8. CONCLUSIONS AND RECOMMENDATIONS

In terms of the Environmental Impact Assessment Regulations (2006) published in Government Notice R385 to R387 of 21 April 2006 in terms of Section 24(5), read with Section 44, of the National Environmental Management Act, 1998 (Act No. 107 of 1998), Eskom Holdings Limited requires authorisation from the National Department of Environmental Affairs and Tourism (N DEAT) in consultation with the Limpopo Department of Economic Development, Environment and Tourism (L DEDET) and the Mpumalanga Department of Agriculture and Land Administration (M DALA) for the undertaking of the proposed Pumped Storage Scheme project in the Steelpoort area. In order to obtain authorisation for this project, comprehensive, independent environmental studies must be undertaken in accordance with the EIA Regulations.

The main objectives of this largely issues-based ESS were as follows:

- Validation of the ESI that had been conducted.
- Identification of potential positive and negative environmental (biophysical and socio-economic) impacts associated with the proposed project, including a description of the *nature*, *extent* and *status* of each impact.
- Description of the alternatives that were identified.
- Evaluation of the potentially feasible alternatives and the nomination of the most feasible site to be investigated within the EIA phase of the project.
- Recommendations with regards to the more detailed investigations required during the EIA phase of the project.

Neither a detailed assessment of environmental impacts nor the development of management and mitigation measures therefore form part of the scope of this issues-based ESS. Such aspects will be addressed within the EIA and EMP phases of the project.

8.1 Alternatives

In terms of the EIA Regulations, feasible alternatives are required to be considered within the ESS. Three (3) main site alternatives for the construction of the proposed SPSS were therefore identified, together with a number of site and layout options within each site alternative. These have been considered within the ESI as well as the ESS phase of the EIA. These alternatives, which are described in Chapter 3 of this report, are as follows:

- Site A – Options 1 to 4
- Site B – Options 1 to 8
- Site C – Options 1 to 2
- "Do nothing" alternative

One of the aims of the ESS is to identify the most feasible alternative to carry through to the EIA phase of the investigation for detailed assessment. The selection of the most feasible site during the ESS phase of the project helps to focus future investigations, both in terms of the environmental investigations required and the scope of the public participation process.

From the ESS, **Alternative A3** is nominated as the most feasible site alternative for the construction of the proposed SPSS. Based on the studies conducted within the Environmental Scoping Study, it is anticipated that this site and option combination will have the least negative impact in terms of the combination of aspects (bio-physical and socio-economic) that have been investigated.

8.2 Potential Environmental Impacts

Based on the ESS undertaken, it can be concluded that there are **no** fatal flaws associated with the proposed SPSS at Site A3. A number of potentially significant (positive and negative) environmental impacts have, however, been identified and will need to be evaluated during the detailed EIA phase of the project. Detailed mitigation and management measures will be developed during the Environmental Management Plan (EMP) phase of the project, in response to the detailed assessment, and will be developed towards the end of EIA phase of the project. Should this project receive environmental authorisation, the EMP will guide the project proponent and appointed contractor(s) through the final design, construction and operational phases of the proposed project and all specifications contained in the EMP will need to be adhered to by the applicant as well as any contractors appointed by the applicant.

A summary of the potentially significant issues associated with the proposed Pumped Storage Scheme, identified within the Environmental Screening Investigation and the Environmental Scoping Study, is provided in Table 7.1 below. The area of potential impact and recommendations for investigations to be undertaken within the EIA phase are also specified.

Table 8.1: Potentially significant issues associated with the proposed Pumped Storage Scheme, identified within the Environmental Screening Investigation and the Environmental Scoping Study. The area of potential impact and recommendations for investigations to be undertaken within the EIA phase are also specified.

Issue	Area of Potential Impact	Recommendations
Climate and Topography	• Potential impacts on climate and topography associated with the pumped storage scheme are anticipated to be of low significance (potential impacts in terms of drainage are noted in the section on Hydrology and potential impacts of dust in the section on Air Quality)	• **All Sites would be suitable.** • No additional studies are required to be undertaken within the EIA with regards to potential impacts on topography.
Terrestrial Ecology	• **Site A** is slightly disturbed, but is still fairly intact and offers habitat to a high number of species. All the communities are present at the two locations for the dams at Site A. Habitat diversity is very high at this site. • **Site B** is the most intact habitat. A large number of species of concern occur in these habitats; however, the richness is lower than that possibly occurring at site A due to the lower habitat diversity • **Site C** is the least ecologically sensitive • Potential impacts include: * Vegetation destruction/loss of biodiversity at the footprint area of all the tower structures. * Fragmentation of undisturbed vegetation and/or grazing. * Loss of rare, endangered and/or protected species. * Disturbance of natural vegetation	• **Site C is the preferred option** • A detailed assessment of the selected overall preferred alternative should be undertaken within the EIA phase in order to adequately assess the potential impacts on fauna and vegetation as a result of the proposed project and recommend appropriate, site-specific mitigation measures where required.

Issue	Area of Potential Impact	Recommendations
	* Accelerated soil erosion, increase in silt loads and sedimentation (especially along the steeper slopes), increased run-off from compacted areas, etc. This could negatively impact upon vegetation in affected areas. * Establishment and spread of weeds and alien invader plants from disturbed areas. * Disturbance of fauna, particularly during the construction phase.	
Riverine Ecology	• Inundation of the Steelpoort River is likely to be highly detrimental to a number of riverine bird species. • A wide range of aquatic species are likely to benefit from the proposed impoundments. • The proposed dam is expected to inundate the Site A Tributary, if this site is selected. This will eliminate all flow-dependent fish species. There is also a risk that alien fish species which are currently absent from this stream, may colonise the stream. • The proposed dams will create a permanent barrier to upstream fish migration and isolate the river fish population into two distinct populations, with consequent long-term implications for genetic diversity and vigour.	• **Site C is the preferred option** • A detailed assessment of the selected overall preferred alternative should be undertaken within the EIA phase in order to adequately assess the potential impacts riverine ecology as a result of the proposed project and recommend appropriate mitigation measures, where required.
Water quality	• Potential impacts on water quality due to increased sediment levels. • Potential water contamination due to storage of chemicals onsite.	• **Site A3 nominated as the preferred alternative.** • A detailed assessment of the selected overall preferred alternative should be undertaken within the EIA phase in order to adequately assess the potential impacts on

Issue	Area of Potential Impact	Recommendations
	• Off-channel storage schemes may offer a reduced risk for siltation as filling from the river typically happens on a continuous basis during base flow conditions. This would reduce the potential impact on turbidity within the impoundment.	water quality as a result of the proposed project and recommend appropriate mitigation measures, where required.
Hydrology, surface water and groundwater	• Options with smaller storage capacity are preferred, due to lower potential evaporative losses and smaller potential hydrological impact. • Increase in run-off and flow velocities are expected as a result of the increased impermeable surface areas. • No preferential site can be selected based on the available hydrochemical data. • All three sites have incidents of shallow groundwater, thus no one site is more vulnerable than the next in this aspect. • Site A (preferably A3 & A4) or B (preferably B4 & B8) could be considered for evaluation in the EIA process, from a groundwater perspective. • Site A is the preferred site when compared to sites B and C, based on geological stability, groundwater / aquifer development, and potential dewatering impacts. Site A3 or A4 most preferred.	• **Groundwater: A3 or A4 most preferred.** • **Surface Water and General Hydrology: Site A3, Site B1, B3, B5** and **B7 are all acceptable as a preferred alternative.** • A detailed assessment of the selected alternative should be undertaken within the EIA phase in order to adequately assess the potential impacts on hydrology, surface water and groundwater as a result of the proposed project and recommend appropriate mitigation measures, where required.

Issue	Area of Potential Impact	Recommendations
Geology, Soils and agricultural potential	• Potential impacts associated with construction, stabilisation and re-enforcement difficulties, as well as the risk of erosion, particularly at the power house site. • Erosion potential is anticipated to increase during site clearance and, if appropriate mitigation is not implemented. Access roads are also anticipated to lead to an increase in erosion. • Agricultural potential: Site A – low Site B – low Site C – medium • Geology: Fatal flaw at Site C – Steelpoort Fault	• **Sites A and B are preferred alternatives** • **Site C: Fatal flaw** in terms of geology • A detailed geotechnical survey of the selected site should be undertaken by the design team during the design phase of the project in order to fully understand the geology. • Detailed, site-specific mitigation measures should be developed for the preferred alternative as part of the EIA phase of this project. These should address issues such as increased erosion rates at the dam and power house sites.
Air Quality	• Potential impact of dust created during heavy construction on the local air quality (short term); • Potential impacts on: * ambient air quality; * local residents and neighbouring communities; * the aesthetic environment; and * possibly fauna and flora • Impacts on aesthetics and tourism due to poor air quality is expected to be of short duration, of a localised nature and therefore of low significance. • Potential greenhouse gas emissions from decomposing vegetation in the dams; however, based on the ESS studies (which did not include quantification of potential greenhouse gas production), this is not anticipated to be	• **All sites are considered equally suited to the proposed project; there is no preferred site.** • It is not anticipated that potential air quality impacts would need to be studied in more detail in EIA phase. Mitigation and management measures will, however, be developed for inclusion in EMP.

Issue	Area of Potential Impact	Recommendations
	a significant impact. • No potential impact of greenhouse gases on health or safety of surrounding communities. • Methane emissions could add cumulatively to those from the proposed De Hoop Dam near Site C.	
Traffic	The following are likely to have an impact on traffic • Transport of Construction Employees • Length/Cost of Road to be Constructed for Access • Travel distance between Control Room and Upper Reservoir • Construction Traffic • The traffic impact is expected to be **significant** in nature but could be **regional or local**	• **Site A** is considered the best site from a transportation viewpoint. • More detailed traffic-related studies will be conducted with regards to this site during the EIA phase of the project.
Social	• The major issues addressed in the social impact assessment within this report focussed on: * Displacement of persons (negative); * Health and safety (negative); * Access roads (negative and positive); * Potential loss of income (negative); * Job creation (positive); * Infrastructural development (positive); * Noise.	• **Site B is** the preferred Alternative from a social standpoint (mainly because of the proximity of the sites to settlements, and the potential impact of construction activities on these settlements). • Should Site B not be taken to EIA Phase, the proximity of the other alternatives to settlements should be considered, and the Environmental Management Plan should set out strict guidelines for conduct with inhabitants.
Heritage	• It is anticipated that the proposed pumped storage scheme will have a significant impact on heritage sites. • A number of graves and old ruins were identified in the	• **Site C Option 1 is the preferred heritage alternative.** • The preferred alternative will be investigated in more

Issue	Area of Potential Impact	Recommendations
	area. • The layout must attempt to avoid these sites.	detail. The final layout must attempt to avoid significant sites; if this is not possible, detailed, site-specific mitigation and mitigation measures will then be recommended in the detailed EIA phase. This should be developed in consultation with the local SAHRA office.
Visual	• The visual impact is anticipated to be minor for Site A (options 1, 2 and 3), but the upper reservoir for options 2 and 3 will be visible from the Steelpoort Valley, thus having a visual impact. • The Site B lower reservoirs are not foreseen have a significant impact. The upper reservoir may have an impact, however, though the extent of the impact is at this stage uncertain. • The upper reservoir for Site C will have an impact on visual quality but should not significantly change the overall visual effect.	• **Site A1 and A2 and Site C1 are the preferred alternatives**. • More detailed analyses during the EIA phase should identify and address site-specific visual impacts and, where possible, and possible mitigation measures.
Tourism Potential	• Various farms with existing or potential future tourism operations may be impacted upon by the construction of the proposed pumped storage scheme. • Potential impacts include visual impacts on lodges and hunting activities, with potential associated impacts on visitor numbers, as well as potential visual impacts on future tourism prospects and potential impacts on land value. • Tourism activities such as hunting are anticipated to be negatively impacted upon during construction (this is	• **Alternative A3 is the preferred alternative.** • More detailed analyses during the EIA phase should identify and address site-specific visual impacts and, where possible, mitigation measures.

Issue	Area of Potential Impact	Recommendations
	relevant to both route alternatives), due to visual and noise impacts as a result of construction activities; these may negatively impact upon tourists' experience. Factors such as noise and human presence are also likely to cause disturbance to animals, which would in turn detract from tourists' experience of the area. • The above-mentioned impacts are likely to be of low significance during the operational phase.	

8.3 Conclusions

Based on the ESI and the ESS, **Site C is ruled out due the fatal flaw** in terms of geology (presence of the Steelpoort Fault), even though Site C1 was the preferred site in terms of certain environmental aspects.

Site B was only considered preferable to the other sites in terms of social aspects. Due to the fact that it was considered less than optimal for all other aspects, it is strongly **recommended that site B not be investigated further in the EIA phase**.

Based on the summary contained in Table 8.2, it is clear Site A3 is the preferred site alternative from an environmental perspective. In all aspects except social, Site A (and specifically A3) was either nominated as the preferred site or as equally suitable as Sites B and C. This was also the conclusion of the ESI, which was conducted independently of the ESS.

8.4 Recommendations

8.4.1 Preferred Site Alternative

It is recommended that **Site A Option 3** be considered in more detail within the EIA phase of the project.

It is felt that potential impacts pertaining to Topography and Climate have been fully addressed within the ambit of the ESS. It is recommended that comprehensive studies be conducted with regards to Site A3 for the following aspects:

- Fauna and Flora;
- Wetlands;
- Surface and groundwater impacts;
- Geology (particularly geotechnical);
- Soils and Agricultural Potential;
- Traffic;
- Social aspects;
- Noise;
- Heritage;
- Visual; and
- Tourism;

It is therefore strongly recommended that this Environmental Scoping Report be accepted and that Site A Option 3 be considered further within the detailed EIA phase of the environmental investigations.

The draft Environmental Scoping Report is available to the public for review for 45 days, from 17 November 2006 to 01 January 2006, in accordance with the EIA Regulations. The comments received during this period, as well as during the initial stages of the ESS, will be included in the Social Issues Trail which will form part of the final ESR.