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PROPOSED DEVELOPMENT OF A HARDENED WATER RESERVOIR AND ASSOCIATED PIPING AT THE KOEBERG NUCLEAR POWER STATION LOCATED ON THE FARM DUYNEFONTYN NO.1552, MELKBOSSTRAND

FINAL BASIC ASSESSMENT REPORT

In terms of the National Environmental Management Act (Act 107 of 1998, NEMA) as amended and the Environmental Impact Assessment Regulations, 2014



20 July 2017

Prepared for:
Eskom Holdings SOC Ltd.

Prepared by:
Doug Jeffery Environmental Consultants

DJEC Ref: 2015/31

EXECUTIVE SUMMARY

The Applicant, Eskom Holdings SOC Limited, proposes to develop a hardened water reservoir split between two tanks with associated piping, here after referred to as the Hardened Water Supply, at the Koeberg Nuclear Power Station (KNPS) located on the Farm Duynfontyn No.1552, Melkbosstrand.

The purpose of the proposed hardened water supply is to ensure that there is adequate water inventory at the KNPS to provide core cooling and spent fuel pool make-up, to cope with an extended beyond design basis Loss of Ultimate Heatsink and/or Station Black-out, which could be precipitated by an extreme seismic and/or flooding event(s).

The seismically induced accident at Fukushima Daiichi, emphasised the importance of long-term cooling water to a nuclear power station in a beyond design basis event. If the Koeberg Nuclear Power Station (KNPS) were to be confronted with a similar scenario, the conventional and existing emergency cooling water supplies are limited, and could be destroyed by an external event. Given a beyond design basis seismic event and/or tsunami it is likely that the hardened water supply being created by this project will be the only source of potable water, within the medium term. Due to the critical nature of this hardened water source, as the only seismically protected medium-term water source in a beyond design basis event, all efforts should be taken to ensure its availability in a Station Black-out, and its resilience against external hazards, such as beyond design basis earthquakes, tsunamis, and severe weather events.

DESCRIPTION OF THE RESERVOIR AND ASSOCIATED PIPING

The activity involves the construction of two interconnected hardened water tanks, with a total usable volume of approximately 9 500 cubic metres of potable water, with an elastomeric lining. The two individual tanks will be approximately 27 metres in diameter with a total footprint area of approximately 1953 square meters (63m X 31m).

The length and route of piping associated with the proposed reservoir depends on where the reservoir will be located. The length of the piping required from Site A to the water conveyance system is approximately 550m, and the length of the piping required from Site B to the water conveyance system is approximately 610m. The proposed piping to supply either site with water to fill the reservoir will be connected to the conventional municipal water supply.

SPECIALIST INPUT

A. Heritage Impact Assessment (HIA)

ACRM undertook a HIA comprising of a palaeontological desktop study and an archaeological field assessment, for the proposed development (refer to **Appendix D2**).

Site Alternative 1 (preferred site alternative), located north of the reactor building, was levelled in the 1980s for the construction of the KNPS. The footprint area is partially covered in low vegetation, on a substrate of compact dune sand. The surface of the site historically included low dunes of the Witzand Formation, and possibly deflated exposures of calcrete and yellow sand deposits of the Springfontyn Formation. During the course of the excavations for the KNPS, excavated material was dumped over this area and levelled. A large portion of the site is covered in blue concrete stone and bits of old building rubble and waste.

Site Alternative 2 is a small, vacant site located south of the reactor building, adjacent a service yard, surrounded by ancillary buildings and parking. The site is fundamentally transformed.

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Heritage resources identified

The following observations were made during the field assessment of the proposed site alternatives undertaken by ACRM in November, 2016.

Alternative 1

A broken Middle Stone Age (MSA) quartzite flake and a small nodule of silcrete were recorded on the proposed development site. Apart from a few small fragments of weathered shellfish (a-diagnostic limpets & Venus clams) and larger fragments of White Sand Mussel, no other archaeological resources were identified. No organic remains such as pottery or ostrich eggshell were found.

The archaeological resources have been graded as having low (Grade 3C) significance.

Alternative 2

No archaeological heritage was encountered on the proposed site.

Impact assessment

Alternative 1

Pre-construction: test of sediments to maximum depth of base. Possible methods include geotechnical coring to start; test holes by heritage specialist(s) dependent on result. Monitoring by an appropriately-qualified specialist to take place at each stage. Monitoring protocols for dealing with heritage material pre-developed and implemented.

Construction: monitoring of excavations by appropriately-qualified palaeontologist. Protocols for managing heritage material will need to be embedded in the EMPr. Collection of information and material by specialist and deposition in approved repository.

Operational Phases: no issues are expected unless maintenance or modification/ development requires excavation. The protocol will need to cover this eventuality.

Cumulative Effects: none are expected unless renewed excavation or dismantling is contemplated. In such an instance prior assessment of possible negative effects will be required. The decision to mitigate or not will follow from that assessment.

Alternative 2

Pre-construction: test of sediments will be required to the maximum depth of the base. Possible methods include geotechnical coring to start; test holes by heritage specialist(s) dependent on the result. Monitoring by an appropriately-qualified specialist will need to take place at each stage. Monitoring protocols for dealing with heritage material will need to be pre-developed and implemented.

Construction: monitoring of excavations will be required by an appropriately-qualified palaeontologist. Protocols for managing heritage material will need to be embedded in the EMPr. Collection of information and material will be required by the specialist and deposited in an approved repository.

Operational Phases: no issues are expected unless maintenance or modification / development requires excavation. A protocol will need to be developed to cover this eventuality.

Cumulative Effects: None are expected unless renewed excavation or dismantling is contemplated. In such an instance prior assessment of possible negative effects will be required. A decision to mitigate or not will follow from that assessment.

Conclusion

According to the specialist, there is no reason why establishment of the proposed reservoir should not proceed, provided that the recommendations and mitigation measures provided in the HIA report are followed.

B. Botanical Impact Assessment

Nick Helme, from Botanical Surveys undertook a Botanical Impact Assessment for the proposed development (refer to **Appendix D1**).

Regional context of vegetation

The assessment indicated that the study area, in a regional context, is considered to be part of the West Strandveld bioregion (Mucina & Rutherford 2006), and is part of the Fynbos biome, located within what is now known as the Core Region of the Greater Cape Floristic Region (GCFR; Manning & Goldblatt 2012).

Due to a number of factors the loss of natural vegetation in the West Strandveld bioregion has been severe (>60% of original extent lost within the region), and the bioregion has a fairly high number of threatened plant species (Raimondo et al 2009).

The City of Cape Town regularly updates and revises its Biodiversity Network as sites are lost and new information becomes available (Holmes et al 2008), and the latest map (dated July 2015) indicates that the study area is excluded from the Biodiversity Network, and is thus not mapped as a Critical Biodiversity Area.

Description of vegetation on site

According to the SA Vegetation Map the original natural vegetation on the site is all likely to have been Cape Flats Dune Strandveld (Mucina & Rutherford 2012).

Cape Flats Dune Strandveld is regarded as Endangered with less than 60% of its total original extent remains intact, less than 5% is conserved, and the national conservation target is 24% (Mucina & Rutherford 2006). The unit is not known to support a large number of plant Species of Conservation Concern (Raimondo *et al* 2009).

The landscape of both sites (Alternatives A & B) is flat as a result of historical construction related activities associated with the development of the KNPS. All (or at least 90%) of vegetation on site today is thus probably secondary, and has re-established since the development of the KNPS. Most of Site B (Alternative 2) is used as a storage area for machinery, and partly natural vegetation occurs on only 15% of this alternative site. Site A (Alternative 1) has more natural vegetation (about 75% cover) and has probably not been disturbed since construction of the power station.

There is no significant woody alien invasive vegetation on either of the alternatives, but various alien herbs and annuals are likely, given the soil disturbance, including *Senecio burchellii* (indigenous, but invasive in disturbed areas), *Brassica tournefortii*, *Raphanus rapistrum* (wildmostert), *Eucalyptus* spp. (gums), *Lolium* sp. (ryegrass), *Avena* sp. (wild oats), *Bromus diandrus* (ripgut brome), *Lupinus* spp. (lupin), *Vicia* spp. (vetch), *Pennisetum clandestinum* (kikuyu), *Echium plantagineum* (Patterson's curse) and *Conyza bonariensis*.

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Botanical sensitivity

The botanical conservation value of Alternative 1 is of Medium sensitivity, while for Alternative 2 most of the study area is deemed to be of Low sensitivity, with about 15% being of Medium sensitivity.

Impact assessment

The study found the main construction phase impact is loss of natural and partly natural vegetation within the development footprint, which will be less than 0.3ha in total. All development located within natural or partly natural vegetation (of Low and Medium sensitivity) will result in the permanent loss of that vegetation. It is assumed that the disturbance will be restricted to the footprint areas.

The cumulative botanical impacts are equivalent to the regional botanical impacts, in that the vegetation type to be impacted by the proposed development has been, and will continue to be, impacted by numerous developments and other factors (the cumulative impacts) within the region. The overall cumulative botanical impacts are expected to be Low negative for Alternative 1 and Low negative for Alternative 2.

Conclusion

The specialist concluded that the proposed development could be authorised without significant negative botanical impacts, at either of the proposed alternative sites. On balance the preferred site from a botanical perspective is Alternative 2.

LISTED ACTIVITIES

GN No. R. 327, Item 19A: The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from —

- (i) the seashore;
- (ii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater; or
- (iii) the sea; —

but excluding where such infilling, depositing, dredging, excavation, removal or moving —

- (a) will occur behind a development setback;
- (b) is for maintenance purposes undertaken in accordance with a maintenance management plan;
- (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;
- (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or
- (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.

The installation of the piping associated with the hardened water reservoir will require excavation and removal of more than 5 cubic metres of soil within 100 metres inland from the high-water mark of the sea.

GN No. R. 324, Item 2: The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres.

i. Western Cape

- i. A protected area identified in terms of NEMPAA, excluding conservancies;
- ii. In areas containing indigenous vegetation; or
- iii. Inside urban areas:
 - (aa) Areas zoned for use as public open space; or

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- (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose.

The activity involves the construction of a reservoir, with a total volume of 9 500 cubic metres at the KNPS, within an area containing Cape Flats Strandveld vegetation and within the Koeberg Nature Reserve Protected Area in terms of NEMPAA.

GN No. R. 324, Item 12: The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purpose undertaken in accordance with a maintenance management plan.

i. Western Cape

- i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;
- ii. Within critical biodiversity areas identified in bioregional plans;
- iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;
- iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or
- v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.

Upon development of the hardened water reservoir, more than 300 square metres of the endangered natural vegetation (Cape Flats Strandveld) will be removed, within 100 metres inland from the high-water mark of the sea.

DESCRIPTION OF ALTERNATIVES

Two site alternatives were assessed as part of this basic assessment process, these are:

Alternative 1 (preferred alternative)

Site A is located North of the reactor building, inside the security fence of access control point 2 (ACP2). Alternative 1 is the technically preferred option. The advantages of Alternative 1 include:

- The geographical separation from the existing SEP reservoir and the hardened water reservoir is increased if Alternative 1 is utilised. In addition the tie in point to the water conveyance system is shifted to an area that it is unaffected by potential explosions at the existing hydrogen fuel storage (SGZ) yard or a collapse of the SEP tanks.
- Alternative 1 is located in an area that experiences shine (radiation) from the Low Level Waste building. This reduces the type of facilities that may be developed on the site.
- The overall length of piping utilised between the Hardened Water ECP and the proposed Hardened Water Supply at Alternative 1 is shorter than those required for Alternative 2. This results in an overall cost saving.

Alternative 2

Site B is located South of the existing Potable Water Distribution (SEP) tanks, inside the security fence of access control point 2 (ACP2). The advantages and disadvantages of Alternative 2 include:

- The proposed site is fundamentally transformed (advantage).

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- The vicinity surrounding Alternative 2 has significantly more potential exposure to mobilisations of missiles by external events including tornadoes, high winds, explosions and tsunamis which may damage the tanks or the piping (disadvantage).
- Alternative 2 is located in an area that may be utilised for other projects or office areas and is thus in greater demand (disadvantage).

No other alternatives were assessed.

No-go alternative

The Status Quo of the site will remain if no development is undertaken.

The “No-Go” option is not regarded as a viable option since the primary purpose of the proposed hardened water supply is to ensure that there is adequate water inventory at the KNPS to provide core cooling and spent fuel pool make-up, to cope with an extended beyond design basis Loss of Ultimate Heatsink and/or Station Black-out, which could be precipitated by an extreme seismic and/or flooding event(s).

This is an essential back up system required at the KNPS as part of an emergency response system. The Hardened Water Supply project is also considered to be a mandatory modification due to the NNR’s directive.

DESCRIPTION OF THE SITE

The proposed development site is located at the Farm Duynefontyn No. 1552, Melkbosstrand (SG code: C0160000000155200000).

KNPS is located on a sandy coastline of the West Coast, approximately 27 km north of the Cape Town Central Business District and 1.5 km north of the residential area of Duynefontein. Access to KNPS is via the R27 which runs along the property’s eastern boundary or alternatively via Otto du Plessis Drive.

Both Alternative 1 and 2 are located within Access Control Point 2 (ACP2) of the KNPS.

Climate and Hydrology

The study area, as with most of the southern Western Cape, falls within the Mediterranean climate, where most of the mean annual precipitation is received in winter (April – August). It receives its lowest rainfall in February and the highest in June. The average daily maximum temperature ranges from 14.3°C in July to 26.7°C in February.

Vegetation

The KNPS is located within the City of Cape Town Metropolitan Municipality and within the Fynbos biome and the Western Strandveld bioregion. The vegetation type indicated by Mucina and Rutherford (2009) is Cape Flats Dune Strandveld which is considered to be Endangered within the region (National list of threatened ecosystems for South Africa, 2011).

At least 90% of vegetation on site is secondary, and has re-established since the development of the KNPS. Most of Site B (Alternative 2) is used as a storage area for machinery, and partly natural vegetation occurs on only 15% of this alternative site. Site A (Alternative 1) has more natural vegetation (about 75% cover) and has probably not been disturbed since construction of the power station.

There is no significant woody alien invasive vegetation on either of the alternatives, but various alien herbs and annuals are likely, given the soil disturbance, including *Senecio burchellii* (indigenous, but invasive in disturbed areas), *Brassica tournefortii*, *Raphanus rapistrum* (wildmostert), *Eucalyptus* spp. (gums), *Lolium* sp. (ryegrass),

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Avena sp. (wild oats), *Bromus diandrus* (riggut brome), *Lupinus spp* (lupin), *Vicia spp.* (vetch), *Pennisetum clandestinum* (kikuyu), *Echium plantagineum* (Patterson's curse) and *Conyza bonariensis*.

Geology and Soil

The site is located on a plateau within the KNPS site around 490 meters from the shore. The unconsolidated to semi-consolidated sediments underlying the proposed development site belong to the Sandveld Group, which is subdivided into the Elandsfontyn, Varswater, Velddrif, Langebaan, Springfontyn and Witzand formations.

Surface water

The KNPS is located inside the Berg Water Managements Area. No watercourses flow through the KNPS or the surrounding Koeberg Nature Reserve.

Socio-Economic Character

The proposed development site is located in Ward no. 32 of the City of Cape Town.

According to the census data of 2011, the population of Ward no. 32 stands at more or less 37430 people of which 33% of the relevant populations are younger than 18, while ~46% fall within economically active age group of 18-64. Ward no. 32 has a relatively large youth component with approximately 3% of the population being 65 years and older.

The percentage of people living in poverty has declined since the mid-2000s. In 2010, the proportion of people in the City living in poverty was just under 20%. Compared to Western Cape districts, the City had smallest proportion of people living in poverty at 19.7 per cent. This was below the provincial average of 22.1% which is significantly lower than the Central Karoo District's 32.5% which represented the highest proportion in the Province.

The City of Cape Town has a literacy rate of 90.5%. Learner enrolment in the City has increased from 633 999 in 2013 to 648 056 in 2014. For the same period, the average learner-teacher ratio in the City has fallen from 31.7% in 2013 to 27.5% in 2014. The 2014 ratio is more in line with the Provincial average of 28.1%.

The socio-economic value of the activity will only be determined at tender stage and once the construction contract is awarded.

PUBLIC PARTICIPATION

The public participation process for this basic assessment process will involve the following steps:

- All potential interested and affected parties (I&APs), state departments and local authorities will be given the opportunity to comment on the draft BAR.
- Advertisements will be placed in various newspapers. These are: Cape Times, Table Talk, WeskusNuus, Tygerburger Table View, Isolabantu and Impact 24/7.
- Site notices will be fixed at various places accessible to the public at the R27 road entrance to the KNPS; Duynfontein suburb entrance to KNPS; ACP1 and ACP2 to the KNPS site.
- Written notice will be given to all potential I&APS, Stakeholders and Authorities with jurisdiction in the area.
- Copies of the draft BAR will be made available at the Koeberg Public Library; Wesfleur Public Library, Cape Town Public Library, KNPS visitors centre and Doug Jeffery Environmental Consultants' (DJEC) office.
- The draft BAR will also be available online on the DJEC company website (www.dougjeff.co.za).

The draft BAR and EMPr will be made available for a 30-day commenting period to all potential I&APs, State Departments and Local Authorities. All comments received during the 30-day comment period will be responded to in the form of a comments and response report (CRR) that will be included in the final BAR that will be submitted for decision-making to the Department of Environmental Affairs (DEA).

Proof of the public participation process undertaken will be included under **Appendix E** of this report.

IMPACT ASSESSMENT

Impacts that may result from the proposed activity as well as proposed management of identified impacts and proposed mitigation measures are described in this report under Section D.

All potential impacts, as listed below, identified by the EAP and specialist studies conducted during the basic assessment process will be mitigated by measures identified in the broader EMPr.

Potential impacts foreseen during the design or pre-construction phase

- *Loss of fossil-bearing deposits:*
Excavating into potentially fossil-bearing deposits during the pre-construction phase might damage some fossils. The risk of the proposed activities is considered to be negligible after the proposed mitigation measures are implemented.

Potential impacts foreseen during the construction phase

- *Impact on Soil and Ground Water*
There is potential for soil and ground water contamination from accidental cement spills or oil leaks from construction vehicles during the construction phase, as a result of accidental spills or leaks, resulting in product seeping into the ground. The risk of the proposed activities is considered to be negligible after the proposed mitigation measures are implemented.
- *Possible impact on slope and surface stability*
Possible impact on the slope stability, footing, sub-surface and surface drainage due to construction activities: The risk of the proposed activities is considered to be negligible after the proposed mitigation measures are implemented.
- *Impact on vegetation*
Potential loss of medium sensitivity vegetation on about 85% of the site, due to site clearing, earth works and construction activities: The risk of the proposed activities is considered to be of a low significance after the proposed mitigation measures are implemented.
- *Impact on air quality*
There is potential for the air quality to be impacted through the construction activities that may generate dust through exposing soil and disturbing the ground. Fugitive dust is considered to be a nuisance factor for land users and occupiers. Construction vehicles will also emit exhaust fumes while in use. The risk of the proposed activities is considered to be low after the proposed mitigation measures are implemented.
- *Socio-economic impacts*
The development is expected to generate temporary jobs during the construction phase. The proposed activities are therefore expected to be of a positive nature since the local community will partially benefit from the employment opportunities during the construction phase.
- *Loss of heritage material*

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Likely loss of heritage material and information during the construction phase: The risk of the proposed activities is considered to be negligible after the proposed mitigation measures are implemented.

- *Discovery of fossil-bearing deposits:*
Excavating into potentially fossil-bearing deposits during the construction phase: The proposed activities are therefore expected to be of a positive nature since the proposed development will create an opportunity to gain new information and recover material.
- *Potential Noise Impact*
Construction vehicles and other construction machinery will increase the noise levels during working hours. Increased noise levels may be a nuisance factor to occupiers of the land. The risk of the proposed activities is expected to be low significance after the proposed mitigation measures are implemented.
- *Potential visual impact*
The views of the proposed development will be unsightly due to construction activities and the construction site. The risk of the proposed activities is expected to be low significance after the proposed mitigation measures are implemented.

Potential impacts foreseen during the operational phase

- *Alien invasive vegetation*
Spread of alien invasive vegetation associated with the soil disturbance caused by construction: The risk of fire is expected to be low significance after the proposed mitigation measures are implemented.
- *Potential visual impact*
Unsightly views of the reservoir: The risk of fire is expected to be low significance after the proposed mitigation measures are implemented.

ENVIRONMENTAL IMPACT STATEMENT

Alternative 1 (preferred alternative)

Overall the impacts associated with Alternative 1 are considered to be of a **low negative** significance, with several being negligible, after the management and mitigation of measures have been implemented. Some of the impacts are considered to be of a **positive** nature ranging from a **low** to **medium** significance. The majority of the impacts extend only as far as the development site, thus no impacts are foreseen beyond this extent. However the duration of the possible impacts range from short term (0-5 years) to permanent (> 15 years), it can be mitigated to acceptable significance levels. No impacts, associated with Alternative 1, are expected to have a detrimental effect on the environment since the proposed development site is located within the KNPS.

Alternative 1, the preferred alternative, is considered to be the best possible technical option for the proposed development since the geographical separation from the existing SEP reservoir and the hardened water reservoir is increased if Alternative 1 is utilised. In addition the tie in point to the water conveyance system is shifted to an area that it is unaffected by potential explosions at the existing hydrogen fuel storage (SGZ) yard or a collapse of the SEP tanks. Furthermore, Alternative 1 is located in an area that experiences shine (radiation) from the Low Level Waste. This reduces the type of facilities that may be developed on the site.

Lastly, the overall length of piping utilised between the Hardened Water ECP and the proposed Hardened Water Supply at Alternative 1 is shorter than those required for Alternative 2. This results in an overall cost saving.

Alternative 2

The significance of the impacts associated with Alternative 2 are similar to those associated with Alternative 1, except for the loss of vegetation which is considered to be of a **low negative** significance, compared to the of **low** significance of Alternative 1, after the management and mitigation of measures have been implemented. No impacts, associated with Alternative 2, are expected to have a detrimental effect on the environment since the proposed development site is located within the already developed area of the KNPS.

The Botanical Impact Assessment found that the proposed development, at either of the proposed alternative sites, could be authorised without significant negative botanical impacts. On balance the preferred site from a botanical perspective is Alternative 2.

From a technical and safety perspective, Alternative 2 is not the preferred option as the vicinity surrounding Alternative 2 has significantly more potential exposure to mobilisations of missile by external events including tornadoes, high winds, explosions and tsunamis which may damage the tanks or the piping. In addition, Alternative 2 is located in an area that may be utilised for other projects or office areas and is thus in greater demand.

No-go alternative

The "No-Go" alternative is not expected to have any impacts on the environment since the status quo of the site will remain if no development is undertaken.

The "No-Go" option is not regarded as a viable option since the primary purpose of the proposed hardened water supply are to ensure that there is adequate water inventory at the KNPS to provide core cooling and spent fuel pool make-up, to cope with an extended beyond design basis Loss of Ultimate Heatsink and/or Station Black-out, which could be precipitated by an extreme seismic and/or flooding event(s). The Hardened Water Supply project is also considered to be a mandatory modification due to the NNR's directive.

RECOMMENDATIONS

EAP recommendations

- All mitigation measures described in this BAR and the EMPr must be implemented to demonstrate compliance and adherence to best practice.
- The EMPr must be implemented throughout all the phases of the proposed development.
- An Environmental Control Officer (ECO) must be appointed to oversee the implementation of the EMPr.
- All areas outside the proposed development area disturbed during the construction phase should be rehabilitated.

Botanical specialist's recommendation

No specific botanical mitigation is required for this project, other than ongoing alien invasive management and removal in the disturbed areas around the development footprints.

Heritage specialists' recommendation

- A series of test pits must be dug across the proposed footprint area prior to construction work commencing. This could also form part of a geotechnical investigation of sub-surface sediments / formations. Excavations that extend into light orange coloured sands of the Springfontyn Formation may encounter undisturbed fossils (bone and shell), and Stone Age artefacts. It is important to establish the archaeological significance of buried sub-surface deposits before bulk earthworks commence, as it will enable the archaeologist and palaeontologist to develop an appropriate mitigation plan.

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- Fossils and Stone Age artefacts are protected by law. Should anything of a paleontological / palynological nature be found on site by the contractor (or any other party), e.g. bones not previously visible, work is to be stopped in that area immediately, and the Environmental Control Officer (ECO) notified. Failure to do so will result in a penalty and this must be carefully explained to workers during the Environmental Education Induction Programme undertaken by the ECO. The archaeologist must also assist with the induction programme. No paleontological or archaeological material may be removed from the site without a permit from Heritage Western Cape, the Provincial Heritage Authority.
- Permits to recover fossils and archaeological material should be applied for (by the monitoring heritage specialist) in advance of the Construction Phase commencing.
- Excavations must be monitored by a palaeontologist or archaeologist with appropriate paleontological knowledge. The frequency of this to be worked out a priori with the contractor to minimize time spent on site.
- If possible, geotechnical information should be provided prior to the commencement of construction. This may enable a better estimation of the time(s) when monitoring would be necessary.
- Protocols for dealing with paleontological/palynological (fossil pollens) monitoring and possible further mitigation must be included in the EMPr.
- Funds must be available a priori to cover costs of monitoring and any additional fieldwork and radiocarbon dates, should the opportunity/need arise.
- Should paleontological and/or archaeological material be encountered, the ECO will advise on demarcation of this area and notify the specialist palaeontologist / archaeologist to view material and ascertain whether further study of the area will be required.
- Should a specialist confirm a genuine fossil or sub-fossil and recommend further study of the area, work in the applicable area is to cease until further notice. Heritage Western Cape is to be informed immediately.
- Should any human remains be disturbed, exposed or uncovered during excavation, work in that area must stop and the find shall immediately be reported to the South African Police Service and the monitoring heritage specialist. If it is suspected that the remains are older than 60 years, then the South African Heritage Resource Agency – SAHRA (021 462 4502) must be informed and established protocols followed.
- The removal of discovered paleontological remains by a contracted specialist shall be at the applicant's expense.
- All paleontological and archaeological material must be lodged in an appropriate Iziko Museums of South Africa collection.
- The above recommendations must be included with the EMPr for the project.

BASIC ASSESSMENT REPORT



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:

Application Number:

Date Received:

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **08 December 2014**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

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14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included in the electronic copy of the report submitted to the competent authority.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?

YES	NO
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If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

1. PROJECT DESCRIPTION

a) Describe the project associated with the listed activities applied for

Background information

The seismically induced accident at Fukushima Daiichi, emphasised the importance of long-term cooling water to a nuclear power station in a beyond design basis event. If Koeberg Nuclear Power Station (KNPS) were to be confronted with a similar scenario, the conventional and existing emergency cooling water supplies are limited, and could be destroyed by an external event. Given a beyond design basis seismic event and/or tsunami it is likely that the hardened water supply being created by this project will be the only source of potable water, within the medium term. Due to the critical nature of this hardened water source, as the only seismically protected medium-term water source in a beyond design basis event, all efforts should be taken to ensure its availability in a Station Black-out, and its resilience against external hazards, such as beyond design basis earthquakes, tsunamis, and severe weather events.

Proposal

The Applicant, Eskom Holdings SOC Limited, proposes to develop a hardened water reservoir split between two tanks with associated piping, at the Koeberg Nuclear Power Station (KNPS) located on the Farm Duynefontyn No.1552, Melkbosstrand.

The purpose of the proposed hardened water supply is to ensure that there is adequate water inventory at the KNPS to provide core cooling and spent fuel pool make-up, to cope with an extended beyond design basis Loss of Ultimate Heatsink and/or Station Black-out, which could be precipitated by an extreme seismic and/or flooding event(s).

Site Alternatives

Two sites have been investigated for the positioning of the proposed hardened water reservoir (see Figure 1), with Site A being the technically preferred option. Site A (Alternative 1 – preferred alternative) is located North of the Low Level Waste area, and Site B (Alternative 2) is located South of the existing Potable Water Distribution (SEP) reservoir at the KNPS. These alternatives will be discussed further later in this report.



Figure 1: Location of the Site Alternatives.

Description of the reservoir and associated piping

The activity involves the construction of two interconnected hardened water tanks, with a total usable volume of approximately 9 500 cubic metres of potable water, with an elastomeric lining. The two individual tanks will be approximately 27 metres in diameter with a total footprint area of approximately 2 500 square meters. Refer to Figure 2 and Figure 3 for a representation of the scaled reservoir proposed.



Figure 2: Representation of scaled reservoir on Site A.



Figure 3: Representation of scaled reservoir on Site B.

The length and route of piping associated with the proposed reservoir depends on where the reservoir will be located (see Figure 4). The length of the piping required from Site A to the water conveyance system is approximately 550m, and the length of the piping required from Site B to the water conveyance system is approximately 610m (see Figure 4). The proposed piping to supply either sites with water to fill the reservoir will be connected to the conventional municipal water supply.



Figure 4: Illustration of the proposed piping options.

Figure 4 illustrates the routes and lengths of the proposed pipelines associated with each site option, as well as the water conveyance system associated with the Hardened Water External Connection Points (ECP) project. The solid green line indicates the water conveyance system. The solid blue line ($\pm 550\text{m}$) is the proposed piping from Site A to the water conveyance system. The solid and dashed red lines ($\pm 610\text{m}$) indicate the proposed piping from Site B to the water conveyance system. The solid white lines indicate the proposed piping to supply either Site A or Site B with water to fill the reservoir.

Refer to **Appendix J3: Pipeline Route Coordinates**.

Specialist Input

Specialists were instructed to conduct relevant specialist assessments as part of this basic assessment. Refer to Sections B7 and B9 of this report.

- b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN 327, 325 and 324	Description of project activity
GN No. R. 327, Item 19A: The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from —	The installation of the piping associated with the hardened water reservoir will require excavation and removal of more than 5 cubic metres of soil within 100 metres inland from the high-water mark of the sea.

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<p>(iv) the seashore;</p> <p>(v) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater; or</p> <p>(vi) the sea; —</p> <p>but excluding where such infilling, depositing , dredging, excavation, removal or moving —</p> <p>(f) will occur behind a development setback;</p> <p>(g) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>(h) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>(i) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>(j) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>	
<p>GN No. R. 324, Item 2: The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres.</p> <p>i. Western Cape</p> <p>iv. A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>v. In areas containing indigenous vegetation; or</p> <p>vi. Inside urban areas:</p> <p>(aa) Areas zoned for use as public open space; or</p> <p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose.</p>	<p>The activity involves the construction of a reservoir, with a total volume of 9 500 cubic metres at the KNPS, within an area containing Cape Flats Strandveld vegetation and within the Koeberg Nature Reserve Protected Area in terms of NEMPAA.</p>
<p>GN No. R. 324, Item 12: The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purpose undertaken in accordance with a maintenance management plan.</p> <p>i. Western Cape</p> <p>vi. Within any critically endangered or endangered ecosystem listed in terms of</p>	<p>Upon development of the hardened water reservoir, more than 300 square metres of the endangered natural vegetation (Cape Flats Strandveld) will be removed, within 100 metres inland from the high-water mark of the sea.</p>

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<p>section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</p> <p>vii. Within critical biodiversity areas identified in bioregional plans;</p> <p>viii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;</p> <p>ix. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or</p> <p>x. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.</p>	
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2. FEASIBLE AND REASONABLE ALTERNATIVES

“alternatives”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h), Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

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The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
<p>Site A is located North of the reactor building, inside the security fence of access control point 2 (ACP2). Alternative 1 is the technically preferred option. The advantages of Alternative 1 include:</p> <ul style="list-style-type: none"> • The geographical separation from the existing SEP reservoir and the hardened water reservoir is increased if Alternative 1 is utilised. In addition the tie in point to the water conveyance system is shifted to an area that it is unaffected by potential explosions at the existing hydrogen fuel storage (SGZ) yard or a collapse of the SEP tanks. • Alternative 1 is located in an area that experiences shine (radiation) from the Low Level Waste building. This reduces the type of facilities that may be developed on the site. • The overall length of piping utilised between the Hardened Water ECP and the proposed Hardened Water Supply at Alternative 1 is shorter than those required for Alternative 2. This results in an overall cost saving. 	33°40'21.33"S	18°25'51.60"E
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
<p>Site B is located South of the existing Potable Water Distribution (SEP) tanks, inside the security fence of access control point 2 (ACP2). The advantages and disadvantages of Alternative 2 include:</p> <ul style="list-style-type: none"> • The proposed site is fundamentally transformed. • The vicinity surrounding Alternative 2 has significantly more potential exposure to mobilisations of missiles by external events including tornadoes, high winds, explosions and tsunamis which may damage the tanks or the piping. <p>Alternative 2 is located in an area that may be utilised for other projects or office areas and is thus in greater demand.</p>	33°40'41.76"S	18°26'5.53"E
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)
N/A		

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In the case of linear activities:

Alternative:

Alternative S1 (preferred)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

Latitude (S):

Longitude (E):

33°40'21.10"S	18°25'50.38"E
33°40'23.86"S	18°25'45.65"E
33°40'33.85"S	18°25'51.35"E

Alternative S2 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

33°40'40.51"S	18°26'4.44"E
33°40'42.61"S	18°25'55.51"E
33°40'37.11"S	18°25'50.67"E

Alternative S3 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

Please refer to [Appendix J3: Pipeline Route Coordinates](#).

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

b) Lay-out alternatives

No layout alternatives have been investigated.

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
N/A		
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
N/A		
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)
N/A		

c) Technology alternatives

Alternative 1 (preferred alternative)
N/A
Alternative 2
N/A
Alternative 3
N/A

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d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Alternative 1 (preferred alternative)
N/A
Alternative 2
N/A
Alternative 3
N/A

e) No-go alternative

The Status Quo of the site will remain if no development is undertaken.

The “No-Go” option is not regarded as a viable option since the primary purpose of the proposed hardened water supply is to ensure that there is adequate water inventory at the KNPS to provide core cooling and spent fuel pool make-up, to cope with an extended beyond design basis Loss of Ultimate Heatsink and/or Station Black-out, which could be precipitated by an extreme seismic and/or flooding event(s).

This is an essential back up system required at the KNPS as part of an emergency response system. The Hardened Water Supply project is also considered to be a mandatory modification due to the NNR’s directive.

Paragraphs 3 – 13 below should be completed for each alternative.

3. PHYSICAL SIZE OF THE ACTIVITY

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:

- Alternative 1¹ (preferred activity alternative)
- Alternative 2 (if any)
- Alternative 3 (if any)

Size of the activity:

± 2 500 m ²
± 2 500 m ²
N/A

or, for linear activities:

Alternative:

- Alternative A1 (preferred activity alternative)
- Alternative A2 (if any)
- Alternative A3 (if any)

Length of the activity:

N/A
N/A
N/A

¹ “Alternative A..” refer to activity, process, technology or other alternatives.

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b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:

Alternative A1 (preferred activity alternative)
 Alternative A2 (if any)
 Alternative A3 (if any)

Size of the site/servitude:

	N/A
	N/A
	N/A

4. SITE ACCESS

Does ready access to the site exist?

If NO, what is the distance over which a new access road will be built

YES	NO
N/A	

Describe the type of access road planned:

The existing site access to the KNPS, via the R27 road or alternatively Otto du Plessis Drive, will be used to gain access to the proposed development site.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

5. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s);
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

A Locality Map is included under **Appendix A1** of this report.

6. LAYOUT/ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

A Layout Plan is included under [Appendix A2](#) of this report.

7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

A Sensitivity Map is included under [Appendix A3](#) of this report.

8. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

Site photographs are included under [Appendix B](#) of this report.

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

A detailed facility illustration is included under **Appendix C** of this report.

10. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

1. Is the activity permitted in terms of the property's existing land use rights?	YES	NO	Please explain
Both Alternatives are located within an area zoned Risk Industry within ACP 2 of the KNPS. The proposed activity is in line with the current zoning of the proposed development site.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES	NO	Please explain
The Western Cape Provincial SDF and CoCT IDP do not discuss the KNPS, but it is assumed that as an approved nuclear facility, consideration is given to the KNPS, its operations and development projects and related exclusion zones.			
(b) Urban edge / Edge of Built environment for the area	YES	NO	Please explain
The proposed development site is located outside of the urban edge within the KNPS site and within the developed zone of the Koeberg Nature Reserve management plan.			
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES	NO	Please explain
<p>The Western Cape Provincial SDF and City of Cape Town's (CoCT's) IDP do not discuss the KNPS, but it is assumed that as an approved nuclear facility, consideration is given to the KNPS, its operations and development projects and related exclusion zones.</p> <p>The CoCT's IDP (2012-2017) is a strategic plan that is used to guide the development of the City for a specific period. It guides the planning, budgeting, implementation, management and future decision making processes of the CoCT.</p> <p>The strategic focus areas (or pillars) of the CoCT's IDP include:</p> <ol style="list-style-type: none"> 1. The opportunity city; 2. The safe city; 3. The caring city; 4. The inclusive city; and 			

5. The well-run city.

These five pillars help focus the City's purpose of delivery. The IDP is the City's principal strategic planning instrument, from which various other strategic documents will flow. It informs planning and development in the City.

The CoCT IDP does not discuss the KNPS, but it is assumed that as an approved nuclear facility, consideration is given to the KNPS, its operations, development projects and related exclusion zones.

The City of Cape Town (CoCT) SDF (2012) is a long-term plan to guide and manage urban growth, and to balance competing land use demands, by putting in place a "logical development path that will shape the spatial form and structure of Cape Town".

In the medium- to long-term, the CoCT would like to reduce the development impediments and safety risks associated with the KNPS. Specific actions related to this objective include:

- The CoCT, in conjunction with Eskom and the Provincial Government of the Western Cape (PGWC), must update the Integrated Koeberg Nuclear Emergency Plan (KNEP) as required;
- The CoCT, in conjunction with Eskom and the PGWC, must continue to optimise, with a view to sustainability, the requirements in respect of the KNEP; and
- The CoCT must review and update the town planning assessment criteria to ensure that the processing and assessment of development applications within the KNPS emergency planning zones do not compromise the effective implementation of the KNEP.

(d) Approved Structure Plan of the Municipality	YES	NO	Please explain
<p>In the medium- to long-term, the CoCT would like to reduce the development impediments and safety risks associated with the KNPS. Specific actions related to this objective include a review and update the town planning assessment criteria to ensure that the processing and assessment of development applications within the KNPS emergency planning zones do not compromise the effective implementation of the Koeberg Nuclear Emergency Plan.</p>			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES	NO	Please explain
<p>The Management Plan for the Koeberg Nature Reserve (KNR) (in which the project is situated) consists of a strategic framework aimed at providing the basis for the protection and operation of the Koeberg Nature Reserve (this biodiversity stewardship site and has been prepared collaboratively through a process including Eskom staff, general public, the DEA provincial conservation authorities, and key stakeholders such as CapeNature and the CoCT). The hardened water reservoir development will occur in the Developed Zone described in the Nature Reserve Management Plan. As such it is consistent with the objectives of the Management Plan.</p> <p>The Strategic Management Framework (a component of this Management Plan) describes the overall long-term goal for the operation and protection of the Koeberg Nature Reserve. The objectives and strategic outcomes that follow are intended to provide the basis for the Management Plan. The objectives provide a broad description of the goals for each key environmental aspect. The KNR management authority has</p>			

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approved this development.			
(f) Any other Plans (e.g. Guide Plan)	YES	NO	Please explain
N/A None			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	YES	NO	Please explain
The CoCT IDP does not discuss the KNPS, but it is assumed that as an approved nuclear facility, consideration is given to the KNPS, its operations and development projects.			
4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	YES	NO	Please explain
The primary proposed hardened water reservoir are to ensure that there is adequate water inventory at the KNPS to provide core cooling and spent fuel pool make-up, to cope with an extended beyond design basis Loss of Ultimate Heatsink and/or Station Black-out, which could be precipitated by an extreme seismic and/or flooding event(s).			
The proposed development supports the operation of the KNPS which is an important part of the national power grid.			
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	YES	NO	Please explain
The reservoir will be filled with water from the municipal supply. Approval will be obtained from the CoCT in terms of the City's bylaw.			
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	YES	NO	Please explain
The CoCT IDP does not discuss the KNPS, but it is assumed that as an approved nuclear facility, consideration is given to the KNPS, its operations and development projects.			
7. Is this project part of a national programme to address an issue of national concern or importance?	YES	NO	Please explain
An unforeseen external event could, at worst, result in KNPS containment failure and uncontrolled radiological releases in the air and water. It is of national importance to ensure the public is protected from uncontrolled radiological releases. Electricity supply is also a national priority therefore ensuring the safety and operation of the KNPS after an unforeseen external event is of national importance.			

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8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	YES	NO	Please explain
The proposed development site is located within the KNPS within a Risk Industry Zone. This zone includes areas with extensive development or transformed land. It can be argued that the location factors favour this land use.			
9. Is the development the best practicable environmental option for this land/site?	YES	NO	Please explain
The area is zoned for Risk Industry use; the purpose of the proposed development is for the construction of a hardened water reservoir to ensure that there is adequate water inventory to provide core cooling and spent fuel pool make-up, to cope with an extended beyond design basis loss of ultimate Heatsink and and/or Station Black-out, which can be precipitated by extreme seismic wave and/or flooding event(s). The proposed development will not have a significant environmental impact on the proposed development area since it was previously disturbed. In a broader context the site is located inside the already developed KNPS boundary.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES	NO	Please explain
The proposed development is for the construction of a hardened water reservoir to ensure that there is adequate water inventory to provide core cooling and spent fuel pool make-up, to cope with an extended beyond design basis loss of ultimate Heatsink and and/or Station Black-out, which can be precipitated by extreme seismic wave and/or flooding event(s). A loss of core cooling may result in a core melt. A melting of the core has far reaching and significant environmental, social and economic effects as is currently evident in Fukushima Japan. The proposed development will not have a significant impact on the environment and the benefits of the proposed land use/development outweigh the negative impacts of it.			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES	NO	Please explain
The proposed development will occur within the KNPS site which is already a developed area; it will not set a precedent for similar activities in the area or in context of the local municipality			
12. Will any person's rights be negatively affected by the proposed activity/ies?	YES	NO	Please explain
The proposed development will occur within the KNPS site, no person's rights be negatively affected by the proposed activity.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	YES	NO	Please explain
The proposed development will occur within the KNPS site, it will therefore not compromise the "urban edge" as defined by the local municipality			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES	NO	Please explain
The proposed development will not contribute to any SIPS.			
15. What will the benefits be to society in general and to the local communities?	Please explain		
Society in general and the local communities will benefit from the proposed activities as the facility will improve the safety levels of the power station. Also a limited amount of construction jobs will be created.			

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16. Any other need and desirability considerations related to the proposed activity?	Please explain
None.	
17. How does the project fit into the National Development Plan for 2030?	Please explain
N/A	
18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.	
<p>The general objectives of integrated environmental management (IEM) have been taken into account in the following ways:</p> <ul style="list-style-type: none"> • The principles of IEM have been considered throughout the decision making process for all decisions that might have a significance on the environment. • All significant impacts on the environment have been identified and will be assessed throughout the Basic Assessment Process. Various alternatives and mitigation measures have been addressed in order to minimising the negative impacts (where the impacts could not have been avoided), maximise the benefits, and promote compliance with the principles of environmental management. • The Botanical and Heritage specialist have been consulted to ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them. • The public participation process ensures adequate opportunity provided for the public to participate in a decision that may affect the environment. • A draft Environmental Management Programme (EMPr) will be submitted together with the final Basic Assessment Report that will discuss the appropriate environmental management procedures to mitigate and manage the proposed development's impact. 	
19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.	
<p>The principles of Environmental Management have and will be taken into account throughout the entire Basic Assessment process. The following are some significant examples:</p> <ul style="list-style-type: none"> • The proposed development will be advertised to the public and all affected and interested parties will have an opportunity to comment and become involved in the process, in this way ensuring that all people's needs; rights and concerns will be addressed through this process. The public participation process (PPP) deals with the following principles, amongst others: <ul style="list-style-type: none"> ○ the participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured. ○ decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge. ○ decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law. • The potential environmental impacts expected from the proposed development have been identified and assessed. Mitigation measures have been recommended to manage and minimise any negative impacts these impacts might have on any environmental aspects. The impact assessment deals with 	

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the following principles, amongst others:

- that the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
 - that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;
 - the social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated and decisions must be appropriate in the light of such consideration and assessment.
- An EMPr has been drawn up which addresses the avoidance, management and minimisation of all potential impacts. The EMPr deals with the following principles, amongst others:
 - that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
 - that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
 - that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.
 - Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.
 - Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.

11. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
City of Cape Town Water By-law, 2010	Get written consent from the City, in terms of section 53(2), for the receipt of water to fill the reservoir and for the storage of water supplied by the City.	City of Cape Town	To obtain
Land Use Planning Ordinance, 1985 (Act No. 15 of 1985) and zoning scheme regulations	Re-Zoning: Koeberg Nuclear Power Station	City of Cape Town	13 June 2011
National Environmental Management Act, 1998 (Act No. 107, 1998).	Environmental Authorisation	Department of Environmental Affairs (DEA)	Pending (this application)
National Environmental Management Biodiversity Act,	NEMBA governs the conservation of protected and	DEA	2004

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2004 (Act No. 10 of 2004) (NEMBA).	endangered indigenous species.		
National Environmental Management: Protected Areas, 2003 (Act No. 57 of 2003)	The project is situated within the Koeberg Nature Reserve and must comply with the management plan.	DEA	2003
National Heritage Resources Act, 1999 (Act No. 25 of 1999).	Comment on notice of intent to develop (refer to Appendix J2).	Heritage Western Cape Comment	20 October 2016
National Nuclear Regulator Act , 199 (Act No. 47 of 1999)	NNR Act established the nuclear regulatory requirements.	National Nuclear Regulator	1999

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

YES	NO
Uncertain	

If YES, what estimated quantity will be produced per month?

How will the construction solid waste be disposed of (describe)?

All construction waste will be removed from work areas and disposed of at approved and licensed waste disposal facilities. Where possible, options for the reuse or recycling of waste materials will be favoured over disposal.

A radiation protection process is also in place to ensure that waste is not contaminated by radiation.

Where will the construction solid waste be disposed of (describe)?

All construction waste will be removed from work areas and disposed of at approved and licensed waste disposal facilities.

Will the activity produce solid waste during its operational phase?

YES	NO
m ³	

If YES, what estimated quantity will be produced per month?

How will the solid waste be disposed of (describe)?

No waste will be produced during the operation of the reservoir.

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

N/A

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

N/A

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

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Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?

YES	NO
-----	----

 If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility?

YES	NO
-----	----

 If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

YES	NO
-----	----

 If YES, what estimated quantity will be produced per month?

	m ³
--	----------------

 Will the activity produce any effluent that will be treated and/or disposed of on site?

YES	NO
-----	----

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?

YES	NO
-----	----

 If YES, provide the particulars of the facility:

Facility name:		
Contact person:		
Postal address:		
Postal code:		
Telephone:	Cell:	
E-mail:	Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

N/A

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities?

YES	NO
-----	----

 If YES, is it controlled by any legislation of any sphere of government?

YES	NO
-----	----

 If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.
 If NO, describe the emissions in terms of type and concentration:

Sources of emissions during the construction phase will include dust generated by the movement of construction vehicles on cleared areas and earthworks (where required) as well as exhaust emissions from construction vehicles.

Emissions expected from the proposed development will be managed in terms of the National Dust Control

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Regulations of 1 November 2013 and the City of Cape Town: Air Quality Management By-law, 2010.

No other sources of emissions are anticipated.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?

YES	NO
-----	----

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) Generation of noise

Will the activity generate noise?

YES	NO
-----	----

If YES, is it controlled by any legislation of any sphere of government?

YES	NO
-----	----

Describe the noise in terms of type and level:

Noise will be generated during the excavation and construction activities from earth moving equipment and the trucks transporting cement and removing spoils. Eskom must ensure the noise generated will comply with the City of Cape Town Air Quality Management By-law, 2016.

No noise will be generated during the operational phase.

13. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water		
<p>This application refers to the construction of a hardened water reservoir. Although the reservoir will be used to store water, the activity will itself will not require water. No water will be required for cement mixing as the cement will be ready-mix brought in from an external provider.</p> <p>Filling of the reservoir</p> <p>It is proposed to fill the reservoir with municipal water. The hardened water reservoir will have a total usable volume of approximately 9 500 m³. Eskom will apply for consent from the CoCT to receive water to fill the reservoir and for the storage of water supplied by the City, once the reservoir is completed.</p> <p>Proof of application to the City of Cape Town will be included under Appendix J1 of the Final BAR.</p>							
<p>If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:</p> <p>Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?</p>					N/A		
					<table border="1" style="float: right;"> <tr> <td style="text-align: center;">YES</td> <td style="text-align: center;">NO</td> </tr> </table>	YES	NO
YES	NO						

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If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

N/A

14. ENERGY EFFICIENCY

Describe the design measures, if any, which have been taken to ensure that the activity is energy efficient:

The reservoir will be covered with a roof to minimise evaporation. Furthermore, a gravity feed will be used to fill the reservoir and to extract water for use when needed.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

This application is for the construction of a hardened water reservoir, no energy efficiency measures have been taken into account.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

- For linear activities (pipelines, etc.) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A): A

- Paragraphs 1 - 6 below must be completed for each alternative.

- Has a specialist been consulted to assist with the completion of this section? YES NO
 If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Property description/physical address:

Province	Western Cape
District Municipality	City of Cape Town
Local Municipality	City of Cape Town
Ward Number(s)	32
Farm name and number	Farm Duynefontyn No.1552
Portion number	0
SG Code	C0160000000155200000

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:

Risk Industry

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required? YES NO

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1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	-------------	-------------	-------------	--------------	-------------	------------------

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline	<input type="checkbox"/>	2.4 Closed valley	<input type="checkbox"/>	2.7 Undulating plain / low hills	<input type="checkbox"/>
2.2 Plateau	<input type="checkbox"/>	2.5 Open valley	<input type="checkbox"/>	2.8 Dune	<input checked="" type="checkbox"/>
2.3 Side slope of hill/mountain	<input type="checkbox"/>	2.6 Plain	<input type="checkbox"/>	2.9 Seafront	<input type="checkbox"/>
2.10 At sea	<input type="checkbox"/>				

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	Alternative S1:	Alternative S2:	Alternative S3 (if any):			
Shallow water table (less than 1.5m deep)	YES	NO	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	YES	NO	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	YES	NO	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	NO	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	YES	NO	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES	NO	YES	NO	YES	NO
Any other unstable soil or geological feature	YES	NO	YES	NO	YES	NO
An area sensitive to erosion	YES	NO	YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

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4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition ^E	Natural veld with scattered aliens^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an “E” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	YES	NO	UNSURE
Non-Perennial River	YES	NO	UNSURE
Permanent Wetland	YES	NO	UNSURE
Seasonal Wetland	YES	NO	UNSURE
Artificial Wetland	YES	NO	UNSURE
Estuarine / Lagoonal wetland	YES	NO	UNSURE

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

N/A

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Natural area	Dam or reservoir	Polo fields
Low density residential	Hospital/medical centre	Filling station ^H
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential ^A	Church	Agriculture
Retail commercial & warehousing	Old age home	River, stream or wetland
Light industrial	Sewage treatment plant ^A	Nature conservation area
Medium industrial ^{AN}	Train station or shunting yard ^N	Mountain, koppie or ridge
Heavy industrial ^{AN}	Railway line ^N	Museum
Power station	Major road (4 lanes or more) ^N	Historical building

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Office/consulting room	Airport ^N	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam ^A	Sport facilities	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

If any of the boxes marked with an "N" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES	NO
Core area of a protected area?	YES	NO
Buffer area of a protected area?	YES	NO
Planned expansion area of an existing protected area?	YES	NO
Existing offset area associated with a previous Environmental Authorisation?	YES	NO
Buffer area of the SKA?	YES	NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:

YES

NO

Uncertain

N/A

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

ACRM undertook a Heritage Impact Assessment (HIA), comprising of a palaeontological desktop study and an archaeological field assessment, for the proposed development (refer to **Appendix D2**).

Description of proposed sites

Site Alternative 1 (preferred site alternative), located north of the reactor building, was levelled in the 1980s prior to construction of the KNPS. The footprint area is partially covered in low vegetation, on a substrate of compact dune sand. The surface of the site historically included low dunes of the Witzand Formation, and possibly deflated exposures of calcrete and yellow sand deposits of the Springfontyn Formation. During the course of the excavations for the KNPS, excavated material was dumped over this area and levelled. A large portion of the site is covered in blue concrete stone and bits of old building rubble and waste.

Site Alternative 2 is a small, vacant site located south of the reactor building, adjacent a service yard, surrounded by ancillary buildings and parking. The site is fundamentally transformed.

Heritage resources identified

The following observations were made during the field assessment of the proposed site alternatives undertaken by ACRM in November, 2016.

Alternative 1

A broken Middle Stone Age (MSA) quartzite flake and a small nodule of silcrete were recorded on the proposed development site. Apart from a few small fragments of weathered shellfish (a-diagnostic limpets & Venus clams) and larger fragments of White Sand Mussel, no other archaeological resources were identified. No organic remains such as pottery or ostrich eggshell were found.

The archaeological resources have been graded as having low (Grade 3C) significance.

Alternative 2

No archaeological heritage was encountered on the proposed site.

Impact assessment

Alternative 1

Pre-construction: test of sediments to maximum depth of base. Possible methods include geotechnical coring to start; test holes by heritage specialist(s) dependent on result. Monitoring by an appropriately-qualified specialist to take place at each stage. Monitoring Protocols for dealing with heritage material pre-developed and implemented.

Construction: monitoring of excavations by appropriately-qualified palaeontologist. Protocols for managing heritage material embedded in EMP. Collection of information and material by specialist and deposition in approved repository.

Operational Phases: no issues expected unless maintenance or modification/ development requires excavation. Protocol to cover eventuality.

Cumulative Effects: none expected unless renewed excavation or dismantling is contemplated. In such an instance prior assessment of possible negative effects will be required. Decision to mitigate or not will follow from that assessment.

Alternative 2

Pre-construction: test of sediments to maximum depth of base. Possible methods include geotechnical coring to start; test holes by heritage specialist(s) dependent on result. Monitoring by an appropriately-qualified specialist to take place at each stage. Monitoring Protocols for dealing with heritage material pre-developed and implemented.

Construction: monitoring of excavations by appropriately-qualified palaeontologist. Protocols for managing heritage material embedded in EMPr. Collection of information and material by specialist and deposition in approved repository.

Operational Phases: no issues expected unless maintenance or modification/ development requires excavation. Protocol to cover eventuality.

Cumulative Effects: None expected unless renewed excavation or dismantling is contemplated. In such an instance prior assessment of possible negative effects will be required. Decision to mitigate or not will follow from that assessment.

Conclusion

According to the specialist, the impacts associated with both Alternatives are acceptable and it is not expected to result in a fatal flaw, therefore there is no reason why establishment of the proposed reservoir should not proceed, at the preferred alternative, provided that the recommendations and mitigation measures provided in the HIA report are followed.

Will any building or structure older than 60 years be affected in any way?

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

YES	NO
YES	NO

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. SOCIO-ECONOMIC CHARACTER

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

The proposed development site is located in Ward no. 32 of the City of Cape Town.

According to the census data of 2011, the population of Ward no. 32 stands at more or less 37430 people of which 33% of the relevant populations are younger than 18, while ~46% fall within economically active age group of 18-64. Ward no. 32 has a relatively large youth component with approximately 3% of the population being 65 years and older.

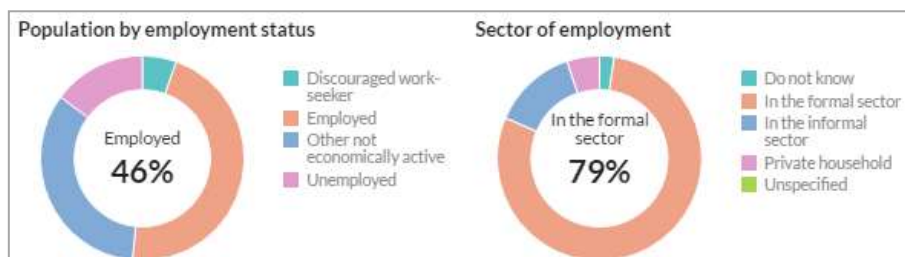


Figure 5: Graphs of the employment rate (15 years and older) and sector of employment for Ward no. 32 in City of Cape Town (Source: Wazimap & Census 2011).

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In 2011, the City represents almost two thirds (66.3%) of the Province's labour force. While the City's share of the Province's employed roughly corresponds with proportional share of the labour force, with 73.5% of the Western Cape's unemployed, the City is over-represented in its proportion of the Province's unemployed.

Economic profile of local municipality:

The percentage of people living in poverty has declined since the mid-2000s. In 2010, the proportion of people in the City living in poverty was just under 20%. Compared to Western Cape districts, the City had smallest proportion of people living in poverty at 19.7 per cent. This was below the provincial average of 22.1% and significantly lower than the Central Karoo District's 32.5% which represented the highest proportion in the Province.

According to Statistics South Africa Census 2011, average household income in the country has doubled over the last decade; however, high levels of income inequality still persist. The largest proportion of households in the Cape Metro earned between R19 601 and R307 600 per annum (Census, 2011). The large proportion of households in each of the metros earning no income raises concern.

In line with the downward revision of the global economic outlook and the substantial downward revision of the outlook for growth nationally and in the Province, the Cape Metro GDP growth forecast for the period 2014 - 2019 has been reduced to 3.0 per cent per annum, from 3.6% per annum at the time of the 2013 MERO study (for the period 2012 - 2017). The growth performance of the Cape Metro (1.8 per cent) was below that recorded for the Western Cape Province (2.1%) in 2013.

Level of education:

The City of Cape Town has a literacy rate of 90.5%

Learner enrolment in the City has increased from 633 999 in 2013 to 648 056 in 2014. For the same period, the average learner-teacher ratio in the City has fallen from 31.7% in 2013 to 27.5% in 2014. The 2014 ratio is more in line with the Provincial average of 28.1%.

The 2013 data showed some improvement in the matriculation pass rate from the previous year, increasing from 80.6% in 2012 to 83.2% in 2013. About 32.7% of the population in Ward no.32 has matriculation certificate or a higher qualification, and roughly 46% has some form of secondary education.

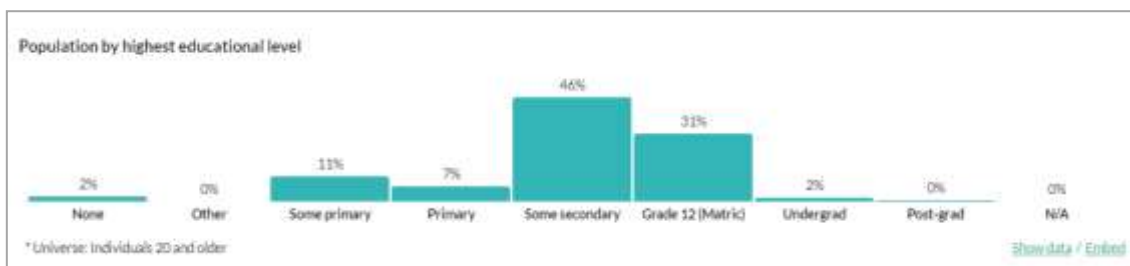


Figure 6: Graph showing the highest education level in Ward no. 32, City of Cape Town (Source: Wazimap).

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b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	Unknown	
What is the expected yearly income that will be generated by or as a result of the activity?	None	
Will the activity contribute to service infrastructure?	YES	NO
Is the activity a public amenity?	YES	NO
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	Will only be determined at tender stage and once the construction contract is awarded.	
What is the expected value of the employment opportunities during the development and construction phase?	Will only be determined at tender stage and once the construction contract is awarded.	
What percentage of this will accrue to previously disadvantaged individuals?	Will only be determined at tender stage and once the construction contract is awarded.	
How many permanent new employment opportunities will be created during the operational phase of the activity?	None	
What is the expected current value of the employment opportunities during the first 10 years?	None	
What percentage of this will accrue to previously disadvantaged individuals?	Will only be determined at tender stage and once the construction contract is awarded.	

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult <http://bgis.sanbi.org> or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

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- a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	<p>According to Mucina and Rutherford (2012) the original natural vegetation or the surrounding area is the Cape Flats Strandveld, which is considered to be Endangered.</p> <p>However, the study area is not mapped as a CBA in the City of Cape Town Biodiversity Network.</p>

- b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc.).
Natural	Alternative 1 - Preferred Alternative	
	25%	All (or at least 90%) of vegetation on site is secondary, and has re-established since the development of the KNPS.
Near Natural (includes areas with low to moderate level of alien invasive plants)	Alternative 1 - Preferred Alternative	
	75%	<p>Indigenous plant species diversity and abundance on site is fairly low, being about 40% of what would be expected in a pristine example of this habitat. This is likely to be a result of the previous disturbance of the site, but indigenous plant cover is about 75%.</p> <p>Alien invasive species include various annual grasses (<i>Bromus</i>, <i>Lolium</i> and <i>Briza</i>), and alien herbs include <i>Brassica tournefortii</i> (wildemostert), <i>Raphanus rapistrum</i> and <i>Erodium moschatum</i>.</p>
	Alternative 2	
	15%	<p>Indigenous plant species diversity and abundance on site is fairly low, being about 40% of what would be expected in a pristine example of this habitat. This is likely to be a result of the previous and ongoing disturbance of the site, and the fact that only about 15% of this area still has any natural vegetation, with the remainder being bare sand or hardened surface.</p> <p>The primary indigenous species in the study area are likely to include <i>Carpobrotus edulis</i> (suurvy), <i>Metalsia muricata</i> (blombos), <i>Muraltia spinosa</i> (tortoise berry), <i>Morella cordifolia</i> (wasbessie), <i>Osteospermum moniliferum</i> (bietou), <i>Osteospermum incanum</i> (dune bietou), <i>Searsia laevigata</i> (dune taibos), <i>Trachyandra divaricata</i> (duinekool), <i>Helichrysum</i></p>

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		<i>niveum</i> , <i>Ficinia dunensis</i> , <i>Senecio elegans</i> , <i>Gymnodiscus capillaris</i> , <i>Gazania maritima</i> , <i>Didelta carnosus</i> , <i>Cotula turbinata</i> (gansogies), <i>Arctotheca calendula</i> (Cape weed), <i>Othobium bracteolatum</i> , <i>Pelargonium capitatum</i> (dune malva), and <i>Cynodon dactylon</i> .
Degraded (includes areas heavily invaded by alien plants)	0%	N/A
Transformed (includes cultivation, dams, urban, plantation, roads, etc.)	Alternative 2	
	85%	Bare sand and hardened surface.

c) Complete the table to indicate:

- (i) the type of vegetation, including its ecosystem status, present on the site; and
- (ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems							
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical	Wetland (including rivers, depressions, channelled and unchannelled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline		
	Endangered								
	Vulnerable								
	Least Threatened								
		YES	NO	UNSURE	YES	NO	YES	NO	

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

Nick Helme Botanical Surveys undertook a Botanical Impact Assessment for the proposed development (refer to [Appendix D1](#)).

Regional context of vegetation

The assessment indicated that the study area, in regional context, is considered to be part of the West Strandveld bioregion (Mucina & Rutherford 2006), and is part of the Fynbos biome, located within what is now known as the Core Region of the Greater Cape Floristic Region (GCFR; Manning & Goldblatt 2012).

Due to a number of factors the loss of natural vegetation in the West Strandveld bioregion has been severe (>60% of original extent lost within the region), and the bioregion has a fairly high number of threatened plant species (Raimondo et al 2009).

The City of Cape Town regularly updates and revises its Biodiversity Network as sites are lost and new information becomes available (Holmes et al 2008), and the latest map (dated July 2015) indicates that the

study area is excluded from the Biodiversity Network, and is thus not mapped as a Critical Biodiversity Area.

Description of vegetation on site

According to the SA Vegetation Map the original natural vegetation on the site is all likely to have been Cape Flats Dune Strandveld (Mucina & Rutherford 2012).

Cape Flats Dune Strandveld is regarded as Endangered with less than 60% of its total original extent remains intact, less than 5% is conserved, and the national conservation target is 24% (Mucina & Rutherford 2006). The unit is not known to support a large number of plant Species of Conservation Concern (Raimondo *et al* 2009).

The landscape of both sites (Alternatives A & B) is flat as a result of historical construction related activities associated with the development of the KNPS. All (or at least 90%) of vegetation on site today is thus probably secondary, and has re-established since the development of the KNPS. Most of Site B (Alternative 2) is used as a storage area for machinery, and partly natural vegetation occurs on only 15% of this alternative site. Site A (Alternative 1) has more natural vegetation (about 75% cover) and has probably not been disturbed since construction of the power station.

There is no significant woody alien invasive vegetation on either of the alternatives, but various alien herbs and annuals are likely, given the soil disturbance, including *Senecio burchellii* (indigenous, but invasive in disturbed areas), *Brassica tournefortii*, *Raphanus rapistrum* (wildmostert), *Eucalyptus* spp. (gums), *Lolium* sp. (ryegrass), *Avena* sp. (wild oats), *Bromus diandrus* (ripgut brome), *Lupinus* spp (lupin), *Vicia* spp. (vetch), *Pennisetum clandestinum* (kikuyu), *Echium plantagineum* (Patterson's curse) and *Conyza bonariensis*.

Botanical sensitivity

The botanical conservation value of Alternative 1 is of Medium sensitivity, while for Alternative 2 most of the study area is deemed to be of Low sensitivity, with about 15% being of Medium sensitivity.

Impact assessment

The study found the main construction phase impact is loss of natural and partly natural vegetation within the development footprint, which will be less than 0.3ha in total. All development located within natural or partly natural vegetation (of Low and Medium sensitivity) will result in the permanent loss of that vegetation. It is assumed that the disturbance will be restricted to the footprint areas.

The cumulative botanical impacts are equivalent to the regional botanical impacts, in that the vegetation type to be impacted by the proposed development has been, and will continue to be, impacted by numerous developments and other factors (the cumulative impacts) within the region. The overall cumulative botanical impacts are expected to be Low negative for Alternative 1 and Low negative for Alternative 2.

Conclusion

The specialist concluded that the proposed development could be authorised without significant negative botanical impacts, at either of the proposed alternative sites. On balance the preferred site from a botanical perspective is Alternative 2.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	Cape Times	Table Talk	WeskusNuus	Tygerburger Table View	Isolabantu	Impact 24/7
Date published	25-04-2017	26-04-2017	25-04-2017	24-04-2017	25-04-2017	25-04-2017
Site notice position	Position		Latitude		Longitude	
1	R27 road Entrance to KNPS		33°40'30.45"S		18°26'6.79"E	
2	Duynefontein suburb Entrance to KNPS		33°40'31.58"S		18°26'22.04"E	
3	Access Control Point 1 to KNPS site		33°40'36.38"S		18°27'22.10"E	
4	Access Control Point 2 to KNPS site		33°41'28.17"S		18°26'33.71"E	
Date placed	25-04-2017					

A copy of the draft BAR was available for review at the following venues:

- Koeberg Public Library, Duynefontein;
- Wesfleur Public Library, Atlantis;
- Cape Town Public Library;
- KNPS Visitors Centre; and
- Doug Jeffery Environmental Consultants' office in Klappmuts.

An electronic copy was made available on the website of Doug Jeffery Environmental Consultants (www.dougjeff.co.za).

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 733. Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
Mr. Guy Thomas	Heritage Western Cape	guy.thomas@westerncape.gov.za
Mr. Rhett Smart	CapeNature	rsmart@capenature.co.za
Ms. Louisa Mpete	National Nuclear Regulator	Impete@nnr.co.za

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

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- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
No comments received from any I&APs to date.	

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

Please refer to Appendix E3 for the comments and response report.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Department of Environmental Affairs & Development Planning (DEA&DP): Development Management	Eldon van Boom	021 483 2877	021 483 4372	Eldon.vanBoom@westerncape.gov.za	Private Bag X9086 Cape Town 8000
City of Cape Town	Pat Titmuss	021 444 0597	021 444 0605	Pat.Titmuss@capetown.co.za	PO Box 35 Milnerton 7435
DEA&DP: Pollution and Chemicals Management	Zayed Brown	021 483 8367	021 483 3186	zayed.brown@westerncape.gov.za	Private Bag X9086 Cape Town 8000
DEA&DP: Waste Management	Eugene Pienaar	021 483 5546	021 483 4425	Eugene.Pienaar@westerncape.gov.za	Private Bag X9086 Cape Town 8000

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Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

[Please refer to Appendix E4 for proof of written notification sent to Authorities and Organs of State.](#)

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

[Please refer to Appendix E5 for a list of registered I&APs.](#)

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

[Please refer to Appendix E6 for copies of correspondence.](#)

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

Activity	Impact summary	Significance after mitigation	Proposed mitigation
Pre-Construction Phase			
Alternative 1 (preferred alternative)			
Direct impacts:			
Geotechnical assessments or testing	Loss of fossil-bearing deposits: Excavating into potentially fossil-bearing deposits during the pre-construction phase.	Negligible	<ul style="list-style-type: none"> Refer to the mitigation measures proposed by the Heritage specialist, as described under Section E of this report, in the HIA Report (Appendix D2), and the EMPr. All mitigation measures described in the EMPr relating to the protection of archaeological or palaeontological artefacts must be adhered to.
Alternative 2			
Direct impacts:			
Geotechnical assessments or testing	Loss of fossil-bearing deposits: Excavating into potentially fossil-bearing deposits during the pre-construction phase.	Negligible	<ul style="list-style-type: none"> Refer to the mitigation measures for Alternative 1 above.
Construction Phase			
Alternative 1 (preferred alternative)			
Direct impacts:			
Site clearing, earthworks and construction activities	Potential soil and ground water contamination: There is potential for soil and ground water contamination from accidental cement spills or oil leaks from construction vehicles during the construction phase, as a result of accidental spills or leaks, resulting in product seeping into the ground.	Negligible	<ul style="list-style-type: none"> All construction vehicles must be properly maintained to prevent leaks. Cement mixing must be confined to a designated area and must be done on an impervious surface, or pre-mixed cement must be used. Any fuel stored on site must be kept in bunded storage tanks. Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants. Drip trays are to be inspected on a weekly basis for leaks and effectiveness, and emptied when necessary. This is to be closely monitored during rain events to prevent overflow.

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Activity	Impact summary	Significance after mitigation	Proposed mitigation
Earthworks	Possible impact on slope and surface stability: Possible impact on the slope stability, footing, sub-surface and surface drainage.	Negligible	<ul style="list-style-type: none"> • All earthworks must be inspected by an experienced geotechnical engineer or engineering geologist.
Site clearing, earthworks and construction activities	Loss of vegetation: Loss of Medium sensitivity vegetation on site (about 85% of site)	Low negative	<ul style="list-style-type: none"> • Alien invasive vegetation management around site. • Demarcate and fence off the construction site boundaries upon site establishment and limit all activities to inside these boundaries. • Limit the footprint area of the construction activity to the immediate site. • Designate areas outside the construction footprint as No Go areas. • Contractors must drive on existing access roads as far as possible to prevent formation of unnecessary tracks for access roads. • Prohibit temporary storage of building material or soil within areas of natural vegetation falling outside of the construction footprint.
Earthworks and construction activities	Dust nuisance and exhaust fumes: There is potential for the air quality to be impacted through the construction activities that may generate dust through exposing soil and disturbing the ground. Fugitive dust is considered to be a nuisance factor for land users and occupiers. Construction vehicles will also emit exhaust fumes while in use.	Low negative	<ul style="list-style-type: none"> • Dust suppression methods, such as wetting or laying straw, should be applied where there are large tracts of exposed surfaces. If wetting is used, consideration in the use of non-potable water must be considered. • Stock piles and spoil heaps must be covered with tarpaulins or straw to prevent fugitive dust. • All construction vehicles must be appropriately maintained to minimise exhaust emissions • All mitigation measures described in the EMPr relating to dust and vehicle emissions must be adhered to.
Construction activities	Job creation: The development is expected to generate temporary jobs during the construction phase.	Low positive	<ul style="list-style-type: none"> • The developer should encourage the contractor to increase the local procurement practices and employment of people from local communities as far as feasible to maximize the benefits to the local economies.
Earthworks and construction activities	Loss of heritage material: Likely loss of heritage material and information during the construction phase.	Negligible	<ul style="list-style-type: none"> • Refer to the mitigation measures proposed by the Heritage specialist, as described under Section E of this report, in the HIA Report (Appendix D2), and the EMPr. • All mitigation measures described in the EMPr relating to the protection of archaeological or palaeontological artefacts must be adhered to.
Earthworks and construction activities	Discovery of fossil-bearing deposits: Excavating into potentially fossil-bearing deposits during the construction phase. Opportunity to gain new information and recover material.	Medium positive	<ul style="list-style-type: none"> • Refer to the mitigation measures proposed by the Heritage specialist, as described under Section E of this report, in the HIA Report (Appendix D2), and the EMPr. • All mitigation measures described in the EMPr relating to the protection of archaeological or palaeontological artefacts must be adhered to.
Earthworks, construction vehicle movement and construction activities	Potential noise impact: Construction vehicles and other construction machinery will increase the noise levels during working hours. Increased noise levels may be a nuisance factor to occupiers of the land.	Low negative	<ul style="list-style-type: none"> • Construction activities as well as the use of construction vehicles on the road must only occur between 07:00am and 05:00pm. • All construction vehicles must be fitted with silencers to avoid excessive noise. • All equipment to be adequately maintained

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Activity	Impact summary	Significance after mitigation	Proposed mitigation
			<p>and kept in good working order to reduce noise.</p> <ul style="list-style-type: none"> • All employees must be given the necessary ear protection gear. • Noise levels must comply with the SANS 100103 – 0994 (recommended noise levels), as well as the Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013. • All mitigation measures relating to noise control as described in the EMPr must be adhered to.
Earthworks and construction activities	<p>Potential visual impact: Unightly views due to construction site.</p>	Low negative	<ul style="list-style-type: none"> • The visual impact experienced during the construction phase would be relatively short-term and be mitigated by good housekeeping and regular removal of rubble on the site. • An approved EMPr must be adhered to in order to minimize the visual impacts of construction phase activities. • An ECO must be appointed. The EMPr must be enforced and monitored by the ECO. The site must be kept clean and tidy at all times. No stockpiles may exceed 2m in height.
Indirect impacts:			
No indirect impacts foreseen for Alternative 1.			
Cumulative impacts:			
No cumulative impacts foreseen for Alternative 1.			
Alternative 2			
Direct impacts:			
Site clearing, earthworks and construction activities	<p>Potential soil and ground water contamination: There is potential for soil and ground water contamination during the construction phase, as a result of accidental spills or leaks, resulting in product seeping into the ground.</p>	Negligible	Refer to the mitigation measures for Alternative 1 above.
Earthworks	<p>Possible impact on slope and surface stability: Possible impact on the slope stability, footing, sub-surface and surface drainage.</p>	Negligible	Refer to the mitigation measures for Alternative 1 above.
Site clearing, earthworks and construction activities	<p>Loss of vegetation: Loss of Medium sensitivity vegetation on site (about 15% of site).</p>	Low negative	Refer to the mitigation measures for Alternative 1 above.
Earthworks and construction activities	<p>Dust nuisance and exhaust fumes: There is potential for the air quality to be impacted through the construction activities that may generate dust through exposing soil and disturbing the ground. Fugitive dust is considered to be a nuisance factor for land users and occupiers. Construction vehicles will also emit exhaust fumes while in use.</p>	Low negative	Refer to the mitigation measures for Alternative 1 above.
Construction	Job creation:	Low positive	Refer to the mitigation measures for Alternative

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Activity	Impact summary	Significance after mitigation	Proposed mitigation
activities	The development is expected to generate temporary jobs during the construction phase.		1 above.
Earthworks and construction activities	Loss of heritage material: Likely loss of heritage material and information during the construction phase.	Negligible	Refer to the mitigation measures for Alternative 1 above.
Earthworks and construction activities	Discovery of fossil-bearing deposits: Excavating into potentially fossil-bearing deposits during the construction phase. Opportunity to gain new information and recover material.	Medium positive	Refer to the mitigation measures for Alternative 1 above.
Earthworks, construction vehicle movement and construction activities	Potential noise impact: Construction vehicles and other construction machinery will increase the noise levels during working hours. Increased noise levels may be a nuisance factor to occupiers of the land.	Low negative	Refer to the mitigation measures for Alternative 1 above.
Earthworks and construction activities	Potential visual impact: Unightly views due to construction site.	Low negative	Refer to the mitigation measures for Alternative 1 above.
Indirect impacts:			
No indirect impacts foreseen for Alternative 2.			
Cumulative impacts:			
No cumulative impacts foreseen for Alternative 2.			
Operational Phase			
Alternative 1 (preferred alternative)			
Direct impacts:			
Poor alien invasive vegetation management	Alien invasive vegetation: Spread of alien invasive vegetation associated with the soil disturbance caused by construction.	Low negative	<ul style="list-style-type: none"> • Ongoing alien invasive vegetation management. • All mitigation measures relating to alien invasive vegetation as described in the EMPr must be adhered to.
No specific activity	Potential visual impact: Unightly views of reservoir.	Low Negative	<ul style="list-style-type: none"> • Re-vegetation and landscaping with plant species indigenous to the Cape Flats Dune Strandveld biome must be undertaken, where possible, to minimise the visual effects of the reservoir.
Indirect impacts:			
No indirect impacts foreseen for Alternative 1.			
Cumulative impacts:			
No cumulative impacts foreseen for Alternative 1.			
Alternative 2			
Poor alien invasive vegetation management	Alien invasive vegetation: Spread of alien invasive vegetation associated with the soil disturbance caused by construction.	Low negative	Refer to the mitigation measures for Alternative 1 above.
No specific activity	Potential visual impact: Unightly views of reservoir.	Low negative	Refer to the mitigation measures for Alternative 1 above.
Indirect impacts:			
No indirect impacts foreseen for Alternative 2.			

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Activity	Impact summary	Significance after mitigation	Proposed mitigation
Cumulative impacts:			
No cumulative impacts foreseen for Alternative 2.			

A complete impact assessment in terms of Regulation 19(3) of GN 733 must be included as Appendix F.

2. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative 1 (preferred alternative)

Overall the impacts associated with Alternative 1 are considered to be of a **low negative** significance, with several being negligible, after the management and mitigation of measures have been implemented. Some of the impacts are considered to be of a **positive** nature ranging from a **low** to **medium** significance. The majority of the impacts extend only as far as the development site, thus no impacts are foreseen beyond this extent. However the duration of the possible impacts range from short term (0-5 years) to permanent (> 15 years), it can be mitigated to acceptable significance levels. No impacts, associated with Alternative 1, are expected to have a detrimental effect on the environment since the proposed development site is located within the KNPS.

The significance of the proposed development at Alternative 1 is acceptable from a botanical and heritage perspective, as the development is not expected to have any detrimental effects on any botanical or heritage resources after mitigation measures are implemented.

Alternative 1, the preferred alternative, is considered to be the best possible technical option for the proposed development since the geographical separation from the existing SEP reservoir and the hardened water reservoir is increased if Alternative 1 is utilised. In addition the tie in point to the water conveyance system is shifted to an area that it is unaffected by potential explosions at the existing hydrogen fuel storage (SGZ) yard or a collapse of the SEP tanks. Furthermore, Alternative 1 is located in an area that experiences shine (radiation) from the Low Level Waste. This reduces the type of facilities that may be developed on the site.

Lastly, the overall length of piping utilised between the Hardened Water ECP and the proposed Hardened Water Supply at Alternative 1 is shorter than those required for Alternative 2. This results in an overall cost saving.

Alternative 2

The significance of the impacts associated with Alternative 2 is similar to those associated with Alternative 1 after the management and mitigation of measures have been implemented. No impacts, associated with Alternative 2, are expected to have a detrimental effect on the environment since the proposed development site is located within the already developed area of the KNPS.

The Botanical Impact Assessment found that the proposed development, at either of the proposed alternative sites, could be authorised without significant negative botanical impacts. On balance the preferred site from a

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botanical perspective is Alternative 2.

From a technical and safety perspective, Alternative 2 is not the preferred option as the vicinity surrounding Alternative 2 has significantly more potential exposure to mobilisations of missile by external events including tornadoes, high winds, explosions and tsunamis which may damage the tanks or the piping. In addition, Alternative 2 is located in an area that may be utilised for other projects or office areas and is thus in greater demand.

Alternative C

N/A

No-go alternative (compulsory)

The “No-Go” alternative is not expected to have any impacts on the environment since the status quo of the site will remain if no development is undertaken.

The “No-Go” option is not regarded as a viable option since the primary purpose of the proposed hardened water supply are to ensure that there is adequate water inventory at the KNPS to provide core cooling and spent fuel pool make-up, to cope with an extended beyond design basis Loss of Ultimate Heatsink and/or Station Black-out, which could be precipitated by an extreme seismic and/or flooding event(s). The Hardened Water Supply project is also considered to be a mandatory modification due to the NNR's directive.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

YES	NO
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If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

N/A

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

EAP RECOMMENDATIONS

- All mitigation measures described in this BAR and the EMPr must be implemented to demonstrate compliance and adherence to best practice.
- The EMPr must be implemented throughout all the phases of the proposed development.
- An Environmental Control Officer (ECO) must be appointed to oversee the implementation of the EMPr.
- All areas outside the proposed development area disturbed during the construction phase should be rehabilitated.

BOTANICAL SPECIALIST'S RECOMMENDATION

No specific botanical mitigation is required for this project, other than ongoing alien invasive management and removal in the disturbed areas around the development footprints.

HERITAGE SPECIALISTS' RECOMMENDATION

- A series of test pits must be dug across the proposed footprint area prior to construction work commencing. This could also form part of a geotechnical investigation of sub-surface sediments / formations. Excavations that extend into light orange coloured sands of the Springfontyn Formation may encounter undisturbed fossils (bone and shell), and Stone Age artefacts. It is important to establish the archaeological significance of buried sub-surface deposits before bulk earthworks commence, as it will enable the archaeologist and palaeontologist to develop an appropriate mitigation plan.
- Fossils and Stone Age artefacts are protected by law. Should anything of a paleontological / palynological nature be found on site by the contractor (or any other party), e.g. bones not previously visible, work is to be stopped in that area immediately, and the Environmental Control Officer (ECO) notified. Failure to do so will result in a penalty and this must be carefully explained to workers during the Environmental Education Induction Programme undertaken by the ECO. The archaeologist must also assist with the induction programme. No paleontological or archaeological material may be removed from the site without a permit from Heritage Western Cape, the Provincial Heritage Authority.
- Permits to recover fossils and archaeological material should be applied for (by the monitoring heritage specialist) in advance of the Construction Phase commencing.
- Excavations must be monitored by a palaeontologist or archaeologist with appropriate paleontological knowledge. The frequency of this to be worked out a priori with the contractor to

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minimize time spent on site.

- If possible, geotechnical information should be provided prior to the commencement of construction. This may enable a better estimation of the time(s) when monitoring would be necessary.
- Protocols for dealing with paleontological/palynological (fossil pollens) monitoring and possible further mitigation must be included in the EMPr.
- Funds must be available a priori to cover costs of monitoring and any additional fieldwork and radiocarbon dates, should the opportunity/need arise.
- Should paleontological and/or archaeological material be encountered, the ECO will advise on demarcation of this area and notify the specialist palaeontologist / archaeologist to view material and ascertain whether further study of the area will be required.
- Should a specialist confirm a genuine fossil or sub-fossil and recommend further study of the area, work in the applicable area is to cease until further notice. Heritage Western Cape is to be informed immediately.
- Should any human remains be disturbed, exposed or uncovered during excavation, work in that area must stop and the find shall immediately be reported to the South African Police Service and the monitoring heritage specialist. If it is suspected that the remains are older than 60 years, then the South African Heritage Resource Agency – SAHRA (021 462 4502) must be informed and established protocols followed.
- The removal of discovered paleontological remains by a contracted specialist shall be at the applicant's expense.
- All paleontological and archaeological material must be lodged in an appropriate Iziko Museums of South Africa collection.
- The above recommendations must be included with the EMPr for the project.

Is an EMPr attached?

YES

NO

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

Adel Groenewald

NAME OF EAP

Adel Groenewald

SIGNATURE OF EAP

20-07-2017

DATE

SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

- Appendix A1: Locality Maps
- Appendix A2: Layout Plan
- Appendix A3: Environmental Sensitivity Map
- Appendix A4: Composite Layout Plan

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

- Appendix D1: Botanical Impact Assessment
- Appendix D2: Heritage Impact Assessment

Appendix E: Public Participation (to be included in the final BAR)

- Appendix E1: Proof of the placement of the relevant advertisements and notices
- Appendix E2: Proof of written notification sent to Stakeholders
- Appendix E3: Comments and response report
- Appendix E4: Proof of written notification sent to Authorities and Organs of State
- Appendix E5: List of registered I&APs
- Appendix E6: Copies of correspondence

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information

- Appendix J1: Services Capacity Letters from City of Cape Town
- Appendix J2: Comment from Heritage Western Cape
- Appendix J3: Pipeline Route Coordinates