

# Ucwaningo Lokungenzeka Emvelweni Umqulu Oyisendlalelo Solwazi Nesimemo Sokubamba

## Ulayini Kagesi Onamandla Angu 2x400kV Osuka E- Mbewu Uya E-Isundu March 2011

### Isingeniso noMqulu

Ukuze amelane nezidingo ezikhulayo zikagesi zaKwaZulu- Natal, uEskom uhlongoza ukwakha olayini bagesi ababili abasha abanamandla angu 400kV ukusukela esiteshini sikagesi esiseduze kwase Mgungundlovu (isiteshi iMbewu) ukuya esiteshini sikagesi esiseduze naseMpangeni (isiteshi Isundu). Leprojecti iyingxenywe yemizamo yokuthuthukisa iKZN futhi izothuthukisa izingi lokunikezela ugesi kanye nokuthuthukisa izinga lokusabalalisa kagesi, nokuqinisekisa ukuthi uhlala ukhona ugesi ezindaweni ezisentshonalanga kwasePinetown kanye nasendaweni okukhula khona izindawo zokusebenzela yaseMpangeni.

Ngokwezemfuno zoMthetho kaZwelonke Wokuphathwa Kwezemvelo ongunombolo 107 ka 1998 (NEMA) intuthuko ehlongozwayo ithinta izinto ezingaba nomthelelo omkhulu emvelweni.



Ngalesisizathu uEskom udinga isinqumo esivela eMnyangweni Wezemvelo kanye noMnyango wezokuLima, ezeMvelo nokuThuthukiswa kweMiphakathi yaseMakhaya eKwaZulu-Natal sokuthi intuthuko ehlongozwayo ingagunyazwa yini noma cha.

Abaluleki Bezokuphathwa Kwezemvelo, iAurecon South Africa (Pty) Ltd baqashwe nguEskom njengoNgoti Bocwaningo Lwemvelo Abazimele ukuba babhekane nomgudu woCwaningo Lemvelo elidingwa uMnyango Wezemvelo. Umgudo uzohlola imithelelo engabakhona emimbi nemihle, unikeze imibono ngokungenziwa ukugwema nokunciphisa imithelelo emibi ekwaxhiweni kolayini bagesi abanamandla angu 400kV. Ucwaningo lizohlola amaPhaseji amathathu lapho olayini bagesi bangase bahambe khona.

Lolucwaningo lizovula ithuba lokuthi umphakathi kanye nabahlomuli, nocwepheshe banikeze imibono yabo, kanye nokuhlanganyela kulomgudu.

**aurecon**

LoluCwaningo lwenzelwa  
iEskom Holdings Limited

## Inhloso yaloMqulu

Inhloso yalo Mqulu Oyisisikela Solwazi ukunikeza ulwazi maqondana nalentuthuko ehlongozwayo, kanye nokuthola izimvo nemibono yakho njengomuntu othintekayo nofisa ukubamba iqaza ekubhekeni imithelelo engaba khona emvelweni, okuhlanganisa (akupheleli lana): imvelo, ezokuhlala kwabantu, ezomnotho, ezokuvakasha, nezokubukeka.

Uyamenywa ukuba ubhalise njengomuntu othintekayo nofisa ukubamba iqaza, ukuze usisize ekuqaguleni imithelelo engadalwa intuthuko ehlongozwayo emvelweni nokuba uveze imibono yakho engasiza ukunciphisa imithelela engemihle.

Sicela ugqwalise ifomu lokuphendula elitholakala ekugcineni kwaloMqulu. Ulithumele kulelikheli:

### Ikheli leposi:

**Aurecon**

**PO Box 905 Pretoria 0001**

**South Africa**

**Isikahlahamezi: (0) 86-665-3273**

**Tel: (012) 427 2972**

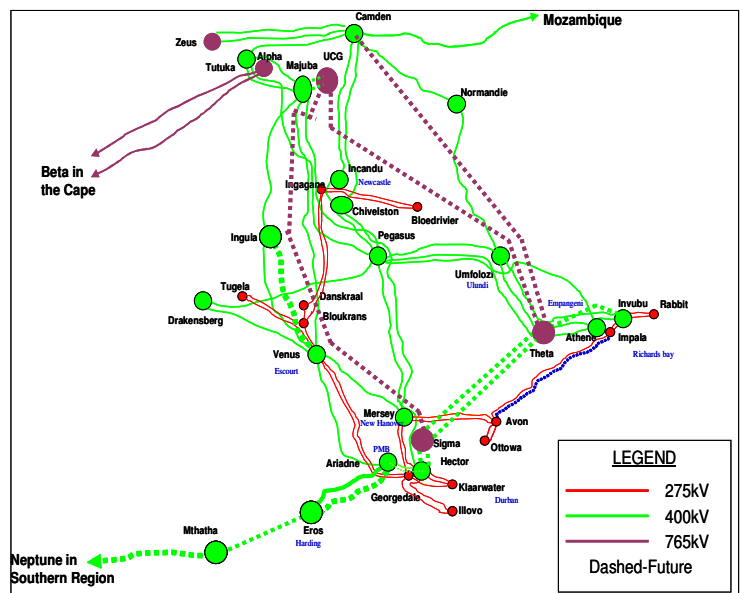
**Thumela ku: Ms Dineo Kwili**

**E-mail:**

**Dineo.kwili@af.aurecongroup.com**

## Ukudingeka nokufuneka kweProjecthi

Ukuze kunciphiswe ukucindezeleka kwemiphambo yagesi okwesikhashana kanye nasesikhathini esizayo eKwaZulu- Natal. uEskom uhlangoza ukwakhwa olayini bagesi abanamandla angu 765kV. Ipulani ehlongozwayo (njengoba umfanekiso utshengisa ngenzansi) ihlanganisa olayini bagesi abanamandla angu 765kV ukusukela lapho kukhona imishini yokwenza ugesi eMpumalanga, olayini ababili bagesi abaya endaweni yaseMpangeni, nolayini owodwa oya endaweni yasePinetown. Kuphinde kuhlongozwe ukwakhiwa kwagesi onamandla angu 400kV ozoxhumanisa umphambo wolayini bagesi abanamandla angu 765kV phakathi kwaseMpangeni nasePinetown.



Ukuxhumana kolayini bagesi abanamandla angu 400kV ukusukela eMpangeni nasePinetown kudingeka umangabe kwenzeka kulahleke owondwa ulayini kagesi. Labo layini abanamandla angu 400kV bazophinde bavumele ukunikezelwa kwagesi esikhathini esizayo phakathi kwasezindaweni zaseMpangeni nasePinetown.

Ngalesisizatho kudingeka ukwakhiwa kolayini bagesi abachishe babengamakhilomitha angu 150 abanamandla angu 400 km ukusuka esteshini iMbewu kuya esteshini Isundu. Lesiscelo siyigxenye yeprojecti loluCwaningo elingayo, ukwakhiwa kupulanelwe u2015.

## **Incazelo ngeProjecti**

uEskom uhlongoza ukwakha olayini bagesi ababili abanamandla angu 400kV ebangeni lamakhilomitha acishe abengaphezulu ka 150 ukusuka esteshini iMbewu esizokwakhiwa phakathi kwase New Hanover nase Cato Ridge kuya esteshini Isundu. Kuzophinda kwakhiwe nama feeder bays amabili anamandla angu 400kV esteshini iMbewu nama feeder bays amabili anamandla angu 400kV esteshini Isundu.

Ulayini kagesi uzodlula komasipala abalandelayo;

- uMgungundlovu
- Ethekwini
- uThungula
- Illembe
- uMshwathi
- uMhlathuze
- Ntambanana
- uMlalazi
- Mandeni
- KwaDukuza
- Ndwedwe
- Maphumulo

Ucwaningo Lokungenzeka Emvelweni lizohlola amaPhaseji ahlongozwayo amathathu lapho izintabambo zikagezi zingahamba khona achaziwe ngenzansi:

### **iPhaseji elihlongozwayo 1**

Ulayini kagesi uhamba kwi phaseji elihlongozwayo lokuqala usuke endaweni ecishe ibe amakhilomitha amabili ukusukela enyakatho ntshonalanga kwase Wartburg

uhambe ngendlela eya empumalanga uxhumane nomunye ulayini kagesi okade uvele ukhona onamandla angu 275kV. Uqhubeka, udlule izindawo lapho abantu bakhile khona, uphinde udlule umgwaqo uR614 ezindaweni ezahlukahlukene. Uqhubeka uwele Umfula iTugela udlulele ngasemgcele yaseZingeni nase Sbhamu. Ulayini unqamula phakathi kweNyuvesi yase Zululand nasezindawo ezinabantu abaningi abakhile eKhandisa nase Vulindlela, lapho ulayini ufike ujikele ngase nyakatho ntshonalanga phakathi kwesimoba, unqamulele onqengqeni lwase Carsdale nase Dondolo. Ukusuka lapho uqhubekela phambili entshonalanga lapho uyophelela esteshini Isundu enduze kwaseMpangeni.

### **iPhaseji elihlongozwayo 1 olucezukayo 1**

Ulayini kagesi uhamba kwi phaseji elihlongozwayo lokuqala usuke endaweni ecishe ibe amakhilomitha amabili ukusukela enyakatho ntshonalanga kwase Wartburg uhamba ngendlela eya empumalanga uxhumane nomunye ulayini kagesi okade uvele ukhona onamandla angu 275kV. Uqhubeka, udlule izindawo lapho abantu bakhile khona, uphinde udlule umgwaqo uR614 ezindaweni ezahlukahlukene. Uqhubeka uwele Umfula iTugela nePandanger. Ulayini uchezuka kwiphaseji lokuqala endaweni yase Gingindlovu ubheke enyakatho ntshonalanga uqhubekela entshonalanga, uhambisane nomgwaqo uR66 uyophelela esteshini sase Isundu enduzane kwaseMpangeni.

### **iPhaseji elihlongozwayo 1 olucezukayo 2**

Ulayini kagesi uhamba ngendlela efanayo nePhaseji lokuqala. Ucezuqe kwiphaseji lokuqala eduze kwaseMpangeni uthathe indlela eya enyakatho impumalanga uphelele ngamakhilomitha ayisithupha ngenhla kwaseMpangeni.

### **iPhaseji elihlongozwayo 2**

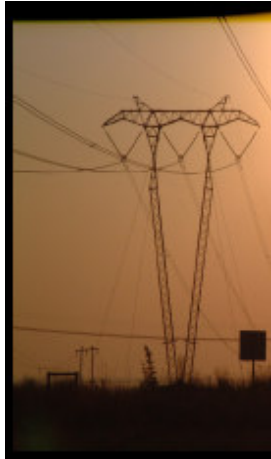
Ulayini kagesi uhamba ePhasejini lesibili elihlongozwayo usuka esiteshini iMbewu esihlongozwayo eduze kwase Cato Ridge endaweni eyaziwa nge Valley of the Thousand Hills. Ulayini usuka ubheka enyakatho impumalanga uwele umgwaqo iR614. Uxhumane no layini kagesi okade uvele ukhona onamandla angu 275kV uqhubeke uwele umgwaqo uR74 kanye noMfula iTugela. Udlulele ngendlela eya empumalanga udlule eGingindlovu uhambisane nomgwaqo uR102. Uphinde udlule ezindaweni lapho kwakhe abantu khona, ujike ngendlela ebheke entshonalanga uma ufika eNyuvesi yase Zululand, uyophelela esteshini Isundu eduze kwaseMpangeni.

**iPhaseji elihlongozwayo 3**

Ulayini kagesi uhamba kwi phaseji elihlongozwayo lesithathu lisuka eDenge endaweni eyaziwa nge Valley of a Thousand Hills. Uhamba ngendlela ebheke enyakatho mphumalanga lapho ufike uwele uMfula iTugela enduze kwaseDendetu unqamule eMambane, unqamule umgwaqo uR66 amakhilomitha ayishumi nambili naseningizimu kwase Eshowe lapho unqamula eDengweni Forest Reserve. Uphela amakhilomitha amabili ukusuka kumgwaqo UR34.

**Olayini bagesi abahlongozwayo**


Izinsika ezihlongozwayo zizokwakhiwa ngokulandela imidwebo emisha okudlula eminye. (bona Umdwebo 1, 2, 3 no 4 ngenzansi). Olayini bagesi bazodinga indawo engama mitha awu 80.



**520 B**  
**Guyed-Vee suspension Tower**  
**Voltage: 400kV**  
**Developed: 1988**

This structure was developed by Eskom for optimal use with the quad zebra configuration. The guyed-vee towers has one large foundation and four guys therefore four smaller foundations. Guyed-vee towers provide the best protection from lightning impulses due to the groundwire and cross arm configuration. Tower cross bar helps with the live line maintenance. Problems with guyed-vee towers are that they limited to relatively flat terrains and helicopters are needed when cranes restricted.


**Umdwebo 1**



**513A**  
**Self - Supporting Double Circuit Suspension Tower**  
**Voltage: 400kV**  
**Developed: 1978**

The double circuit towers were developed to reduce servitude needed by two parallel lines. These towers were used on the Ariadne Hector line. The tower utilized the V assemblies with twin dinosaur conductors and silicone rubber (composite) insulators. This tower was developed by Powerlines, but Eskom has the copyright.

**Umdwebo 2**



**506A**  
**Self - Supporting Suspension Tower**  
**Voltage: 400kV**  
**Developed: 1974**

This structure is typical of most single circuit structures in use at the time, having been developed to support Eskom's introduction of 400kV lines to the national grid. It typically carries twin Dinosaur conductor, a relatively light configuration.

The use of a V-string assembly allows for compaction of phase spacing, which in turn results in both structural and electrical efficiency.

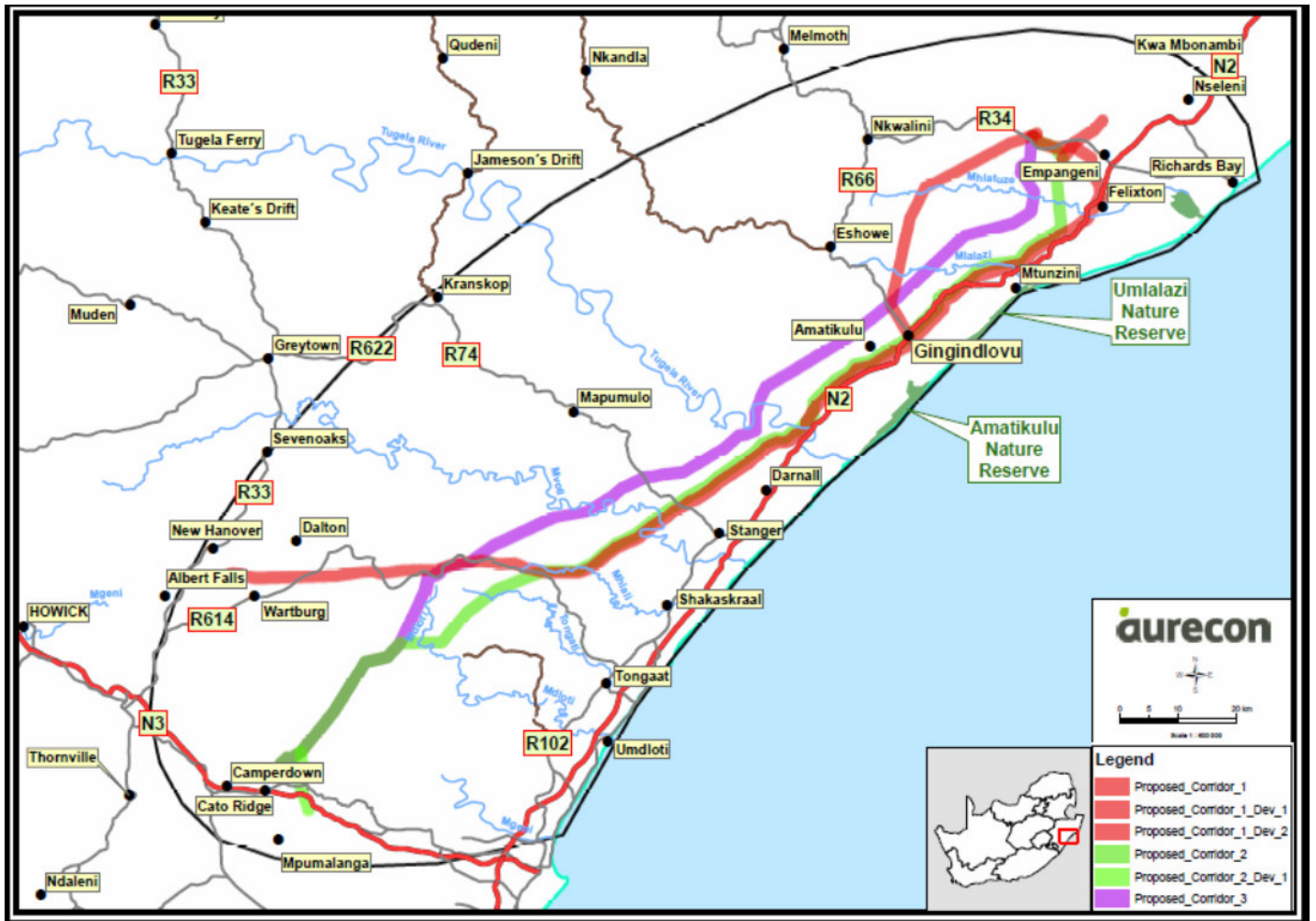
**Umdwebo 3**



**518 H**  
**Self - Supporting Suspension Tower**  
**Voltage: 400kV**  
**Developed: 1988**

This is a typical Eskom designed self supporting tower and utilizes a V assembly to allow for compaction of the phases. The structure was optimized to carry 190KN glass insulators which support quad zebra conductors. Commonly used before the cheaper guyed and cross rope structures were designed.

**Umdwebo 4**



## Imithelelo Elindelekile

**Ukusetshenziswa Komhlaba;** - olayini bagesi abahlongozwayo bazodlula emapulazini amaningi anabanikazi abazimele, kungadala ukuhlakazeka komhlaba, nokulahlekwa komlimi.

**Ukuphathwa kokusetshenziswa komhlaba-** uEskom udinga indlela yokungena endaweni lapho kuhamba khona olayini bagesi naseziteshini zikagesi ukuze agcine olayini besesimweni esamkelekile, okungaphazamisa indlela amapulazi asebenza ngayo.

**Indlela indawo ebukeya ngayo-** izinsimbi zokusekela olayini bagesi zinde futhi zinkulu, zingabangela ukungabukeki kwendawo kakhulukazi ezindaweni zokogiwa kwemvelo.

**Izizinda zezindawo ezingamagugu-** izindawo eziyigugu ngokwesizwe nezakhiwo ezindala

zingamosheka ngesikhathi sokwakhiwa nokunakekelwa kwezintambo zikagesi.

**Inhlobo yemvelo yakhona nevikelekile-** ngesikhathi sokwakhiwa nokulungiswa kolayini bagesi kungadala umonakalo ezilwaneni nasezihlahleni, umonakalo ungadaleka kakhulu kuhlobo lwezilwane nezihlahla zokongwa.

**iElectro-magnetic field-** olayini bagesi bangaba nemibani eyingozi ezindaweni lapho abantu bakhile khona.

**Ezokuhlala kwabantu-** leprojecti izovulelela amathuba omsebenzi, kakhulukazi umsebenzi wesikhashana kubantu abangasebenzi ezindaweni eziseduzane. Kungacishe kubekhona ukujoveka kumnotho wendawo okungazuza khona amabizisini. Ngenxa yomthetho wezokuphepha wakwaEskom nokufuneka kwendawo yokwakha kungadingeka ukususwa kwemizi zibekwe kwenye indawo.

**Ezomnotho-** Amathuba omsebenzi, ugesi ozoya kumnotho okhulayo waKwaZulu Natal nokujoveka kwemali kulendawo (ngenxa yokwakha nokuthengwa kwendawo yokwakha) ngu Eskom kuzoba nemohumelo emihle kwezomnotho yedawo. Kodwa, imphumelo emibi yezomnotho ingaba khona ekulahlekelweni amapulazini okulima kanye nokulahlekelwa ekutheleleni kwezithelo ngenxa yolayini bagesi kanye nedawo ezodingeka.

**Ezokuvakasha-** Indawo ethinthekayo iyingxenye ebalulekile ngokwezokuvakasha, ehlanganisa indawo yaseThekwini kanye nezindawo ezisenyakatho naKwaZulu-Natal. Lezizindawo ezikhangayo zibalulekile, njengezi ndawo zokonga izilwane nemvelo, izindawo ezingama gugu ngokwesizwe nezakhiwa kudala. Lentuthuko ingaba nomthelelo ongamuhle wehlise indlela indawo ebukeya ngayo, kwehlise nezinga labantu abavakashayo endaweni. Kungaba nomthelelo omubi ekuhleleni ukuvakasha esikhathini esizayo nasekuthuthukiseni okutholalalayo nokukhiqizwayo ezindaweni ezithintekayo.

## **Ucwaningo ngezindawo ezingasetshenziswa**

Zonke izindlela ezilungele ukuba zingasetshenziselwa olayini bagesi abahlongozwayo bazohlolisiswa esigabeni sokuQoqwa Kwezimvo noCwaningo Lwemvelo okuzodinga izimvo ezivela kuMnyango ophakeme, abanikazi bomhlaba, kanye nomphakathi, ithimba locwaningo lwezemvelo kanye nochwepheshe.

Ngenzansi zibhaliwe ezinye izindlela ezingenziwa ukuqinisekeisa nokuthuthukisa ugesi endaweni yaKwaZulu-Natal.

### **Ukungenzi Lutho**

Ukungenzi lutho kuyindlela elula. Uma uEskom Transmission ungenzi lutho, abazukwazi ukuqinisekisa ukunikezela kwagesi eKZN okungadala ukuhlukumezeka kwi Grid

Code (iLaysense yeTransmission). Lokhu kungabangela ukuphalalisa kwezinga lokunikezela ugesi, Ukuze kuvikeleke ukubhidlika kwemiphambo umangabe owodwa wolayini bagesi abanamandla angu 400 kV ungasebenzi. Ukungezi lutho kuzoba nomthelelo omkhulu kwezomnotho esifundazweni sa KwaZulu-Natal, njengoba imiphambo ingeke isavumela amakhasimende amasha. Ngalesizathu lendlela ayithandisiswa.

### **iDemand side management**

iDemand Side Management ingachazwa njengomsebenzi owenziwa abasaphalali bakagesi. Iyakhelwe ukuletha ushintsho esisindweni sikagesi ngokugququzela abantu ukuthi bongwe ugesi, Ukuze lwehle izinga ugesi abantu abawusebenzisa ngawo.

Ngokwehlisa ukusebenziswa kwagesi okukhulu kushintshelwa kokuncane, lokhu kwehlisa nokukhokhelwa kukagesi. Izinto ezitshengisayo izinga lokusetshenziswa kagesi isiboniso sentengo yemali (njengo hlelo lemali yokutheliswa ngomthetho kaHulumeni ama Tariffs). Lendlela yokwehlisa izinga lokusebenzisa ugesi iyasetshenziswa kodwa akuchazila ukuthi iwonga kakhulu ugesi ngoba isebenziswa abantu abathandayo ukuyisebenzisa.

### **Ukwakhiwa kwalayini kagesi wesibili onamandla angu 400 kV osuka esteshini sikagesi iVenus uya esteshini iAriadne.**

Ukwakhiwa kwalolayini onamandla angu 400 kV, kube kukhona vele ulayini kagesi onamandla angu 765 kV kuzo qinisa imiphambo kagesi. Umphumelo uzoba umphambo wolayini bagesi abanamandla angu 400 kV oqinile ophuma esteshini iVenus uya kumphambo osePinetown. Lendlela yokuxhumanisa olayini bagesi iyindlela engaba nomthelelo omuhle ngokwezimali. Futhi

amandla kagesi angagcina esenyukile umakukhethwa lendlela.

Okuhle ngalendlela ukuthi

- Kwehlisa izinga lokuwa kwagesi.
- Uma ngabe owodwa wolayini onamandla angu 400 kV ungasebenzi, akuzuba inkinga ngoba uzobe ukhona omunye ulayini kagesi ovela esteshini sase Venus. Lokhu kuzoba nomthelelo omuhle ekutheni kuzoqinisekisa ukuthi ugesi uhlala ukhona. Kuzoba nomthelelo omuhle kuEskom kanye nakumphakathi osebenzisa ugesi .

## Ucwaningo Lokungenzeka Emvelweni

Ucwaningo Lokungenzeka Emvelweni indela yokupulana nokuthatha isinqumo ngokwemfuno zoMthetho kaZwelonke Wokuphathwa Kwezemvelo unombolo 107 ka 1998 nangokwezaziso zikaHulumeni ezingunombolo R543, R544, R545 noR546 ka 18 June 2010. Ukuqhubeka Locwaningo Lokungenzeka Emvelweni kuhlanganisa izindlela ezimbili ezilinganisene ezihlangene ngokuphelele:

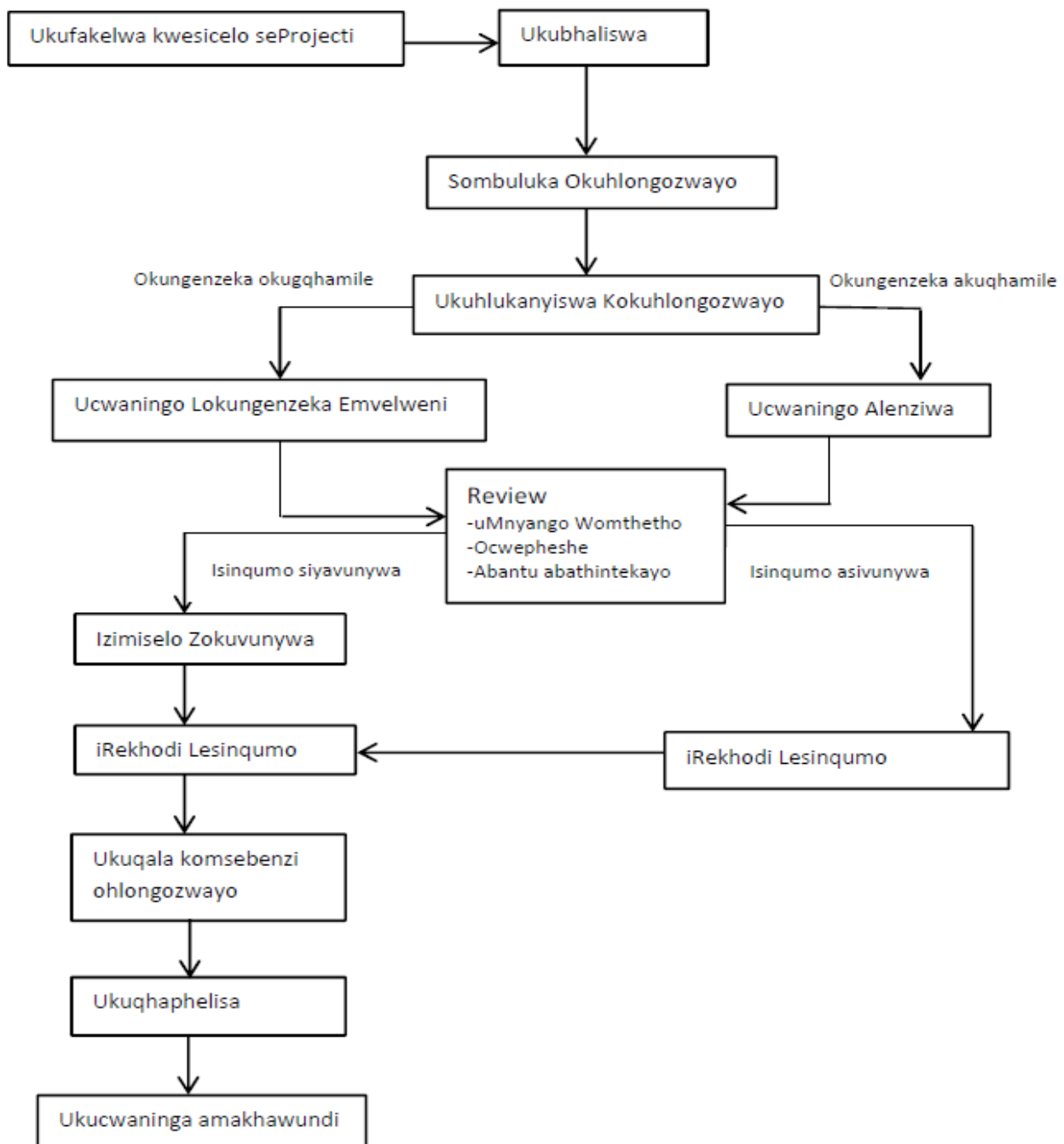
- i. Umgudu wocwephese ohlola ulwazi ngendawo ehlongozwayo. Iqagula imiphumelo engabakhona emibi kanye nemihle engadalwa intuthuko ehlongozwayo ekuqaleni kweprojecti, futhi inikeza izindlela zokukhulisa imiphumelo emihle, nokugwema noma ukwehlisa imiphumelo emibi. Lolulwazi lwethulwa ngombiko wokugoqwa kwezimvo (Scoping Report) bese uyiswe esigabeni Locwaningo Lokungenzeka, ekugcineni kuphuma umbiko Lokungenzeka Emvelweni.
- ii. Umgudu wokubambiqhaza komphakathi , udlala indima enkulu kuCwaningo Lokungenzeka Emvelweni ukuze kufezeke

ukuvuleka nokugqama komgudu. Unikeza abahlomuli ulwazi olufanelekile, unikeze ithuba lokuba abahlomuli bafake izimvo zabo kwiprojecti, ngezindawo abanezikhalazo ngazo naba khathazeke ngakho. Umgudu wokubambiqhaza komphakathi kuzosiza abahlomuli ba:

- Phakamisa izindawo zokukhathazeka bese befaka imbono ngezindawo ezinye ezingaba nozuzo olungcono..
- Baziswe ngendawo.
- Ukuqinisekisa ukuthi izikhalazo zabo ziqoqiwe zahlanganiswa ekuhlolweni kwaleprojecti.
- Basho izimvo zabo ngokutholiwe kumbiko woCwaningo Lokungenzeka Emvelweni

Umbiko wokugcina Lokungenzeka Emvelweni uzothunyelwa kuMnyango Wezemvelo ukuze uhlolwe. Bonke abantu abathintekayo nabafuna ukubamba iqaza bazokwaziswa ngesinqumo esithathwe uMnyango Wezemvelo.

## UMGUDO WOCWANINGO LOKUNGENZEKA EMVELWENI



### Ungahlangana Kanjani?

Inhloso Locwaningo Lokungenzeka Emvelweni ukunikeza abomthetho ulwazi olwanele lokuthatha isinqumo sokuthi intuthuko ehlongozwayo ingagunyazwa noma cha, uma isinqumo sithi ingagunyazwa ngaphansi kwaziphi izimo. Izimvo zabahlomuli kanye nabantu abathintekayo ngalentuthuko ehlongozwayo ziyasiza ekutheni abantu bomthetho bathathe isinqumo esifundisiwe. Uyagqugquzelwa ukuba ubambe iqhaza, ngokuletha izimvo zakho, noma ulwazi ngokuhlongozwayo, nezindlela ezilungile kanye nokungenzeka emvelweni ngenxa yalentuthuko ehlongozwayo okungasiza Ucwaningo. Uma ufisa ukubhaliswa noma ukuthumela izimvo zakho, cela ugzwalise ifomu lokubhalisa elingenzansi, noma usibhalele incwadi (uyipose noma uyifaxe)( noma usithumelele i-email (ikheli uzolithola ebokisini elilandelayo).



<b>Ucwaningo Lokungenzeka Emvelweni</b> <b>Ulayini Kagesi Onamandla Angu 400kV Osuka eMbewu</b> <b>uya e-Isundu</b> <b>IFOMU YOKU BHALISA NOKUGCWALISA IZIMVO ZAKHO</b> <b>Ifakwe kuLomqulu Oyisendlalelo Solwaz</b>	<b>IMINININGWANE:</b> <b>Aurecon</b> Thumela ku: Dineo Kwili PO Box 905 Pretoria 0001 South Africa Ucingo: +27-12-4272972; Isikhahlamezi +27 86 665 3273 iEmail: dineo.kwili@af.aurecongroup.com
--	--

***Cela ugcwalise bese uyithumelele ku Dineo Kwili (imininingwane itholakala ngenhla)***

<b>IBIZO</b>		<b>IGAMA</b>	
<b>AMANISHELA</b>		<b>ISIBONGO</b>	
<b>INHLANGANO/ UMSEBENZI</b>		<b>I-EMAIL</b>	
<b>IPOSI</b>			
		<b>ICODI YEPOSI</b>	
<b>UCINGO</b>		<b>ISIKHAHLAMEZI</b>	

Cela ukubhaliswa ngokomthetho njengo muntu othintekayo futhi ofisa ukubamba iqhaza ukuzi ngikwazi ukuqhubeka ngithole ulwazi nezaziso ngoCwaningo Lokungenzeka Emvelweni. <b>(Cela undingilize uyebo noma cha)</b>	<b>YEBO</b>	<b>CHA</b>
Ngingathanda ukuthola izaziso ngalendlela:	Incwadi (ngePosi)	
	I-Email	
	Isikhahlamezi	

**IZIMVO**(cela usebenzise elinye iphepha malingenele) Ngicabangisa ukuthi lezizindawo ezilandelayo ezikathazayo zihlolwe kuCwaningo Lokungenzeka Emvelweni:

Ngicabangisa lokhu okulandelayo kumgudo woCwaningo Lokungenzeka Emvelweni kanye nakumgud wokubamba iqhaza komphakathi:

Ezinye izimvo:

Ngicela nibuze engisebenza nabo/kanye nabangani abalandelayo ukuba babhalise njengabantu abathinkayo nabafisa ukubamba iqhaza kuCwaningo Lokungenzeka Emvelweni:

IGAMA	INHLANGANO/UMSEBENZI	IMINININGWANE

**SIYABONGA NGOMBEKELELO WAKHO**