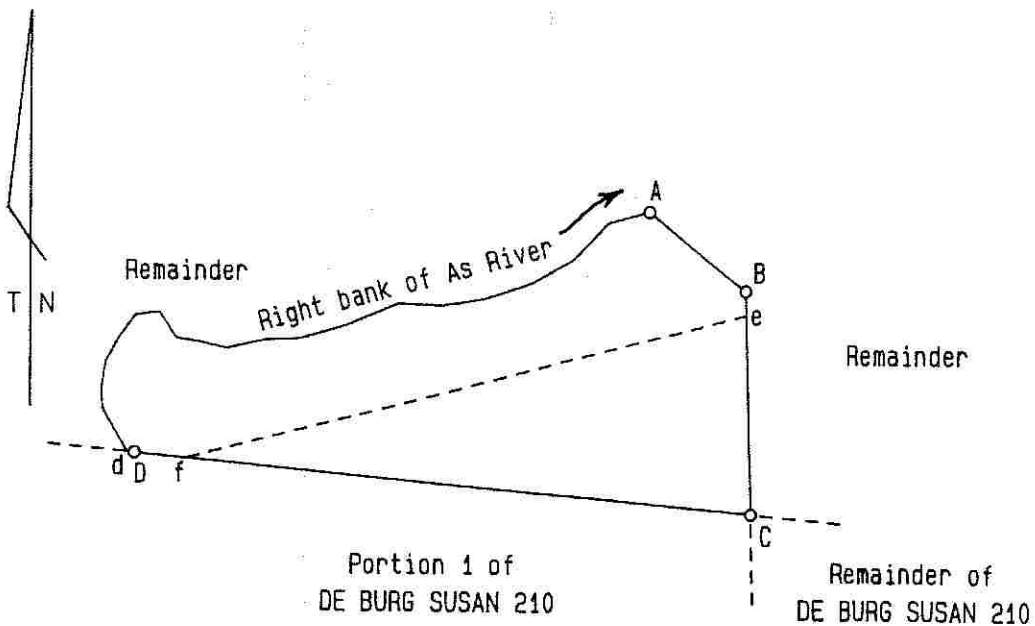


SIDES Metres		ANGLES OF DIRECTION		CO-ORDINATES System: WG29° X		S.G. No.
		Constants:		+	0, 00	+3100 000, 00
AB	65, 85	308 29 10	A	+ 62 449, 63	+ 38 836, 71	Approved * Subject to Approval for SURVEYOR- GENERAL
BC	118, 10	358 23 50	B	+ 62 398, 08	+ 38 877, 69	
CD	327, 84	95 19 51	C	+ 62 394, 78	+ 38 995, 75	
DA	300, 47	244 39 50	D	+ 62 721, 20	+ 38 965, 29	
Dd		95 19 51				
Eendvogelvlei (70)		△	+ 60 780, 74	+ 38 060, 74		
Houtkop (77)		△	+ 62 958, 27	+ 36 310, 35		

Description of Beacons

A : 20mm hole in rock
B, C, D : Half iron standard

Servitude Note: The figure A B e f d Right bank of As River A represents a Servitude Area, vide Diagram S.G.No.501/1994, Deed of Servitude No.K616/1996s



Scale 1: 4000

The figure A B C d Right bank of As River A represents 3,3317 hectares of land being Portion 2 of the farm MERINO 1487

Situate in Administrative District : Bethlehem

Surveyed in February 2008 by me Province of Free State

R J Thomas PLS0615
Professional Land Surveyor

This diagram is annexed to No. d.d. i.f.o. Registrar of Deeds

The original diagram is S.G. No. 181/0/1920 Transfer 8506/1920

File S.R. Comp. GR-3B No. 42669 dd. 2007-11-12

File

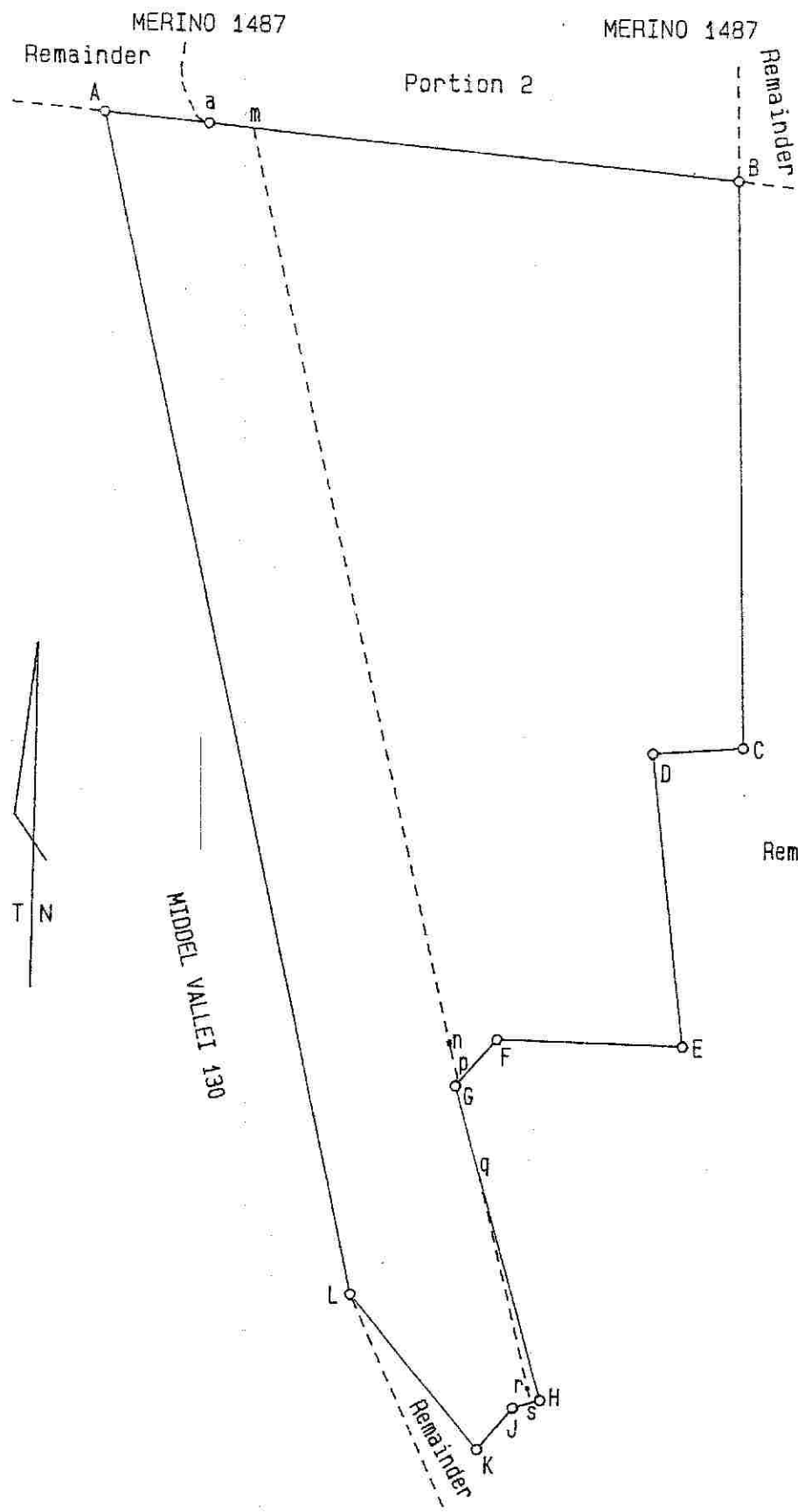
Portion 1 of the farm DE BURG SUSAN 210
Administrative District : Bethlehem

S.G. No.
539/2008

Approved

[Signature]
11.04.08
for
SURVEYOR-
GENERAL

Sheet 2 of
2 sheets



Scale 1: 4000

Surveyed in February 2008 by me.

[Signature]
R J Thomas PLS0615
Professional Land Surveyor

[Signature]

SIDES Metres	ANGLES OF DIRECTION	CO-ORDINATES			S.G. No. 539-2008
		Y	System: W629°	X	
		Constants:	+	0, 00	+3100 000, 00
AB	392, 57	275 19 51	A	+ 62 785, 65	+ 38 959, 28
BC	341, 00	358 23 50	B	+ 62 394, 78	+ 38 995, 75
CD	55, 85	85 44 30	C	+ 62 385, 25	+ 39 336, 62
DE	177, 73	352 49 20	D	+ 62 440, 95	+ 39 340, 76
EF	113, 28	91 15 20	E	+ 62 418, 74	+ 39 517, 10
FG	37, 58	40 53 20	F	+ 62 531, 99	+ 39 514, 62
GH	196, 55	343 20 00	G	+ 62 556, 59	+ 39 543, 03
HJ	17, 62	73 11 20	H	+ 62 500, 22	+ 39 731, 32
JK	32, 92	39 22 40	J	+ 62 517, 08	+ 39 736, 42
KL	121, 93	139 30 30	K	+ 62 537, 97	+ 39 761, 87
LA	729, 58	166 38 50	L	+ 62 617, 15	+ 39 669, 14
Indicatory Data					
aA	64, 73	95 19 51	a	+ 62 721, 20	+ 38 965, 29

Approved

RJ Thomas

11.04.08

for
SURVEYOR-
GENERAL

Sheet 1 of
2 sheets

Eendvogelvlei (70) Δ + 60 780, 74 + 38 060, 74
Houtkop (77) Δ + 62 958, 27 + 36 310, 35

Description of Beacons

- A : Not beacons
- a, B, F, G, H, L : Half iron standard
- C, D, E, J, K : 12mm hole in top of stone post

Servitude Note

The figure A m n p G q r s J K L represents a Servitude area.
Vide diagram S.G. No. 500/1994. Deed of Servitude No. K705/1996s.

The figure A B C D E F G H J K L
represents 18,9675 hectares of land being
Portion 1 of the farm
DE BURG SUSAN 210
Situate in Administrative District : Bethlehem
Surveyed in February 2008 by me Province of Free State

RJ Thomas
R J Thomas PLS0615
Professional Land Surveyor

This diagram is annexed to No. d.d. i.f.o. Registrar of Deeds	The original diagram is	File BETLEHEM 1487
	S.G. No. 205/D/1907	S.R. 225-2008
	Transfer 33215/1911	Comp. GR-3B No. 42669 dd. 2007-11-12



E. 10

[Signature]

Appendix E8: Comments Received from I&APs and Stakeholders

Natanya Whitehorn

From: Natanya Whitehorn
Sent: 13 October 2011 03:15 PM
To: De Wet van Aswegen
Cc: Roshantha Nanoolal
Subject: RE: Registration as I&AP for development of Photovoltaic Power Plant
Attachments: Draft_BID_vo2.pdf

Dear De Wet,

Thank you for registering as an I&AP on the above mentioned project. We will add your details to our database.

Attached please find the Background Information Document for your perusal.

Please do not hesitate to contact me should there be anything else that you require.

Kind regards

Natanya Whitehorn | BA Hons Geography

Environmental Services | Aurecon

T +27 12 427 3081 | M +27 82 214 3713

E Natanya.Whitehorn@aurecongroup.com

Aurecon Centre, Lynnwood Bridge Office Park, 4 Davenry Str, Lynnwood Manor, 0081, Tshwane | South Africa
aurecongroup.com

The Aurecon logo consists of a stylized lowercase 'a' with a green dot above it, followed by the word 'aurecon' in a bold, lowercase, sans-serif font.

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DISCLAIMER

From: De Wet van Aswegen [<mailto:dewet@mmges.co.za>]
Sent: 13 October 2011 11:44 AM
To: Natanya Whitehorn
Subject: Registration as I&AP for development of Photovoltaic Power Plant

Dear Natanya

We would hereby like to register as I&Ap for the proposed development of a Photovoltaic Power plant on the farm Merino 1487, Portion 2.

We are EAP's currently busy with a Basic Assessment for a resort development on the adjacent farm De Burg Susan 210. From experience the palaeontological heritage of the area is also of significance and we regularly do Palaeontological Impact Assessments as a specialist study as part of the EIA process. Some Palaeontological finds have been recorded in previous studies on the farm Merino.

Can you please send us the Background Information Document if available and registration forms as applicable.

Greetings

De Wet van Aswegen
Metsi Metseng Geological & Environmental Services
Cell:082 417 1356
Fax: 086 242 2319

Private Bag X 62
Suite 91
Bethlehem
9700

--

This message has been scanned for viruses and dangerous content by **Pinpoint Securemail**, and is believed to be clean.

Natanya Whitehorn

From: Pat Raubenheimer [raubenheimer@icon.co.za]
Sent: 19 October 2011 02:43 PM
To: Mike Shand
Cc: Natanya Whitehorn
Subject: FW: Background Information Document - Development of a Photovoltaic Plant on the Farm Merino 1487
Attachments: Draft_BID_vo2.pdf
Importance: High

Dear Mike,

I've just received this from a friend in the village. I thought that I was registered with all the Aurecon Offices as an interested person, but apparently not.

This project may fall across the proposed pipe line route adjacent to the Merino Hydro Station but the map that I got in the document is too small to clearly identify the position.

Regards,
Ralph

Ralph Raubenheimer

+27582561123

raubenheimer@icon.co.za



From: Natanya Whitehorn [<mailto:Natanya.Whitehorn@aurecongroup.com>]
Sent: 18 October 2011 11:57 AM
To:
Cc:
Subject: Background Information Document - Development of a Photovoltaic Plant on the Farm Merino 1487

Dear sir / madam,

Aurecon South Africa (Pty) Ltd was appointed by EAB-Astrum Energy (Pty) Ltd to conduct the Basic Assessment Process for the proposed development of a Photovoltaic Power Plant on the farm Merino 1487 in the Free State Province. The project entails the construction of a Photovoltaic (PV) Power Plant that will produce approximately 6MW of electricity which will be fed into the existing 22kV power lines at the Merino Hydro Power Plant. Power so generated will be sold to Eskom and the Dihlabeng Municipality.

Attached please find the Background Information Document for the project mentioned above. The purpose of this document is to provide potential stakeholders with the opportunity to register as Interested and Affected Parties in the Basic Assessment Process and to illicit initial comments on the proposed project. Newspaper advertisements are also appearing in the Maluti, Volksblad and Vrystaat during the next two weeks.

Please register yourself as an interested and affected party / stakeholder and submit your comments on the proposed project to the undersigned.

Kind regards

Natanya Whitehorn | BA Hons Geography
Environmental Services | Aurecon
T +27 12 427 3081 | M +27 82 214 3713

E Natanya.Whitehorn@arecongroup.com

Aurecon Centre, Lynnwood Bridge Office Park, 4 Davenry Str, Lynnwood Manor, 0081, Tshwane | South Africa
arecongroup.com



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DISCLAIMER

Natanya Whitehorn

From: Natalie Koneight [nkoneigh@randwater.co.za]
Sent: 07 October 2011 11:55 AM
To: Natanya Whitehorn
Subject: Registration as IAP: BA for the development of a Photovoltaic Plant on farm Merino 1487
Attachments: 20091106073310937.pdf; Dev of a Photovoltaic Plant - Merino 1487.pdf; ATT00001.txt

Dear Sir/Madam

Rand Water is hereby registering as IAP for the above-mentioned project.
Kindly forward confirmation of registration as IAP to Natalie Koneight at nkoneigh@randwater.co.za

Attached is Rand Water's Wayleaves, for your information.

Rand Water would like to be sure that the development as per the BID have planned adequately for their sewerage removal off site.

Please provide Rand Water with :

1. The detail about the facility that will receive the sewerage.
2. An agreement that the identified sewerage facility is aware of the development and that they have the capacity to accept the sewerage from the site without overloading the facility.
3. Will there be any discharges other than the sewerage system that will increase storm water entering the environment. If so, has the development considered retention and stilling ponds to slow down high peak flows.

If the sewerage facility cannot accept the additional load into their facility then this will have a negative impact on the environment and the pollution load into the river systems

Natalie Koneight

Secretary to Leslie Hoy
EMS Department, GSSE



T +27-11-724-9366
F +27-11-900-2108
E nkoneigh@randwater.co.za
www.randwater.co.za



RAND WATER

Environmental Management Services
PO Box 1127 Johannesburg 2000 South Africa
Tel (011) 724 9350 Fax (011) 900 2108

Reference: 15/9/1/115
Enquiries: Leslie Hoy
Direct Line: 011 724-9352

8 December 2011

For attention: Ms Natanya Whitehorn

Aurecon South Africa (Pty) Ltd
P.O. Box 74381
Lynnwood Ridge
0040

PHOTOVOLTAIC POWER PLANT – FARM MARINO 1487, FREE STATE

Thank you for the opportunity to allow Rand Water to offer additional comments on your proposed development.

This letter needs to be seen in addition to comments already submitted by Rand Water.

The following comments are made on the BAR given to Rand Water:

Section 3 of the BAR application form

- a) Item 3.1.4, in terms of NEMA regulation 544, Listing notice 1, it is believed that this activity is triggered under item 1, thus calling for a BA. The applicant has ticked no, should this not be yes?
- b) Item 3.1.6, in terms of Water Act Section 21, any activity within 500m of a wetland or any activity within 32m of a water course requires a Water Use Licence authorisation. The applicant has ticked no, should this not be yes?
- c) It is queried if a Water Use Licence has been applied for?
- d) Item 3.1.7, the area is rich in heritage which is referred to in the BA. Would the applicant not need permission from SAHRA for this development especially since the size of the activity is 7.34ha and SAHRA triggers at 5000m³. The applicant has ticked no in this instance however it is believed this should actually be yes?

Basic Assessment Report:

- a) The preferred site will most likely be flooded or directly impacted on when Rand Water construct the holding dam and associated pipelines and as a result your development should select a site that is beyond the 1732 contour line.
- b) Although reference is made to fauna and flora, no report is attached and therefore no comment is possible on this.

Environmental Management Plan

- a) Item 9 – Although reference is made to vegetation removal and erosion it is felt that this is not adequately addressed.
 - 9.1) There is no reference to erosion control on the site in the long term thus ensuring that no eroded soil makes its way into the Ash River.
 - 9.2) There is reference indicating how erosion of soil will be prevented.
 - 10.1) The specialist Archeological report calls for “a qualified scientist to monitor the excavation of material at all the sites”. The EMP calls only for the appointment of a registered archaeologist to be consulted. These are two different statements and meanings. The EMP does not address the specialist requirements.
 - 10.1) In the EMP there is also no indication of how the Dinosaur footprints will be;
 - a) Protected during the construction phase and?
 - b) Protected during the maintenance/operational phase?
 - c) Accessed by the public should they want to view this national treasure?

Rand Water trusts that their concerns will be adequately addressed and mitigated and included in final submission to the relevant authorities. Feedback from the EAP on the above matters would be appreciated.

Regards


Leshe Hoy
Manager
Environmental Management Services

**BASIC ASSESSMENT FOR
THE DEVELOPMENT OF A PHOTOVOLTAIC PLANT ON FARM MERINO 1487
-FREE STATE**

BACKGROUND INFORMATION DOCUMENT
INVITATION TO REGISTER AND COMMENT

DEA PROJECT REFERENCE NUMBER: 12/12/20/2433

Please complete and return to Aurecon by 4 November 2011

PO Box 74381 Lynwood Ridge 0040

Tel: (012) 427 2000

Fax: 086 574 2929

E-mail:

natanya.whitehorn@aurecongroup.com

TITLE	MNR.	FIRST NAME	Louw
INITIALS	L.C.	SURNAME	VAN BILJON
ORGANISATION	ASKRIVIER BEWAREA, CLARENS DORPSBEWAREA		
POSTAL ADDRESS	CLARENS BOEREVERENIGING, HOOGLAND BESKTHEIJS FORUM		
POSTBUS 49, CLARENS	POSTAL CODE	9707	
TEL NUMBER	058-2561195	FAX NUMBER	086-513-1531
CELL NUMBER	082-777-2647		
E-MAIL	spatium@isat.co.za		

Yes, I would like to participate in this Basic Assessment

YES

No, I am not interested

NO

COMMENTS: (please use separate sheets if you wish)

1. The following issues must be considered in the Basic Assessment Process:

- VISUELE IMPAK
- INVLOED OP PERISME

2. Please add the following colleagues/friends to your mailing list:

- HUGO VAN DOORNICK naled@vodamail.co.za
- DIRK VILJOEN dirkvi@isat.co.za
- JOHANN STEYN mvdbeth@imaginet.co.za
- MARK JANKIELSON markje@vodamail.co.za
- RODNEY WAINWRIGHT rwainwright@icon.co.za

We thank you for your participation

- MICHAEL FERREIRA savet.ferreira@afgri.co.za
- GREGG Mauseley gmauseley@netralink.net

Natanya Whitehorn

From: Christine Mannington [Christinem@idc.co.za]
Sent: 06 October 2011 09:07 AM
To: Natanya Whitehorn
Subject: PHOTOVOLTAIC POWER PLANT
Attachments: 2011-09-23 Green industries brochure.pdf

Importance: High

Good day

This email on behalf of Mr OC Meyer: Regional Manager, IDC Free State.

I refer to your advert in the Volksblad of 5 October 2011 and would like to know whether you have already secured finance.

The IDC provides finance for the establishment and or expansion of economically viable businesses by funding, inter alia, business assets and working capital. Finance is dependent on the applicant's ability to meet the IDC's main criteria as summarised below:

- ✓ The project must fall within the IDC's development mandate;
- ✓ The project must show economic merit, i.e. it must be able to make acceptable, sustainable profits within a reasonable period of time;
- ✓ The owners must make a reasonable contribution to the project cost. This contribution should be in the form of non-interest bearing, unsecured shareholders' loans or share capital with no fixed repayment terms; and
- ✓ The minimum loan amount is R1 million (excluding owners contribution). **Note that IDC does not provide grant funding.**

I have attached our brochure for your perusal.

Please feel free to contact us should you require additional information.

Regards

Christine Mannington
Bloemfontein Regional Office
Tel: +27 (0) 51 411 1450
Fax: +27 (0) 51 447 4895
christinem@idc.co.za
www.idc.co.za



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water affairs

Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

Enquiries: G. Nel
Telephone: 051 405 9000
Reference: 16/2/7/C401/D1

Natanya Whitehorn
Aurecon South Africa
PO Box 74381
LYNNWOOD RIDGE
0040

DRAFT BASIC ASSESSMENT FOR THE DEVELOPMENT OF PHOTOVOLTAIC PLANT ON FARM MERINO 1487 – FREE STATE

This Department acknowledges receipt of the abovementioned application. **The Department of Water Affairs has no objection towards the proposed project, however, the following must be adhered to:**

- No activities may take place, without the necessary authorization from this Department, within a horizontal distance of 100 m from any watercourse or estuary.
- The applicant must comply with all the conditions of the National Water Act (Act 36 of 1998).
- The areas used for waste and the loading of materials should be lined and bund walls has to be erected to contain any spills that may occur.
- The applicant must provide this office, prior to commencement of any activity on the property, with a consent letter from the property owner if the property is leased.
- The applicant has to ensure the storm water run-off has to be directed away from the site to ensure the separation of clean and dirty water

For any clarity, please do not hesitate to contact George Nel at 051 405 9000

Regards

T Ntuli
REGIONAL HEAD: FREE STATE
Letter signed by: Mr. W Grobler
Designation: Deputy Director: Water Regulation

DATE: 13/12/11

REGISTRATION AS IAP

**BASIC ASSESSMENT FOR THE DEVELOPMENT OF A PHOTOVOLTAIC PLANT
ON FARM MERINO 1487 – FREE STATE PROVINCE
DEA PROJECT REF: 12/12/20/2423**

First Name/s:	MPATI
Last Name:	NALE
Title: (Dr./ Miss/ Mr./ Mrs./ Prof. etc)	MRS
If representing an entity (i.e. company or organisation), name of entity:	RAND WATER
If representing an entity, position within entity (i.e. CEO, Chairperson, Secretary, Councillor, etc):	ENVIRONMENTAL ASSESSOR
Postal Address:	P.O. BOX 1127 JOHANNESBURG 2000
Physical Address	
E-mail Address:	mnale@randwater.coz.za
Phone Number:	(011) 724-9357
Cell Phone Number:	
Fax:	(011) 900-1208
<u>Comments:</u> ALL TRAVERSING ALONG AND OVER RAND WATER PIPELINES. POSSIBLE LEAKS FROM OTHER SERVICES THAT COULD CAUSE GROUND STABILITY TO CHANGE. PLEASE KEEP US INFORMED REGARDING THE ABOVE ASPECTS.	

**BASIC ASSESSMENT FOR
THE DEVELOPMENT OF A PHOTOVOLTAIC PLANT ON FARM MERINO 1487
-FREE STATE**

BACKGROUND INFORMATION DOCUMENT
INVITATION TO REGISTER AND COMMENT

DEA PROJECT REFERENCE NUMBER: **12/12/20/2433**

Please complete and return to Aurecon by 4 November 2011

PO Box 74381 Lynwood Ridge 0040

Tel: (012) 427 2000

Fax: 086 574 2929

E-mail:

natanya.whitehorn@aurecongroup.com

TITLE	Mrs	FIRST NAME	Winifred
INITIALS	W.H.	SURNAME	Staples
ORGANISATION	Clarens Valley Fruit		
POSTAL ADDRESS	P.O. Box 337		Bethlehem
		POSTAL CODE	9700
TEL NUMBER		FAX NUMBER	058-303 8265
CELL NUMBER	083-459 1353		
E-MAIL	bstaples@xsinet.co.za		

Yes, I would like to participate in this Basic Assessment YES

No, I am not interested NO

COMMENTS: (please use separate sheets if you wish)

1. The following issues must be considered in the Basic Assessment Process:

As we are neighbours (Parton 1 Merino) we would like to be kept up to date on progress.

2. Please add the following colleagues/friends to your mailing list:

We thank you for your participation

Appendix E9: Comments and Responses Report

COMMENTS AND RESPONSES FOR THE PROPOSED CONSTRUCTION OF MINI-HYDRO POWER SCHEMES AT FARM BOSTON 40 AND FARM MERINO 1487

DATE	MADE BY	COMMENT	RESPONSE
06/10/2011	IDC – C Mannington	Enquired whether finance had already been secured by the client.	EAB-Astrum Energy replied to IDC directly as this issue does not affect the Environmental Process.
2010/10/07	Rand Water – R Koneight	<p>Enquired whether adequate planning was done for sewerage removal off site.</p> <p>Requested the following from the consultant:</p> <ul style="list-style-type: none"> • Detail about facility that will receive the sewerage; • Agreement that the identified sewerage facility is aware of the development and that they have the capacity to accept the sewerage from the site without overloading the facility; • Information about whether any other discharges might be present which will increase storm water entering the environment & whether the development has considered retention and stilling ponds to slow down peak flows. 	<p>During Construction Phase chemical toilets will be used on site for construction workers and all site personnel. The sewage will be removed and dealt with by the appointed contractor.</p> <p>During operation phase two options for sewage will be investigated: septic tanks or conservancy tanks. Conservancy tanks would be the preferred option as sewage would be removed on a regular basis and transported off site. Septic tanks are a more permanent structure and would require ongoing maintenance. No decision on this matter has been finalised and will be further investigated during the EIA Phase.</p> <p>With regards to storm water entering the environment; preventative measures will be in place to ensure the mitigation of any run off. Sediment traps will be considered to prevent runoff from entering the watercourse.</p>
2010/10/07	Rand Water – M Nale	Commented that Rand Water should be informed of all aspects with regards to service leaks that will affect the ground stability and of any traversing along and over rand water servitudes.	Comments have been noted and Rand Water will be updated with information as the Basic Assessment Process progresses.

2010/08/16	De Wet van Aswegen	Requested the Background information document for more information and the project and wished to be registered as an I & AP. It was also indicated that paleontological finds have been recorded in previous studies on the farm Merino.	A background Information Document was sent to Mr Aswegen on the 13 October 2011. The consultant is aware of the paleontological finds adjacent to the site and it will be ensured that it is not impacted upon.
2010/08/17	L.C van Biljon	Concerned about the impacts the Development of the Photovoltaic Power Station will have on Tourism and the visual aesthetics of the area.	Comments have been noted. Mitigation measures regarding Visual Impact are addressed in the EMPr.
19/10/2011	R Raubenheimer	Requested to be registered as an I&AP on the project.	Comment noted and added to register of I&APs.
01/11/2011	Clarens Valley Fruit – W Staples	Requested to be kept up to date on progress as they are neighbors.	Comment noted and added to register of I&APs.
8/12/2011	Rand Water- Leslie Hoy	With reference to point 3.1.4 of the Application to DEA, NEMA Regulation 544, Listing notice 1, it is believed that this activity is triggered under item 1, thus calling for a BA. The applicant has ticked no, should this not be yes?	Item 1 of the NEMA Regulation 544, Listing Notice 1 is triggered by the proposed project – thus the need for the Basic Assessment Process currently underway but item 3.1.4 of the Basic Assessment Application Form refers to the National Environmental Management: Biodiversity Act (No. 10 of 2004). No permits are required in terms of this Act.
		In terms of section 21 of the National Water Act, any activity within 500m of a wetland or any other activity requires a water use license, the applicant ticked no in the BAR application form. It is queried if a WULA has	Comment noted and report amended. A WULA will be applied for to the DWA for under sections 21 a, c & I of the National Water Act (No. 36 of 1998).

		been applied for.	
		As the area is rich in heritage, would the applicant not need permission from SAHRA for this development as the applicant has ticked no in the BA under Section 3.1.7	Comment noted and report amended. SAHRA has already been informed of the heritage site, a letter was received from SAHRA requesting for a heritage Assessment to be done. A Heritage study will be carried out as part of the Basic Assessment Process.
		When Rand Water constructs the holding dam, the proposed site for the PV Power plant will be flooded and as a result the development should select a site beyond the 1732 contour line.	The construction of the Rand Water Holding dam which is upstream of the proposed Photovoltaic Power Plant will not impact on the proposed project.
		Reference to a Fauna and Flora was made in the Basic Assessment but no report was attached and therefore no comment is possible.	Based on specialist investigations carried out prior to the construction of the existing Hydro Power Plant on site it can be understood that no extensive areas of particular faunal or floral sensitivity can be highlighted on the site. The cumulative impacts of the various Hydro Power Plants as well as the Lesotho Highlands Water Project has resulted in a degraded plant community (successional stage e.g. grassland with low shrubs and no trees) occupying vacant niches created by construction activities. Animal communities will move away from the site during construction and will colonise suitable habitat elsewhere.
		In the EMP no reference to erosion control on the site for long term has been addressed.	As little vegetation will be cleared to erect the PV module racks, erosion would be minimal. In the long term natural re-vegetation of the areas disturbed will be completed thus mitigating any possible erosion.

		The specialist archaeological report calls for “a qualified scientist to monitor the excavation of material at all the sites”. The EMP calls only for the appointment of a registered archaeologist to be consulted. The EMP does not address the specialist requirements.	SAHRA requested that an accredited (registered) specialist be appointed to conduct a Phase 1 Archaeological Impact Assessment Report. This is currently underway.
		In the EMP there is no indication of how the Dinosaur footprints will be protected through the entire lifecycle of the project. It was also queried as to how the public would obtain access to the national treasure should they want to view it.	Comment noted – the EMPr will be updated accordingly. The site will be fenced off and protected from any construction activities. The public does not have access to the site as it is located on private property.
13/12/2011	Department of Water Affairs – Free State- T Ntili	No activities may take place, without the necessary authorization from DWA, within a horizontal distance of 100m from the nearest watercourse.	A WULA will be applied for to the DWA for under sections 21 a, c & l of the National Water Act (No. 36 of 1998).
		The applicant must comply with the National Water Act.	Comment noted
		The areas used for waste and the loading of materials should be lined and bund walls has to be erected to contain any spills that may occur.	Comment noted. Mitigation measures are indicated in the EMPr.
		The applicant must provide this office, prior to commencement of any activity on the property, with a consent letter from the property owner if the property is leased.	The property currently belongs to Bethlehem Hydro (Pty) Ltd, who is a member of the joint venture The Merino PV Project Development Consortium running this project. A copy of the memorandum of understanding between these parties will be sent to DWA prior to any construction commencing.
		Applicant has to ensure the storm water runoff has to be directed away from the site and to ensure the separation of clean and dirty water.	Comment noted.

Appendix F: Environmental Management Programme (EMPr)



**ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE DEVELOPMENT OF A
PHOTOVOLTAIC POWER PLANT ON THE FARM MERINO 1487 PORTION 2, FREE
STATE PROVINCE**

DEA Reference: 12/12/20/2423

Report No: 107450/emp

Prepared By:

AURECON South Africa (Pty) Ltd

Aurecon Centre Tel: 012 427 3082
4 Daventry Street Fax: 086 766 1473
Lynnwood Manor E-mail: roshantha.nanoolal@aurecongroup.com
Pretoria

Contact: Mrs. R. Nanoolal

Prepared For:

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I UNDERTAKING TO IMPLEMENT THE EMP

Undertaking by the Contractor

I,,
....., acting on behalf of the Contractor, hereby indicate that I have read through the Environmental Management Programme, and understand the measures required to be implemented in terms of the EMP. I hereby undertake to implement these measures and carry out my duties as specified herein.

Signed on at

.....
Contractor's Environmental Representative

.....
Witness

.....
Witness

Undertaking by the Environmental Control Officer

I,,
....., the Environmental Control Officer appointed by EAB-Astrum Energy (Pty) Ltd Joint Venture, hereby indicate that I have read through the Environmental Management Programme, and understand the measures required to be implemented in terms of the EMP and hereby undertake to fulfil my duties as specified herein.

Signed on at

.....
Environmental Control Officer

.....
Witness

.....
Witness

1. CONTEXT AND INSTITUTIONAL MATTERS

1.1 BACKGROUND TO PROJECT

NuPlanet (Pty) Ltd, the developer of the Bethlehem Hydro Plant has partnered with Astrum Energy (Pty) to form the EAB-Astrum Energy (Pty) Ltd Joint Venture for the development of the 6MW Photovoltaic (PV) Power Plant.

The proposed PV Power Plant would potentially supply additional “green” electricity to surrounding towns of Bethlehem and Clarens. Most importantly “green” electricity is a clean source of power i.e. it produces no carbon dioxide, sulphur dioxide, nitrous oxides, or any other air emissions. In addition, it produces no solid or liquid wastes.

The proposed project for farm the Merino 1487 Portion 2, which is located approximately 14 km south of the town of Bethlehem entails the construction of solar panel racks placed at an approximately 30° angle to the ground level. The proposed development of the PV plant will convert the solar energy into electric energy via the PV cells. The approximately 6 MW electricity generated from the Photovoltaic plant will be then converted from DC to 3 phase 380AC via power inverters. The voltage will then be stepped up to 22kV via transformers that will be fed into the same 22kV power lines of the Merino Hydro Power Plant. The dedicated power lines runs to the Eskom Node Substation with a capacity of 10MVA which feeds into the Eskom grid.

Aurecon South Africa (Pty) Ltd, a leading consulting engineering and environmental firm both locally and internationally, has been appointed by EAB-Astrum Energy (Pty) Ltd Joint Venture to assist with the environmental impact studies and authorisation for the proposed PV Power Plant. As part of the process, this Environmental Management Programme (EMP) has been developed as a guiding and binding document against which EAB-Astrum Energy (Pty) Ltd Joint Venture and its appointed contractors must comply with.

1.2 PROJECT LOCALITY

The site for the proposed PV Plant is located on the Farm Merino No. 1487 Portion 2 within the Dihlabeng Municipality area between Bethlehem and Clarens, Free State Province.

1.3 SCOPE OF DOCUMENT

The scope of this document is to give guidelines for environmental best practice to the Contractor commissioned to the development of the proposed PV Power Plant. This document shall be seen as part of the contract and supplementary to tender documentation.

The EMP has a long-term objective to ensure that:

- 1) Environmental Management considerations are implemented from the start of the project,
- 2) Precautions against damage and claims arising from damage are taken timeously, and
- 3) The completion date of the contract is not delayed due to problems with Landowners arising during the course of construction.

EAB-Astrum Energy (Pty) Ltd would require to be committed to the following issues:

1. *Take into consideration the Landowners;*
2. *Always behave professionally on and off site;*
3. *Ensure quality in all work done, technical and environmental;*
4. *Resolve problems and claims arising from damage immediately to ensure a smooth flow of operations;*
6. *To use this EMP for the benefit of all involved; and*
7. *To preserve the natural environment by limiting destructive actions on site.*

1.4 LEGISLATIVE CONTEXT

This EMP has been compiled in terms of the EIA Regulations, which provides a framework for the content and intent of an Environmental Management Plan. The EMP follows the rationale of the ISO 14001: Environmental Management System international standard in that it addresses and differentiates between *Activity, Aspect, Impact, Mitigatory Measures, Performance Indicators, Responsibility, Resources and Time Schedule*.

2. ROLES AND RESPONSIBILITIES

2.1 Environmental Control Officer

The Environmental Control Officer (ECO) is the independent person responsible for monitoring of the implementation of the EMP and is the liaison person between EAB-Astrum Energy (Pty) Ltd Joint Venture and the Landowners. The ECO may not be appointed by the

Contractor, and will report to EAB-Astrum Energy (Pty) Ltd Joint Venture, and DEA only. The ECO has the authority to stop any works if, in his/her opinion, there is or may be a serious threat to or impact on the environment; caused directly by the contractor's actions or activities during the construction phase. In all such work stoppage situations the ECO is to inform the Contractor of the reasons for the stoppage within 24 hours. All ECO reports will be sent on a monthly basis to EAB-Astrum Energy (Pty) Ltd Joint Venture to keep abreast of compliance on site.

Upon failure by the Contractor, or his employees, to show adequate consideration to the EMP, the ECO may recommend to the Contractor to have the Contractor's representative or any employee(s) removed from the site, or work suspended until the matter is resolved.

2.2 Engineer

The Engineer responsible for the design of the PV Plant will be a EAB-Astrum Energy (Pty) Ltd Joint Venture appointment. It will be the responsibility of the Engineer to oversee the overall implementation of the project as well as the compliance of the EMP and incorporate any potential environmental aspects mentioned into the design.

2.3 Contractor

As part of being responsible for the construction of the proposed PV Plant, the Contractor will be responsible for the overall implementation of the EMP. The Contractor will nominate a representative on site as his environmental representative, known as the Contractor's Environmental Control Officer (CECO). The contractor must issue site instructions to rectify any environmental non-compliance, based on the CECO's findings. The EAB-Astrum Energy (Pty) Ltd Joint Venture Site Manager can also issue site instructions.

2.4 Contractor Environmental Control Officer (CECO)

The CECO will be responsible, on behalf of the contractor, to ensure that the EMP is implemented and complied with on site on a daily basis. The CECO will liaise with the ECO (see below) in all matters relating to the implementation of the EMP. The CECO needs a certain amount of environmental management experience in the field.

2.4.1 Environmental awareness training

Prior to construction all contractor teams involved in work on the project are to be briefed on their obligations towards environmental controls and methodologies in terms of this EMP. It is recommended that the briefings take the form of an on-site talk and demonstration by the

CECO. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team.

2.5 ORGANISATIONAL AND INSTITUTIONAL ARRANGEMENTS

Any changes to the EMP must be communicated in writing to the DEA within one week (five working days). A provisional reporting and communications structure is indicated in **Figure 2** below.

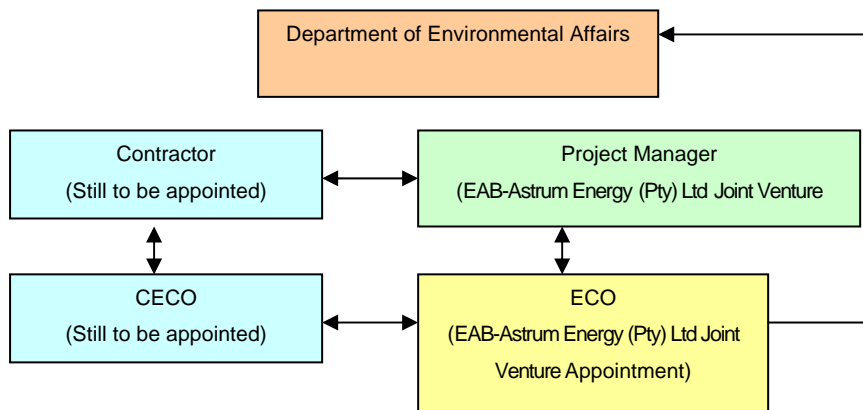


Figure 2: Proposed organisational and reporting structure

2.6 MONITORING AND AUDITING FRAMEWORK

2.6.1 Monitoring Programme

The purpose of the monitoring programme is to ensure that mitigation measures identified and described in the EMP are implemented. Construction activities of the PV Plant will be monitored and recorded by the ECO and audited against the EMP on a monthly basis. A report must be submitted at the end of each month prior to the progress meetings where they will form part of the agenda. The ultimate target is to achieve 100% compliance with the EMP.

2.6.2 Penalties

The Contractor will comply with the environmental management requirements of this EMP on an ongoing basis, any failure on their part to do so will entitle the Project Manager, in consultation with the ECO to certify the imposition of a fine. The value of the fine will be agreed between the PM and ECO based on the nature, extent and duration of the offence and subsequent environmental damage. Such penalties shall be payable in addition to any remediation costs for correction of environmental damage as a result of non-compliance to

this EMP, that will also be for the Contractor's account. Time penalties may also be awarded by the contract's manager where the contractors do not comply. These details are to be included into the contracts.

Note that the following is applicable:

- In terms of the Conventional Penalties Act (1962) a creditor is not entitled to recover both the penalty and damages,
- Accordingly, where a Contractor causes damage, EAB-Astrum Energy (Pty) Ltd Joint Venture can either enforce a penalty or make the Contractor make good the damage, but not both.

The Contractor is deemed NOT to have complied with this specification if:

- Within the boundaries of the site, site extensions and access roads there is evidence of contravention of the requirements of the EMP,
- Environmental damage ensues due to negligence,
- The Contractor fails to comply with corrective or other instructions issued within a specific time,
- The Contractor fails to comply with a site instruction given by the Engineer based on the ECO report.
- The Contractor fails to respond adequately to complaints from the public,
- Legal action is instituted against the developer in terms of Environmental laws.

Payment of any fines in terms of the contract will not absolve the offender from being liable from prosecution in terms of any law.

3. DESCRIPTION OF ACTIVITIES

The activities that are going to be undertaken involve, but are not limited to:

3.1 PRE-CONSTRUCTION AND CONSTRUCTION PHASE

- Establishment of the contractor's camp;
- Clearing the proposed site of any vegetation;
- Removal and stockpiling of topsoil;

- Fencing of the construction sites and heritage areas;
- Personnel conduct;
- Storage of hazardous material;
- Handling and disposal of construction waste;
- Protection of archaeological and heritage sites.

3.2 REHABILITATION PHASE

- Removal/decommissioning of Contractor's camp;
- Removal of all construction, hazardous and domestic waste;
- Rehabilitation of the disturbed areas as a result of construction works.

4. SUMMARY OF IMPACT AND ASSOCIATED MITIGATION MEASURES

The following table covers the construction activities and associated environmental impacts that will occur during the Development of a 6MW Photovoltaic Power Plant.

The table considers the expected impacts on-site during the different phases of the project, as well as the mitigation measures and environmental management procedures required to manage the expected impacts. The following sections are dealt with in the table:

- Section 5 : Pre-construction and construction site environmental management
- Section 6 : Materials
- Section 7 : Waste
- Section 8 : Surrounding land
- Section 9 : Flora, fauna, air quality, noise, water and other
- Section 10 : Archaeological and heritage sites
- Section 11 : Planning and engineering considerations
- Section 12 : Claims for damages

5. PRECONSTRUCTION AND CONSTRUCTION SITE ENVIRONMENTAL MANAGEMENT (Table 1)

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
5.1 Engineering Design	All the aspects listed in the EMP	Design incompatible with environment	<p>Objective: To ensure the design of the PV Plant takes into account the environment.</p> <p>Target:</p> <ul style="list-style-type: none"> Assimilate requirements of the EMP in the design and construction management giving special attention to the proposed infrastructure. 	Design meets objectives and does not degrade the environment	Engineering Design Consultant	Contract and allowance in P&G's	During Tender Design & Design Review Stage	Engineering Design Consultant	Design Phase
5.2 Establishment of the construction camp sites	Construction camp	Damage or loss of existing vegetation and changes to the area's water quality	<p>Objective: To prevent and mitigate the damage or loss of natural vegetation. To prevent negative influence to the surrounding surface and groundwater.</p> <p>Target:</p> <ul style="list-style-type: none"> Site establishment shall take place in an orderly manner and all amenities shall be installed at the identified camp sites before the main workforce move onto site A method statement is required from the Contractor at tender stage that includes the layout of the camp, management of ablution facilities and wastewater management A site plan of the construction camp must be provided indicating waste areas, storage areas and placement of ablution facilities The planning and design for the construction camp must ensure that there is a minimum impact on the environment The Contractor camp shall have the necessary ablution facilities with chemical toilets at commencement of construction The Contractor shall supply a wastewater management system that will comply with legal requirements and be acceptable to EAB-Astrum Energy (Pty) Ltd Joint Venture The Contractor shall inform all site staff of the use of supplied ablution 	Construction camp established in compliance with objectives.	Contractor, CECO.	Contract and allowance in P&G's	Pre-construction, Establishment of Site	ECO	Once off

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities</p> <ul style="list-style-type: none"> • The Contractor shall supply scavenger-proof waste collection bins where such is not available and all solid waste collected shall be disposed of at a registered waste landfill in Bethlehem or in the surrounding area • Certificates of safe disposal shall be obtained by the Contractor from the waste disposal facility and kept on file • Under no circumstances may solid waste be burned on site • Refuse bins will be emptied and secured • The construction camp must be placed on already disturbed land as far as possible • The construction camp should be fenced off so as to limit the removal of unnecessary vegetation • Fences and security access must be maintained throughout the project. • All fences removed to facilitate access will be replaced by the contractor once machinery and personnel have been removed from the site to the satisfaction of all the relevant landowners • Emergency and contact numbers of the contractors and the client must be available and prominently displayed on a signage board that is clearly visible at the entrance to the site. 						
5.3 Establishment of the construction camp site	Construction camp	Loss of soil fertility	<p>Objective Whilst establishing the contractor's camp the footprint of disturbance is to be minimised thereby preventing the degradation and loss of topsoil.</p> <p>Target:</p> <ul style="list-style-type: none"> • Allowance for one contractors camp at the hydro scheme • Once the site has been cleared of vegetation, the topsoil should be stripped to a minimum depth of 350mm. • Topsoil must be stored in a demarcated area which is protected from wind and 	Established construction camp in compliance with objectives and no evidence of environmental degradation	Contractor, CECO.	Contract and allowance in P&G's	Pre-construction, Establishment of Site	ECO	Once off

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			rain. <ul style="list-style-type: none"> The topsoil stockpiles may not exceed 1.5m in height. The area must be rehabilitated once the construction camp has been decommissioned. 						
5.4 Closure of the construction camp	Construction camp.	Potential impacts associated with the closure of the construction camp	Objective(s): To limit potential impacts on the environment for periods during which the construction camp is closed. Target : Should the construction camp be closed for a period of more than one week, a report on compliance will be lodged with the Engineer and Project Manager confirming the following:- <ul style="list-style-type: none"> No persons allowed other than project employees; Minimal materials kept stored; Materials to be stored in leak-proof, sealable containers or packaging; The store area is secure and locked; Fire extinguishers are serviced and accessible; The area is secure from accidental damage through vehicle collision, etc.; Emergency and contact numbers of the contractor is available and prominently displayed; All stores are secured; Chemical toilets are emptied, kept hygienically clean and secured; 24 hour security will be on site during this period. 	Closure of the construction camp in line with the requirements of the EMP.	Engineer, Contractor and CECO	Contract and allowance in P&G's	Closure of camp	Engineer ECO	Whenever the construction camp is closed for longer than a week.
5.5 Storage of topsoil	Stripping and stockpiling of topsoil.	Mixing of topsoil and subsoil. Erosion of topsoil. Contamination of top soil. Dust.	Objective Topsoil is conserved, maintained and re-used. Target: <ul style="list-style-type: none"> The topsoil in the specific region should be regarded as the top 350 mm (maximum) of the soil profile irrespective of the fertility appearance or physical 	Topsoil is conserved and maintained on site.	Contractor, CECO.	Contract and allowance in P&G's	Pre-construction, Establishment on site	ECO	

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>depth, unless otherwise confirmed by the ECO. Topsoil is to be stripped to this depth in as dry a condition as possible in order to prevent compaction.</p> <ul style="list-style-type: none"> • The topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process. • Topsoil stockpiles shall not be stored for a period longer than 4 months. • Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation. • The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding. • All grass and other vegetation should be left on the topsoil stockpiles so that they colonise the area after construction. • Alien vegetation growing on topsoil stockpiles must be eradicated • Herbicides shall not be used to remove alien vegetation unless approved by the ECO. • Photographic record must be kept of the topsoil stockpiles. • Dust and erosion of topsoil from runoff must be minimised through appropriate watering and the avoidance of transporting and placing of topsoil in areas exposed to high wind or excessively rainy conditions. • The contractor shall devise a soil conservation and stockpiling plan, to be approved by the ECO and Engineer, which shall detail:- <ul style="list-style-type: none"> ○ Stockpile sizes, layout and form; ○ Means of erosion (wind and water) prevention for stockpiles; ○ The rehabilitation measures to be taken for the area taken up by the temporary stockpile; ○ A generic schedule of soil replacement for areas where work has been completed. Soil replacement should preferably run in parallel (where 						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			feasible) with the construction process; <ul style="list-style-type: none"> Soil erosion prevention measures for general site use. 						
5.6 Construction of site buildings	Site building materials	Soil pollution and permanent alteration to the natural environment.	Objective(s): To ensure the materials for site infrastructure are recyclable and to minimise the impacts of the construction of the infrastructure on the environment. Target : <ul style="list-style-type: none"> No permanent structures will be permitted at the contractor's camp. Temporary structures shall be founded on a platform, either subsoil or screed slab. Buildings should preferably be pre-fabricated or constructed of re-usable/recyclable materials. All temporary structures must be soundly built and not pose a danger to workers. Containers are to be used for the storage of materials which have the potential to release pollutants into the environment. All structure footprints to be rehabilitated and re-vegetated after construction is complete. 	On site infrastructure constructed according to the requirements of the EMP.	Contractor and CECO.	Contract and allowance in P&G's	Pre-construction, Establishment of site.	ECO	Once off
5.7 Fencing of the construction sites that will be affected by the proposed project	Demarcation of the site	Unnecessary removal of vegetation. Loss of topsoil. Safety	Objective(s): Whilst establishing the site, the footprint of disturbance must be minimised and the extent of soil erosion, loss of vegetation and the potential for the pollution of soils must be prevented. Target: <ul style="list-style-type: none"> All excavations must be demarcated as indicated in the EMP using danger tape with steel droppers or other methods approved by the ECO. The width of the construction footprint must be agreed upon by the ECO and the Engineer and as far as possible must be kept to a minimum. No personnel or construction materials will be allowed to move outside the 	The site is demarcated according to the requirements of this section of the EMP.	Contractor and CECO.	Contract and allowance in P&G's	Construction sites must be fenced off along the alignment prior to site clearance.	Engineer, ECO.	As construction proceeds along the alignment.

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			designated/demarcated site during construction activities. <ul style="list-style-type: none"> Do not perform any activities or operations that are likely to adversely affect the aesthetic quality of the environment. 						
5.8 Cooking of food	Cooking facilities	Type and placement of cooking facilities used, and how they will be used.	<p>Objective(s): To ensure that the cooking facilities used on site do not pose risks to the environment.</p> <p>Target:</p> <ul style="list-style-type: none"> The contractor must supply gas and /or electricity cooking facilities for the labourers at the construction camp. If gas cooking facilities are not available, fires (for the purposes of cooking) will be allowed in a demarcated area that has been cleared of all combustible materials. Firewood, or other suitable fuels, must be supplied by the Contractor. No vegetative matter may be removed from the area for firewood. After use, all cooking fires must be extinguished. 	Evidence of presence of gas and /or electricity cooking facilities and/or demarcated area for cooking with fire.	Contractor.	Contract and allowance in P&G's	Pre-construction, Establishment of site.	ECO	Once off.

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
5.9 Operation of the sanitation system(s)	Sanitation systems	<p>Unpleasant odours on site.</p> <p>Inadequate number of latrines on site.</p> <p>Position of latrines and shower systems.</p> <p>Mis-management of waste water.</p>	<p>Objective(s): To ensure good sanitation system and management throughout the construction period.</p> <p>Targets:</p> <ul style="list-style-type: none"> ● Adequate chemical toilets must be provided for all staff. ● Chemical toilets must be emptied / serviced on a regular basis to prevent them overflowing. Proof of this must be provided to the ECO. ● A minimum of one toilet must be provided per 11 persons at each working area within 100m from worker activity ● Where shower facilities are provided for use by staff the following must be imposed:- <ul style="list-style-type: none"> ○ Positioning of the showers, specifically the discharge point , must be placed in a way to ensure that erosion and build-up of detergents does not occur; ○ All discharge from the shower and other washing facilities must pass through a suitable filter to reduce the load of detergents to the environment; ○ Use of the shower facilities must be limited to staff or authorised persons only. 	<p>Adequate toilets and showers will be positioned at the right places as per the EMP and ECO.</p> <p>Absence of odours, erosion and build-up of detergents.</p>	Contractor	Contract and allowance in P&G's	Pre-construction, Establishment of site.	ECO	Once off

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
5.10 Vehicle parking area. Storage of equipment	Vehicle parking and parking area(s). Storage of equipment.	Pollution of soils. Disturbance of soils due parking of vehicles outside of designated areas.	<p>Objective(s): To ensure vehicles are parked according to the specifications in the EMP and that equipment is handled appropriately.</p> <p>Target:</p> <ul style="list-style-type: none"> No storage of vehicles or equipment will be allowed outside of the designated area Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment when not in use 	Drip trays must be provided and placed under vehicles and equipment which are not being utilised on site.	Contractor and CECO.	Contract and allowance in P&G's	Throughout the construction period.	ECO	Whenever there are stationary vehicles or equipment present on site.
5.11 Servicing and washing of vehicles and machinery	Workshop and Equipment Storage Areas	Water contamination, Soil contamination, Noise pollution	<p>Objective(s): To ensure that the environment is not polluted by ensuring that service areas and wash bays for vehicles and machinery are made available and utilised.</p> <p>Target:</p> <ul style="list-style-type: none"> All maintenance of vehicles and equipment shall take place in the workshop area. During servicing of vehicles or equipment, a suitable drip tray shall be used to prevent spills onto the soil, especially where emergency repairs are effected outside the workshop area. Leaking equipment shall be repaired immediately or be removed from site to facilitate repair. All potentially hazardous and non-degradable waste shall be collected and removed to a registered waste site. Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and re-mediated to the satisfaction of the ECO. A method statement is required from the Contractor showing how procedures for dealing with possible emergencies that can occur, such as 	Evidence of prescribed servicing and washing services.	Contractor, CECO.	Contract and allowance in P&G's	During construction.	ECO	Whenever servicing or maintaining of vehicles or equipment throughout the construction period is required.

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			fire and accidental leaks and spillage. <ul style="list-style-type: none"> • The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site. • Should emergency repairs be necessary, drip trays or tarpaulins (plastic / synthetic sheets / covers) must be utilised to ensure the collection of the oil. The area for emergency repairs should be identified by ECO • The contractor must ensure that delivery drivers and plant operators are informed of all relevant procedures and restrictions required ensuring compliance with this document. • All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages. • The following shall apply: <ul style="list-style-type: none"> ○ All contaminated soil shall be removed and be placed in containers for further disposal ○ Contaminated material can be taken to one central point where bio-remediation can be done ○ Smaller spills can be treated on site ○ A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site ○ All spills of hazardous substances must be reported to the ECO and the relevant Authorities. 						
5.12 Personnel conduct	Personnel	Infringement of the EMP requirements by personnel	Objective(s): To ensure that personnel are adhering to the EMP requirements. Targets: <ul style="list-style-type: none"> • The Contractor will adhere to all requirements of the Occupational Health and Safety Act (Act 56 of 2004), including the drafting of a suitable Health 	Personnel wearing proper safety uniform. Absence of trespassers on site.	Contractor and labourers.	Contract and allowance in P&G's	Approved PPE must be issued to all employees pre-construction	ECO	Throughout construction period.

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>and Safety Plan which will be implemented during the construction phase.</p> <ul style="list-style-type: none"> • All personnel to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. • Induction presented by the contractor must be attended by all parties involved in the construction. • Tool box talks to include aspects of the EMP. • Labourers associated with the contractor must be easily recognizable (i.e. company issued overalls with company name/logo etc.), and other persons will not be allowed within the construction camp without prior permission from the Project Manager. • The Contractor shall take all necessary precautions against trespassing on private properties. • Warning signs must be placed on and around the site as per the Occupational, Health and Safety requirements. • Adequate first aid services must be provided by the contractor at the contractor's camp. • The contractor will be responsible for his own security arrangements and shall comply will all site security instructions. • Basic fire fighting equipment must be available on site. • PPE to be provided and well maintained at contractor's camp. • All incidents should be reported to ECO, investigated, documented and kept in safety file. 				but must be used for the duration of the construction period.		

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
5.13 Construction activities	Safety of the Public / Landowners	Injuries to Public / Landowners Health of Public / Landowners	<p>Objective(s): To ensure that the Public at large and Landowners are not injured or affected negatively in any way.</p> <p>Target:</p> <ul style="list-style-type: none"> The Contractor shall recognise that the Site is situated amongst inhabited and agricultural areas and shall therefore take all reasonable measures to ensure the safety of people in the surrounding area. Where the public could be exposed to danger by any of the works or site activities, the Contractor shall as appropriate provide suitable flagmen, barriers and/ or warning signs in English, Afrikaans and Sesotho, all to the approval of the Project Manager. All unattended open excavations shall be adequately demarcated such as fencing which shall consist of a minimum of three strands of wire and made clearly visible. Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed pylons and protective scaffolding. No firearms shall be permitted on site. 	<p>No injuries or health consequences to neighbouring people.</p> <p>No complaints for neighbouring people.</p>	Contractor and CECO.	Contract and allowance in P&G's	Throughout the construction period.	ECO	Whenever there are stationary vehicles or equipment present on site.

6. MATERIALS

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
6.1 Transportation of material	Material transport	Traffic congestion. Dust during transportation. Excessive noise.	<p>Objective(s) To ensure that whilst material is transported, it cannot be of negative influence to the surrounding environment.</p> <p>Targets: The contractor should note that existing roads are sufficient to facilitate access to the PV Plant but the following should be adhered to:</p> <ul style="list-style-type: none"> • Access to privately owned land will be arranged with the various landowners by the contractor if necessary. • Adequate and appropriate traffic warning signage must be erected where applicable, along transport routes and access roads. • The Contractor shall take preventative measures e.g. screening, muffling, timing, pre-notification of affected parties to minimise complaints regarding noise and vibration nuisance from construction activity sources. • Fine materials such as sand must be covered during transportation. • Appropriate response plans must be prepared by Contractor to ensure the fastest possible reaction to spills or accidents. • All trucks and vehicles removing spoil from the site must have load areas of good condition and must be covered by a tarpaulin (plastic / synthetic sheets / covers) to prevent rocks and spoil falling onto the road surfaces. • Vehicle speeds on site may not exceed 30km/hr. • All drivers and operators are to have licences for driving and operating plant on site. • All road vehicles to be road worthy. 	<p>Mufflers and silencers fitted to construction vehicles and equipment.</p> <p>Covering of material during transportation.</p> <p>Emergency reaction plan (for spills/accidents) must always be readily available on site.</p>	Contractor and CECO	Contract and allowance in P&G's	Prior to construction start.	ECO	Throughout construction period or as required by the ECO.

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
6.2 Storage of Hazardous Material	Hazardous Material storage areas	Contamination of soil by hazardous material. Inadequate remediation measures for spills.	<p>Objective(s): To ensure adequate protection of soil and soil remediation measures in case of spills.</p> <p>Targets:</p> <ul style="list-style-type: none"> • Hazardous materials – such as paint, cement, fuels, bitumen, fuel, oil, herbicides, battery acid or detergents – must be stored in sealed, lockable containers when not in use. • A register shall be kept of all substances and be available for inspection at all times. Areas shall be monitored for spills and any spills shall be contained, cleaned and rehabilitated immediately. • No decanting into unmarked containers or containers with incorrect labels • No decanted fuel to be left unattended in the sun • When handling hazardous materials, manufacturer's specifications must be complied with. The 16 point Material Safety Data Sheet is available on site • All spills (minor and major) must be cleaned and remediated to the satisfaction of the ECO and CECO within 24 hours of occurrence • The contractor must ensure that there is a supply of absorbent material (e.g. Drizit) and cleanup materials readily available to absorb, breakdown and, where possible, encapsulate minor hazardous material spillages. • No material may be stacked higher than 2m. • All products are to be stored with compatibility in mind. • Storage areas shall display the required safety signs depicting "No smoking", "No naked lights" and "Danger". Containers shall be clearly marked to indicate contents as well as safety requirements. • The contractor shall supply a method statement to the engineer for approval for the storage of hazardous materials prior to site preparation works. 	<p>Storage of hazardous materials in sealed and lockable containers.</p> <p>No evidence of spills on site.</p> <p>Absorbent and clean-up material readily available on site.</p>	Contractor and CECO.	Contract and allowance in P&G's	Construction period	ECO	For the duration of the construction period dependent on the presence of hazardous material on site.

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
6.3 Storage of Fuel	Storage areas	Contamination of soil by fuel. Inadequate remediation measures for spills.	<p>Objective(s): To ensure that there is optimum environmental protection (especially soil) from fuel spills.</p> <p>Targets:</p> <ul style="list-style-type: none"> • Fuel must be stored in above ground storage tanks or sealed containers, contained within a bunded area with sump drainage. • All bunds must be designed to contain at least 110% of the tank or drum storage capacity (this shall apply to above ground storage, and include fuels, welding equipment and oxy-acetylene cutting equipment). • No drainage from fuel storage areas shall be permitted. • Any other hazardous substances stored in bulk will require bunding. 	Established fuel storage areas in compliance with the objectives of the EMP.	Contractor and CECO.	Contract and allowance in P&G's	Pre-construction, Establishment of site.	ECO	Once off
6.4 Use of cement	Cement	Contamination of soil and surrounding environment. Decrease in ambient air quality.	<p>Objective(s): To ensure that the environment is protected from cement that will be used on site.</p> <p>Target:</p> <ul style="list-style-type: none"> • Cement must be delivered in sound and properly secured bags or in approved bulk containers. • Cement products in bags must be stored in storage containers to be provided at the construction camp and should only be opened when needed. • The storage facility and surrounding area must be swept and cleaned regularly as required to ensure that cement products do not pollute the surrounding environment. • Cement bags are not to be burnt on site but should be disposed of at a registered waste disposal site. • No concrete batching on bare soil. 	Cement delivery, storage and use will be in line with the EMP requirements.	Contractor and CECO.	Contract and allowance in P&G's	Construction period.	ECO	As long as cement is in use on site.

7. WASTE

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
7.1 Storage, removal and disposal of construction waste	Construction waste	Land pollution. Compaction of soil by rubble. Decreased aesthetic quality of the site.	<p>Objective(s): To ensure that waste is correctly stored and disposed of, decreasing the visual impact during the construction and post construction period. To keep the servitude neat and clean. Disposal of rubble and refuse in an appropriate manner. Minimise litigation. Minimise landowner complaints.</p> <p>Targets:</p> <ul style="list-style-type: none"> No material shall be left on site that could be of harm to humans and animals. Surplus concrete may not be dumped indiscriminately on site, but shall be removed from site when nearing completion of the different stages of work. Concrete trucks shall not be washed on site unless adequate washing and concrete collection facilities be introduced to site. Bins and containers must be made available by the contractor for the storage of construction waste. Temporary storage of construction waste will take place within the site, and within areas designated by the ECO and the Contractor although construction waste will not be stored on site for longer than 30 days. The Contractor will be responsible to remove and transport all construction waste material off site to a registered waste disposal facility. No burning of waste permitted on site. 	Construction waste stored, collected and disposed of as per the requirements of this EMP.	Contractor and CECO	Contract and allowance in P&G's	Waste bins/ skips must be available prior to construction. Removal of waste throughout the construction period.	ECO	The ECO will determine the frequency of waste removed from site.
7.2 Storage, removal and disposal of	Domestic waste	Land pollution. Unpleasant	<p>Objective(s) To ensure that waste is correctly stored and disposed of, decreasing the visual and possible environmental impact during the construction and post construction period.</p>	Evidence of domestic waste stored, removed and disposed of	Contractor and CECO	Contract and allowance in P&G's	The waste bins/ skips must be available prior	ECO	The ECO will determine the frequency of waste removal

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
domestic waste		odours. Decreased aesthetic quality of the site.	<p>Targets:</p> <ul style="list-style-type: none"> The Contractor must supply sealable waste bins at the construction camp for the storage of domestic waste. Clearly marked waste bins are to be provided for the separation of waste. Recyclable waste, including glass, paper and plastic must be separated at the construction camp, stored and recycled, where economically feasible. Personnel must be informed about the necessity of using the waste drums. The Contractor must do site clean-ups of litter other than construction waste on a daily basis, and dispose of it in the designated refuse bins provided at the Contractor's Camp. The contractor must ensure that general site-wide litter clean-up will occur at least once a week. No burning of waste permitted on site. The Contractor must dispose of all domestic refuse generated by his staff and Sub-Contractors on a weekly basis at a registered waste disposal facility. The Contractor must provide proof of this to the ECO in the form of a safe disposal certificate. Sealable waste drums should be provided in close proximity to all working areas during the construction of the hydro scheme. 	according to the requirements indicated in this EMP.			to construction. Removal of waste throughout the construction period.		from site.
7.3 Storage, removal and disposal of hazardous waste.	Hazardous waste.	Soil pollution. Water pollution.	<p>Objective(s): To ensure that soil, water and the rest of the surrounding environment on site is protected from hazardous waste.</p> <p>Targets:</p> <ul style="list-style-type: none"> The Contractor is required to refer to the Hazardous Substances Act (No 15 of 1973) to determine whether any substance (new or waste) stored on site is subject to controls contained within the act. 	All mitigation measures with regards to Hazardous waste mentioned in the EMP are implemented.	Contractor and CECO	Contract and allowance in P&G's	Hazardous Wastes must be collected in sealable, safe containers. Removal of hazardous	ECO	Old hydrocarbons and other hazardous materials must be removed on a regular basis (at least

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> • All hazardous waste must be stored in sealed and suitably marked containers for removal to a registered hazardous waste disposal facility. • Any oil spillage on site will be excavated to a depth determined by the ECO and disposed of for removal to a registered hazardous waste disposal site. Excavated areas are to be refilled with suitable replacement material. Alternative <i>in situ</i> remediation techniques could be used, if approved by the ECO. • Contaminated water must be stored in sealable marked containers and disposed of with other waste water from the construction works. 				waste throughout the construction process.		every 30 days).

8. SURROUNDING LAND

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
8.1 Entering different properties	Access roads	Damage to access roads. Damage to environment. Loss of topsoil. Erosion.	<p>Objective(s): To minimise damage to existing access roads. To minimise damage to the environment due to construction of new access roads. To minimise loss of topsoil and erosion.</p> <p>Targets:</p> <ul style="list-style-type: none"> • Planning of access routes must be done in conjunction between the Contractor, ECO, Engineer and applicable Landowners. • All agreements reached should be documented and no verbal agreements should be made. • The Contractor shall properly mark all access roads. Markers shall show the direction of travel. Roads not to be used shall be marked with a " NO ENTRY " sign. • Water diversion berms shall be installed from the start of the contract. These berms shall be maintained at all times and be repaired at the end of the contract. • Where berms are introduced on steep slopes the outflow shall be suitably stone pitched to prevent erosion from starting at the berms. • Roads may not be constructed on steep slopes prone to result in excessive erosion unless such roads follow contours. • The introduction of concrete pipes and drifts, to facilitate access, shall be at the discretion of ECO on site. Any dangerous crossings shall be marked as such and where necessary, speed limits shall be enforced. • Where necessary, a suitable mixture of grass seed shall be used to re-seed damaged areas. 	<p>No claims from Landowners due to further damage on existing access roads.</p> <p>No erosion visible on access roads three months after completion of construction.</p> <p>No loss of topsoil due to run-off water on access roads.</p>	Contractor and CECO.	Contract and allowance in P&G's	During the establishment of the construction site.	ECO	Once off

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> Deteriorated areas shall be fenced-in to enhance rehabilitation. 						

9. FLORA, FAUNA, AIR QUALITY, NOISE, WATER & OTHER

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
9.1 Construction activities (Physical issues and their control)	Terrain	Scarring of soil surface, disturbance/loss of topsoil.	<p>Objective(s): Minimise scarring of the soil surface and land features. Minimise disturbance and loss of topsoil. Rehabilitate all disturbed areas along the servitude.</p> <p>Targets:</p> <ul style="list-style-type: none"> • Topsoil to be stripped to 350 mm where required by ECO. • Topsoil only to be stripped where absolutely necessary. • The areas within and around the servitude will most likely be disturbed by construction activities and rehabilitation is required to reinstate such areas. 	<p>No visible erosion scars once construction is completed.</p> <p>Minimum loss of topsoil at the site.</p> <p>No barren areas visible three months after construction is completed.</p> <p>All damaged areas successfully rehabilitated.</p>	Contractor and CECO.	Contract and allowance in P&G's	During the establishment of the construction site.	ECO	Topsoil is stripped as and when required.
	Wet areas	<p>Unnecessary removal of flora.</p> <p>Removal of vegetative matter for firewood.</p>	<p>Objective(s): Avoid wet areas on the site to prevent damage.</p> <p>Target:</p> <ul style="list-style-type: none"> • No vehicular traffic shall be allowed in such areas. • No equipment shall be used which may cause irreparable damage to wet areas. 	No damage to wet areas.	Contractor and CECO.	Contract and allowance in P&G's	During the establishment of the construction site.	ECO	Once off.

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
9.2 Vegetation clearing	Vegetation	Damage to vegetation. Erosion due to removal of vegetation.	<p>Objective(s): Minimise damage to vegetation. Keep site area natural as possible. Minimise possibility of erosion due to removal of vegetation. Minimise removal of plant material on river embankments. Eradication of alien invader species.</p> <p>Targets:</p> <ul style="list-style-type: none"> • The object of vegetation clearing is to trim, cut or clear the minimum number of trees and vegetation necessary for the safe mechanical construction and electrical operation of the hydro scheme. • No vegetation shall be pushed into heaps or left lying at the site. • Vegetation clearing at the site must be kept to a minimum. Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are removed • Stumps shall be treated with herbicide. • No vegetation clearing in the form of de-stumping, scalping or uprooting shall be allowed at the river banks. • Protected or endangered species of plants shall not be removed unless they are in the way of the hydro scheme position. Where such species have to be removed, the necessary permission and permits shall be obtained from the Provincial Nature Conservation authorities. • All protected species not to be removed must be clearly marked and such areas fenced off if required. • The use of herbicides shall only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent. • Herbicide applicators must be in possession of a valid herbicide applicator license. 	<p>No trees and vegetation removed unnecessarily.</p> <p>No de-stumping of vegetation on river embankments.</p> <p>No visible erosion scars three months after completion of the contract due to vegetation removal.</p> <p>No visible damage to the vegetation one year after completion of the contract due to herbicide use.</p> <p>No litigation due to unauthorised removal of vegetation.</p> <p>All alien invaders eradicated from the servitude</p>	Contractor and CECO.	Contract and allowance in P&G's	During the establishment of the construction site.	ECO	During construction.

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
	Gate installation and control.	Damage to existing fences, security.	<p>Objective(s): Properly install gates to allow access to the site. To minimise damage to fences. To minimise the extent of removal of vegetation.</p> <p>Targets:</p> <ul style="list-style-type: none"> The Engineer shall approve gate positions. All gates shall be fitted with locks and be kept locked at all times during the construction phase. Gates shall only be left open on request of applicable landowners. All claims arising from gates left open shall be investigated and settled in full by the Contractor. If any fencing interferes with the construction process, such fencing shall be deviated until construction is completed. 	<p>No damage to fences and subsequent complaints from Landowners.</p> <p>All gates equipped with locks and kept locked at all times to limit access to key holders.</p> <p>All fences properly tied off to the gate posts.</p> <p>All gates properly and neatly installed according to specifications.</p> <p>No complaints about open gates.</p>	Contractor and CECO.	Contract and allowance in P&G's	During the establishment of the construction site.	ECO	During construction.
	Conservation and protection of flora.	<p>Unnecessary removal of flora.</p> <p>Removal of vegetative matter for firewood.</p>	<p>Objective(s): To minimise the extent of removal of vegetation.</p> <p>Targets:</p>	No unnecessary loss of vegetation.	Contractor and CECO.	Contract and allowance in P&G's	During the establishment of the construction site.	ECO	During construction.

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> Plants outside of the construction area are not to be disturbed, damaged or removed. The Contractor will be held liable for the replacement of any plant or feature under protection that is removed or damaged by the Contractor's negligence or mismanagement. No vegetative matter may be removed for firewood. No open fires permitted. No material storage or lay down is permitted under trees. 						
9.3 Removal and control of alien vegetation	Alien vegetation.	Introduction of alien plants/seeds on site.	<p>Objective(s): To prevent alien plants/ seeds from being introduced on site. To remove alien plants where possible, from site.</p> <p>Targets:</p> <ul style="list-style-type: none"> All areas disturbed by construction activities must be monitored for exotic or invasive plant species and weeds. Chemical removal shall be used in accordance with manufacturer's specification for weeds. The type of chemical to be utilised must be approved by the ECO. Any eradicated exotic/invasive plant or weed vegetation must be removed from site and disposed of at an approved waste disposal facility. The applicant must have a herbicide or pest control operators licence. 	Decrease of alien plants on site.	Contractor, Labourers, CECO.	Contract and allowance in P&G's	For the duration of the construction period.	ECO	Ongoing, as alien vegetation is identified on site.

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
9.4 Protection and handling of fauna on site.	Protection of Fauna	Intentional or unintentional killing of fauna on site. Loss of fauna due to habitat disturbance.	<p>Objective(s): To ensure that fauna found on site are protected and not interfered with.</p> <p>Targets:</p> <ul style="list-style-type: none"> The contractor must ensure that the site is kept clean and free of rubbish that could potentially attract animal pests, and that rubbish bins are scavenger proof. The contractor must report problem animals or vermin to the ECO. Ensure that domesticated animals belonging to the local landowners are kept away from the construction works. Workers should be educated so as not to kill any fauna found onsite. The footprint of disturbance should be kept to a minimum. No hunting or trapping is permitted in the project area. Access roads should be planned so that only minimum linear distances are developed. Excavations must be checked on a daily basis for any signs of fauna which may have fallen in. 	<p>No evidence of domestic animals on site.</p> <p>The site is kept clean and does not attract fauna.</p>	Contractor, CECO.	Contract and allowance in P&G's	Throughout the construction and post construction period.	ECO	Ongoing.
	Protection of Avifauna	Avifauna disturbance. Loss of avifauna.	<p>Objective(s): To minimise disruption of farming activities. To minimise disturbance of animals. To minimise interruption of breeding patterns of birds.</p> <p>Targets:</p> <ul style="list-style-type: none"> Should any new sites or nests be found during the construction process, that was not known or have been noted before, each site shall be assessed for merit and the necessary precautions be taken to ensure the least 	<p>No complaints from Landowners or Nature Conservation.</p> <p>No litigation concerning stock losses and animal deaths.</p>	Contractor, CECO.	Contract and allowance in P&G's	Throughout the construction and post construction period.	ECO	During construction

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			disturbance. <ul style="list-style-type: none"> Bird guards and diverters shall be installed where necessary. 						
9.5 Trenching	Dust control	Air pollution	Objective(s): To reduce the generation of dust on the construction site. Targets: <ul style="list-style-type: none"> Dust suppression is to be undertaken during construction, or as complaints are received. Warning barricading should be placed around open excavations and should be suitable for high winds. The Contractor is to take appropriate measures to minimise the generation of dust as a result of excavation works. Such measures include frequent spraying during low rainfall periods or by using chemical dust binding agents approved by the ECO. Speed limits must be enforced in all areas to reduce the generation of dust. 	Dust is kept at a minimum level on site.	Contractor and CECO.	Contract and allowance in P&G's	Throughout construction period.	ECO	During periods of low rainfall or as required by the ECO.
9.6 Use of construction vehicles and equipment	Construction vehicles, plant and machinery.	Noise and vibration.	Objective(s): Noise levels are kept to a minimum on site. Target: <ul style="list-style-type: none"> Should construction have to continue after hours, all residents affected must be notified. All machinery and equipment must be maintained in good working order, and fitted with approved and specified muffler systems. 	Construction vehicles and machinery fitted with mufflers silencers. Working hours are adhered to.	Contractor and CECO.	Contract and allowance in P&G's	Vehicles and machinery must be fitted with mufflers prior to the commencement of construction. Work hours, unless otherwise	ECO	Ongoing

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
							permitted, must be adhered to through the construction period.		

10. ARCHAEOLOGICAL AND HERITAGE SITES

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
10.1 Protection of archaeological and heritage sites	Heritage & Archaeology	Destruction of graves and other sites of archaeological and heritage value.	<p>Objective(s): To make sure that sites of archaeological and heritage value is preserved.</p> <p>Targets:</p> <ul style="list-style-type: none"> The position of known sites will be shown on the final profiles. Such areas shall be marked as no go areas. Artefacts may not be removed under any circumstances. The Paleontologist must be contacted to remove artefacts. Construction must be immediately stopped, should any elements of cultural or heritage significance be found. A qualified and registered palaeontologist must be present on site during all earth moving activities, The resident ECO must be trained by a palaeontologist in order to recognise fossils Uniquely preserved palaeosurface with dinosaur tracks should be demarcated and not development should take place in that area 	No destruction of or damage to known archaeological or heritage sites.	Contractor, CECO.	Contract and allowance in P&G's	For the duration of the construction period.	ECO	Ongoing.

11. PLANNING AND ENGINEERING CONSIDERATIONS

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
11.1 Construction activities	Existing infrastructure.	Disruption of services, damage to installations, damage or loss of plant.	<p>Objective(s): To prevent disruption or damage to existing infrastructure or services.</p> <p>Target:</p> <ul style="list-style-type: none"> • Telephone and power lines shall be identified during the construction operations. • Possible known pipelines must be considered during planning and construction. • Any damage to pipe lines shall be repaired immediately. • All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties. • Speed limits shall be enforced in such areas and all drivers shall be sensitised to this effect. • Upon completion of the project all roads shall be repaired to their original state • Power cuts to facilitate construction, must be carefully planned. If possible, disruptions must be kept to a minimum and should be well advertised and communicated to the Landowners. • Care must be taken not to damage irrigation equipment, lines, channels and crops. • The position of all pipelines and irrigation lines must be obtained from the Landowners and be shown on the physical access plan. 	<p>No unplanned disruptions of services.</p> <p>No damage to any plant or installations.</p> <p>No complaints from authorities or Landowners regarding disruption of services.</p> <p>No litigation due to losses of plant, installations and crops.</p>	Contractor, CECO.	Contract and allowance in P&G's	Prior to construction and during	ECO	Ongoing.
11.7 Actions by site staff	Littering on site.	Untidy and polluted site and surrounding land.	<p>Objective(s): To maintain a neat, tidy and unpolluted construction site.</p>	<p>No visible sign of littering.</p> <p>No complaints from</p>	Contractor, CECO.	Contract and allowance	Construction.	ECO	During construction.

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			Targets: <ul style="list-style-type: none"> • The ECO shall monitor the neatness of the work sites as well as the campsite • A weekly site-wide clean-up shall be held. 	Landowners		in P&G's			

12. CLAIMS FOR DAMAGES

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
12.1 Construction activities (Physical issues and their control)	Claims for damages	Scarring of soil surface, disturbance/loss of topsoil	<p>Objective(s): To minimise complaints from Landowners. To prevent litigation due to outstanding claims. Successful completion of the contract and all Landowners signing release forms.</p> <p>Target:</p> <ul style="list-style-type: none"> All anticipated crop damage shall be noted while access negotiations are underway Any damage to commercial crops shall be recorded immediately The ECO must also keep a photographic record of such damage. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable All claims for compensation emanating from crop damage should be directed to the Environmental Control Officer for appraisal The Contractor shall be held liable for all unnecessary damage to the environment and crops A register shall be kept of all complaints from Landowners All claims shall be handled immediately to ensure timeous rectification / payment 	<p>All claims investigated and settled within one month.</p> <p>No litigation due to unsettled claims.</p> <p>All Landowners signing release forms within six months after completion of the Contract.</p>	Contractor and CECO.	Contract and allowance in P&G's	During the decommissioning of the construction site.	ECO	As required.

15. HIGHLIGHTED EXPECTED PROBLEMS DURING THE PROJECT

15.1 PRE-CONSTRUCTION

Construction of the PV Plant will not interfere with any landowners. The land is owned and occupied by Bethlehem Hydro (Pty) Ltd.

15.2 DURING CONSTRUCTION

Damage to surrounding fences, gates and other infrastructure may accidentally occur at any time. This will create problems with the Landowners and should be avoided as far as possible. All damage to be repaired immediately and to the satisfaction of the landowner. The use of private roads for construction purposes always leads to damage due to heavy equipment and frequent use. It is foreseen that the Contractor may receive complaints in this regard, especially during the rainy season.

15.3 AFTER CONSTRUCTION

If damaged infrastructure is not repaired to the expectations of the Landowners, this may result in claims which should be avoided at all costs.

15.4 POSSIBLE SOLUTIONS TO THE PROBLEMS

- 15.4.1 Proper liaison between EAB-Astrum Energy (Pty) Ltd Joint Venture, the Contractor and surrounding Landowners.
- 15.4.2 The surrounding Landowners shall be informed of the starting date of construction as well as the phases in which the construction shall take place.
- 15.4.3 The Contractor must adhere to all conditions of contract including the Environmental Management Plan.
- 15.4.4 Proper planning of the construction process to allow for disruptions due to rain and very wet conditions.
- 15.4.5 Where existing private roads are in a bad state of repair, such roads' condition shall be documented before they are used for construction purposes. If necessary some repairs should be done to prevent damage to equipment and plant.
- 15.4.6 All manmade structures shall be protected against damage at all times and any damage shall be rectified immediately.
- 15.4.7 Rehabilitation of the existing roads shall be done properly to ensure all Landowners sign the release forms. The Contractor shall ensure that all damaged areas are

rehabilitated to the satisfaction of EAB-Astrum Energy (Pty) Ltd Joint Venture and each and every property owner and that outstanding claims are settled.

15.4.8 Proper site management and regular monitoring of site works.

15.4.9 Proper documentation and record keeping of all complaints and actions taken.

15.4.10 A positive attitude towards Environmental Management by all site personnel.

16.1 LIST OF METHOD STATEMENTS REQUIRED PRIOR TO CONSTRUCTION

1. The Contractor shall supply a method statement that outlines the approximate number of people on site, the layout of the camp, management of ablution facilities and wastewater management.
2. The Contractor shall provide a method statement with regard to waste management.
3. The Contractor shall provide a method statement to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage of carbon fuels and oils.
4. The Contractor shall supply a method statement for the storage of hazardous substances.
5. The Contractor shall supply a method statement for dealing with veld fires caused on site during construction.
6. The Contractor shall supply a method statement for management of concrete and batching plants.
7. The Contractor shall provide a method statement for extraction of water from a natural source.

17 REHABILITATION

Rehabilitation must be carried out as soon as possible after the construction is completed. All rehabilitation is to be done with approval of EAB-Astrum Energy (Pty) Ltd Joint Venture approval. Consent must be given in writing to the Contractor for rehabilitation.

17.1 REHABILITATION OF CONSTRUCTION CAMP

The removal of all construction facilities and materials from the construction camp will be required, and rehabilitation will have to be carried out, including the removal of the following:-

- Concrete and compacted earth platforms;
- Fuel storage tanks; and
- Chemical toilets.

Access roads will need to be rehabilitated according to the requirements below.

Any contaminated material or soil must be removed to a registered hazardous waste disposal facility and the prescribed re-vegetation process must then be followed thereafter.

17.2 ERADICATION OF ALIEN VEGETATION

All alien vegetation spread over the entire construction footprint must be removed, irrespective of its existence prior to construction. Chemical removal shall be used in accordance with manufacturer's specification for weeds. All chemicals used must be approved by the ECO. Once the weeds have perished they shall be removed mechanically by use of an offset disk plough thereby digging up the vegetation including the root ball.

17.2.1 Control of Alien Vegetation

The remainder of the site including the revegetated areas shall be kept free of weeds and alien vegetation.

17.3 REHABILITATION

- Filling of excavations with subsoil and topsoil to a minimum of 350 mm above ground level to allow for subsidence.
- Shaping of the disturbed areas to blend with the surrounding landscape.
- Placing of topsoil on all disturbed areas (minimum depth 200 mm).
- Organic fertilizers must be added to the topsoil prior to seeding (if required).
- Revegetation of all areas where topsoil is placed using a mixture of indigenous grasses and bushes.
- Maintenance of these areas until an acceptable cover has been established. Acceptable cover shall mean 75% ground cover with no gaps exceeding 500 mm. Maintenance may include watering, mowing and weeding as well as preventing the development of erosion channels or, backfilling where they have occurred.

APPENDIX A: Standard method statements

(If the space provided is insufficient then attach additional sheets)

WHAT:	Subject of M/Statement			
WHO:	Site			
	Foreman/contact person:			
	Submitted to (e.g. ESA):	Approved by:		
	Date Submitted on:	Date Approved:		
WHEN:	Date works start	Date works complete		
	Rehabilitation period:	Programme restrictions (critical path, season restrictions etc.)		
	Split work Phasing:	Item	start date	end date
	Phase 1			
	Phase 2			
WHERE	Area of works – submit plan or sketch if appropriate – stockpile, detention ponds, boundaries / restriction of works, special features or mitigation works landscape specials etc:			
HOW:	Route/site layout pegged:	Date available to inspect	Inspection required:	persons
	Landscape concerns: (Specify items not covered in EMP. Refer to EMP items if required.)			
	Existing features & services affected (e.g. paths, curbing, irrigation etc.)			
	Trees (protection or removal methods).			
	Special vegetation			

	Reinstatement methods
	Maintenance
	Exclusion areas

HOW	General Environmental: (specify items not covered in EMP. Refer to EMP items if required.)
(cont.)	Access:
	Machinery:
	Earthworks & dust control:
	Concrete works:
	Storm-water control:
	Stockpiles:

Refuse/rubble:
Water quality – pumping, source & discharge points, settlement, filtration, duration etc:
Hydrocarbon control measures:
I&AP notifications:
Fire/emergency contingencies:
Special conditions / mitigation measures (e.g. stream crossings, live sewer proximity etc.):
Comments:

Appendix G: Additional Information



Appendix G1: Technical Design Report

Merino Photovoltaic Power Station

Technical Design Report



Project Partners:



Project Summary

Bethlehem Hydro (Pty) Ltd owns and operates a 7MW hydro power station near Bethlehem in the Free State Province of South Africa. Nu Planet (Pty) Ltd, the developer of the Bethlehem hydro plant, have partnered with astrum energy (Pty) Ltd to construct a 6MW photovoltaic (PV) power station at the Bethlehem Hydro site. The PV installation shall benefit from the existing infrastructure and grid connection of the hydro plant.

astrum energy, together with its JV partner EAB New Energy from Germany, have conducted a feasibility study. Nuplanet has secured the rights to use the land and infrastructure from Bethlehem Hydro. A SPV has been incorporated by astrum, EAB and Nuplanet which will pay Bethlehem Hydro a percentage of the revenue from the PV plant for the use of its land and infrastructure.

Solar Energy in South Africa

South Africa possesses an enviable solar resource. The Bethlehem hydro site for example receives about twice as much solar irradiation annually as compared to Germany, the world leader in solar energy.

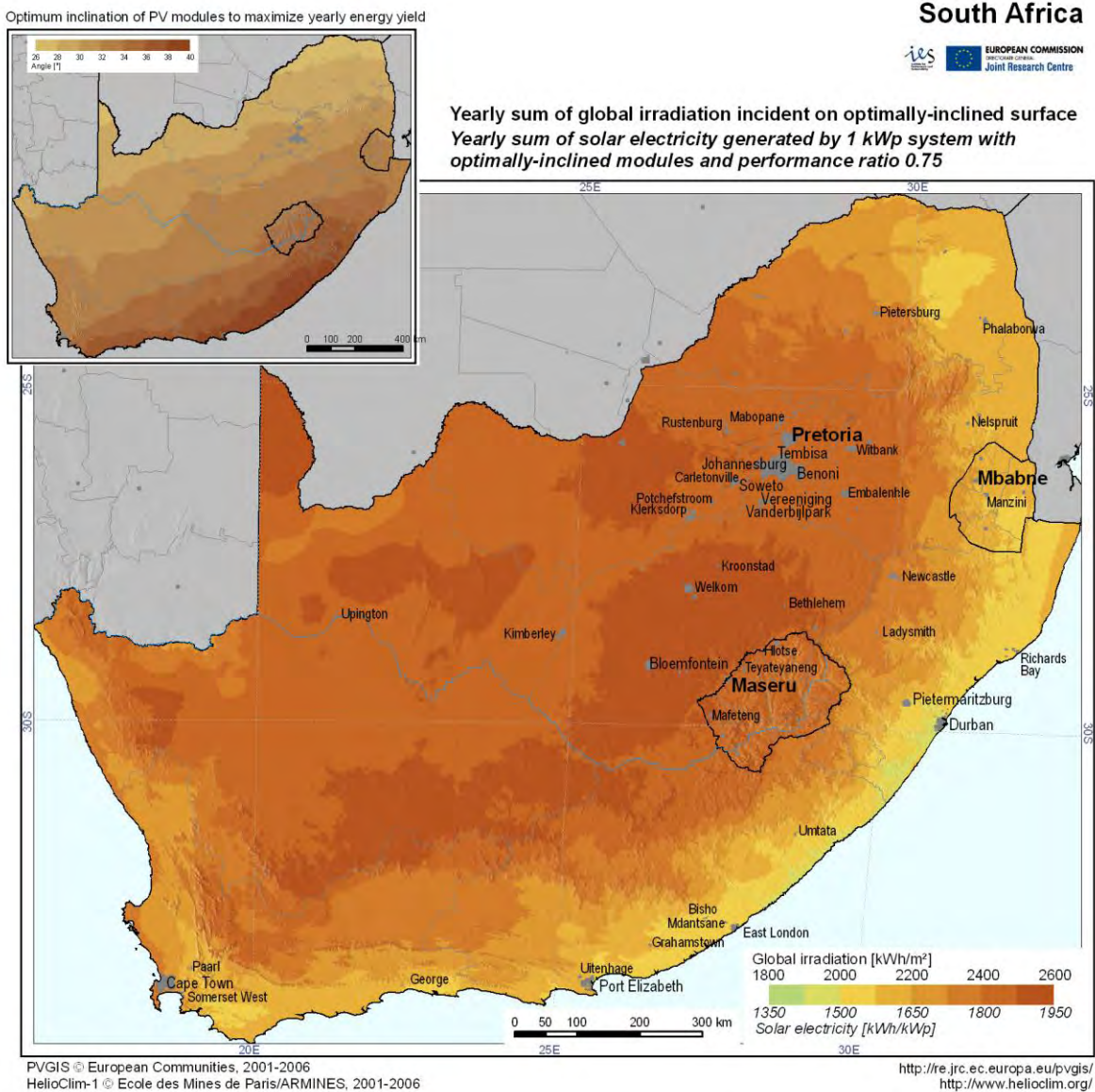


Figure 1 South Africa Irradiation Map

Project Details

Location

The project site is located approximately 16km south of Bethlehem, Free State, South Africa.

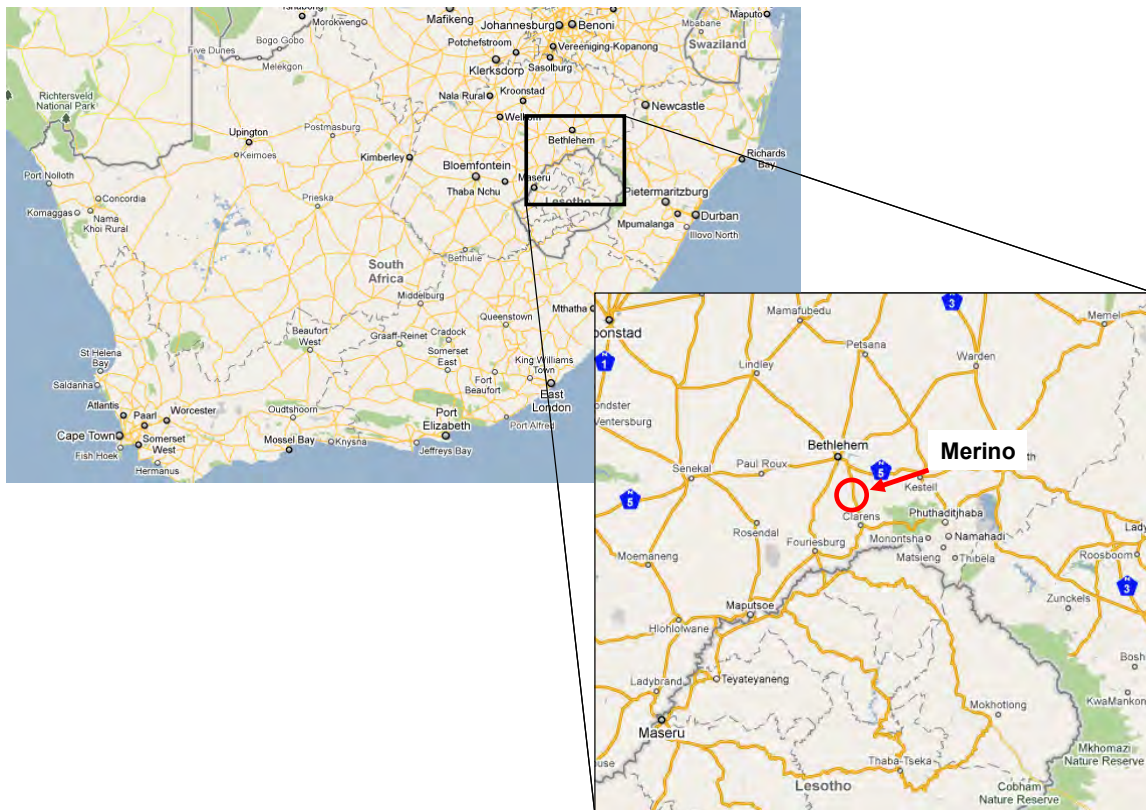


Figure 2 Merino Photovoltaic Power Station Location

Site Description

The Merino PV power station will be built on the same site as the Merino Hydro plant. The plant will share existing infrastructure with the hydro plant including the 22kV line connecting the plant to the Node Substation and access roads. The approximate footprint of the PV plant will be 10ha.

The PV power station will be constructed on the grounds of the Bethlehem Hydro power plant. A preliminary layout can be seen below.

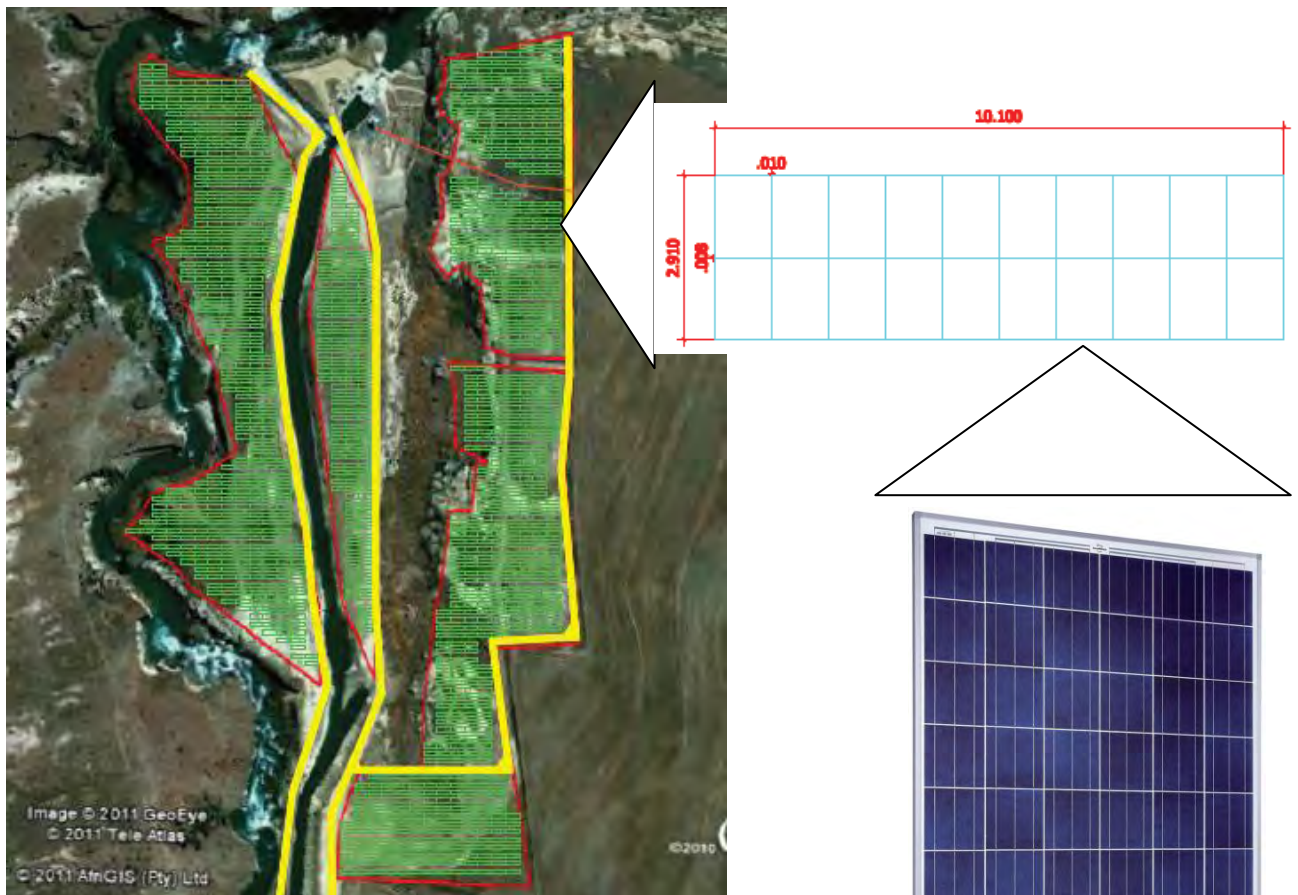


Figure 3 Preliminary Merino Photovoltaic Power Station Layout

1351 racks x 20 modules/rack x 220W/module = 5.94MW

27 020 PV modules

Site layout and alternatives

Attached to this document are two alternative site layouts. The alternatives concern the orientation of the PV modules. It is possible to arrange the modules so that they are mounted in a “landscape” orientation or a “portrait” orientation. The orientation of the modules will affect the dimensions of the require mounting system as illustrated in the attached layouts. The preferred option is the landscape orientation. The landscape orientation of modules, if properly implemented, mitigates against production losses caused by inter-row shading.

Timeline

Activity	May 2011	Jun 2011	Jul 2011	Aug 2011	Sep 2011	Oct 2011	Nov 2011	Dec 2011	Jan 2012	Feb 2012	Mar 2012	Apr 2012	May 2012	Jun 2012	Jul 2012	Aug 2012
Securing of land	█															
EIA and Permissions		█	█	█	█	█	█	█	█	█						
Secure Finance						█	█	█	█	█						
Supplier Selection						█	█	█	█	█						
Obtain licenses and PPA											█	█	█	█	█	█
Implementation																█

Grid Connection

The Merino Photovoltaic Power Station will feed into the same 22kV power lines as the Merino Hydro Power Station. This dedicated line runs to the Eskom Node Substation (88/22kV) with a capacity of 10MVA which feeds into the Eskom grid. The Merino hydro plant is the only generator on the line and has a maximum generating capacity of 3.45MVA leaving sufficient excess capacity for the PV power station.



Figure 4 Merino Hydro Power Station Transformer

The electricity generated by the photovoltaic array will be converted from DC to 3 phase low voltage AC current via power inverters. The voltage will be stepped up to 22kV with a transformer for connection to the 22kV line after the Merino Hydro electricity meters and circuit breakers.

Solar Resource

The Bethlehem area receives high levels of solar irradiation even by South African standards. Table 1 gives the average monthly and annual irradiation on a latitude tilted surface. The data is sourced from four data sets including both terrestrial and satellite based data.

Table 1 Merino Average Latitude Tilt Irradiation

Weighted Average LT Irradiance (kWh/m²)	
January	198.7
February	179.6
March	195.4
April	185.5

May	190.2
June	175.9
July	190.6
August	204.8
September	198.7
October	195.7
November	193.4
December	198.7
Total	2307.2

The total annual irradiation of 2307 kWh/m² is about double that which is found in most of Germany, a world leader in the use of photovoltaic power. Furthermore, modest temperatures at the site will limit efficiency losses due to high temperatures.

Technology

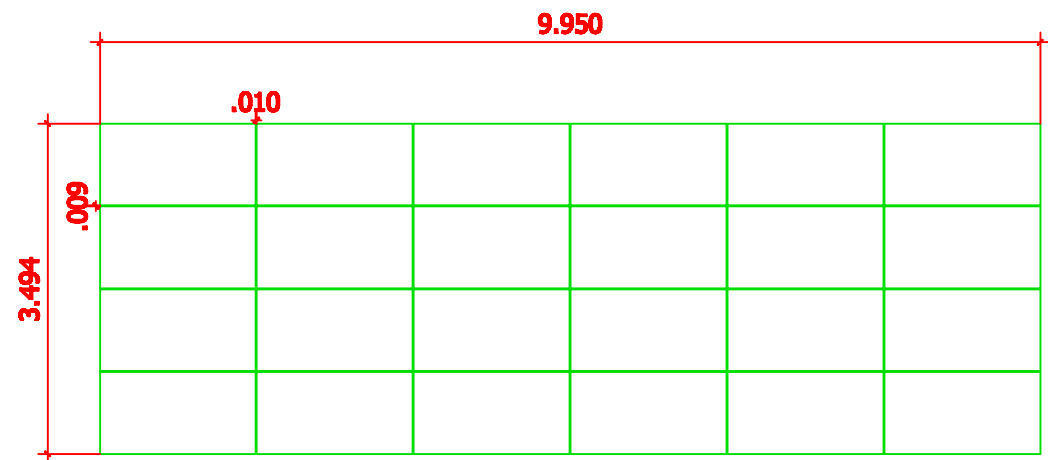
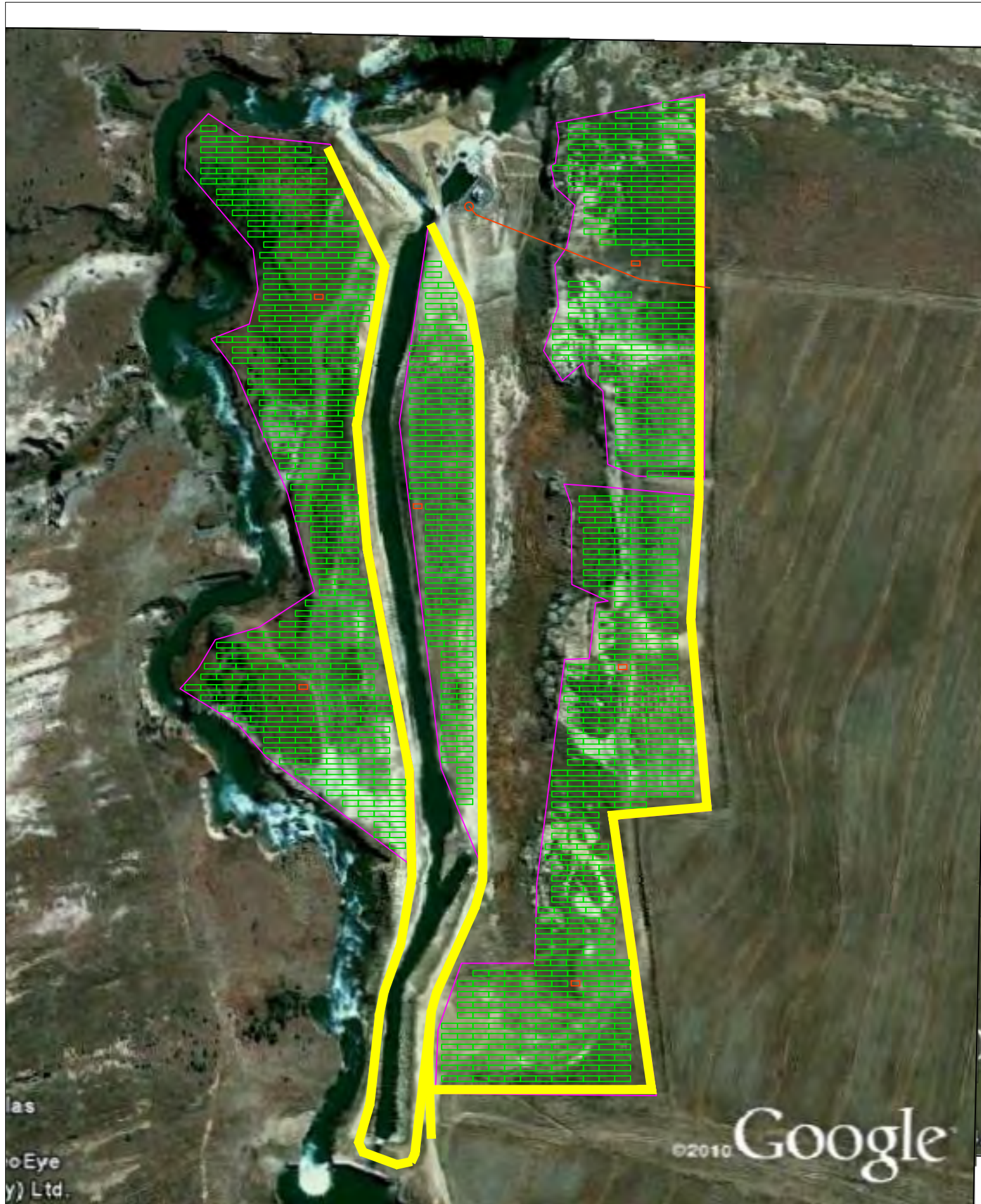
Crystalline silicon or thin film PV modules will be used for the Merino PV Power Station. Crystalline silicon solar cells are more efficient than thin film technologies allowing for greater generating capacity over a given surface area. Thin film solar panel efficiency is less strongly affected by high operating temperatures.



Figure 5 Polycrystalline Solar Cells

Construction

The construction and commissioning of the power plant is expected to require about 4 months. Construction will require limited land clearance and the erection of mounting structures to which the solar panels will be fixed. Interconnection of the strings of panels to inverters will require the laying of underground cabling. The construction process will generate approximately 10m³ of solid waste per month consisting primarily of cardboard and plastic packaging materials, metal and cable scraps and vegetation of clearing activities.

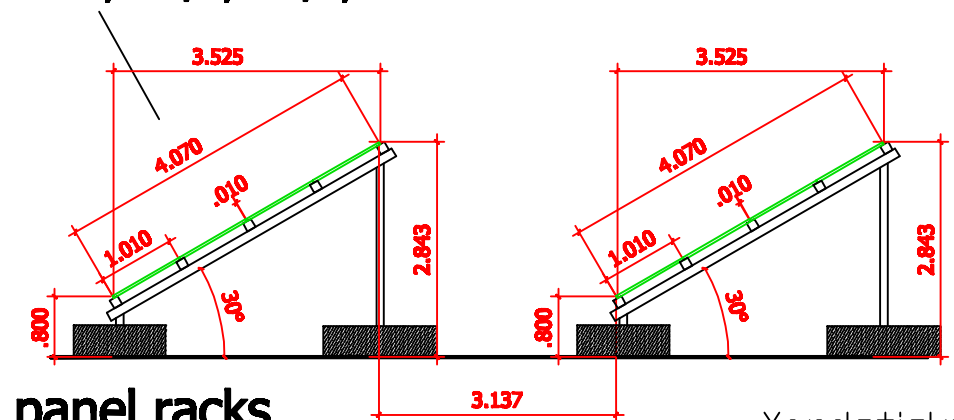


Top view - panel racks

Yardstick: 1:80

legend	powerline	inverter
road	suitable area	
panel rack	grid connect. pt.	

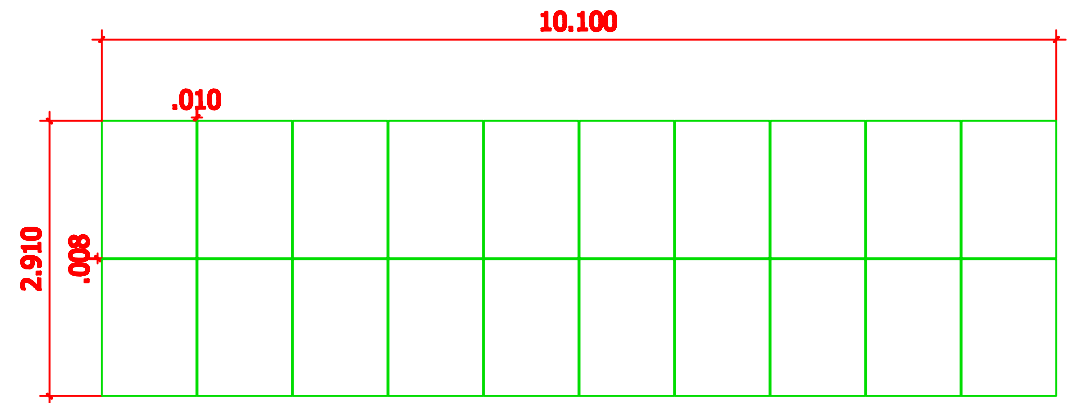
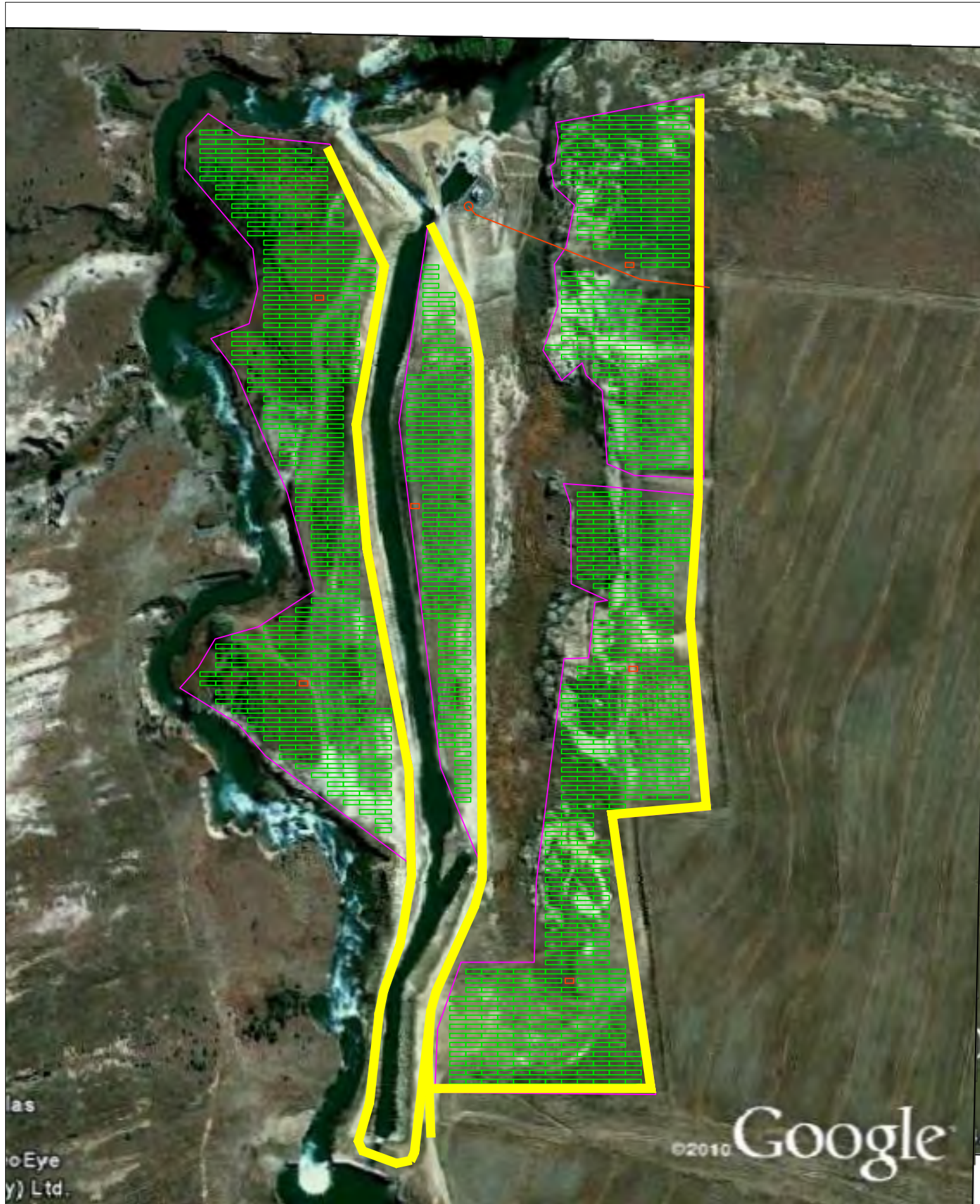
Modul Typ SW 220 poly
W/H/D = 1,001/1,675/0,034 m



Side view - panel racks

Yardstick: 1:100

Modification:		Rights:	
Description: PV area		This drawing is property of the eab New Energy GmbH. You may not, except with our express written permission, duplicate or commercially exploit this drawing. Nor may you make it available to third parties. Non-compliance with this obligation will create a duty of indemnification for subsequent loss or damages.	
Yardstick: 1 : 3300		Project: PV - Project Merino	
Department:	Date: 24.10.2011	Signature:	
Conditioning:	01.12.2010		
Drawing:			
Check:			

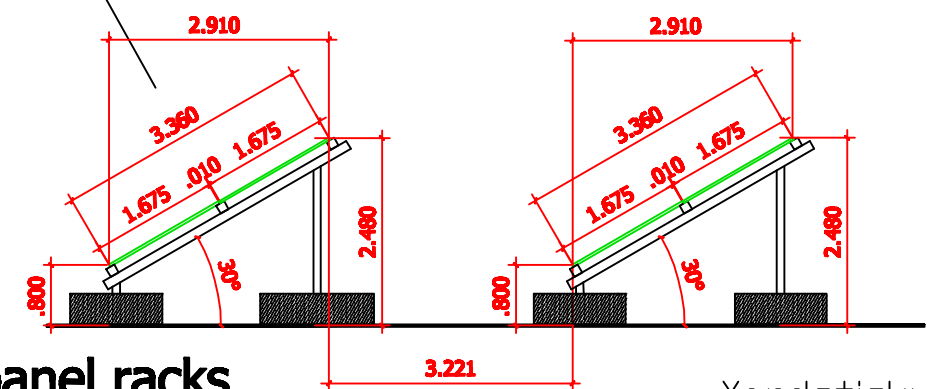


Top view - panel racks

Yardstick: 1:80

legend	powerline	inverter
road	suitable area	
panel rack	grid connect. pt.	

Modul Typ SW 230 poly
W/H/D = 1,001/1,675/0,034 m



Side view - panel racks

Yardstick: 1:100

Modification:		Rights:	
Description: PV area		This drawing is property of the eab New Energy GmbH. You may not, except with our express written permission, duplicate or commercially exploit this drawing. Nor may you make it available to third parties. Non-compliance with this obligation will create a duty of indemnification for subsequent loss or damages.	
Yardstick: 1 : 3300		Project: PV - Project Merino	
Department:	Date:	Signature:	
Conditioning:	24.10.2011		
Drawing:	01.12.2010		
Check:			

Appendix G2: Proof of WULA Submission

Please note that EAB-Astrum Energy (Pty) Ltd is in process of applying for a WULA. No application has been lodged yet.

Appendix G3: CAA Approval

SOUTH AFRICAN



**CIVIL AVIATION
AUTHORITY**

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**EAB Astrum Energy
5 Walnut Road, Durban
4001**

03 November 2011

Attention: Yegis Reddy

**Enquiries: L Stroh
Tel. 011545 1232
strohl@caa.co.za**

**Ref. CAA_2011_09_Sol0058
CA15/2/Bethlehem**

**Approved Proposed Solar PV Energy Facility:
Merino PV Power Project.**

After evaluating the site position and reviewing the information received in 17 August 2011 refers. The CAA has no objection to the proposed Energy facility development, on a proposed maximum height of 5m.

Yours truly,

**Gary Newman
Manager: Procedure design and Cartography
For SA Civil Aviation Authority
email: newmang@caa.co.za
website: www.caa.co.za**