

instability should there be a fault that trips any line from either power station. Transient instability manifests itself by way of rotors speeding out of control requiring a need to trip several transmission lines out of the power stations to avoid a cascade of runways of machines in the Eskom and SAPP systems. Should the network be designed without this checked, blackouts similar to those that occurred in New York in the late 1990s will occur.

Due to current land uses and developments in the country, very few open corridors remain for the installation of major transmission power lines and substation sites. New routes should, however, be secured to ensure the availability servitudes for the expansion of the network and to be able to meet the forecast demand. Therefore, Eskom is proposing that 2 x new 400kV power lines be constructed between the Medupi Power Station and the Mokopane and Polokwane areas.

The need for increased capacity and the need for optimising the existing infrastructure will be met through the implementation of this option, and this is the reason why this option was chosen as the most feasible option by Eskom Grid Planning to integrate Medupi Power Station.

Overhead lines have been proposed over underground cables as the disadvantages of underground cables outweigh those of overhead lines as follows:

- » Underground cabling is more expensive, since the cabling entails excavating tunnels and blasting of rocks similar to train tunnels but of higher magnitude. The costs are several times greater than erecting overhead power lines.
- » Whereas finding and repairing overhead power line faults can be accomplished in hours through ground patrols, underground fault finding and repairs can take days or weeks, and would require several repeat tunnels for strategic patrols,.
- » Operations are more difficult since the high reactive power of underground cables produces large charging currents and so makes voltage control more difficult.
- » Cables could take up a larger land footprint as compared to overhead lines. This is a due to cables being required to be in trenches from the source of supply to the will be rendered sterile. The land footprint of overhead power lines is much less due to the land only being required to construct the towers approximately every 300 m.
- » The environmental impacts associated with underground cabling are considered to be significantly higher than those associated with overhead lines as trenches would be required to be excavated for long distances resulting in severe damage to habitats and surrounding areas.
- » From a time perspective, it could take several years before the underground cables are installed due to construction complications, costs and specialised

equipment. By the time cabling could be achieved the country's energy needs would have spiralled to economic stagnation.

2.3. Identification and Description of Alternative Substation Sites

In order to strengthen the power supply to the Mokopane and Polokwane areas, Eskom Transmission is proposing the construction of a **new transmission substation** on a site near Mokopane. In order to integrate this new substation into the transmission system/grid, Eskom proposes the **looping in and out of one of the existing Matimba-Witkop 400kV transmission lines** (i.e. two lines running parallel for a distance of a maximum of 1 km).

Three technically feasible alternative substation sites have been identified for investigation within the EIA process (refer to Figure 2.1). The three options are situated north of Mokopane on the farms Doornfontein 721 LS (Option 1), Zuidholland 773 LS (Option 3) and Noord Braband 774 LS (Option 4). The proposed sites are all located in close proximity to the Matimba-Witkop 400kV transmission lines in order to allow for turn-in line infrastructure from these lines into the new Mokopane Substation.

Option 1 is located north of the Wit Vinger Nature Reserve and approximately 3 km west of the Segoahteng settlement (refer to Figure 2.1). The proposed site is a relatively flat piece of land with a small protrusion, Mokokowatlaui, as the only higher part near this site. A part of Doornfontein 721LS, where the proposed substation may be established, is utilised for informal agricultural activities. Currently, farmers from Ga-Masasane are exploiting large parts of Doornfontein 721LS elsewhere for crop planting.

Option 3 is located along the Matimba-Witkop 400kV transmission lines at a distance of approximately 3 km from the N11 national road (refer to Figure 2.1). The proposed site slopes slightly south-westwards along the transmission line corridor. Patches of agricultural land occur towards the eastern perimeter of the proposed site.

Option 4 is located approximately 4.5 km south-east of Option 3. It is approximately 6 km from the N11 and the closest major settlement, Sekuruwe, is approximately 5 km south-west of the proposed site (refer to Figure 2.1). The site is located on a relatively undisturbed piece of veld (except for the fact that part of the site has been affected due to the presence of the existing 400kV transmission lines across this farm).

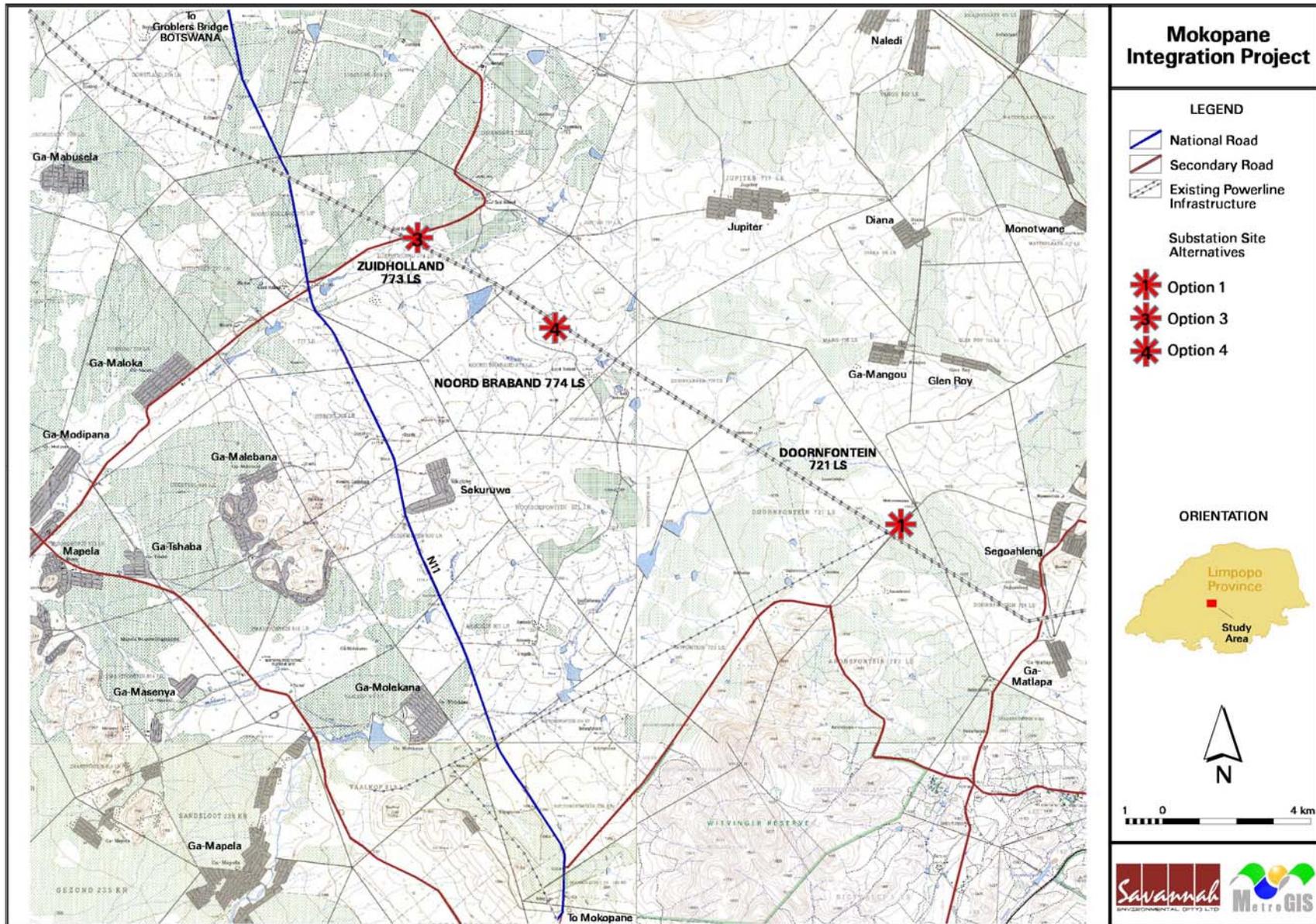


Figure 2.1: Map showing the alternate substation sites identified for consideration in the EIA process

From a technical and environmental perspective, substation site Option 2 was not considered a viable site due to a watercourse partly traversing the site, as well as the presence of a rock outcrop. This option was therefore excluded as an option for further investigation in the EIA process on the basis of technical feasibility (refer to the Final Scoping Report, Savannah Environmental, March 2009).

2.3.1. Construction Phase

The proposed substation would be constructed in the following simplified sequence, and will take approximately 12 months to complete:

- Step 1:** Survey of the substation site (including a final survey by environmental specialists and the compilation of a site-specific Environmental Management Plan (EMP))
- Step 2:** Site clearing and levelling and construction of access road to substation site
- Step 3:** Construction of terrace and substation foundation, including the installation of stormwater drainage on the surface to dispose of such stormwater on the terrace
- Step 4:** Assembly, erection and installation of equipment (including transformers and control building)
- Step 5:** Connection of conductors to substation infrastructure
- Step 6:** Rehabilitation of any disturbed areas and protection of erosion sensitive areas

A number of fences will be installed to secure the substation and the substation site. These fences include a 2.4 m high security fence to enclose all assets, a 1.8 m high fence around the yards, and a 1.2 m high boundary fence on the property-line.

Construction crews for construction of the substation will constitute mainly skilled and semi-skilled workers. No construction workers will reside on site. It is most likely that construction workers will be accommodated in formal housing within towns in the study area.

It is expected that construction of the substation would begin late 2010 or early 2011 and would take 3 years to complete.

2.3.2. Technical Details of the Proposed Substation

The main aspects of the proposed substation include:

- » An area of land approximately 500 m x 500 m is required for the construction of the substation site. Approximately 40% of this area will be used for the High Voltage Yard, which will be fenced off for security purposes.
- » Installation of new equipment (transformers, reactors, etc.) for operation up to 400kV capacity. This equipment will not contain hazardous substances (PCBs, etc.), but will contain cooling oils and similar potential pollutants necessary for the operation of the equipment. The equipment will be designed according to Eskom specifications.
- » The maximum height of the substation development will be 45 m.

2.4. Identification and Description of Alternative Transmission Power Line Development Corridors

From the analysis of the various alternatives to satisfy the need for additional power transmission capacity, Eskom Transmission determined that the introduction of the Mokopane Integration Project was the most feasible and cost-effective solution in order to transmit the power generated at the Medupi power station to the load centres in the Mokopane and Polokwane areas. This project involves construction of the following:

- » **Two new 400 kV transmission power lines running in parallel** between the Delta Substation (a new substation to be located near the Medupi Power Station) and the existing Witkop Substation (near Polokwane), as follows:
 - * A new 400kV transmission power line between the Delta Substation and the new Mokopane Substation (a distance of approximately 150 km); and
 - * a new 400kV transmission power line between the new Mokopane Substation and the Witkop Substation (a distance of approximately 60 km).
 - * A new 400kV transmission power line between Delta Substation and the Witkop Substation (a distance of approximately 200 km).
- » **Associated works** to integrate the new transmission lines into the Transmission grid (such as access roads).

The following technical requirements were considered in the identification of feasible corridors for the establishment of the required transmission power lines:

- » Technically viable and cost effective corridors of approximately 5 km in width were identified.
- » As far as possible, the servitude lengths between power supply and load points should be minimised.

- » As far as possible, the number and magnitude of angles along the line should be minimised in order to allow the use of less expensive and visually less-intrusive tower types.
- » Crossing over of existing major power lines should be avoided as far as possible as this increases the potential for technical incidents during operation.
- » The alignment should cater for known topographical/terrain constraints of the tower types to be used, and soil conditions for the foundations in terms of geotechnical suitability and costs.
- » The proposed alignment should provide for the need of appropriate access roads to the servitude and tower positions for both construction and maintenance/operation phases.
- » Care should be taken to avoid the following as far as tower positioning and access road construction are concerned:
 - * extensive rock outcrops;
 - * rugged terrain, hills and mountains;
 - * active clay soil, vleis and floodplains;
 - * potential unstable side-slope terrain; and
 - * eroded and unstable areas.
- » Other issues which technically affect the location of a transmission power line include:
 - * agricultural lands, in particular those under irrigation;
 - * large water bodies;
 - * open-cast mining; and
 - * crossing points with roads, rail and telecommunication lines at off-set angles less than 60°.
- » The following obvious and observable environmental issues should be taken into account:
 - * human settlements and communities;
 - * land use (where possible);
 - * passing between water bodies (bird flight paths usually extend between water bodies);
 - * ecologically sensitive areas;
 - * scenic areas with high visual/aesthetic quality; and
 - * untransformed indigenous vegetation.

At the outset of the EIA process in May 2009, Eskom identified various power line and substation alternatives for the proposed Mokopane Integration Project within a broader study area (indicated as 'original alignments' in Figure 1.1). The proposal by Eskom at that stage was for the construction of a new substation in the Mokopane area and two 400kV power lines between the Medupi Power Station and the new Mokopane and existing Witkop Substations.

During the site inspection undertaken at the initiation of the process, Eskom identified the need to construct 765kV power lines as part of this project in order to provide sufficient transmission infrastructure in the event that additional power stations were constructed in the Lephalale area. The proposed power line corridors and alternative substation sites remained as initially identified by Eskom. However, in order to accommodate the 765kV lines, the project scope was amended to consider two 80 m wide servitudes (instead of two 55 m wide servitudes for 400kV transmission power lines), and towers of up to 55 m in height (instead of 35 m for 400kV transmission power lines).

Input at the Focus Group meetings held in June 2008 and comments received from the public during the review period of the Draft Scoping Report in September and October 2008 identified various issues associated with the proposed power line corridors. In addition, it was requested by the public that the option of constructing the new power lines adjacent to the existing Matimba-Witkop power lines be considered. As a result, revised corridors were proposed (refer to Figure 1.2), and a Revised Scoping Report released for public review. This Revised Scoping Report identified and described the issues associated with the revised corridors.

The Scoping Report concluded that all identified power line corridor alternatives should be investigated in detail in the EIA phase of the process (i.e. Alternative 1, 2 and 3, as well as the alternative of following the existing Matimba-Witkop lines). However, following the submission of the final Scoping Report to DEA, it was confirmed by Eskom that Corridor 3 was not considered feasible from a technical perspective. This corridor is considered to be *fatally flawed* in terms of construction and maintenance, largely due to the local topography. These challenges make the option to be *not viable for construction*. As the EIA Regulations require that the EIA process only needs to assess feasible and reasonable alternatives³, it was agreed with DEA that this alternative will not be considered in the EIA phase of the process.

A draft EIA Report was made available for public comment in November 2009. During the review period of this draft report, it was requested by the stakeholders and interested and affected parties that a deviation to Corridor 8 in the central portion of the study area where technical constraints were identified be investigated as part of the EIA process.

Alternatives to be assessed in the EIA phase, therefore, include **Corridors 1 and 2**, as well as the **alternative of following the existing Matimba-Witkop lines (corridor 8)** and a deviation to this corridor (**deviation to corridor 8**). In

³ Refer to the NEMA EIA Regulations 385 (Chapter 5, Section 29).

addition, **transmission power line corridors 4, 5, 6 and 7** are to be assessed (refer to Figure 2.2).

These alternative power line alternatives are described in further detail below.

- » **Corridor 1 (Medupi-Mokopane):** From Medupi Power Station the transmission line corridor proceeds in an easterly direction south of Lephalale before traversing the D'Nyala Nature Reserve. It crosses the Waterberg plateau, Waterberg Biosphere Reserve buffer zone (Touchstone Nature Reserve) before spanning across the escarpment and dropping down towards the R518. It steers east for another 50km before joining the Matimba-Witkop transmission lines. The length of this corridor is ~172 km.
- » **Corridor 2 (Medupi – Mokopane)** originates at the Medupi Power Station and proceeds in a north-easterly direction for approximately 30km before veering east for 85km. It traverses the Waterberg Biosphere Reserve's transitional zone before it turns south-east, crossing the southern section of the Bellevue Nature Reserve. It continues for roughly 40km before joining the Matimba-Witkop power lines near the proposed Mokopane substation site. The total length of this corridor is ~180 km.
- » **Corridor 8 (Medupi-Mokopane; the existing Matimba-Witkop transmission line corridor)** originates at the Matimba Power Station and travels east for approximately 29km before reaching the R518. The lines split at this point and the northern section traverses adjacent to this road for almost 9km while the southern section crosses between two hills. The two lines meet up shortly thereafter and continue eastward for 30km before entering the Waterberg Biosphere Reserve's transitional, buffer (Touchstone) and core areas (Moepel Farms). After 32 km it crosses the escarpment and continues another 58 km to the proposed Mokopane substation site. The Matimba-Witkop transmission line covers a distance of over ~182 km from Matimba to the proposed substation site.

The conclusions of a technical investigation undertaken by Eskom indicate that it will not be technically feasible to construct the new power lines directly adjacent to the existing lines for the entire length of the corridor. This is due to two narrow gorges along the existing Matimba-Witkop alignment within Corridor 8, as well as issues raised by landowners within the EIA process for the Matimba-Witkop No 2 400kV power line which must be taken into consideration. Therefore, should Corridor 8 be selected as the preferred option, the new lines would have to deviate from the existing lines in a number of places. These areas are illustrated and explained in Figure 2.3.

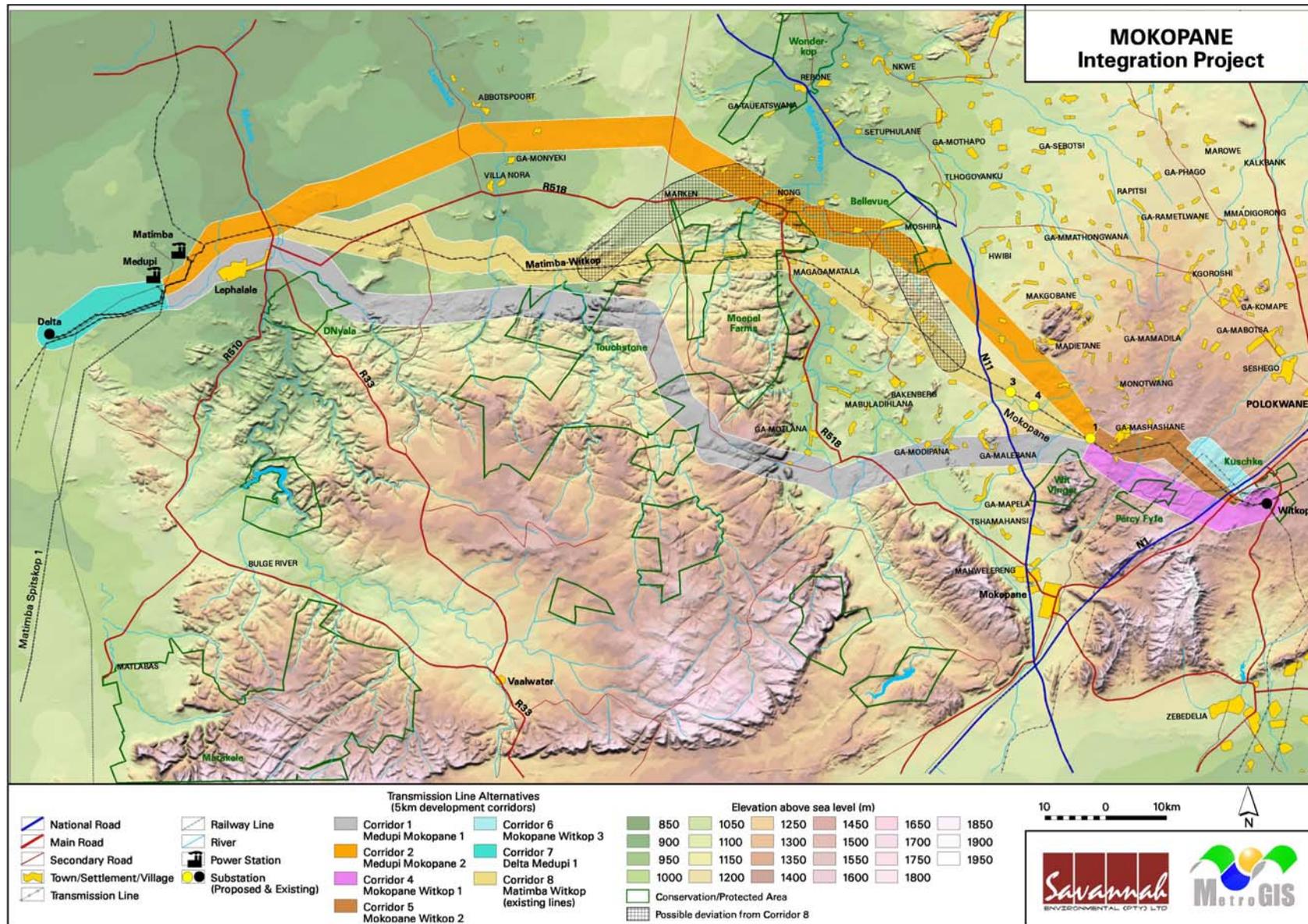


Figure 2.2: Map showing the alternate 5 km wide transmission line corridors to be investigated in the EIA process

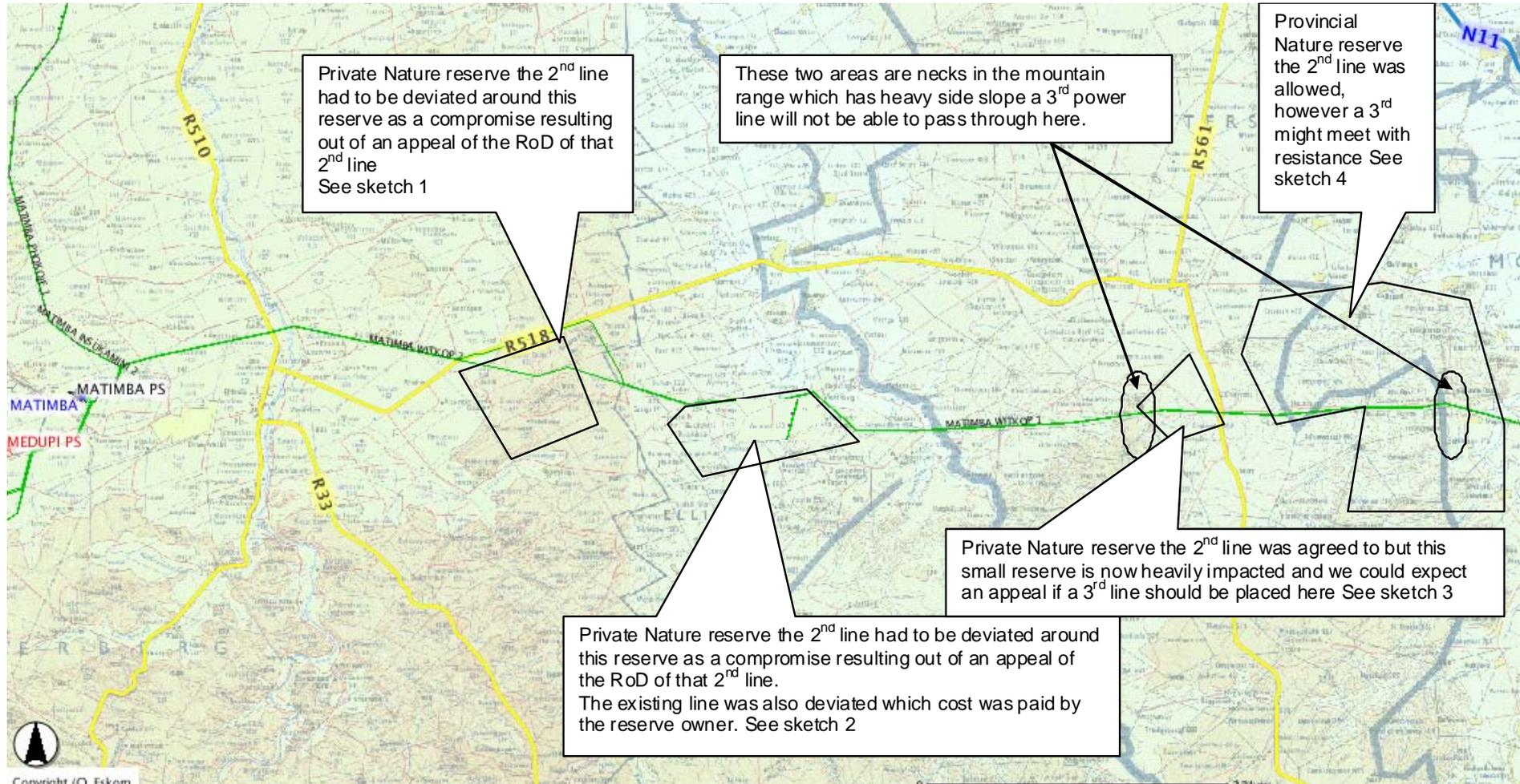


Figure 2.3: Map from Eskom of the existing Matimba-Witkop line indicating the two narrow gorges and sections of line where issues were raised regarding the Matimba-Witkop No 2 400kV line

- » The **Deviation to Corridor 8** has as its purpose the circumvention of the Waterberg Biosphere Reserve's buffer and core areas as well as the Waterberg Mountain and eastern escarpment. These areas were identified as being technically constrained in terms of the space available to construct the proposed two power lines adjacent to the existing power lines in this area. The deviation occurs south-west of Marken where the proposed corridor deviates from corridor 8 in a north-eastern direction, continuing south-east of Marken, for approximately 25km before joining the Corridor 2 alternative. It follows this alternative for roughly 30km before veering south-east for approximately 20km before joining again with corridor 8.
- » **Corridor 4 (Mokopane-Witkop)**: from the proposed substation site to the Witkop substation, this corridor extends in a south-easterly direction for ~11 km before traversing the Percy Fyfe Nature Reserve. After 6 km it leaves the nature reserve and continues for 16km across predominantly thicket and bushland before entering the Witkop substation. The total length of this corridor is ~33 km.
- » **Corridors 5 and 6 (Mokopane –Witkop)** follow the existing Matimba-Witkop 400kV power lines from the proposed substation site to the Witkop substation. Corridor 5 (34.5km total length) follows these power lines for the entire length of its alignment, while Corridor 6 veers off after 19 km to follow the Warmbad-Witkop 275kV line for 17 km. The total length of this corridor (including the joint section with Corridor 5) is ~37 km.
- » The **Delta-Medupi** transmission line corridor (**Corridor 7**) originates at the Delta substation and travels in a north-easterly direction towards the Medupi Power Station. The alignment occurs north of the Matimba-Marang/Pluto/Midas transmission power lines at distances varying between 1.7 km at the closest to 3km at the furthest. The total length of the alignment is ~21 km

The two proposed 400kV transmission power lines between the Medupi Power Station and the Witkop Substation (i.e. Medupi-Delta-Mokopane-Witkop) are **proposed to be constructed parallel within one corridor**.

2.4.1. Construction Phase

Transmission lines are constructed in the following simplified sequence:

- Step 1:** Determination of technically feasible alternatives
- Step 2:** EIA input into route selection
- Step 3:** Negotiation of final route with affected landowners (refer to Section 2.6 below)
- Step 4:** Survey of the route (by air)

- Step 5:** Determination of the conductor type
- Step 6:** Selection of best-suited conductor, towers, insulators, foundations
- Step 7:** Final design of line and placement of towers (including final walk-through survey by environmental specialists and compilation of site-specific Environmental Management Plan (EMP))
- Step 8:** Issuing of tenders, and award of contract to construction companies
- Step 9:** Vegetation clearance and construction of access roads (where required)
- Step 10:** Tower pegging
- Step 11:** Construction of foundations
- Step 12:** Assembly and erection of towers
- Step 13:** Stringing of conductors
- Step 14:** Rehabilitation of disturbed areas and protection of erosion sensitive areas
- Step 15:** Testing and commissioning

Construction of the power lines proposed as part of the Mokopane Integration Project will take approximately 24 months to complete. Construction of these lines is anticipated to begin in 2011.

Construction crew for the transmission power lines will constitute mainly skilled and semi-skilled workers. It is most likely that construction workers will be accommodated within formal housing within towns surrounding the study area. Construction camps can be located within the construction area but only in consultation and agreement with the landowner. It is generally preferred that the construction camps be in close proximity to the construction site.

2.4.2. Technical Details of Tower and Transmission Line Designs

All components of a Transmission line are interdependent, but are distinct in the roles which they fulfil. The primary components include towers, foundations, insulators and hardware, and conductors.

» Towers

Transmission line conductors are strung on in-line suspension towers and bend (strain) towers. Various designs are available for use by Eskom on the proposed power lines (refer to Figure 2.4 to 2.6). The types of towers which to be used will be dependent on the final alignment of the power lines and individual agreements with affected landowners.

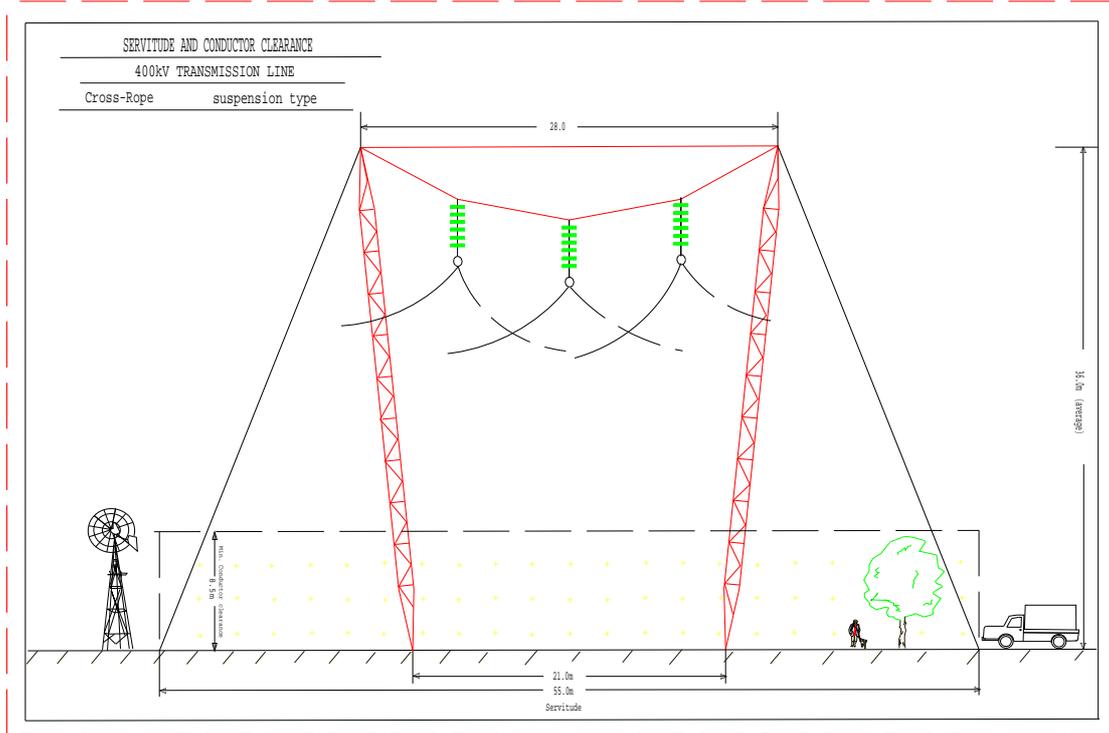


Figure 2.4: Cross Rope Suspension Tower

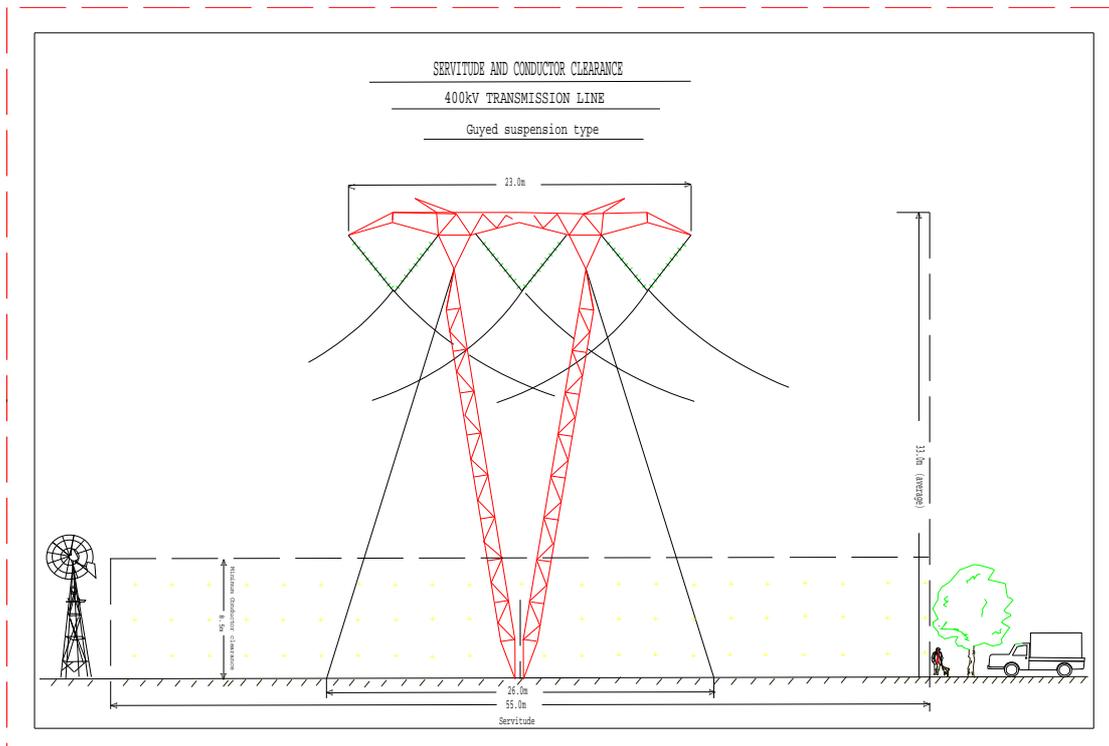


Figure 2.5: Guyed Suspension Tower



Photograph 2.1: Monopole structure which can be used in areas where there are space constraints

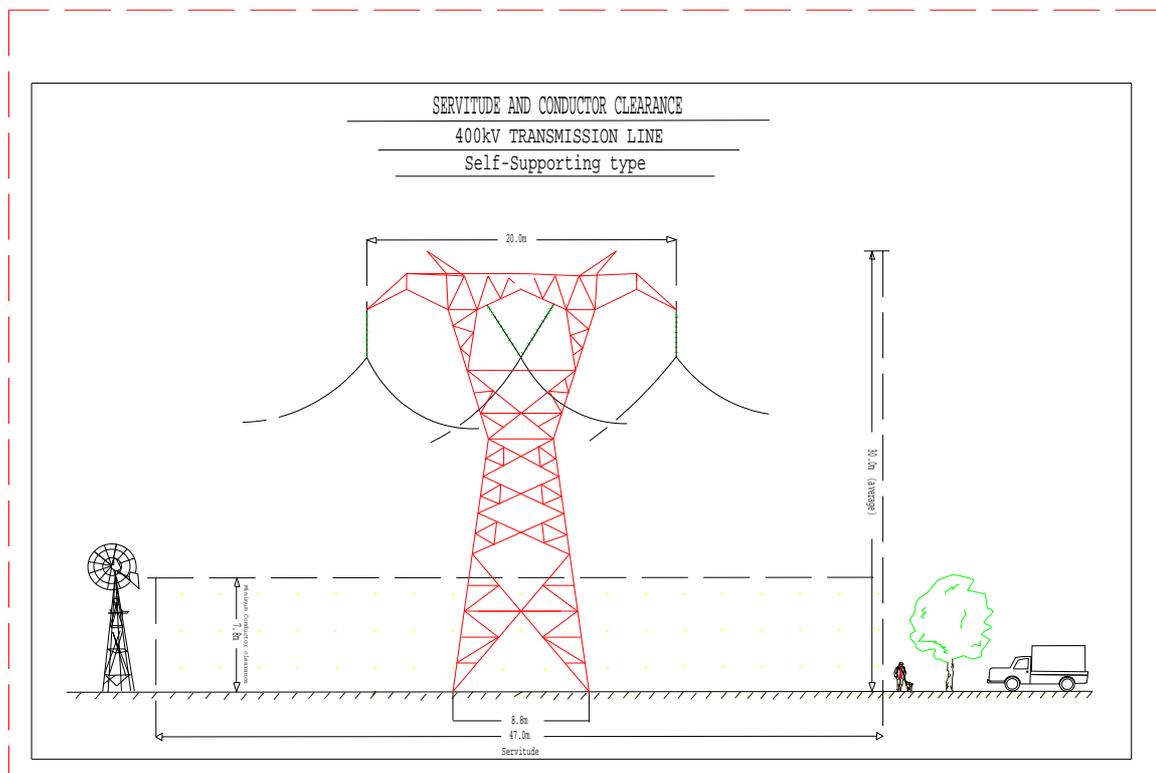


Figure 2.6: Self-Supporting Tower

» *Servitude Requirements*

The servitude width for a 400kV transmission power line is 55 m. The servitude is required to ensure the safe construction, maintenance and operation of the line, and thereby entitles Eskom Transmission Division certain rights (e.g. unrestricted access).

Where 400kV transmission power lines are constructed in parallel, a minimum separation distance of 55 m is required in order to ensure the reliable operation of both lines. The minimum vertical clearance to buildings, poles and structures not forming part of the power line must be 10.4 m, while the minimum vertical clearance between the conductors and the ground is 15 m. Farming activities can be practised under the power line, providing that safe working clearances and building restrictions are adhered to under all circumstances.

The minimum distance of a 400kV transmission power line structure from a proclaimed public roads is between 60 m and 120 m from the centre line of the road (according to the road type), from the centre of the structure to the centre of the road servitude. The minimum distance between any part of a tree or shrub and any bare phase conductor of a 400kV transmission power line must be 10 m.

On receipt of an authorisation of the final corridor by the environmental authorities and after negotiations with landowners, the final definition of the centre line for the transmission line and co-ordinates of each bend in the line will be determined by the surveyors. Optimal tower sizes and positions will be identified and verified using a ground survey (in terms of the Environmental Management Plan (EMP) requirements).

A 4-8 m wide strip is generally required to be cleared of all trees and shrubs down the centre of a transmission power line servitude for stringing purposes only. Any tree or shrub in other areas which will interfere with the operation and/or reliability of the transmission line must be trimmed or completely cleared. The clearing of vegetation will take place, with the aid of a surveyor, along approved profiles and in accordance with the approved EMP, and in accordance with the minimum standards to be used for vegetation clearing for the construction of the proposed new transmission power lines as listed in Table 2.1.

Table 2.1: Minimum standards to be used for vegetation clearing for the construction of a new transmission power line

Item	Standard	Follow up
Centre line of the proposed transmission power lines	Clear to a maximum (depending on tower type and voltage) of a 4-8m wide strip of all vegetation along the centre line. Vegetation to be cut flush with the ground. Treat stumps with herbicide.	Re-growth shall be cut within 100 mm of the ground and treated with herbicide, as necessary.
Inaccessible valleys (trace line)	Clear a 1 m strip for access by foot only, for the pulling of a pilot wire by hand.	Vegetation not to be disturbed after initial clearing – vegetation to be allowed to re-grow.
Access/service roads	Clear a maximum (depending on tower type) 6 m wide strip for vehicle access within the maximum 8 m width, including de-stumping/cutting stumps to ground level, treating with a herbicide and re-compaction of soil.	Re-growth to be cut at ground level and treated with herbicide as necessary.
Proposed tower position and proposed support/stay wire position	Clear all vegetation within proposed tower position in an area of 20 x 20 m (self-supporting towers) and 40 x 40 m (compact cross-rope suspension towers) around the position, including de-stumping/cutting stumps to ground level, treating with a herbicide and re-compaction of soil. Allow controlled agricultural practices, where feasible.	Re-growth to be cut at ground level and treated with herbicide as necessary.
Indigenous vegetation within servitude area (outside of maximum 8 m strip)	Area outside of the maximum 8 m strip and within the servitude area, selective trimming or cutting down of those identified plants posing a threat to the integrity of the proposed transmission line.	Selective trimming
Alien species within servitude area (outside of maximum 8 m strip)	Area outside of the maximum 8 m strip and within the servitude area, remove all vegetation within servitude area and treat with appropriate herbicide.	Cut and treat with appropriate herbicide.

Once the centre line has been cleared, the contractor's surveyor will peg every tower position and mark the crossing point with existing fences for new gate installations. Where required, once the tower positions have been marked, the vegetation clearing team will return to every tower position and clear vegetation (in accordance with the specification outlined in the

Environmental Management Plan (EMP)) for assembling and erection purposes.

» *Foundations*

The choice of foundation is influenced by the type of terrain encountered, as well as the underlying geotechnical conditions. Geotechnical requirements for all tower types are catered for by using various foundation types, which are designed to withstand conditions varying from hard rock to waterlogged marshes. The main types of foundations include piles, pad-and-chimney, and rock anchors. The actual size and type of foundation to be installed will depend on the type of tower to be erected, and the actual sub-soil conditions. Strain towers require more extensive foundations for support than in-line suspension towers, which contribute to the construction expenses.

The construction of foundations is the slowest part of the line construction, and is typically started some time ahead of tower erection. Prior to filling of the foundations and tower erection, excavated foundations are covered or fenced in, in order to safe-guard unsuspecting animals and people from injury. The foundations also represent the biggest unknown in the cost and construction time, since access to the tower sites is required for earth-moving machinery and concrete.

All foundation excavations are back-filled, stabilised through compaction, and rehabilitated at ground level.

» *Insulators and Hardware*

The insulators and hardware are used to connect the conductors to the towers. The main types are glass, porcelain, and composite insulators.

Glass and porcelain have been used for many years, and are the most common. They are, however, heavy and susceptible to breakage by vandals, as well as contamination by pollution. Composite insulators have a glass-fibre core with silicon sheds for insulation. The composite insulators are light-weight and resistant to both vandalism and pollution. They are, however, more expensive than the more common glass insulators.

» *Conductors*

The conductors are made of aluminium with a steel core for strength. Power transfer is determined by the area of aluminium in the conductors. Conductors are used singularly, in pairs, or in bundles of three, four or six. The choice is determined by factors such as audible noise, corona, and electro-magnetic field mitigation.

Many sizes of conductor are available, the choice being based on the initial and life-cycle costs of different combinations of size and bundles, as well as the required load to be transmitted.

2.5. Identification and Description of Alternative Transmission Power Line Development Corridors

In order to accommodate the new 400kV transmission lines proposed to be constructed from the new Medupi Power Station in the Lephalale area, Eskom Transmission is proposing the **construction of new feeder bays within the existing Witkop substation site to accommodate the new lines**. As no significant impacts were identified to be associated with this proposed expansion (as the expansion is proposed within the existing Witkop Substation footprint), this component of the project is not further assessed in this report.

2.6. Servitude Negotiation and the EIA Process

Transmission power lines are constructed and operated within a servitude (55 m wide for 400kV lines) that is established along the entire length of the power line. Within this servitude, Eskom Transmission has certain rights and controls that support the safe and effective operation of the power line. The process of achieving the servitude agreement is referred to as the Servitude Negotiation Process, or simply just the negotiation process. The following important points relating to the negotiation process should be noted:

- » Servitude negotiation is a matter between Eskom Transmission and the appropriate landowner and falls outside of the EIA process.
- » The negotiation process involves a number of stages (see below), and culminates in the 'signing' of a servitude. Here Eskom Transmission enters into a legal agreement with the landowner.
- » The servitude is registered as a 'right of way', and Eskom do not purchase the servitude from the landowner. Compensation measures are agreed in each case.
- » The agreements will detail such aspects as the exact location and extent of the servitude, and access arrangements and maintenance responsibilities, as well as any specific landowner requirements.
- » The negotiation process may take place at any time in the planning of a new power line.
- » This process must be completed (i.e. the agreement must be signed) with the relevant landowner before construction starts on that property.
- » The negotiation process is undertaken directly by Eskom Transmission and is independent of the EIA process. It is important that the aims of the two processes are seen as separate. Although the negotiation process is independent of the EIA, the two processes are related in the sense that a final

route for the proposed power lines will be selected within the corridor approved through the EIA process. In addition, environmental aspects and issues identified during the EIA process have to be considered during negotiations.

The EIA process has become important in the initial planning and route selection of new transmission lines. For this reason, it is usually preferable that the negotiation process begins after the EIA has been completed. At this stage there is greater confidence in the route to be adopted, and it would be supported by environmental authorisation. However, it may be required that the negotiation process begins earlier, and may begin before, or run in parallel with the EIA process. This may be due to urgent timeframes for the commissioning of the new power line, knowledge of local conditions and constraints, etc. Eskom Transmission has a right to engage with any landowner at any time, though they do so at risk if environmental authorisation has not been awarded.

2.6.1. The Negotiation Process

Eskom Transmission is responsible for the negotiation process for all new transmission power lines. It is critical that the process is correctly programmed and incorporated into the planning of a new line. The negotiation process involves the following steps:

- i. Initial meeting with the landowner.
- ii. The signing of an 'option' to secure a servitude (this indicates that the owner will accept that the power line will traverse his property, subject to conditions to be finalised in the negotiation of the servitude agreement). An option is valid for one year.
- iii. Once the route is confirmed (i.e. options are signed with the upstream and downstream landowners), the servitude agreement will be finalised with the individual landowners. This agreement will set out the conditions for the establishment, rehabilitation and maintenance of the servitude, and will be site-specific (as different landowners may have different requirements). Compensation payments would be made when the servitude is registered at the Deeds Office⁴.
- iv. Once construction is complete and the land rehabilitated to the landowners satisfaction (and as agreed prior to construction), the landowner signs a

⁴ Compensation will be based on present day property valuations for all properties obtained from registered evaluators. Eskom only pays compensation for the strip of land that is affected at 100% of present day property value. In cases where properties are significantly affected, Eskom may consider purchasing the whole property at present day market value. All improvements will be valued. Sentimental value and loss of visual amenity are not considered in any valuations as they are not measurable. Valuations are done according to the Expropriation Act.

- 'Final Release' certificate. Until the 'Final Release' certificate has been signed, Eskom Transmission remains liable for the condition of the land.
- v. Once the clearance certificate is signed, the responsibility for the power line and servitude is handed over to the regional Eskom Transmission office.

2.7. Project Operation Phase

The expected lifespan of the proposed transmission power line is between 35 and 40 years, depending on the maintenance undertaken on the power line structures.

During the life-span of the transmission power line, on-going maintenance is performed. Power line inspections are undertaken on an average of 1–2 times per year, depending on the area. During this maintenance period, the power line is accessed via the access routes, as agreed with affected landowners during the negotiation phase. Maintenance of the power line is required to be undertaken in accordance with the specifications of the Environmental Management Plan (EMP).

The expected lifespan of the proposed substation is between 35 and 40 years, depending on the maintenance undertaken. During the life-span of the substation, on-going maintenance is performed. Substation inspections are undertaken on an average of 1–2 times per year, depending on the area. During this maintenance period, components may require replacement in order to significantly extend the lifespan of the substation. Maintenance of the substation is required to be undertaken in accordance with the specifications of the EMP, which is to form part of the appointed contractor's contract documentation.

The creation of additional employment opportunities during the operational phase of the substation will be limited, and will be restricted to skilled maintenance personnel employed by Eskom.

2.7.1. *Servitude Maintenance Responsibilities*

The management of a transmission power line servitude is dependent on the details and conditions of the agreement between the landowner and Eskom Transmission, and are therefore site-specific. These may, therefore, vary from one location to another. However, it is a common occurrence that there is a dual responsibility for the maintenance of the servitude:

- » Eskom Transmission will be responsible for the tower structures, maintenance of access roads, watercourse crossings, and gates and fences relating to servitude access.

- » The landowner will retain responsibility for the maintenance of the land and land use within the servitude (e.g. cropping activities, veld management, etc.).

Exceptions to the above may arise where, for example dual use is made of the access roads and gates or specific land use limitations are set by Eskom Transmission within the servitude which directly affects the landowner (e.g. forestry). Maintenance responsibilities are, ultimately, clearly set out in the servitude agreement.

APPROACH TO UNDERTAKING THE ENVIRONMENTAL IMPACT ASSESSMENT

CHAPTER 3

An Environmental Impact Assessment (EIA) process refers to that process (as per the EIA Regulations) which involves the identification of and assessment of direct, indirect and cumulative environmental impacts associated with a proposed project. The EIA process comprises two phases: **Scoping Phase** and **EIA Phase**. The Scoping Phase culminates in the submission of a Scoping Report to the competent authority (DEAT in this case) for review and acceptance before proceeding onto the next phase of the process. The EIA Phase culminates in the submission of an EIA Report (including a draft EMP) to the competent authority for decision-making.

The phases of the EIA process are as follows:



The EIA process for the proposed Mokopane Integration Project has been undertaken in accordance with the EIA Regulations published in Government Notice 28753 of 21 April 2006, in terms of Section 24(5) of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998). This chapter serves to outline the process that was followed during the EIA phase of the process as well as outlining the applicable legislation for the project.

3.1. Phase 1: Scoping Study

The Scoping phase provided I&APs with the opportunity to receive information regarding the proposed project, participate in the process and raise issues of concern.

The Scoping Report described the baseline environmental conditions within the study area, described the proposed project, identified potential environmental issues associated with the proposed project, and defined the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project, involving the project applicant, specialists with experience in EIAs for similar projects, and a consultation process with interested and affected parties

(I&APs) and key stakeholders (including relevant government authorities, Tribal Authorities, non-governmental organisations (NGOs) and community-based organisations (CBOs). In accordance with the requirements of the EIA Regulations, feasible project-specific alternatives (including the “do nothing” option) were identified for consideration within the EIA process.

The revised draft Scoping Report was made available at public places for I&AP review and comment. All the comments, concerns and suggestions received during the Scoping Phase and the draft report review period were included in the Final Scoping Report. The Final Scoping Report and Plan of Study for EIA were submitted to the National Department of Environmental Affairs (DEA) and the Limpopo Department of Economic Development, Environment and Tourism (DEDET) in January 2009. The Final Scoping Report was accepted by DEA, as the competent authority in May 2009 (refer to Appendix A). In terms of this acceptance, an Environmental Impact Assessment was required to be undertaken for the proposed project.

3.2. Phase 2: Environmental Impact Assessment

Through the Scoping Study, feasible alternatives were identified for further investigation in the EIA Phase of the process. A number of issues requiring further study for all components of the project (i.e. the substation and transmission power lines) were highlighted. A comparative assessment of identified issues associated with the identified feasible alternatives has been undertaken within the EIA phase of the process.

The EIA Phase aims to achieve the following:

- » Provide an overall description and assessment of the social and biophysical environments affected by the proposed alternatives put forward as part of the project.
- » Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with the proposed Mokopane Integration Project.
- » Comparatively assess identified feasible alternatives put forward as part of the project.
- » Nominate a preferred power line alternative corridor and substation site for consideration by DEA.
- » Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.
- » Undertake a fully inclusive public involvement process to ensure that I&AP are afforded the opportunity to participate, and that their issues and concerns are recorded.

The EIA addresses potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with all phases of the project including design, construction, operation and decommissioning, and aims to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project.

3.3. Overview of the EIA Phase

The EIA Phase has been undertaken in accordance with the EIA Regulations in terms of NEMA. Key tasks undertaken within the EIA phase included:

- » Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- » Undertaking a public involvement process throughout the EIA process in accordance with Regulation 56 of Government Notice No R385 of 2006 in order to identify any additional issues and concerns associated with the proposed project.
- » Preparation of a Comments and Response Report detailing issues raised by I&APs as part of the EIA Process (in accordance with Regulation 59 of Government Notice No R385 of 2006).
- » Undertaking of independent specialist studies in accordance with Regulation 33 of Government Notice No R385 of 2006.
- » Preparation of this Draft EIA Report in accordance with the requirements of the Regulation 32 of Government Notice No R385 of 2006.

These tasks are discussed in detail below.

3.3.1. Authority Consultation

As Eskom is a Statutory body (i.e. an Organ of State), the National Department of Environmental Affairs (DEA) will act as the relevant competent authority for this proposed project. As the project falls within the Limpopo Province, the Limpopo Department of Economic Development, Environment and Tourism (DEDET) will act as a commenting authority for the project. Consultation with these authorities has been undertaken throughout the EIA process. This consultation has included the following:

- » Pre-application consultation regarding the proposed project and the EIA process to be undertaken
- » Submission of an application for authorisation to DEA, with a copy submitted to DEDET. The Notice of Intent and the application were acknowledged, approved and given the reference number 12/12/20/1187. Authorisation was therefore granted to continue with the Scoping Phase of the project

- » A consultation meeting with DEA and DEDET when the final scoping report has been submitted to the DEA in order to discuss the proposed project, alternatives identified, public consultation process undertaken and the issues identified for consideration in the EIA process.
- » An authority site inspection and consultation meeting in order to discuss the proposed project, alternatives identified, the public consultation process undertaken and the issues identified for consideration in the EIA process.

The following will also be undertaken as part of this EIA process:

- » Submission of a Final Environmental Impact Assessment (EIA) Report following the public review period.
- » A consultation meeting with DEA and DEDET in order to discuss the findings and conclusions of the EIA Report.

A record of all authority consultation undertaken during the EIA Phase is included in Appendix A.

3.3.2. Comparative Assessment of Alternatives

The following project alternatives were investigated in the EIA (refer to Figure 2.1 and 2.2):

- » Substation site options 1, 3 and 4
- » Power line corridors 1, 2, 4, 5, 6, 7 and 8

These alternatives are described in detail in Chapter 2 of this report.

3.3.3. Public Involvement and Consultation

The aim of the public participation process was primarily to ensure that:

- » Information containing all relevant facts in respect of the proposed project was made available to potential stakeholders and I&APs.
- » Participation by potential I&APs was facilitated in such a manner that all potential stakeholders and I&APs were provided with a reasonable opportunity to comment on the proposed project.
- » Comment received from stakeholders and I&APs was recorded and incorporated into the EIA process.

Through on-going consultation with I&APs and key stakeholders, issues raised through the Scoping Phase for inclusion within the EIA study were confirmed. All relevant stakeholder and I&AP information has been recorded within a database of affected parties (refer to Appendix C for a listing of recorded parties and

landowner consultation map). While I&APs were encouraged to register their interest in the project from the onset of the process, the identification and registration of I&APs has been ongoing for the duration of the EIA process and the project database has been updated on an on-going basis. 455 parties have registered their interest in the project to date.

In order to accommodate the varying needs of I&APs, as well as ensure the relevant interactions between stakeholders and the EIA specialist team, the following opportunities were provided for I&APs issues to be recorded and verified through the EIA phase:

- » Focus group meetings (pre-arranged and stakeholders invited to attend).
- » One-on-one consultation meetings and telephonic consultation sessions (consultation with various parties, for example with directly affected landowners, by the project participation consultant as well as specialist consultants).
- » Written, faxed or e-mailed correspondence.

Application for exemption from complying with Regulation 56 (b) (i) and (ii), Chapter 6 of the GN R385 was requested from the DEA at the start of the Scoping process. This regulation requires that (i) written notice is to be given to owners and occupiers of land adjacent to the site where the activity is or is to be undertaken and (ii) the owners and occupiers of land within 100 m of the boundary of the site or alternative site who are or may be directly affected by the activity. It is however, important to indicate that the application for exemption from complying with Regulation 56 (2)(b) (i) and (ii) was not a deliberate attempt to exclude land owners and occupiers of the land adjacent to the project area. Because of the length of the project (200km), some of the land owners would be notified as the EIA process progressed. Exemption from complying with the requirements of this Regulation was granted by DEA (Refer to Appendix A).

In terms of notification of landowners and occupiers on the proposed power line routes, the following activities have been undertaken in order to provide them the opportunity to become involved in the EIA process:

- » Advertisements were placed in local and regional newspapers in the area announcing the commencement of the EIA process and inviting interested and affected parties to become involved in the project (as detailed below)
- » Notice boards were placed in the area of concern during the announcement of the project (as detailed below)
- » Written notices and Background Information Documents (BIDs) were distributed and placed at public places, sent to the relevant municipal officials and councillors, several community organisations as well as the Tribal

Authority councillors of the area as part of the public participation process for the project.

- » Focus group and public meetings were held in the scoping phase and in the EIA phase of the project at appropriate locations within the study area. Public meetings were advertised in local and regional newspapers and registered parties were invited to attend these meetings by letter.
- » A detailed questionnaire was developed requesting property specific information from the landowners regarding sensitivities on their properties. Responses received were forwarded onto the specialist team for inclusion in their detailed comparative assessments.

Networking with I&APs will continue throughout the duration of the EIA process.

Table 3.1 below provides details of the focus group and public meetings held during the EIA process.

Table 3.1: Details of the meetings held during the EIA process

Date	Parties present	Venue
10 June 2008	Batlokwa T/A, Bakone T/A, Lebelo T/A	Bakone Traditional Council Office
11 June 2008	Nkidikitlane T/A, Babirwa T/A	Babirwa Traditional Council Office
12 June 2008	Dikgale T/A ⁵ , Bakone T/A, Maraba T/A, Mashashane T/A	Capricorn DM Office
12 June 2008	Lekalakala T/A	Lekalakala Traditional Council Office
13 June 2008	Langa (Bekenburg) T/A, Langa (Mapela) T/A, Mokopane T/A	Mapela Traditional Council Office
17 June 2008	Public meeting	Polokwane - The Golden Pillow Hotel
18 June 2008	Public meeting	Mokopane - The Protea Park Hotel
19 June 2008	Public meeting	Marken - Marken Primary School Hall
20 June 2008	Public meeting	Lephalale, The Mogol Club
18 July 2008	Anglo Coal	ILISO Consulting, Centurion
04 August 2008	Lephalale Focus Group Meeting	Lephalale – Lephalale College (corner Nelson Mandela & Ngwako Ramathlodi Rd)
04 August	Lephalale Municipality	Lephalale Municipality - Civic Centre (social services)
05 August 2008	Vaalwater Focus Group Meeting	Vaalwater Farmers Hall

⁵ Moletsi T/A were invited to attend this meeting, but sent an apology

Date	Parties present	Venue
05 August	Polokwane Municipality	Polokwane - Environmental Management Office
06 August 2008	Marken Focus Group Meeting	Marken – Marken Farmers Hall
06 August 2008	Mokopane Focus Group Meeting	Potgietusrus - DLU (Chamber of Business – Mokopane Thabo Mbeki 97)
07 August 2008	Waterberg District Municipality	Modimolle - municipal office
30 September 2008	Lephalale Focus Group Meeting	Marken – Auction Hall
16 February 2009	Lephalale Focus Group Meeting	Lephalale – Mogol Club
16 February 2009	Marken Focus Group Meeting	Marken – Marken Farmers Hall
17 February 2009	Vaalwater Focus Group Meeting	Vaalwater – Vaalwater Farmers Hall
19 March 2009	Thandululo Coal	Hyde Park – Beacon Rock Offices
28 July 2009	Lephalale Focus Group Meeting	Lephalale – Mogol Club
28 July 2009	Marken Focus Group Meeting	Marken – Marken Farmers Hall
29 July 2009	Vaalwater Focus Group Meeting	Vaalwater – Vaalwater Farmers Hall
29 July 2009	Anglo Coal	Vaalwater – Vaalwater Farmers Hall
11 November 2009	Ellisras DLU and Lephalale Agricultural Association and Lephalale Local Municipality	Lephalale - Palm Park Hotel
11 November 2009	Marken Farmers Association	Marken – Marken Farmers Hall
12 November 2009	Waterberg Biosphere Reserve and Conservation groups	Vaalwater – Vaalwater Farmers Hall
12 November 2009	Waterberg District Municipality	Modimolle - municipal office
23 November 2009	Seleka Traditional Council	Seleka Traditional Council Office
23 November 2009	Laka Traditional Council	Babirwa Traditional Council Office
24 November 2009	Shongoane Traditional Council	Shongoane Traditional Office
24 November 2009	Lekalakala Traditional Council	Lekalakala Traditional Council Office
25 November 2009	Bakoni Traditional Council Lebelo Traditional Council Machaka Traditional Council	Bakoni Traditional Offices
26 November 2009	Babirwa Traditional Council Nkidikitlane Traditional Council	Babirwa Traditional Offices
26 November 2009	Bakenberg Traditional Council	Mapela Traditional Offices ⁶

⁶ Although the Mokopane and Bakernberg traditional councils had agreed to come to the meeting at Mapela traditional council office, no one came from either of the councils. Mapela traditional council said that they did not invite any of their leaders because they did not get the invitation letter. They requested that the letter should be sent to the district municipality. They said every time they went to

Date	Parties present	Venue
	Mapela Traditional Council Mokopane Traditional Council	
27 November 2009	Dikgale Traditional Council Moletsi Traditional Council Matlala Traditional Council Maraba Traditional Council Mashashane Traditional Council	Capricorn DM Offices ⁷
11 March 2010 (specialist feedback meeting)	Landowners and stakeholders in study area	Lephalale – Machauka Lodge

Stakeholders were invited to attend these meetings by letter and through the local Tribal Authority structures and Farmers' Associations. Parties registered on the project database were invited to attend the meetings in writing.

It must be noted that, following the first round of meetings, the Tribal Authorities indicated that further public consultation meetings with them would not be necessary until a preferred alternative was recommended by the process. These follow up meetings will be held during the review period for the draft EIA Report. An undertaking has been made by the Tribal Authorities that the affected community members will be made aware of the proposed project and will be provided the opportunity to comment through the Tribal Authority structure.

A landowner consultation map indicating the landowners identified and contacted during the public participation process for the project was compiled (refer to Appendix C)⁸.

Records of consultation undertaken in the EIA phase of the process are included in Appendix D and in the Comments and Responses Report contained in Appendix E.

3.3.4. Comments and Responses Report

Issues and concerns raised by I&APs during the EIA process have been synthesised into the Comments and Responses Report (refer to Appendix E for comments compiled from both scoping and EIA phases). The Comments and Responses Report includes responses from members of the EIA project team and

collect the invitation they were told that the invitation has not come through. Proof of the sending of the fax to the municipality is available.

⁷ Only Mashashane and Maraba traditional council were represented

⁸ It must be noted that not all the landowners consulted as part of this process have provided details of the properties which they own and/or are resident on. Therefore, the information reflected on this map is not inclusive of all landowners consulted. Details of all parties consulted are included in the project database (refer to Appendix C).

the applicant. In some cases, immediate responses and clarification are provided. Where issues are raised that the EIA team considers beyond the scope and purpose of this EIA process, clear reasoning for this view is provided.

3.3.5. Assessment of Issues Identified through the Scoping Process

Based on the findings of the Scoping Study, the following issues were identified as being of low significance, and therefore not requiring further investigation within the EIA:

- » Potential impacts on topography
- » Potential impacts on transmission infrastructure associated with climate and atmospheric conditions

Issues that required investigation within the EIA phase, as well as the specialists involved in the assessment of these impacts are indicated in Table 3.2. Specialist EIA Reports are contained within Appendices F - L. Contact details of specialists are contained within their reports.

Table 3.2: Specialist studies undertaken within the EIA phase

Specialist	Area of Expertise	Qualifications & experience
Riaan Robbeson of Bathusi Environmental Consulting	Biodiversity	MSc (Plant Ecology) 8 years experience South African Council of Natural Scientific Professions (SACNASP) (Ecological Scientist & Botanical Scientist, Reg no: 400005/03)
Megan Diamond of Endangered Wildlife Trust	Avifauna	BSc (Environmental Management) 2 years experience
Garry Patterson of ARC-Institute for Soil, Climate and Water	Agricultural Potential	MSc (Soil Science) 28 years experience President of Soil Science Society of South Africa (2005-2007)
Julius Pistorius	Heritage sites	D Phil Archaeology Member of the Association of Southern African Professional Archaeologists (ASAPA) Member of the South African Archaeological Society 28 years experience
Lourens du Plessis of MetroGIS	Visual Impact Assessment & GIS	BA (Geography and Anthropology) 11 years experience in GIS and visual impact assessments
Anita Bron of MasterQ	Social Impact Assessment, land	MA (Research Psychology), MA (Social Impact Assessment – in

Specialist	Area of Expertise	Qualifications & experience
	use & tourism potential assessment	process), BA Hons (Psychology), BA (Psychology, Criminology and Penology) member of the South African Monitoring and Evaluation Association and the IAIA 7 years experience
Anita Bron of MasterQ	Social Impact Assessment, land use & tourism potential assessment	MA (Research Psychology), MA (Social Impact Assessment – in process), BA Hons (Psychology), BA (Psychology, Criminology and Penology) 7 years experience
William Mullins of Conningarth Economists	Economic Impact Assessment	Mathematician and Statistician

Specialist investigations included desk-top evaluations of existing information (including that provided by landowners in response to the questionnaires distributed), as well as detailed field surveys of the identified corridors and substation sites. In undertaking the field assessment, contact was made with available landowners. A list of the properties where contact was made is included within Appendix M.

An external review of the EIA process has been undertaken by Jaana-Maria Ball and Rueben Heydenrych of GIBB.

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the Mokopane Integration Project. Issues were assessed in terms of the following criteria:

- » The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- » The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional
- » The **duration**, wherein it will be indicated whether:
 - * the lifetime of the impact will be of a very short duration
 - * the lifetime of the impact will be of a short duration (2-5 years)
 - * medium-term (5–15 years);
 - * long term (> 15 years); or
 - * permanent;
- » The **magnitude**, quantified as small (will have no effect on the environment), minor (will not result in an impact on processes), low (will cause a slight impact on processes), moderate (will result in processes continuing but in a modified way), high (processes are altered to the extent that they temporarily

cease), and very high (results in complete destruction of patterns and permanent cessation of processes).

- » The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring and will be rated very improbable (probably will not happen), improbable (some possibility, but low likelihood), probable (distinct possibility), highly probable (most likely) and definite (impact will occur regardless of any prevention measures).
- » the **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- » the **status**, which will be described as either positive, negative or neutral.
- » the degree to which the impact can be reversed (**reversibility**).
- » the degree to which the impact may cause **loss of irreplaceable resources**.
- » the *degree* to which the impact can be *mitigated*.

The potential **significance** of identified impacts will be determined using the significance rating system described below.

Significance of environmental impact = Consequence x Probability

The consequence of an impact can be derived from the following factors:

- » Extent of impact
- » Duration of impact
- » Magnitude
- » Reversibility

The above criteria will be rated using the criteria indicated in the table below.

Magnitude	Reversibility	Duration	Spatial extent	Probability
5 – Very high / don't know	1 – Reversible (regenerates naturally)	5 – Permanent	5 – International	5 – Definite / don't know
4 – High		4 – Long term (impact ceases after operational life)	4 – National	4 – High probability
3 – Moderate	3 – Recoverable (needs human input)	3 – Medium term (5 – 15 years)	3 – Regional	3 – Medium probability
2 – Low		2 – Short term (0 – 5 years)	2 – Local	2 – Low probability
1 – Minor	5 – Irreversible	1 - Immediate	1 – Site only	1 – Improbable
0 – None				0 - None

The overall consequence of an impact must be determined by the sum of the individual scores for magnitude, reversibility, duration and extent of an impact, multiplied by the probability of the impact occurring.

Significance = Consequence (severity + reversibility + duration + spatial scale) X Probability

The significance is then characterised as follows:

- **More than 60 significance points** indicate **High** environmental significance
- **Between 30 and 60 significance points** indicate **Moderate** environmental significance
- **Less than 30 significance points** indicate **Low** environmental significance.

The impacts are ranked according to the significance rating results obtained. The relevant mitigation measures recommended are then considered and the significance of the impacts after mitigation determined. The impacts are then be ranked again according to the significance results after mitigation.

In order to assess the corridor alternatives in respect of their anticipated social impacts, a distinction was made between the following impacts:

- » **Category 1:** Impacts that are not expected to differ between the proposed Corridor alternatives, e.g. the number of construction workers that will be needed for the proposed project remains the same, irrespective of the chosen alternative;
- » **Category 2:** Impacts that are expected to differ between the proposed alternative Corridors, e.g. the number of households to be resettled increases if the development traversed densely populated areas as opposed to skirting populated areas.

A specialist workshop was held on 3 September 2009, with a suite of specialists from the EIA team⁹ in attendance. The conclusions of each of the specialist studies were discussed and an overall recommendation made regarding the preferred substation sites and transmission line corridors for consideration by DEA. A summary of the outcomes of this workshop is included in Appendix N.

⁹ Workshop attendants included Jo-Anne Thomas, Zama Dlamini, Lourens du Plessis, Garry Paterson, Nonka Byker, Megan Diamond, Julius Pistorius, Bhavani Daya, Karin Bowler and Reuben Heydenrych of the EIA team.

3.3.6. Public Review of Draft EIA Report and Feedback Meeting

A draft EIA Report was made available for review from **2 November to 14 December 2009** at the following locations:

Lephalale Library – corner of Joe Slovo and Douwater Street	Agri Lephalale Offices – 6A Jacobus Street
Marken Farmers Hall	Vaalwater Agric Association – NTK Building, Meule Street
Waterberg District Municipality Offices, Modimolle	Potgietersrus DLU, Mokopane
Polokwane Municipality – Environmental Management Office	Polokwane Library – Hans van Rensburg Street
www.eskom.co.za/eia	www.savannahSA.com

Copies of the draft report were also made available to the Lephalale Local Municipality and the Mogalakwena Municipality. Affected parties and stakeholders also received CDs containing the report, on request.

The availability and duration of the public review process was advertised in the Mogol Post, Northern Review Midweek, Polokwane Observer, Seipone, Agri Spectrum, Die Bosvelder, Beeld and The Star. In addition, all registered I&APs were notified of the availability of the report either by e-mail or letter (refer to Appendix D).

Feedback focus group meetings were held during the public review period of the draft EIA Report (refer to Table 3.1). All registered I&APs were invited to attend any of these meetings either by e-mail or letter.

3.3.7. Public Review of Revised Draft EIA Report

This is the **current phase of the EIA process**. This revised draft EIA Report has been made available for review from **19 May 2010 to 18 June 2010** at the following locations:

Lephalale Library – corner of Joe Slovo and Douwater Street	Agri Lephalale Offices – 6A Jacobus Street
Marken Farmers Hall	Vaalwater Agric Association – NTK Building, Meule Street
Waterberg District Municipality Offices, Modimolle	Potgietersrus DLU, Mokopane
Polokwane Municipality – Environmental Management Office	Polokwane Library – Hans van Rensburg Street
www.eskom.co.za/eia	www.savannahSA.com

Copies of the draft report will also be made available to the Lephalale Local Municipality and the Mogalakwena Municipality. Affected parties and stakeholders can also receive CDs containing the report, on request.

The availability and duration of the public review process will be advertised in the Mogol Post, Northern Review Midweek, Polokwane Observer, Seipone, Agri Spectrum, Die Bosvelder, Beeld and The Star. In addition, all registered I&APs will be notified of the availability of the report either by e-mail or letter (refer to Appendix D).

3.4. Regulatory Framework, Legislation and Guidelines Applicable for the Mokopane Integration Project Environmental Impact Assessment Process

The scope and contents of this Draft EIA Report have primarily been informed by the following legislation and guidelines:

- » National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998)
- » EIA Regulations, published under Chapter 5 of the NEMA (GN R385, GN R386 and GN R387 in Government Gazette 28753 of 21 April 2006)
- » All guidelines published in terms of the NEMA EIA Regulations, in particular:
 - * Guideline 3: General Guide to Environmental Impact Assessment Regulations, 2006 (DEA, June 2006);
 - * Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations, 2006 (DEA, May 2006); and
 - * Guideline 5: Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations, 2006 (DEA, June 2006).

Several other Acts, standards or guidelines have also informed the scope of issues to be addressed in the EIA (particularly in terms of the scope and methodology of specialist studies). A review and assessment of legislative requirements applicable to the proposed project, the specialist studies and this EIA process is provided in Table 3.3.

Table 3.3: List of applicable legislation and compliance requirements required for the Mokopane Integration Project.

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
National Legislation			
National Environmental Management Act, 1998 (Act No. 107 of 1998)	<p>EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation.</p> <p>In terms of GNR 387 of 21 April 2006, a scoping and EIA process is required to be undertaken for the proposed project</p>	National Department of Water and Environmental Affairs – lead authority. LDEDET – commenting authority.	This EIA report is to be submitted to DEA and DEDET in support of the application for authorisation submitted in April 2007.
National Environmental Management Act, 1998 (Act No. 107 of 1998)	<p>In terms of the Duty of Care provision in S28(1) Eskom as the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.</p> <p>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p>	National Department of Water and Environmental Affairs (as regulator of NEMA).	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application during the EIA phase and will continue to apply throughout the life cycle of the project.

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	<ul style="list-style-type: none"> » The Minister may by notice in the <i>Gazette</i> publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. » The Minister may amend the list by— <ul style="list-style-type: none"> (a) adding other waste management activities to the list; (b) removing waste management activities from the list; or (c) making other changes to the particulars on the list. » Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that <ul style="list-style-type: none"> (a) the containers in which any waste is stored, are intact and not corroded or in any other way rendered unfit for the safe storage of waste; (b) adequate measures are taken to prevent accidental spillage or leaking; (c) the waste cannot be blown away; (d) nuisances such as odour, visual impacts and breeding of vectors do not arise; and (e) pollution of the environment and harm to health are prevented 	National Department of Water and Environmental Affairs	<p>As no waste disposal site is to be associated with the proposed project, no permit is required in this regard.</p> <p>Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of this Act, as detailed in the EMP (refer to Appendix N).</p>
Environment Conservation Act, 1989 (Act No. 73 of 1989)	National Noise Control Regulations (GN R154 dated 10 January 1992).	National Department of Water and Environmental Affairs Local authorities	There is no requirement for a noise permit in terms of the legislation. Noise impacts are expected to be associated with the construction phase

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
			of the project and are likely to present an intrusion impact to the local community. On-site activities should be limited to 6:00am to 6:00pm Monday – Saturday (excluding public holidays). Should activities need to be undertaken outside of these times, the surrounding communities will need to be notified and appropriate approval will be obtained from DEA and the Local Municipality.
National Water Act, 1998 (Act No. 36 of 1998)	Section 21 sets out the water uses for which a water use license is required.	National Department of Water and Environmental Affairs	As no water use (as defined in terms of S21 of the NWA) will be associated with the proposed project, no water use permits or licenses are required to be applied for or obtained.
National Water Act, 1998 (Act No. 36 of 1998)	In terms of Section 19, Eskom as the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing or recurring.	National Department of Water and Environmental Affairs (as regulator of NWA)	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application during the EIA phase and will continue to apply throughout the life cycle of the project.
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Section 38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including <ul style="list-style-type: none"> » the construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length; » any development or other activity which will change the character of a site 	South African Heritage Resources Agency (SAHRA)	A Phase I Heritage Impact Assessment study was undertaken in the EIA phase of the process and provides a synthesis of the results achieved by the scoping study and the Phase I survey as well as describing the status quo of the study area with regard to its pre-historical, historical and cultural context (Refer to Appendix I).

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>exceeding 5 000 m² in extent.</p> <p>The relevant Heritage Resources Authority must be notified of developments such as linear developments (such as roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m²; or the re-zoning of a site exceeding 10 000 m² in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided.</p> <p>Stand alone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of Section 38. In such cases only those components not addressed by the EIA should be covered by the heritage component.</p>		<p>A permit may be required should any cultural/heritage sites of significance be unearthed during the construction phase of the transmission power lines or at the substation site.</p>
<p>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)</p>	<p>In terms of Section 57, the Minister of Environmental Affairs and Tourism has published a list of critically endangered, endangered, vulnerable and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007.</p> <p>In terms of GNR No. 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must</p>	<p>National Department of Water and Environmental Affairs</p>	<p>As Eskom will not carry on any restricted activity, as is defined in Section 1 of the Act, no permit is required to be obtained in this regard.</p> <p>Specialist flora and fauna studies are required to be undertaken as part of the EIA process. A specialist ecological assessment has been undertaken for the proposed project (refer to Appendix F).</p> <p>A permit may be required should any protected plant species within the</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	be employed during the EIA phase of the project to incorporate the legal provisions as well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA phase.		power line corridors or at the substation site be disturbed or destroyed as a result of the proposed development.
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048. Weeds are described as Category 1 plants, while invader plants are described as Category 2 and Category 3 plants. These regulations provide that Category 1, 2 and 3 plants must not occur on land and that such plants must be controlled by the methods set out in Regulation 15E.	Department of Agriculture	While no permitting or licensing requirements arise from this legislation, this Act will find application during the EIA phase and will continue to apply throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. In addition, a weed control and management plan must be implemented.
Hazardous Substances Act, 1973 (Act No. 15 of 1973)	This Act regulates the control of substances that may cause injury, or ill health, or death by reason of their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. Group I and II: Any substance or mixture of a	Department of Health	It is necessary to identify and list all the Group I, II, III and IV hazardous substances that may be on the substation site and in what operational context they are used, stored or handled. If applicable, a license is required to be obtained from the Department of Health.

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>substance that might by reason of its toxic, corrosive etc, nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared to be Group I or Group II hazardous substance;</p> <p>Group IV: any electronic product;</p> <p>Group V: any radioactive material.</p> <p>The use, conveyance or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p>		
<p>National Road Traffic Act, 1996 (Act No. 93 of 1996)</p>	<p>The Technical Recommendations for Highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges and culverts.</p> <p>The general conditions, limitations and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio,</p>	<p>Limpopo Department of Roads (provincial roads)</p> <p>South African National Roads Agency Limited (national roads)</p>	<p>An abnormal load/vehicle permit may be required to transport the various power line and substation components to site for construction. These include:</p> <ul style="list-style-type: none"> » Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. » Transport vehicles exceeding the dimensional limitations (length) of 22m.

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.		

DESCRIPTION OF THE ENVIRONMENT AFFECTED BY THE PROPOSED 400KV TRANSMISSION POWER LINES

CHAPTER 4

This section of the EIA Report provides a description of the environment that may be affected by the **proposed 400kV transmission power lines** between the Medupi Power Station and Delta Substation, and the Mokopane and Witkop Substations. This information is provided in order to assist the reader in understanding the possible effects of the proposed project on the environment. Aspects of the physical, biological social, economic and cultural aspects of the environment that could be affected by, or could affect, the proposed development have been described. This information aims to provide the overall context within which this EIA is being conducted. A more detailed description of each aspect of the affected environment is included within the specialist scoping reports contained within Appendices F - L.

Alternative power line corridors comparatively assessed within this EIA include **Alternative 1 and 2**, as well as the **alternative of following the existing Matimba-Witkop lines (corridor 8)** and a **deviation of corridor 8**. In addition, **Transmission line alternatives 4, 5, 6 and 7** were assessed (refer to Figure 4.1).

4.1. Location and Baseline Environment of the Study Area

The proposed power line corridors fall within the Lephalale, Mogalakwana, Modimolle and Polokwane Local Municipalities, which are located within the Waterberg District Municipality and the Capricorn District Municipality (refer to Figures 4.2 and 4.3).

The study area is situated between the towns of Lephalale in the west and Polokwane in the east. The greater study area contains elements of both grassland and woodland, but the proposed alignments are situated largely within woodland. The area is situated within the Limpopo River catchment area. Numerous rivers and drainage lines are crossed by the various alternatives. The proposed corridors cross landform types ranging from plains in the north to a hilly and mountainous terrain in the south.

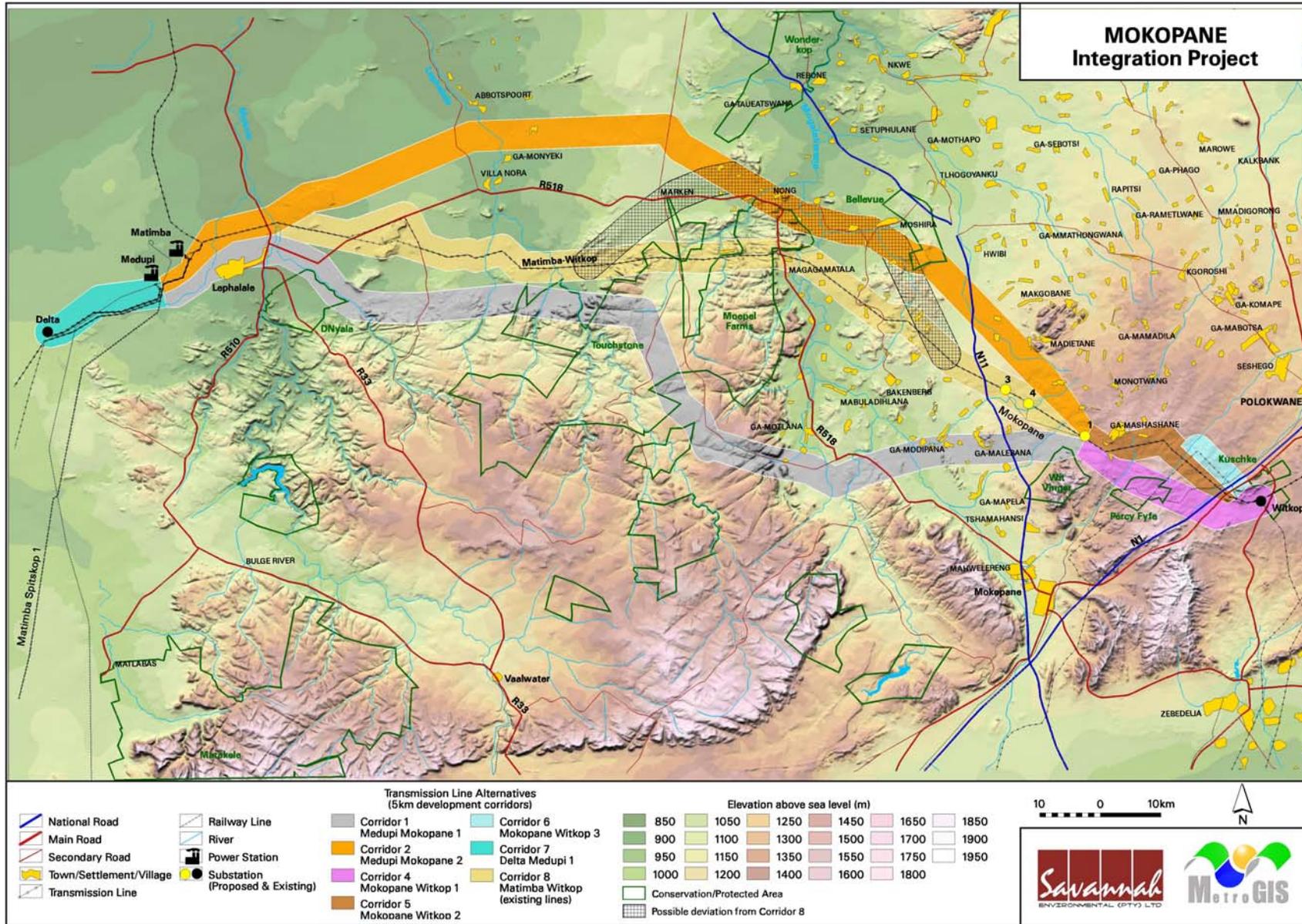


Figure 4.1: Alternatives comparatively assessed in the EIA phase of the process

Description of the Environment Affected
 by the Proposed 400kV Transmission Power Lines

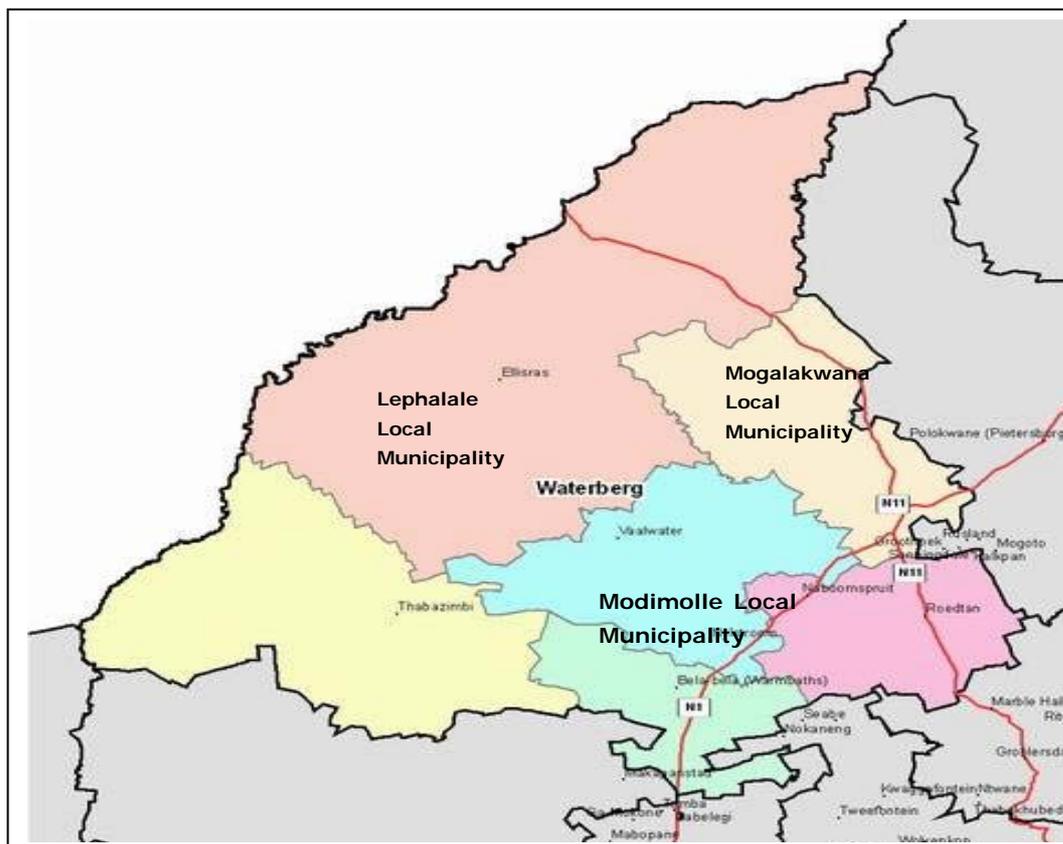


Figure 4.2: Delineation of the Lephhalale, Mogalakwena and Modimolle Local Municipalities within the Waterberg District Municipality

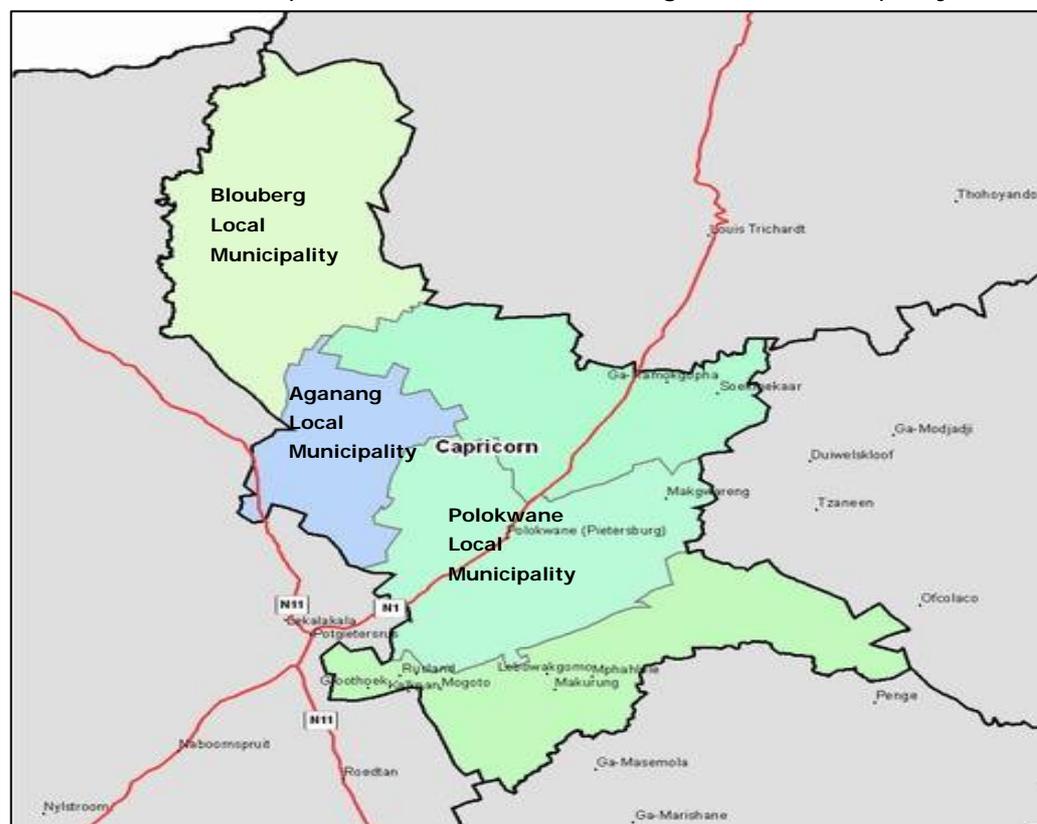


Figure 4.3: Delineation of the Polokwane Local Municipality within the Capricorn District Municipality

The land use within the study area consists of formal and informal residential areas, mining and commercial farming with a mixture of game, cattle and crop cultivation – both dryland and irrigation. Sections of the study area contain subsistence farming, with a mixture of cattle and crop cultivation. The study area includes a number of conservation or protected areas (both provincial and private nature reserves) as well as the Waterberg Biosphere Reserve core, buffer and transitional zones. Industrial and mining land uses occur west of Lephalale in the form of the Grootegeluk coal mine, and the two Eskom coal-fired power stations (the existing Matimba Power Station and the Medupi Power Station currently under construction). Platinum mining activities take place north-west of Mokopane between the R518 and the N11 national road (refer to Figures 4.4 and 4.5).

Large tracts of land within the study area are still in a natural state (undisturbed) with some areas in and along the Waterberg escarpment in a virtually pristine condition. This is due mainly to the low population density (less than 10 people per km²) of the Waterberg plateau and escarpment and the relative remoteness and inaccessibility of the terrain. The population density increases eastwards with a great number of settlements occurring along the Mogalakwena River (between the R518 and N11). Here the population density is between 100 to 200 people per km² and 50 to 100 people per km² east of the N11.

The properties that are potentially affected by the transmission power line alignments are owned by either private landowners or Traditional Authorities.

4.1. Social Characteristics of the Study Area

The Waterberg District Municipality is made up of six separate local municipalities, including the Mogalakwena and Lephalale Local Municipalities. The Waterberg District Municipality is the largest of the six districts and lies in the western part of the province. The district is mostly rural in nature and, according to the Community Survey 2007, it has a total population of approximately 596 092 people living in 160 720 households (at an average of 12 people per km², much lower than the average provincial density of 40 people per km²).

In a 2007 Community Survey, the unemployment rate within the district was estimated at around 29.0%, which was much lower than that of the province. Furthermore, approximately a third (33.0%) of the district's population was under the age of 14 years, which would make any job opportunities vital to the future development of the district.

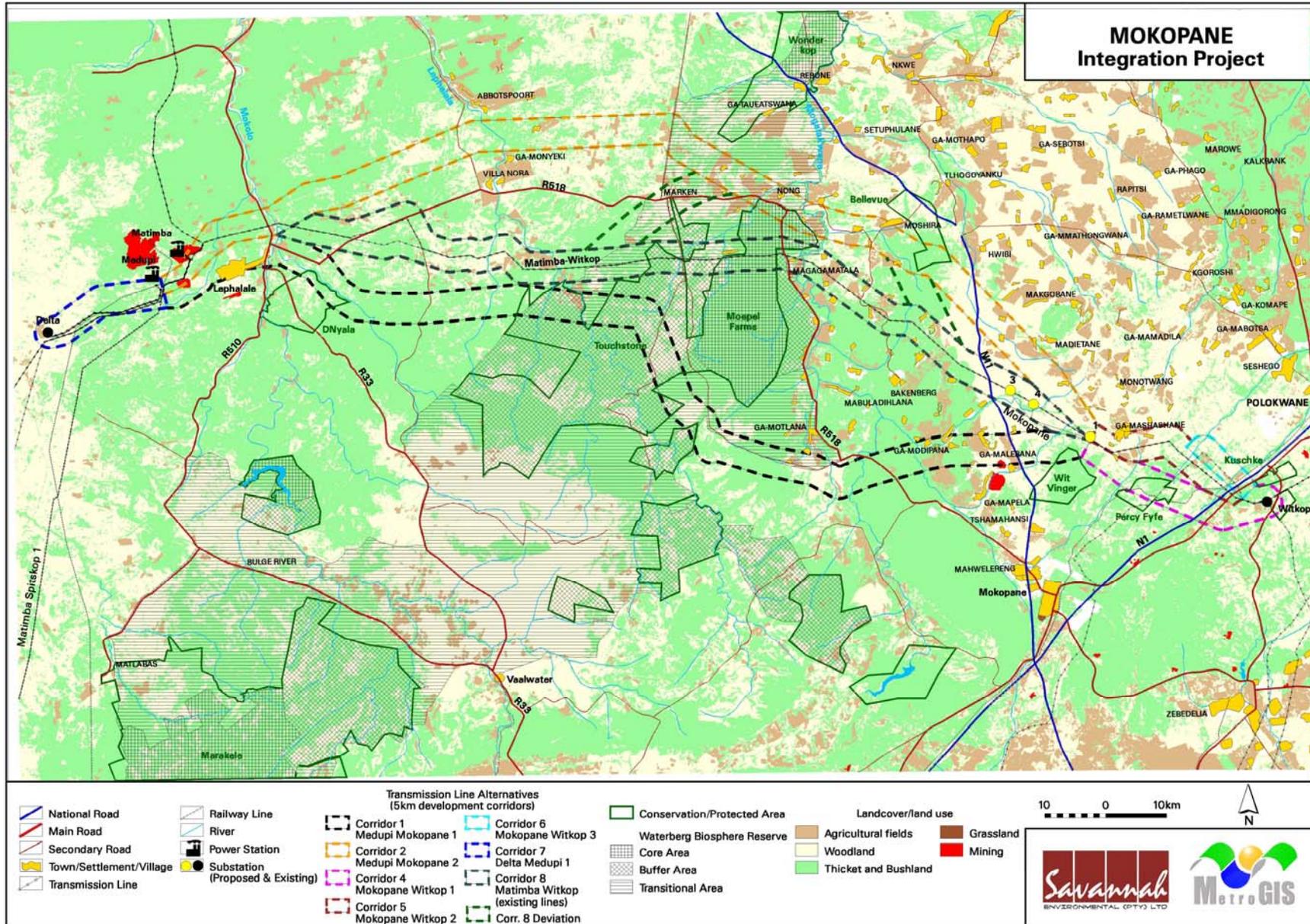


Figure 4.4: Land uses within the study area

Description of the Environment Affected
 by the Proposed 400kV Transmission Power Lines



Figure 4.5: Occurrence of Dwellings within the Corridors (Dwellings are indicated by the red circles)

The WDM is characterised by discrepancies in wealth and skills. The majority of households earned an annual income below R18 001 in 2001. Households' production levels are declining leading to a situation where the majority of the population are financially dependent on state pension and social welfare grants as their primary source of income and subsistence. This is linked to the low educational levels, and lack of skills.

The Waterberg District Municipality's (WDM) Integrated Development Plan (IDP 2008/09) states that only approximately 0.43% of the district's total land surface area is used for settlement purposes (i.e. towns and villages). Of these towns and villages, by far the majority (approximately 69%) are located within the Mogalakwena Local Municipality's area of jurisdiction. In Lephalale Local Municipality, only 37% of the population lives in settlements with high population concentrations and growth potential. The urban areas such as Mokopane and Lephalale dominate the district's urban settlement pattern.

The Capricorn District Municipality (CDM) consists of 5 local municipalities, including the Aganang, Blouberg and Polokwane Local Municipalities. The CDM is located within the centre of the Limpopo Province and, according to the Community Survey 2007, has a total population of approximately 1 243 167 people, which is more than double the population size of the WDM. The average population density of the CDM is estimated at around 73.3 people per km², which is much higher than that of the WDM and the province as a whole.

Currently there are a large number of manufacturers in the Capricorn District, of which the majority are situated in the Polokwane municipal area. The processing of raw materials from mining and secondary activities emanating from processing of agriculture products in Capricorn will contribute significantly in expanding the manufacturing sector within CDM. Investment in construction has increased in the years immediately preceding 2007. However while there are many manufacturers, few employ more than 100 people and as a result many people engage in hawking and informal household shops, which sustains their basic needs but unfortunately does not contribute to economic growth within the CDM.

A large portion of the eastern section of the study area falls within tribal land. Tribal Authorities identified through the public participation process include: Laka, Shongoane, Seleka, Lekalakala, Bekenburg, Mapela, Mokopane, Dikgale, Moletsi, Bakone, Maraba and Mashashane Traditional Councils (refer to Figure 4.5 and Photograph 4.1).



Photograph 4.1: An Aerial photograph of communities located in the north-eastern section of the study area

4.1.1. Demographic Profile

The Integrated Development Plan of Lephalale Local Municipality envisaged that the total population for Lephalale Municipality will increase from 80 141 to 106 521 in 2010. The estimated future population of Lephalale Municipality will increase with approximately 6 500 people over the next six years (from 2007). It was estimated that the population growth rate for Lephalale Municipality will decrease from approximately 1,345% in the year 2004 to 1,024% in the year 2010.

Despite its beneficial location in terms of international trade, the Limpopo Province is regarded as one of the poorest provinces in South Africa. In the province approximately 59.6% of the population was employed in 2007. Of those employed, 18.4% are employed within the community services sector source.

4.1.2. Economic Profile

The Waterberg District Municipality Integrated Development Plan (2008/09) states that the key economic sectors within the WDM are mining, electricity/water, services, trade/catering and agriculture, with mining making the biggest contribution to the Gross Geographical Product (GGP). The land use pattern within the district is diverse, with most of the mining operations concentrated on the periphery, whereas the central area is mostly characterised by the tourism and game industry. The tourism industry is also a significant contributor to the Gross Domestic Product (GDP). Similar to the province as a whole, a trend in the area is the conversion of agricultural land into game farms, resulting in a rapid expansion of game farming and tourism in the area. The