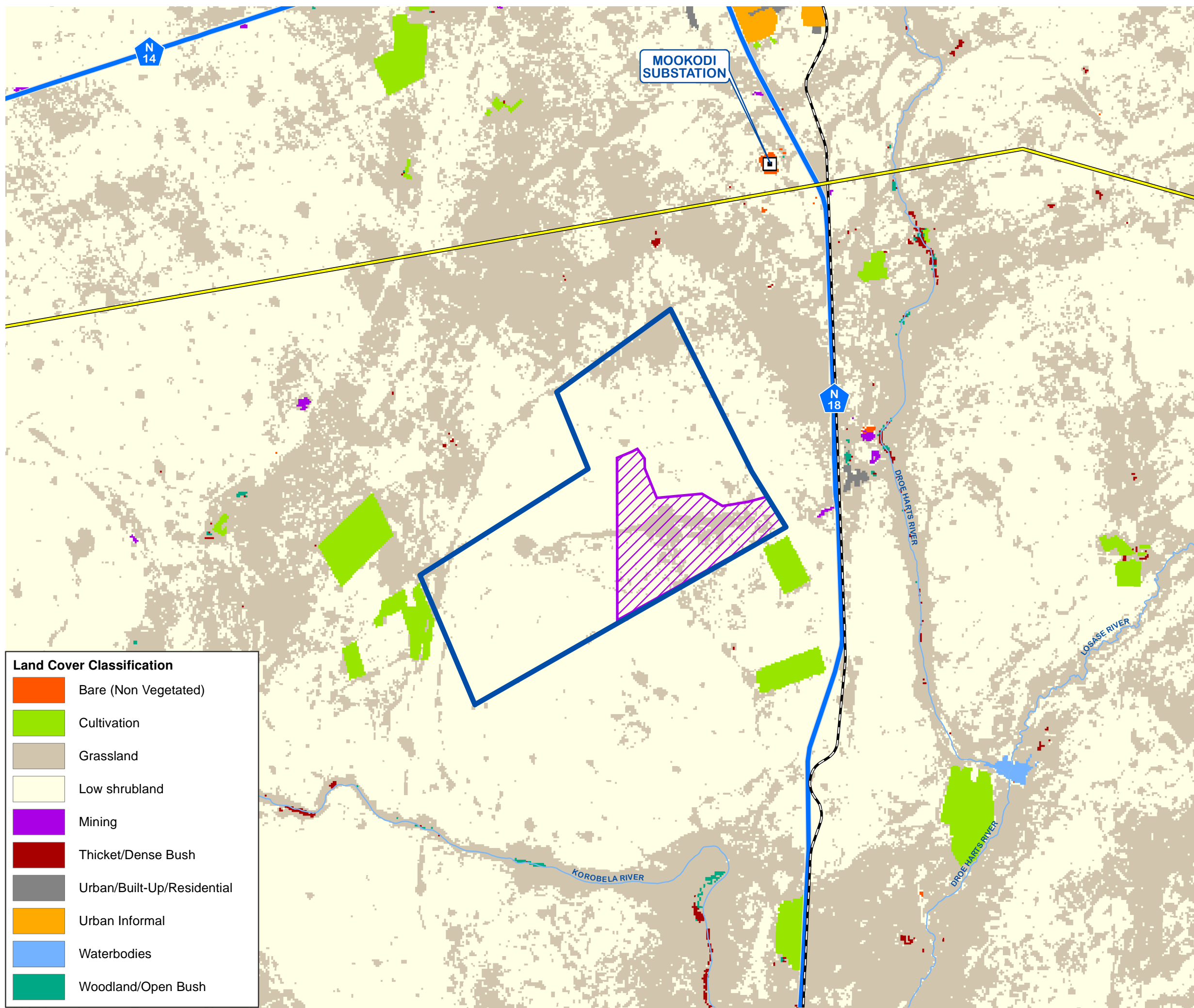
# PROPOSED CONSTRUCTION OF A 75MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY

SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE





BROAD LAND COVER CLASSIFICATION

## Legend


-  National Routes
-  Railway Line
-  Existing High Voltage Power Lines (400kV)
-  Main Rivers
-  Existing Substation
-  Proposed Sendawo Application Site
-  Proposed Sendawo Solar 1 Development Area




**Land Cover Classification**

-  Bare (Non Vegetated)
-  Cultivation
-  Grassland
-  Low shrubland
-  Mining
-  Thicket/Dense Bush
-  Urban/Built-Up/Residential
-  Urban Informal
-  Waterbodies
-  Woodland/Open Bush

SOURCE:  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
2013-2014 SA NATIONAL LAND COVER  
(© GEOTERRAIMAGE - 2014)



0 0.75 1.5  
Kilometers



**SiVEST**

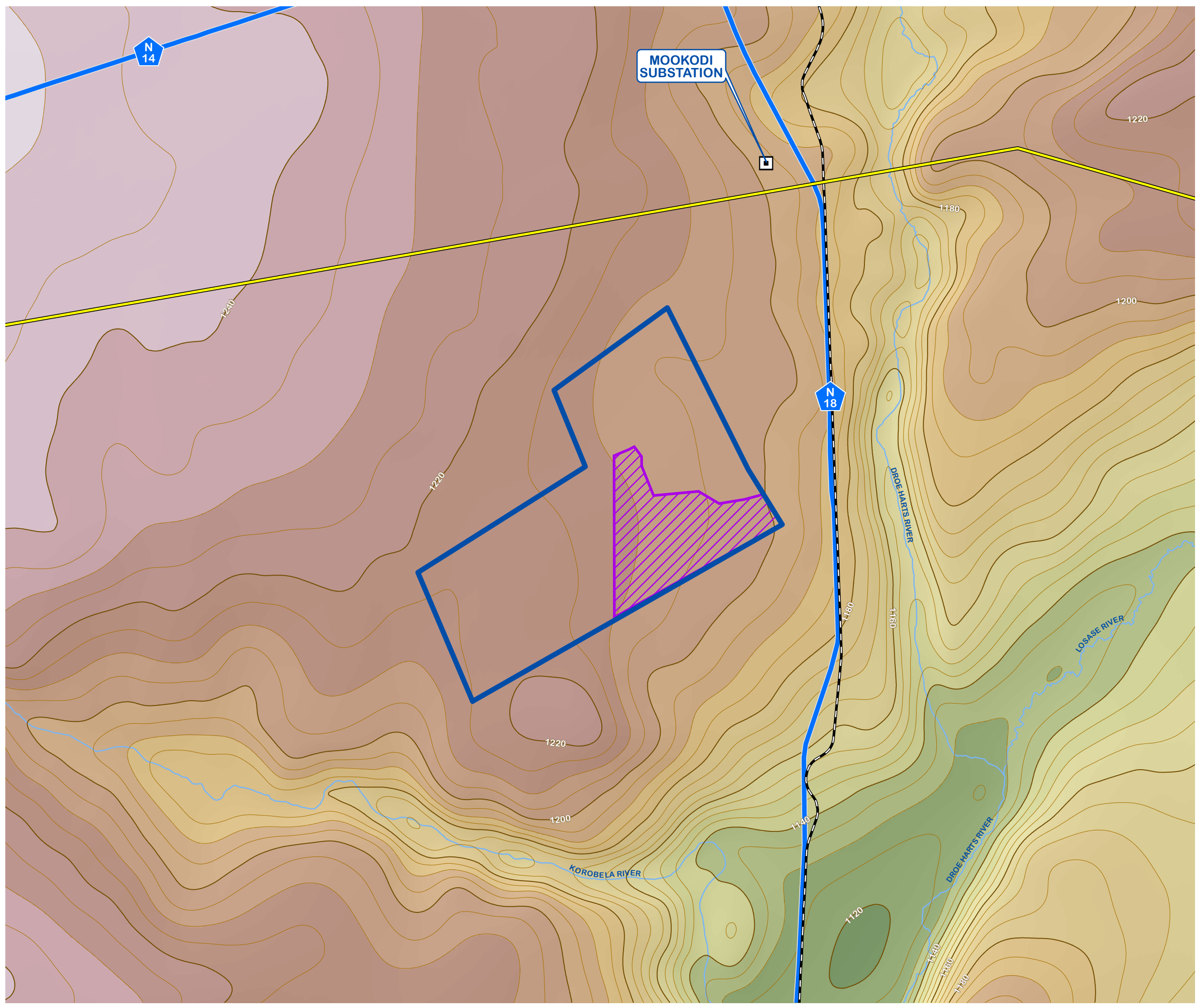
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PHOTOVOLTAIC (PV)  
ENERGY FACILITY**

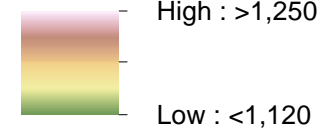
**SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE**

**TOPOGRAPHY**

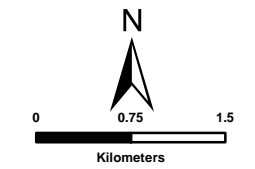
**Legend**

- National Routes
- Railway Line
- Existing High Voltage Power Lines (400kV)
- Main Rivers
- Contours (20m Interval)
- Contours (5m Interval)
- Existing Substation
- Proposed Sendawo Application Site
- Proposed Sendawo Solar 1 Development Area

**Elevation (msl)**



SOURCE:  
ESKOM, 2012  
BIOTERM ENERGY, 2015  
NGI, 2015



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<b>Map Ref No</b> 13303S/EA1_03	<b>Revision</b> 0	<b>Date</b> _____

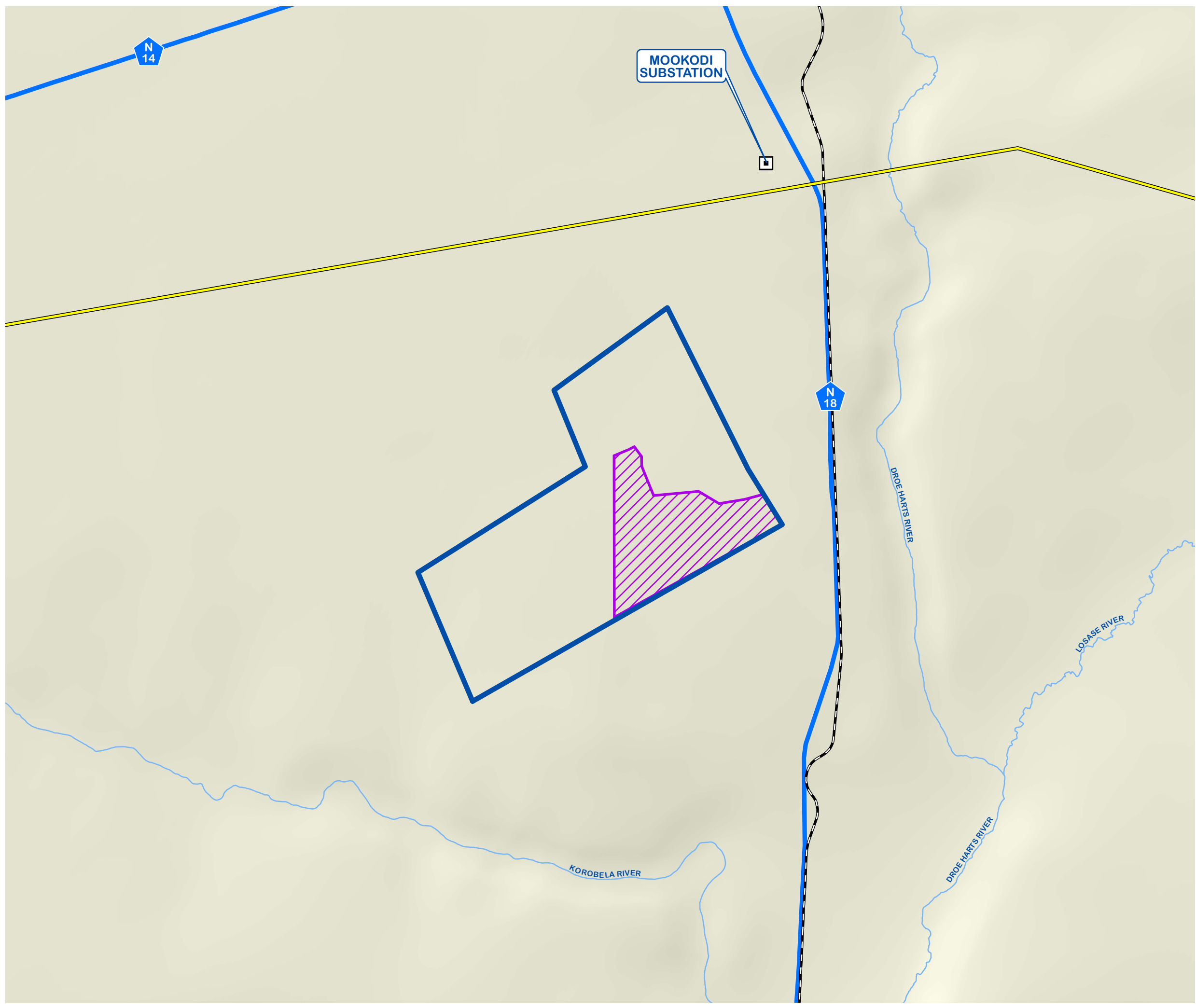
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**PROPOSED  
CONSTRUCTION OF  
A 75MW SOLAR  
PHOTOVOLTAIC (PV)  
ENERGY FACILITY**

**SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE**

**SLOPE CLASSIFICATION**



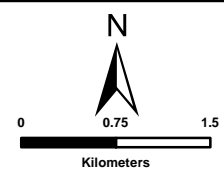
**Legend**

-  National Routes
-  Railway Line
-  Existing High Voltage Power Lines (400kV)
-  Main Rivers
-  Existing Substation
-  Proposed Sendawo Application Site
-  Proposed Sendawo Solar 1 Development Area

**Slope Classification  
(Percent Rise)**

-  <=8%

SOURCE:  
ESKOM, 2012  
BIOTERM ENERGY, 2015  
NGI, 2015



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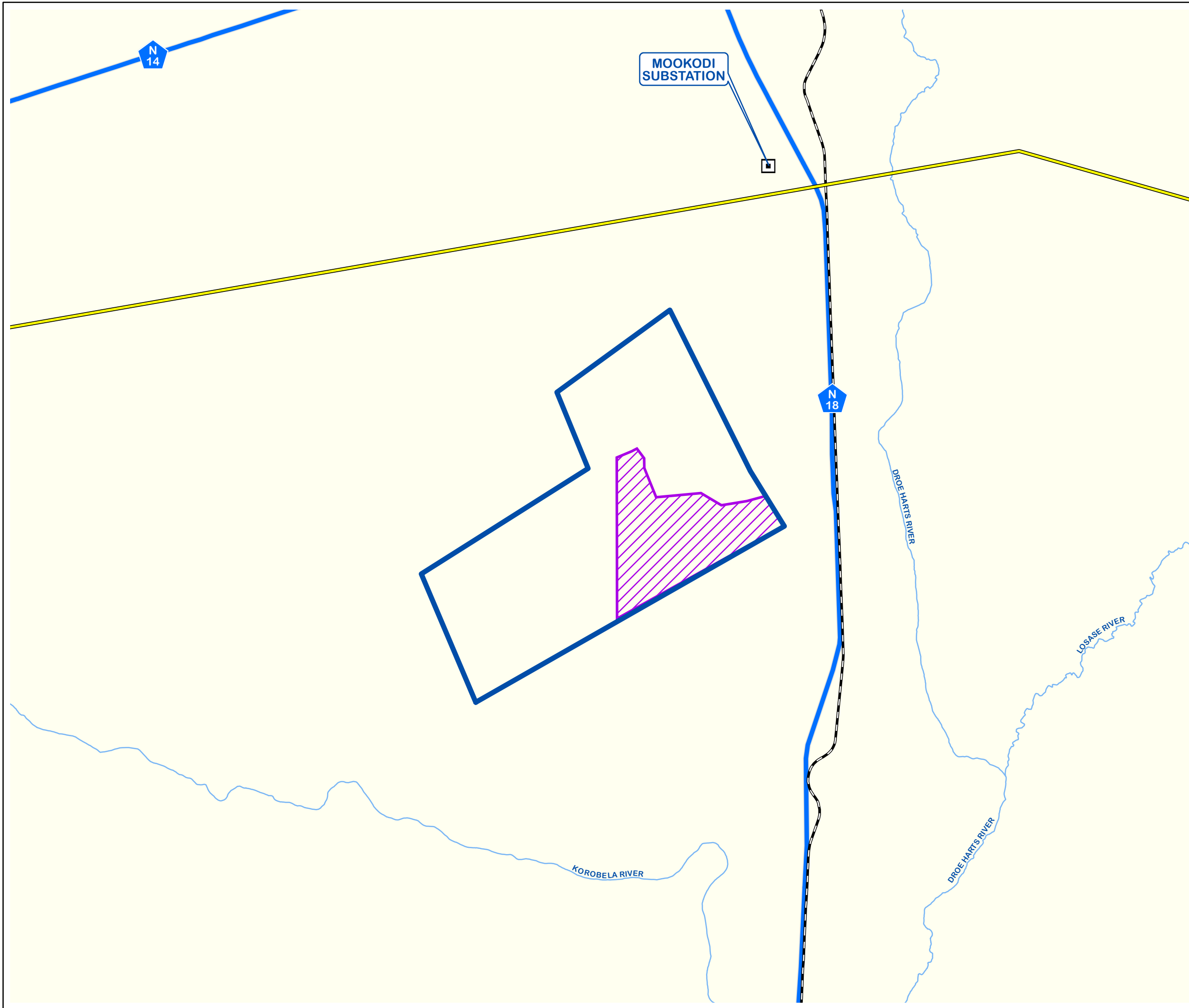
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**PROPOSED  
CONSTRUCTION OF  
A 75MW SOLAR  
PHOTOVOLTAIC (PV)  
ENERGY FACILITY**


**SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE**

**VEGETATION CLASSIFICATION**

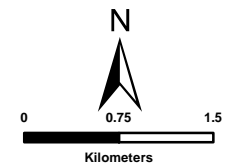
**Legend**

-  National Routes
-  Railway Line
-  Existing High Voltage Power Lines (400kV)
-  Main Rivers
-  Existing Substation
-  Proposed Sendawo Application Site
-  Proposed Sendawo Solar 1 Development Area

**Vegetation Classification**

-  SVk 7 Ghaap Plateau Vaalbosveld

SOURCE:  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
NGI, 2015  
SANBI, 2009



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**PROPOSED  
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A 75MW SOLAR  
PHOTOVOLTAIC (PV)  
ENERGY FACILITY**





**SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE**

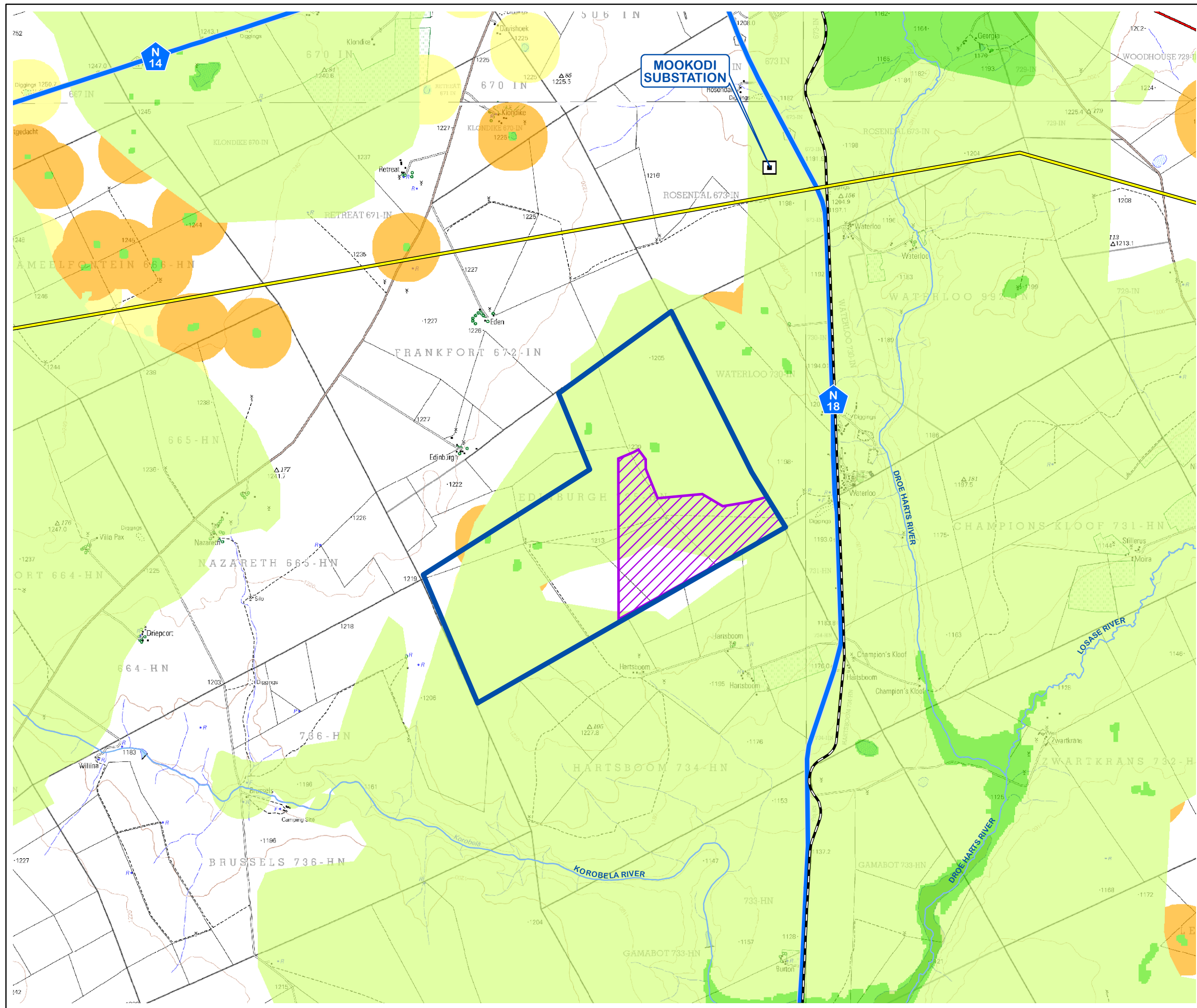
**CRITICAL BIODIVERSITY AREAS**

**Legend**

-  National Routes
-  Railway Line
-  Existing High Voltage Power Lines (400kV)
-  Main Rivers
-  Existing Substation
-  Proposed Sendawo Application Site
-  Proposed Sendawo Solar 1 Development Area

**Critical Biodiversity Areas**

-  CBA 1
-  CBA 2
-  ESA 1
-  ESA 2



**SOURCE:**  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
NGI, 2015  
NORTH WEST PROVINCE BIODIVERSITY  
CONSERVATION ASSESSMENT, 2009  
SANBI, 2009

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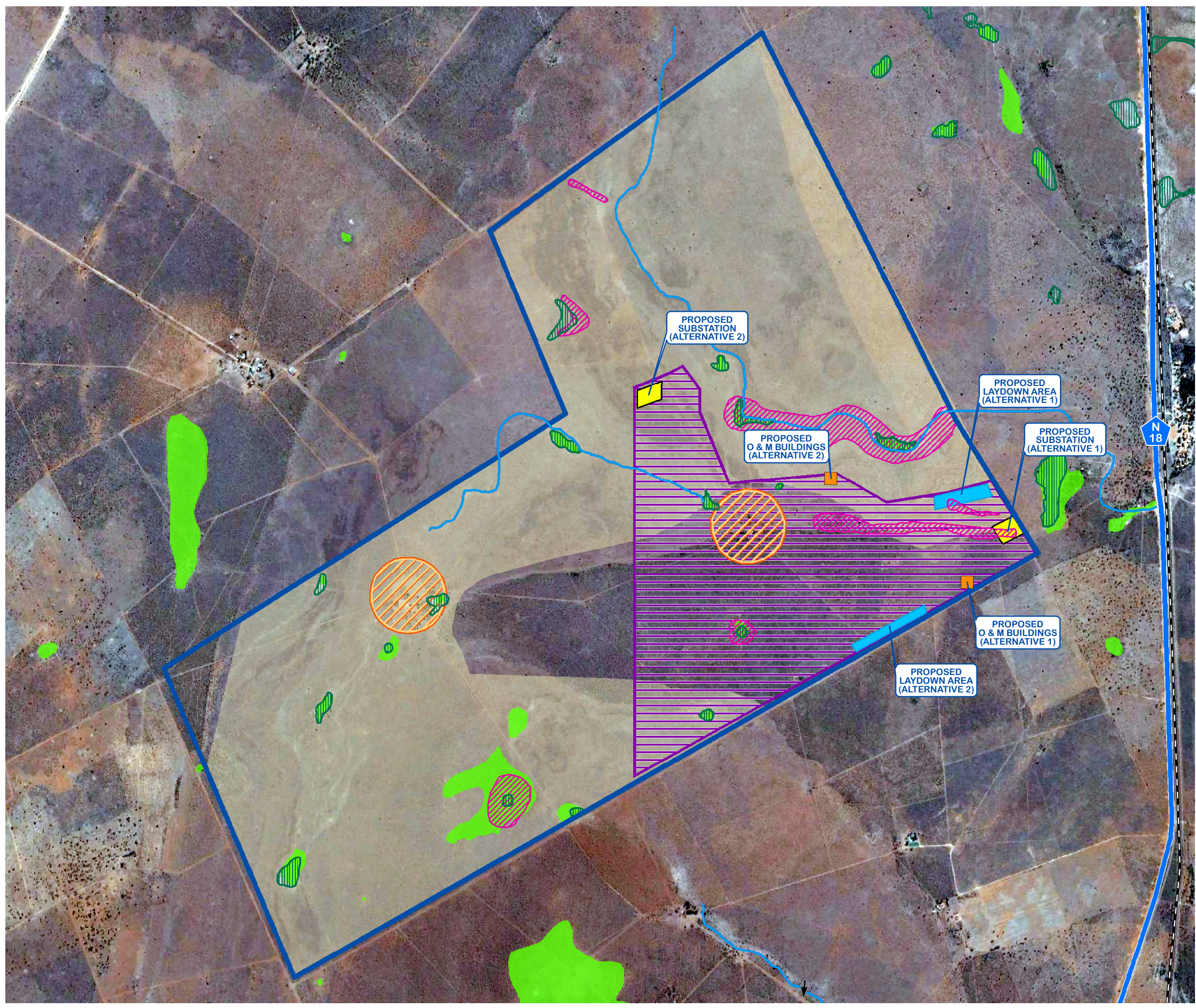
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**PROPOSED  
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A 75MW SOLAR  
PHOTOVOLTAIC (PV)  
ENERGY FACILITY**

**SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE**

**ENVIRONMENTAL SENSITIVITY**



- Legend**
- National Routes
  - Railway Line
  - Proposed Sendawo Application Site
- Proposed Layout Components**
- PV Array
  - 132kV Substation Site Alternatives
  - Laydown Area Site Alternatives
  - O&M Buildings Site Alternatives
- Sensitive Areas**
- Avifaunal Sensitivity
  - Biodiversity Sensitivity
  - Heritage Sensitivity
  - Palaeontology Sensitivity
  - Wetlands
  - Rivers and Water Courses

SOURCE:  
BIOTHERM ENERGY, 2015  
GOOGLE EARTH, 2015

 N  0 250 500 Meters	 <b>SiVEST</b> ENVIRONMENTAL DIVISION 51 WESSELS ROAD RIVONIA, 2128 JOHANNESBURG SOUTH AFRICA Phone: +27 11 798 0600 Fax: +27 11 803 7272 e-mail: info@sivest.co.za
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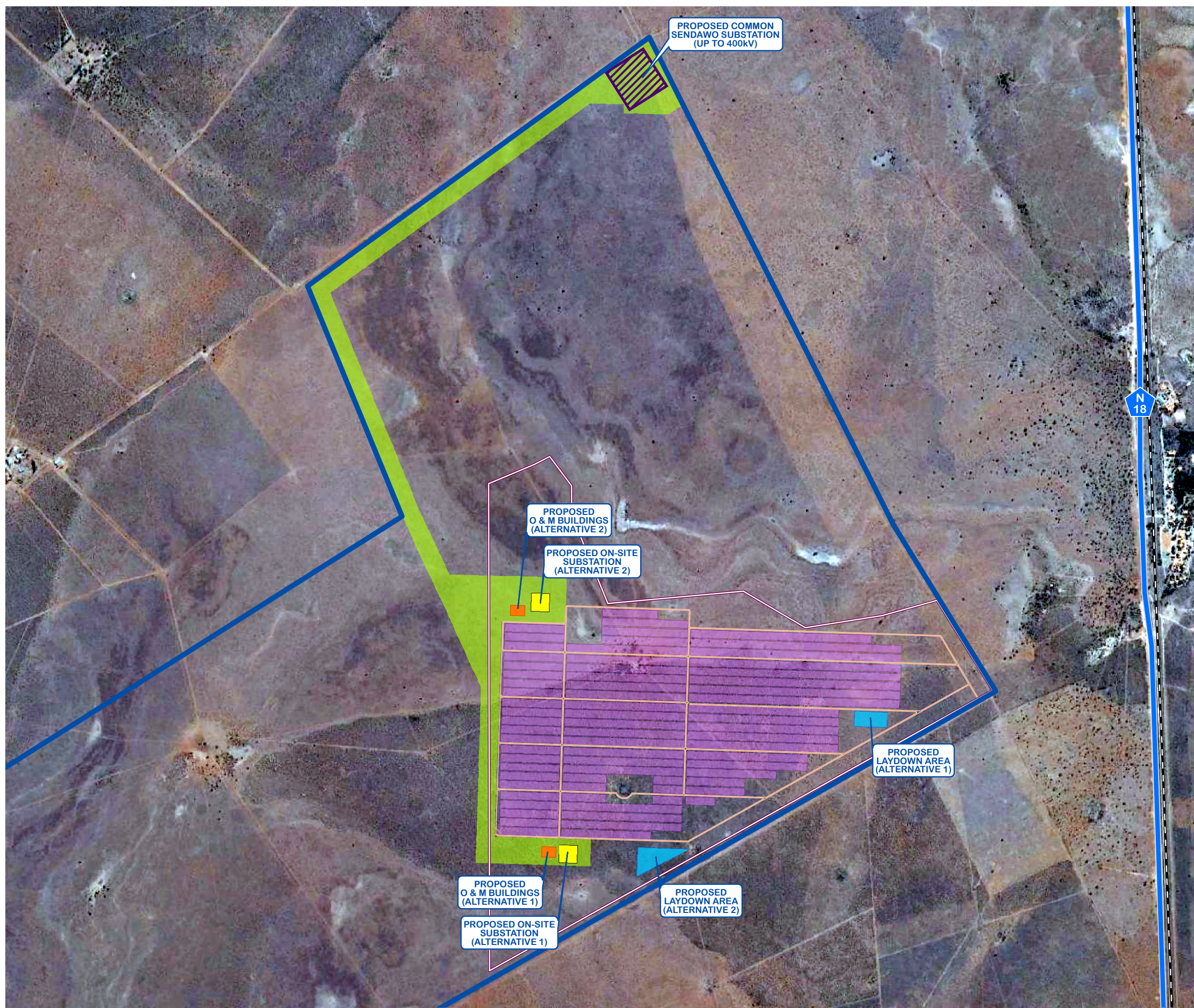
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SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE

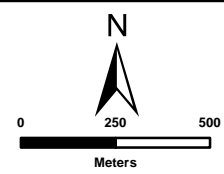
## EIA PHASE LAYOUT ALTERNATIVES

### Legend

-  National Routes
  -  Railway Line
  -  Proposed Sendawo Application Site
  -  Proposed Sendawo Solar 1 Development Area
  -  Proposed Common Sendawo Substation (up to 400kV)
- ### Proposed Layout Components
-  Proposed 132kV Power Line Corridor
  -  PV Array
  -  Substation Site Alternatives
  -  Laydown Area Site Alternatives
  -  O & M Buildings Site Alternatives
  -  Internal Road Network



SOURCE:  
ESKOM, 2012  
BIOTHEM ENERGY, 2015  
GOOGLE EARTH, 2016



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Map Ref No 13303S/EA1_09	Revision 1	Date 03/06/2016

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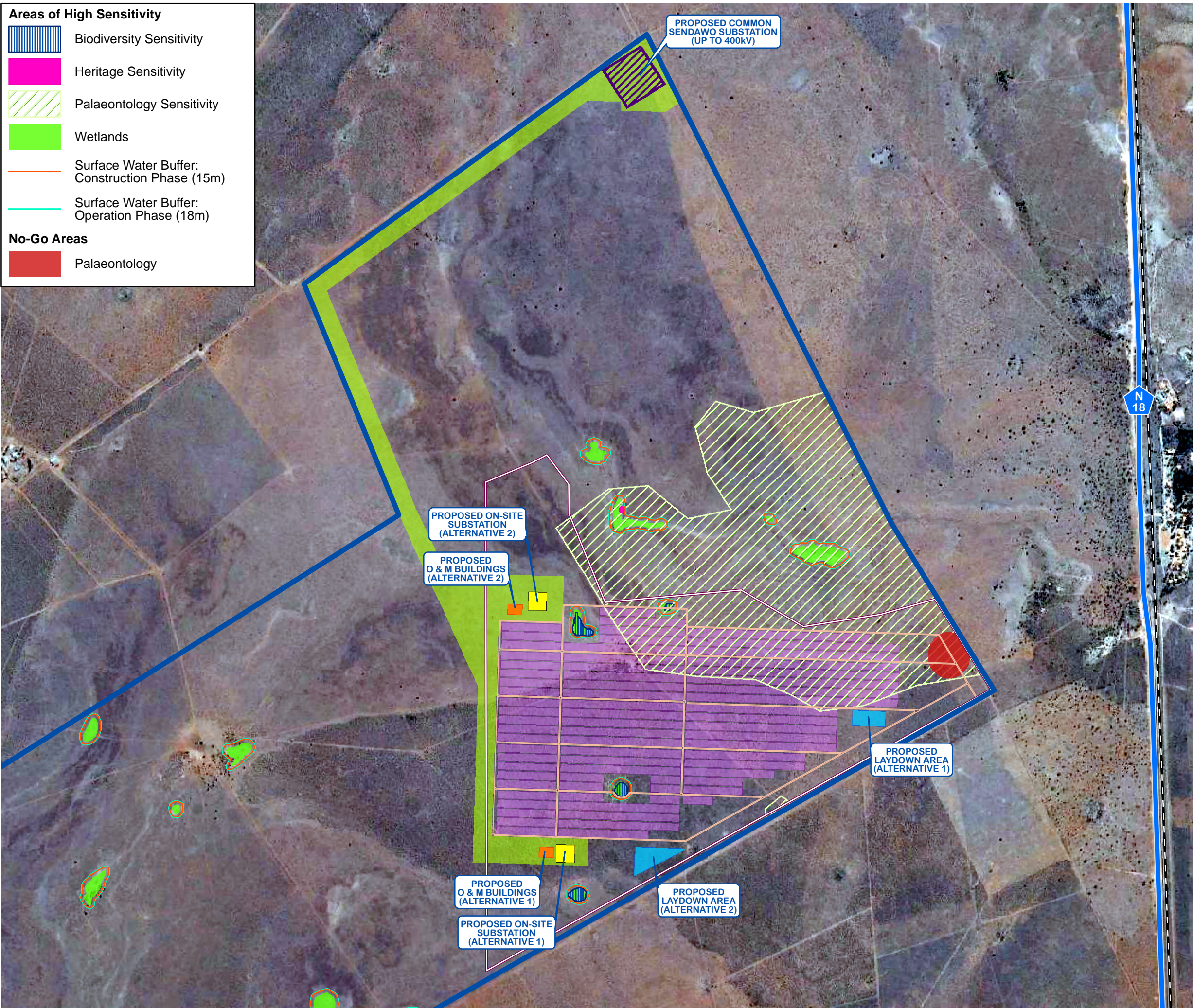


**Areas of High Sensitivity**

-  Biodiversity Sensitivity
-  Heritage Sensitivity
-  Palaeontology Sensitivity
-  Wetlands
-  Surface Water Buffer: Construction Phase (15m)
-  Surface Water Buffer: Operation Phase (18m)

**No-Go Areas**

-  Palaeontology






**PROPOSED CONSTRUCTION OF A 75MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY**








**SENDAWO SOLAR 1 NEAR VRYBURG NORTH WEST PROVINCE**

**AREAS OF HIGH SENSITIVITY**


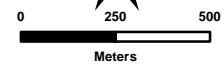
**Legend**


-  National Routes
-  Railway Line
-  Proposed Sendawo Application Site
-  Proposed Sendawo Solar 1 Development Area
-  Proposed Common Sendawo Substation (up to 400kV)

**Proposed Layout Components**

-  Proposed 132kV Power Line Corridor
-  PV Array
-  Substation Site Alternatives
-  Laydown Area Site Alternatives
-  O & M Buildings Site Alternatives
-  Palaeontology
-  Internal Road Network

SOURCE:  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
GOOGLE EARTH, 2016

  
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<b>Map Ref No</b> 13303S/EA1_10	<b>Revision</b> 1	<b>Date</b> 03/12/2016

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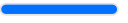






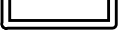


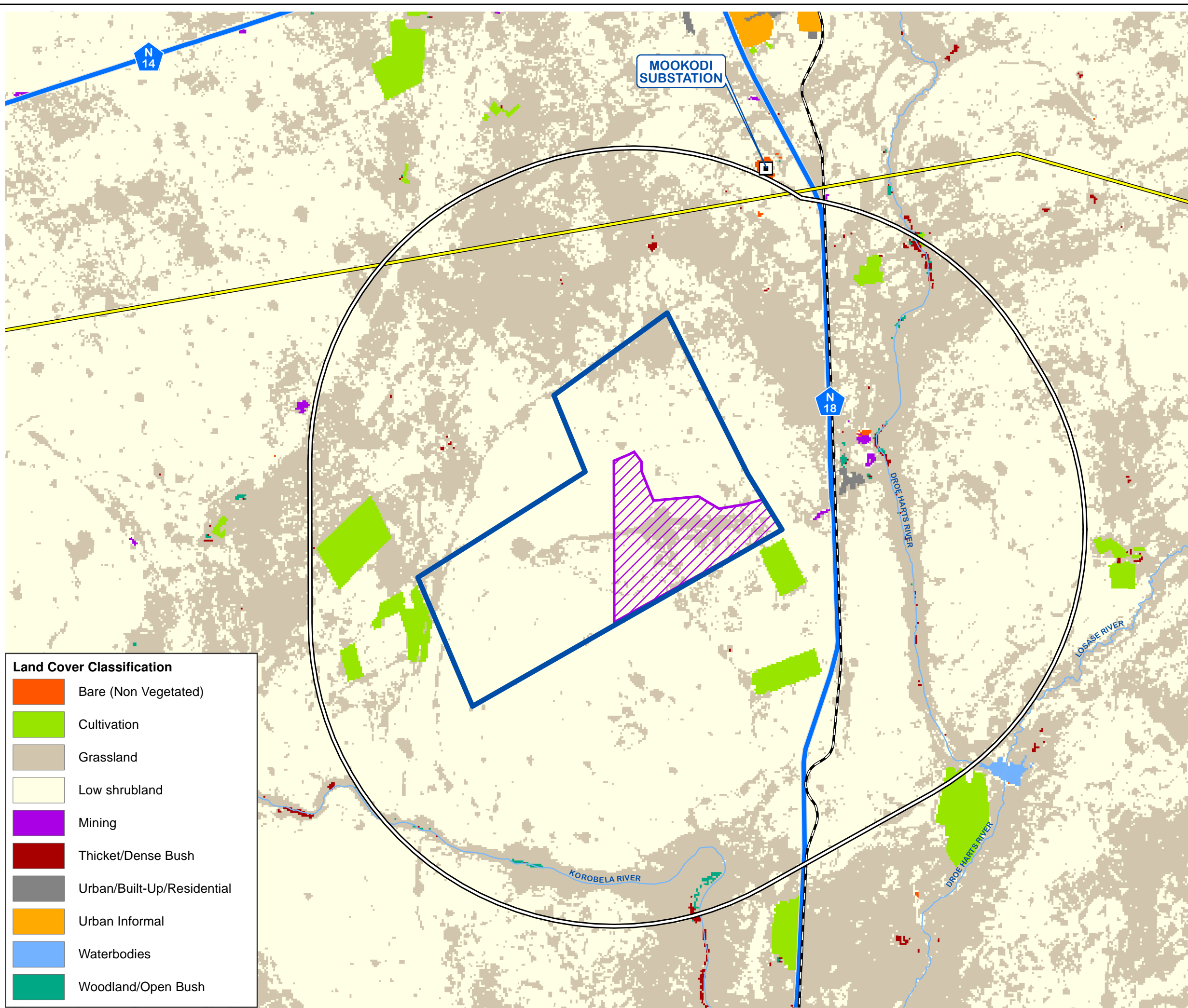
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

VISUAL ASSESSMENT:  
BROAD LAND COVER  
CLASSIFICATION

## Legend


-  National Routes
-  Railway Line
-  Existing High Voltage Power Lines (400kV)
-  Main Rivers
-  Existing Substation
-  Proposed Sendawo Application Site
-  Proposed Sendawo Solar 1 Development Area
-  5km Visual Assessment Zone




**Land Cover Classification**

-  Bare (Non Vegetated)
-  Cultivation
-  Grassland
-  Low shrubland
-  Mining
-  Thicket/Dense Bush
-  Urban/Built-Up/Residential
-  Urban Informal
-  Waterbodies
-  Woodland/Open Bush

SOURCE:  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
2013-2014 SA NATIONAL LAND COVER  
(© GEOTERRAIMAGE - 2014)



0 0.75 1.5  
Kilometers



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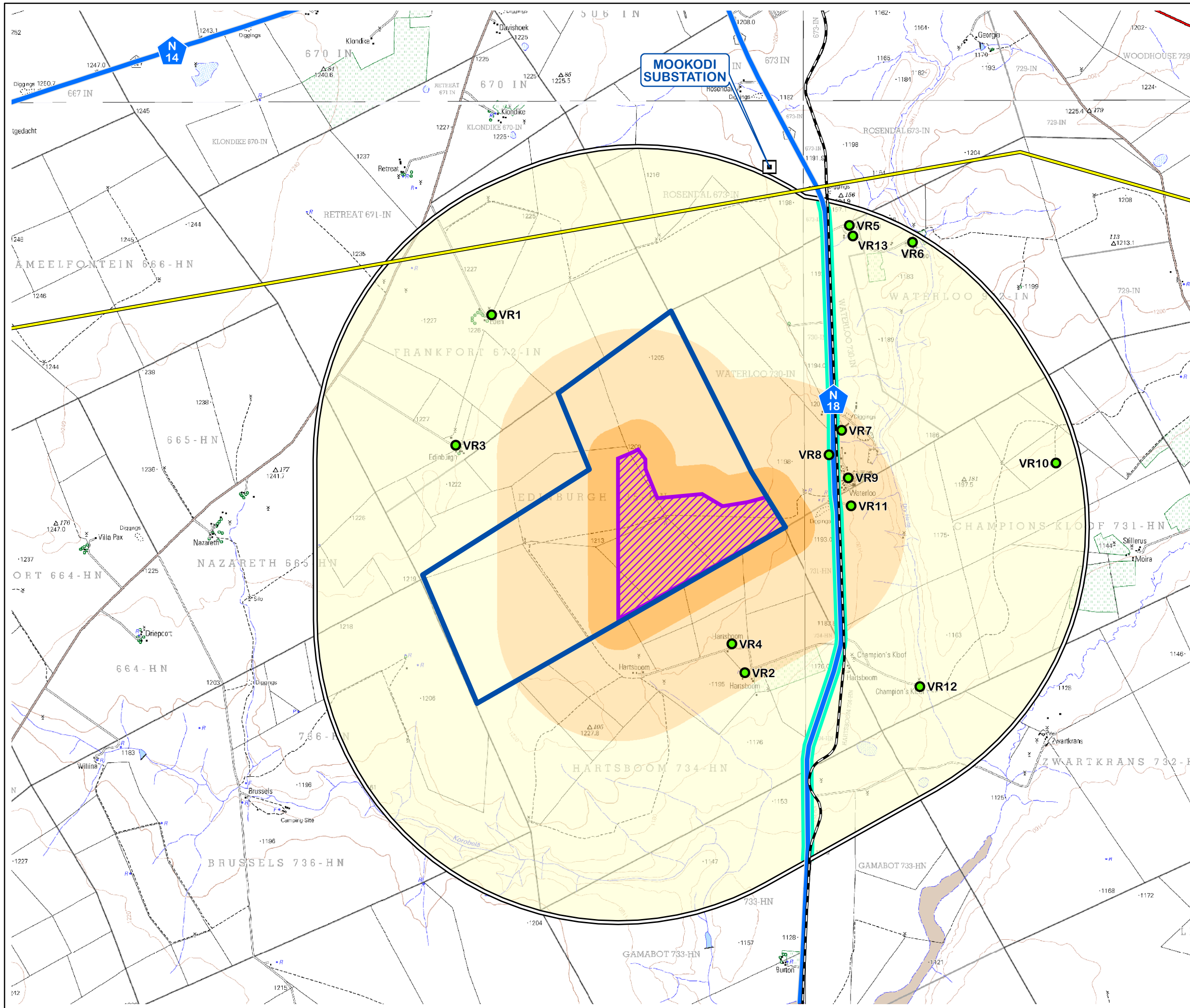
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# PROPOSED CONSTRUCTION OF A 75MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY

**SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE**

**VISUAL ASSESSMENT:  
POTENTIALLY SENSITIVE VISUAL  
RECEPTOR LOCATIONS**



### Legend

- National Routes
- Railway Line
- Existing High Voltage Power Lines (400kV)
- Existing Substation
- Proposed Sendawo Application Site
- Proposed Sendawo Solar 1 Development Area
- 5km Visual Assessment Zone

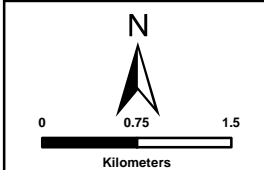
### Visual Receptors

- Potentially Sensitive Receptor Locations
- Receptor Road

### Zones of Visual Exposure

- High (<=500m)
- Moderate (501m - 2km)
- Low (2.1 - 5km)

SOURCE:  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
NGI, 2015



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<b>Project No</b> 13303	<b>Prepared By</b> KLS	<b>Date</b> 23/02/2016
<b>Map Ref No</b> 13303S/EA1_V07	<b>Revision</b> 0	<b>Date</b> 

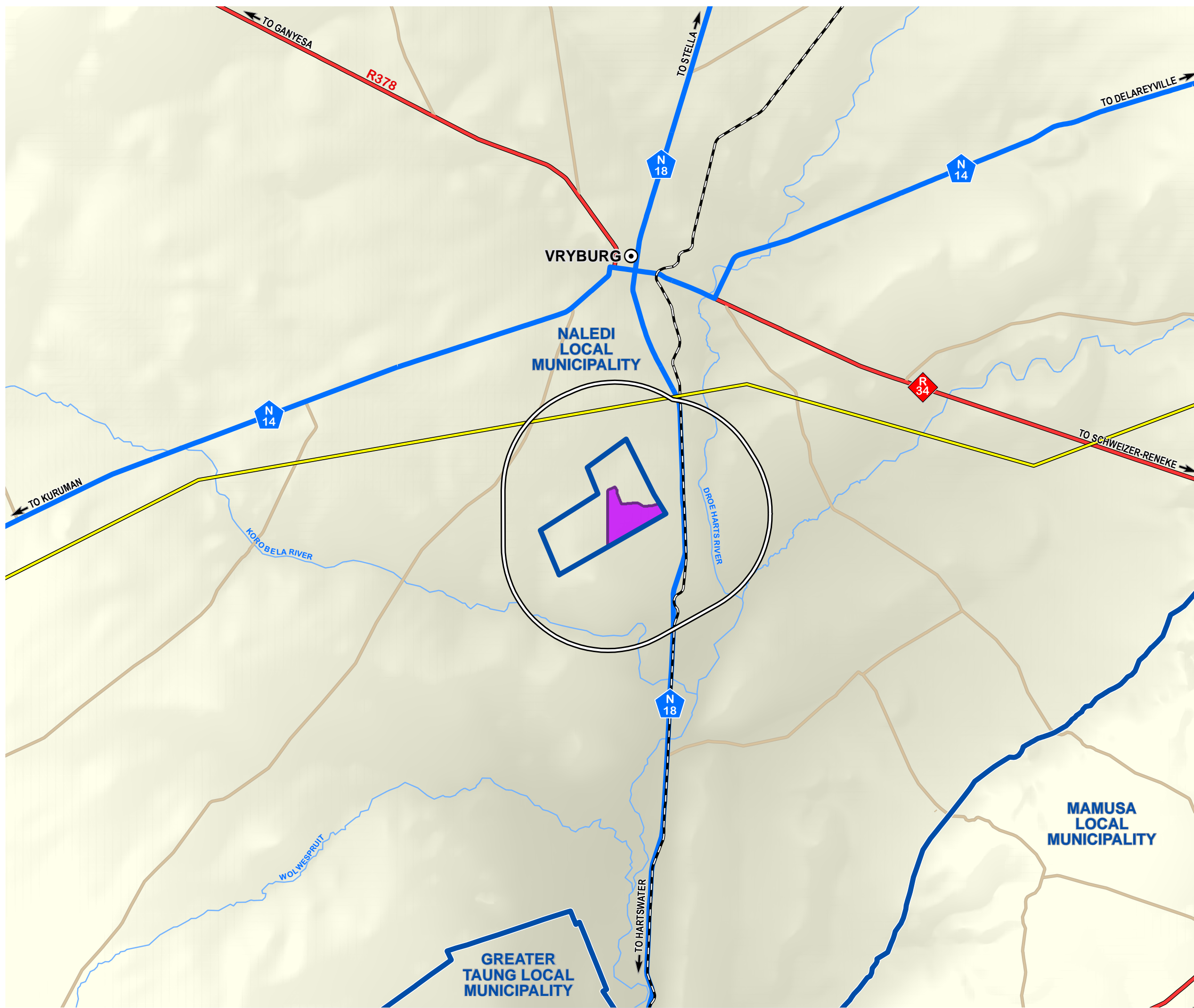
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**PROPOSED  
CONSTRUCTION OF  
A 75MW SOLAR  
PHOTOVOLTAIC (PV)  
ENERGY FACILITY**

**SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE**

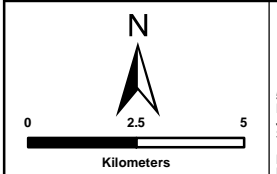
**VISUAL ASSESSMENT:  
REGIONAL CONTEXT**



**Legend**

-  Local Municipal Boundaries
-  National Routes
-  Main Roads
-  Secondary Roads
-  Railway Line
-  Existing High Voltage Power Lines (400kV)
-  Main Rivers
-  Main Towns
-  Proposed Sendawo Application Site
-  Proposed Sendawo Solar 1 Development Area
-  5km Visual Assessment Zone

SOURCE:  
ESKOM, 2012  
BIOTERM ENERGY, 2015  
NGI, 2015



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Map Ref No 13303S/EA1_V02	Revision 0	Date

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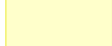



# PROPOSED CONSTRUCTION OF A 75MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY

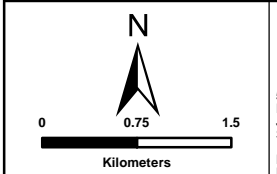
SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE

VISUAL ASSESSMENT:  
SITE LOCALITY

## Legend

-  National Routes
-  Railway Line
-  Existing High Voltage Power Lines (400kV)
-  Existing Substation
-  Adjoining Farm Boundaries
-  Proposed Sendawo Application Site
-  Proposed Sendawo Solar 1 Development Area
-  Other Proposed Solar PV Facilities
-  5km Visual Assessment Zone

SOURCE:  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
NGI, 2015



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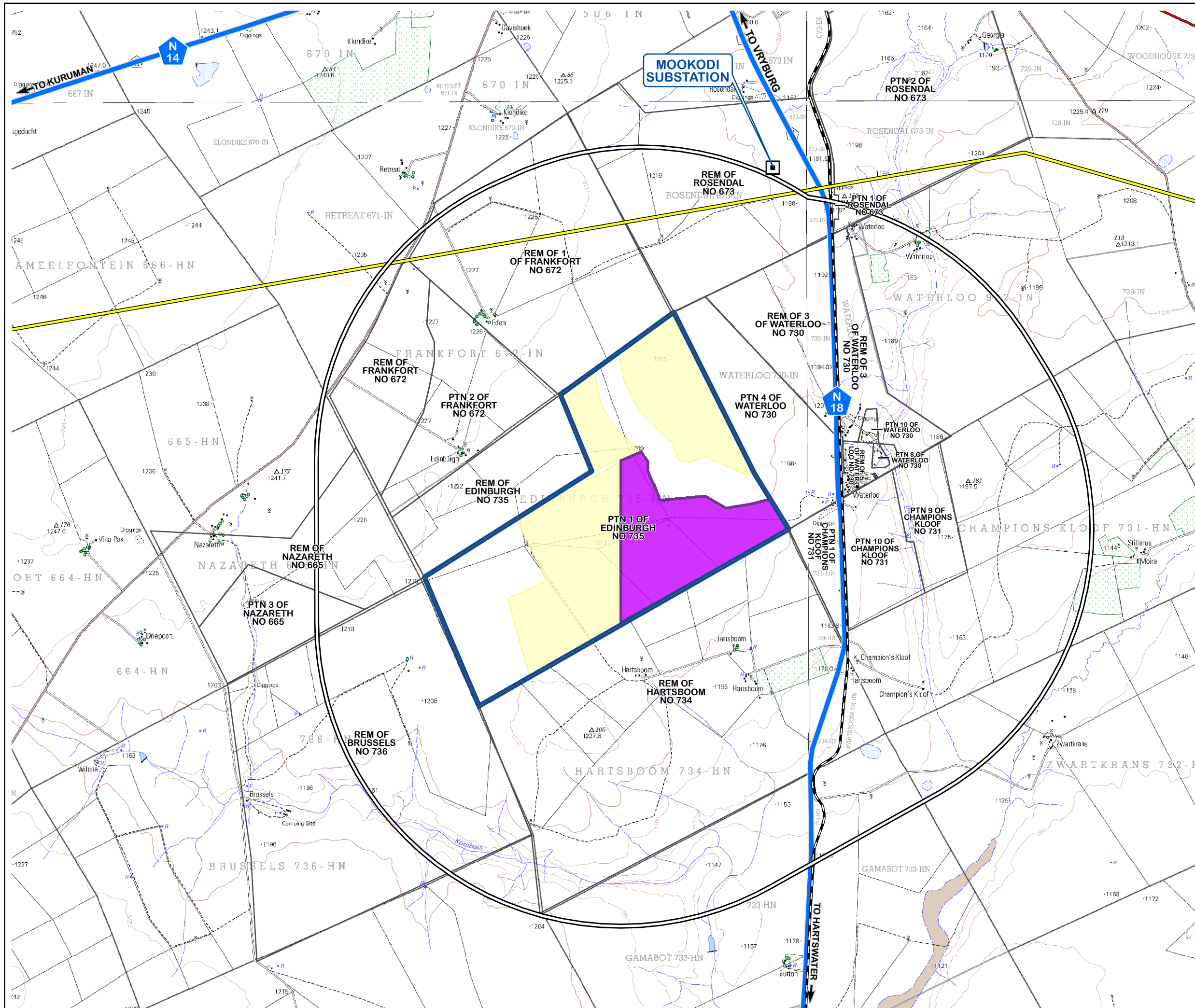
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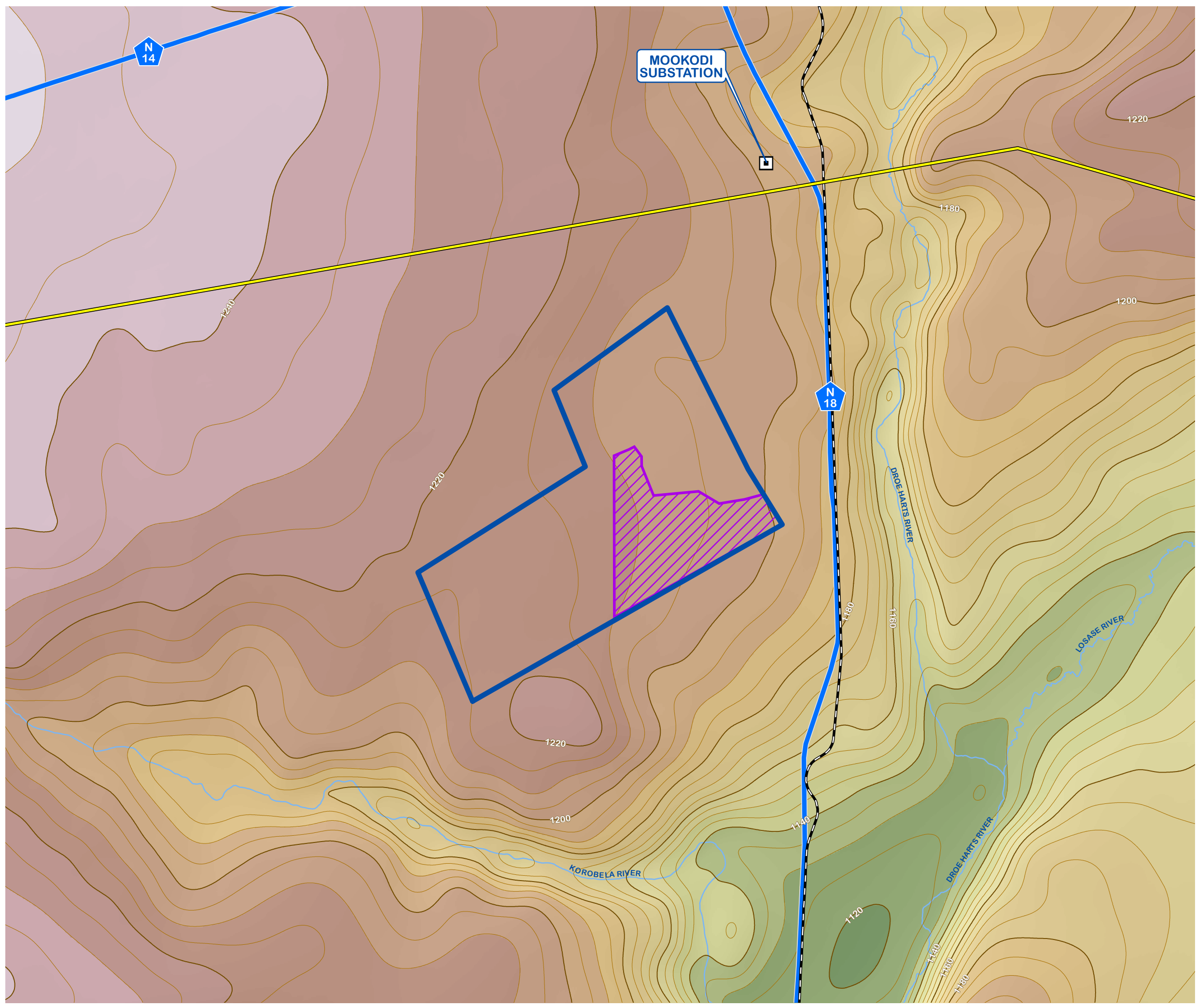
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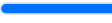












**PROPOSED  
CONSTRUCTION OF  
A 75MW SOLAR  
PHOTOVOLTAIC (PV)  
ENERGY FACILITY**

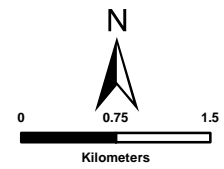
**SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE**

**VISUAL ASSESSMENT:  
TOPOGRAPHY**

**Legend**

-  National Routes
  -  Railway Line
  -  Existing High Voltage Power Lines (400kV)
  -  Main Rivers
  -  Contours (20m Interval)
  -  Contours (5m Interval)
  -  Existing Substation
  -  Proposed Sendawo Application Site
  -  Proposed Sendawo Solar 1 Development Area
- Elevation (msl)**
-  High : >1,250
  -  Low : <1,120

SOURCE:  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
NGI, 2015



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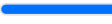









**PROPOSED  
CONSTRUCTION OF  
A 75MW SOLAR  
PHOTOVOLTAIC (PV)  
ENERGY FACILITY**


**SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE**

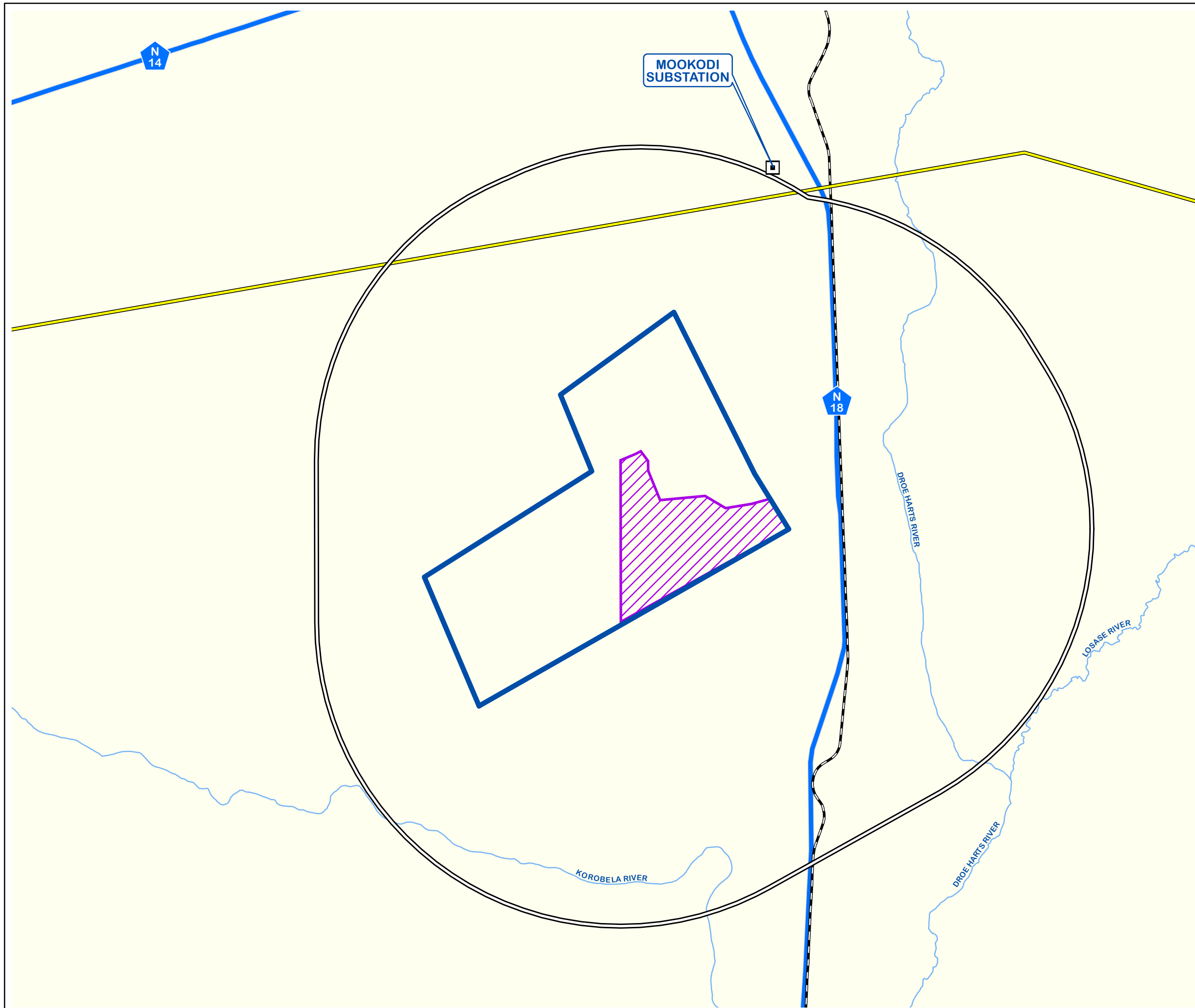
**VISUAL ASSESSMENT:  
VEGETATION CLASSIFICATION**

**Legend**

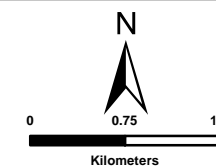
-  National Routes
-  Railway Line
-  Existing High Voltage Power Lines (400kV)
-  Main Rivers
-  Existing Substation
-  Proposed Sendawo Application Site
-  Proposed Sendawo Solar 1 Development Area
-  5km Visual Assessment Zone

**Vegetation Classification**

-  SVk 7 Ghaap Plateau Vaalbosveld



SOURCE:  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
NGI, 2015  
SANBI, 2009



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<b>Map Ref No</b> 13303/EA1_V04	<b>Revision</b> 0	<b>Date</b> _____
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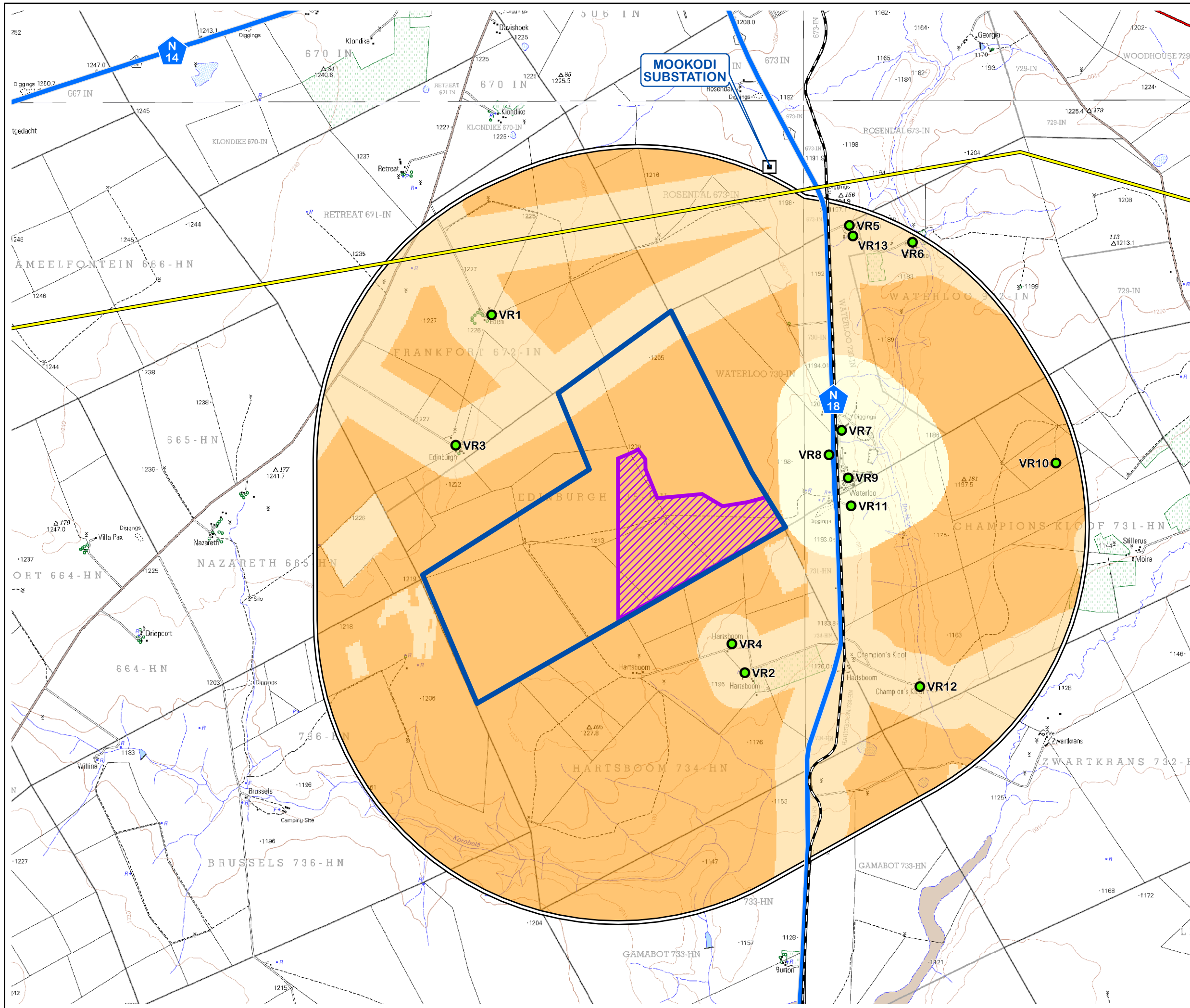
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# PROPOSED CONSTRUCTION OF A 75MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY

SENDAWO SOLAR 1  
NEAR VRYBURG  
NORTH WEST PROVINCE

VISUAL ASSESSMENT:  
ZONES OF VISUAL CONTRAST



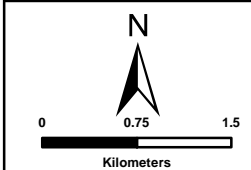
## Legend

- National Routes
- Railway Line
- Existing High Voltage Power Lines (400kV)
- Existing Substation
- Proposed Sendawo Application Site
- Proposed Sendawo Solar 1 Development Area
- 5km Visual Assessment Zone
- Potentially Sensitive Receptor Locations

## Zones of Visual Contrast

- High
- Moderate
- Low

SOURCE:  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
NGI, 2015



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Map Ref No 13303S/EA1_V06	Revision 0	Date
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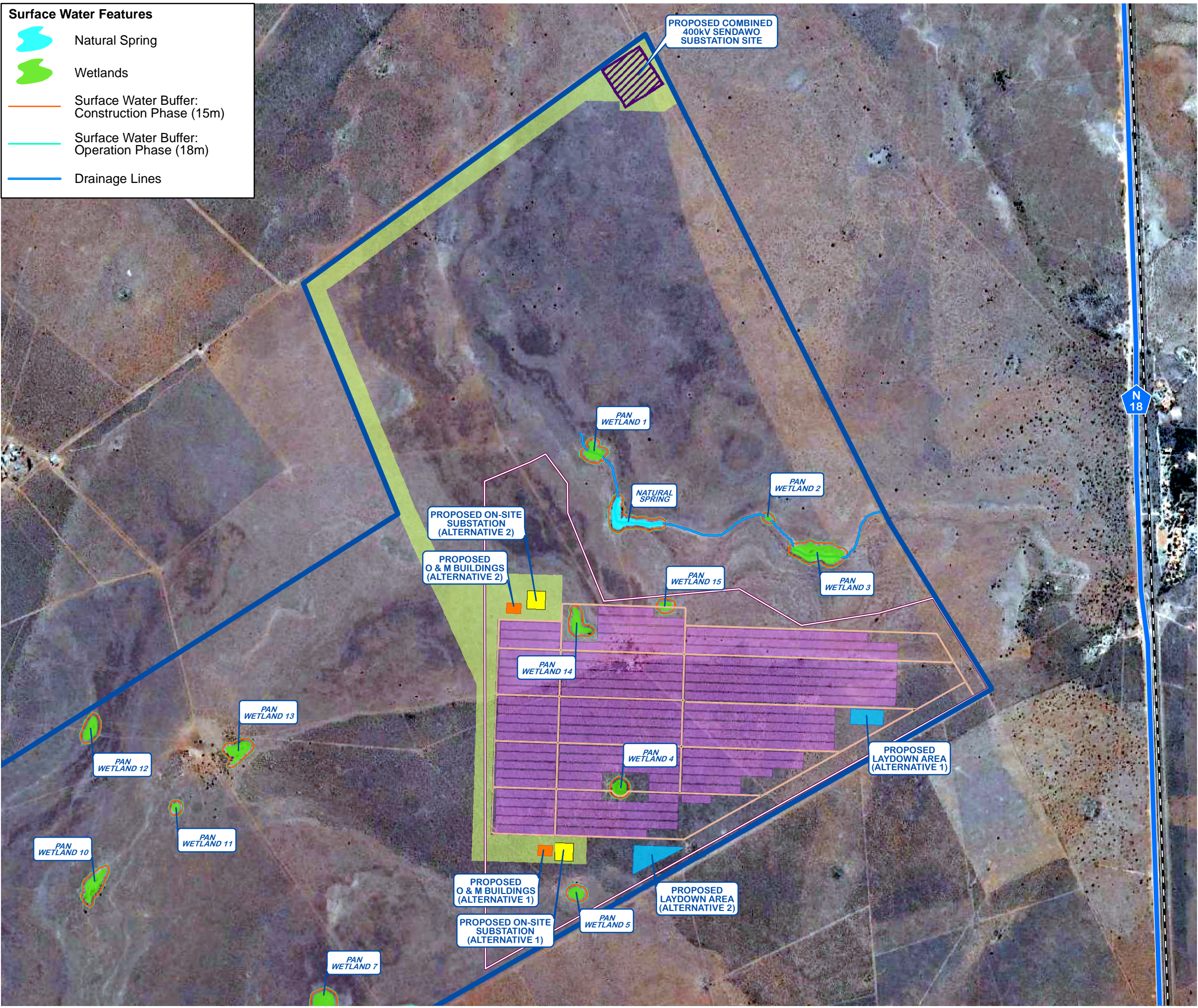
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**Surface Water Features**

-  Natural Spring
-  Wetlands
-  Surface Water Buffer: Construction Phase (15m)
-  Surface Water Buffer: Operation Phase (18m)
-  Drainage Lines



**PROPOSED CONSTRUCTION OF A 75MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY**

**SENDAWO SOLAR 1 NEAR VRYBURG NORTH WEST PROVINCE**

**SURFACE WATER ASSESSMENT: SURFACE WATER DELINEATION**


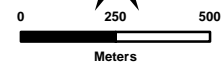
**Legend**


-  National Routes
-  Railway Line
-  Proposed Sendawo Application Site
-  Proposed Sendawo Solar 1 Development Area
-  Proposed Combined 400kV Sendawo Substation Site

**Proposed Layout Components**

-  Proposed 132kV Power Line Corridor
-  PV Array
-  Substation Site Alternatives
-  Laydown Area Site Alternatives
-  O & M Buildings Site Alternatives
-  Internal Road Network

SOURCE: BIOTHERM ENERGY, 2015  
GOOGLE EARTH, 2016

  
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<b>Map Ref No</b> 13303S/EA1_SW01	<b>Revision</b> 0	<b>Date</b> _____

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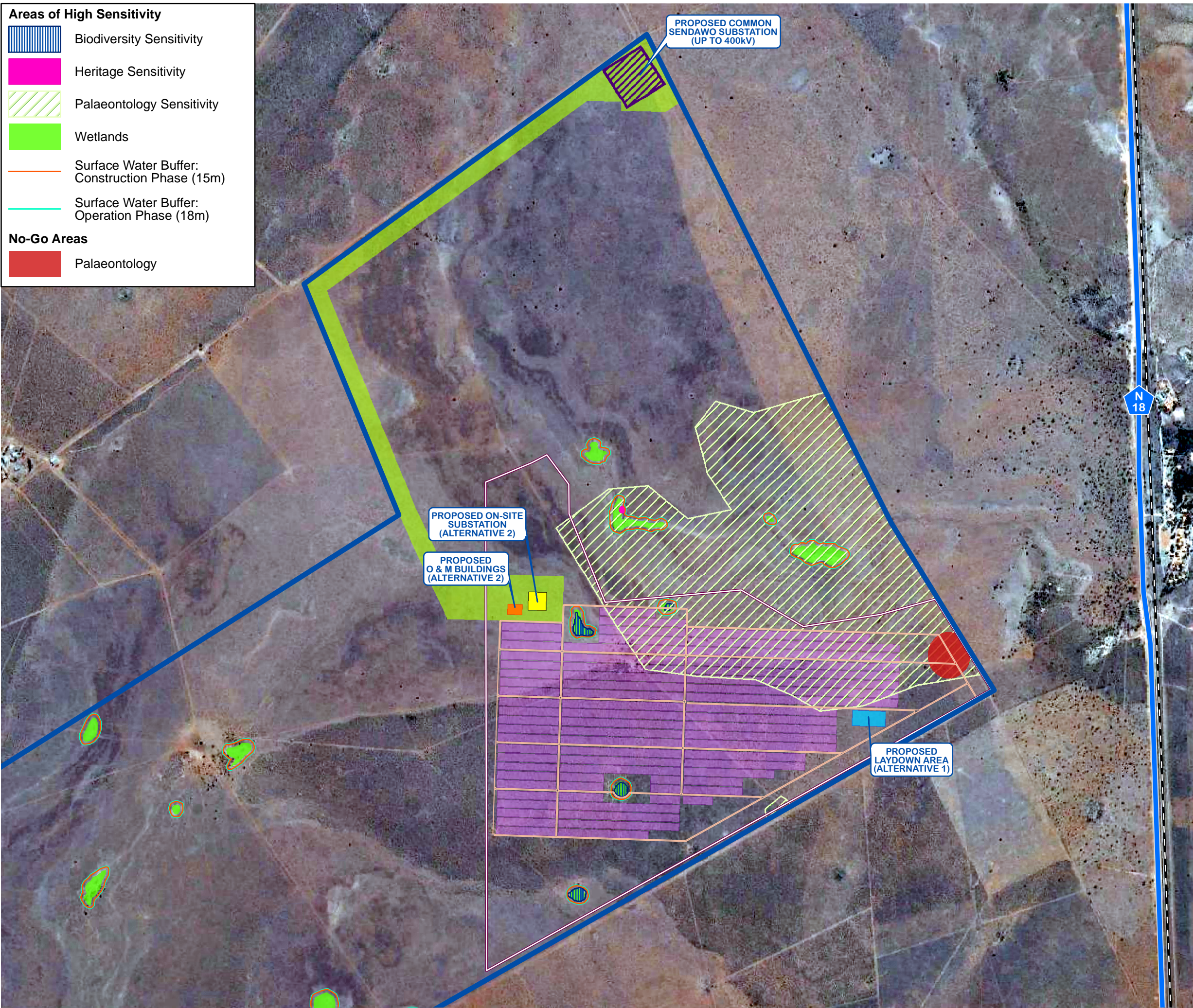


**Areas of High Sensitivity**

-  Biodiversity Sensitivity
-  Heritage Sensitivity
-  Palaeontology Sensitivity
-  Wetlands
-  Surface Water Buffer: Construction Phase (15m)
-  Surface Water Buffer: Operation Phase (18m)

**No-Go Areas**

-  Palaeontology








**PROPOSED CONSTRUCTION OF A 75MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY**







**SENDAWO SOLAR 1 NEAR VRYBURG NORTH WEST PROVINCE**

**PREFERRED SITE LAYOUT**


**Legend**

-  National Routes
-  Railway Line
-  Proposed Sendawo Application Site
-  Proposed Sendawo Solar 1 Development Area
-  Proposed Common Sendawo Substation (up to 400kV)

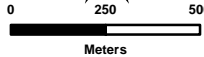
**Preferred Layout Components**

-  Proposed 132kV Power Line Corridor
-  PV Array
-  Preferred Substation Site (Alternative 2)
-  Preferred Laydown Area (Alternative 1)
-  Preferred O & M Buildings Site (Alternative 2)
-  Internal Road Network


SOURCE:  
ESKOM, 2012  
BIOTHERM ENERGY, 2015  
GOOGLE EARTH, 2016



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