Geohydrology Assessment Study 135 Final / March 2011

Quotes from the Geohydrology report surrounded by borders and relevant text highlighted in yellow.

S.Cowling's comments and questions are highlighted in turquoise

Summary

The obvious bias throughout the report and especially in the conclusions, raises doubts about the integrity of the study.Methods of mitigation are vague. How can the report conclude with such confidence that impacts can be reduced with mitigation, lowering impacts from high to low, yet use language such as "This impact **may** be mitigated.." with dewatering schemes which the report states have "not yet been designed".

Furthermore, the purported methods of mitigation to protect the construction of the infrastructure (not the natural systems) pose a further threat to the natural systems. These cumulative threats are not included in the conclusions.

Question The report acknowledges severe threats eg depletion of local aquifers, degradation of wetlands, during construction but is unable to provide mitigation details, costs or efficacy, but is confident of success. This is a flaw in this report.

Table 4.3 gives data for 7 sites analysed at Thuyspunt , of which 5 indicate scale-forming. However, the conclusion reads =Results indicate that corrosion is unlikely to be a problem at this site. The report fails to include the problems associated with scale forming. in the conclusion.This scale forming is likely to cause great problems with infrastructure involving pipes, pumps etc. and cannot be ignored.

Quote "**4.4 No Go Option**

In the event that the sites are not developed for NPSs, Eskom will sell the Bantamsklip and Thyspunt properties and non-essential parts of Duynefontein could also be sold. In this scenario the impact is seen to be of *low* intensity, *neutral* consequence and *low* significance for the Bantamsklip site but of *medium* intensity, *negative* consequence and *high* significance for the Thyspunt and Duynefontein sites as it is unlikely that a similar level of site control and preservation of aquifers and ecological features could be enforced or afforded by private land owners/developers as would have been the case with a nuclear site. The main mitigation measure for this scenario would be strict enforcement of conditions applicable to any approved future development of the sites, which would presumably cover preservation of these features.

Comment and question : The above text indicates the overwhelmingly strong bias of the specialist in favour of the client. Private owners or developers wishing to develop would have to undergo the stringent requirements of an EIA. Private developers are highly unlikely to propose a development of the same scaleor of threat as the building of a nuclear power station. In the event of a No Go, because the land has been purchased with State funds, it could become a state asset such as a sustainably managed natural and cultural heritage site.

Question if the actual mitigatoryactivities of building cut-off walls also pose a threat to the sensitive wetlands etc, why is this not mentioned in the Conclusions?

QuestionThe specialist has referred to interconnectedness in the groundwater systems between the site and the east flowing Sand River. Why is the potential contamination of the latter groundwater (a vital past and potential water source for Greater St Francis Bay)by emissions (of any level) and of bacterial origin not mentioned in the Conclusions?

Question How can the report state that the Thyspunt site has a low to medium sensitivity over most of the site in view of the fact that the Thyspunt site has all five criteria for sensitivity listed in the reportviz major aquifers ;existing supply boreholes/springs; wetlands/seeps; surface water features such as rivers and dams; and 500 m buffer zones around the fore-mentioned?

Question why the phrase “these (water) bodies may (sic) sustain sensitive ecosystems” when the wetlands expert in the EI Assessment has stated emphatically that these are sensitive ecosystems of global and unique importance?

Quote pg 157 A groundwater monitoring programme is essential, as it will provide:
- Baseline information on aquifer behaviour for at least a two-year period before construction commences;

QuestionWhy isn’t this vital point of 2 years’ monitoring included in the report’s conclusions?
Question The report acknowledges severe threats in construction eg depletion of local aquifers, degradation of wetlands, but is unable to provide mitigation details, costs or efficacy, but is confident of success. This is a major flaw in this report.

Cut off wall and Monitoring to prevent: Degradation of Ecologically Sensitive Wetlands / Seeps / Springs
This impact may be mitigated by constructing a cut-off or diaphragm wall, and by carrying out groundwater level monitoring. Groundwater monitoring is considered an essential mitigation measure so that timeous remediation measures can be taken, if required. The final design of dewatering schemes has not been established.
However, based on results from this EIR study, the construction of such a barrier is considered to be an essential mitigation measure at the Duynefontein and Thyspunt sites. The siting of the NPS within the EIA Corridor should also take into account the optimal position from this point of view.
Abstraction should preferably not take place from aquifers with direct links to freshwater ecosystems. Roads, cables, foundations and pipelines should all avoid passing through/intruding areas identified as important hydrological corridors and no roads, pipelines, cable routes or other structures should be passed through wetland areas.

Comment Given the content of the box above –the unknowns, the sensitivity of the site, the further threats posed by mitigatory actions - the conclusions of this report should surely recommend this site as unsuitable for an NPS.

FULL LIST OF DETAILED QUERIES AND COMMENTS

Executive summary Pg iv
The impact rating of the potential environmental impacts is summarised as follows for the construction and operational phases:
- Flooding by groundwater: *Medium* at all three sites with *mitigation* and *Low* without mitigation;

1.Question**:** elaborate on this inexplicable point

Depletion of local aquifers: *Medium* at *Thyspunt and Low-Medium at Bantamsklip and Duynefontein without mitigation and Low at all three sites* with mitigation;

2. QuestionProvide details on mitigation and explain how intensity becomes low –Has this been assessed in the light of recent rainfall events, especially over the medium term (and not just after the recent events).Mention threat by mitigatory cut-walls.

- Degradation of wetlands / seeps / springs: *Medium* at *Thyspunt and Duynefontein and Low-Medium at Bantamsklip without mitigation and Low at all three sites* with mitigation.

3.QuestionProvide details on mitigation and explain how intensity becomes low and what the confidence limits are.

Quote pg 9from report Modelling scenarios**:** Alternative scenarios for a given area are thenassessed. In order to develop a model of an aquifer system, certain assumptions have to be made, including the following:
o The system is initially in equilibrium and therefore in steady state.
o The available information on the geology and field tests is considered as acceptable and representative.

Models done by Dr Ingrid Dennis and reviewed by Professor Gerrit van Tonder of UOFS who has a BSc Hons in geohydrology and MSc and PhD in geohydrological statistics and data analysis. The modelling was also reviewed by Peter Rosewarne and Richard Connelly

4. QuestionCan we have written statements from these experts confirming that this system is in equilibrium and therefore in steady state. If they are unable to confirm this, how do the models hold up?

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Quote pg 11 : The best way to improve the confidence in a groundwater model is to collecttime series data. An extended groundwater/wetlands monitoring programme was thus initiated by Eskom at the site in February 2010, scheduled to run for at least one year. Additional boreholes/piezometers have been established and continuous data loggers installed.

5. QuestionHave these data been analysed and do they support or negate the earlier assumptions and findings

Quote pg 12*:* Thyspunt …. thenuclear footprint is likely to be located very close to the coastline.

6.QuestionHow close is “very close” and how does this align with distances from the shoreline given in the other specialist reports.
Quote pg 94 The prevailing wind direction is south-westerly to north-easterly.

7. Question Why does this differ from the emissions report which states that thenorthwesterly is a prevailing wind.

Quote pg 96 Groundwater flow direction is to the south / east with discharge along the beaches and rocky outcrop into the ocean, and to the south-east into the Sand River aquifer. Local groundwater flow also occurs in westerly and eastern directions, possibly along channels between the dunes and then enters streams or rivers with subsequent southerly flow towards the ocean;
Also
A high yielding significant intergranular aquifer occurs to the east of Thyspunt at Mostert'sHoek and St. Francis Bay, where a spring with an artesian yield of 8 L/s occurs.

8. Question why does the report ignore the tremendous water resources of the Sand River system which has in the past, and potentially be a future source if sustainably managed ?

The intergranular aquifer is currently classified as a Major Aquifer system (Parsons 1995 and Parsons and Conrad 1998), as this aquifer produces high yielding boreholes with good water quality. The site is classified as being highly vulnerable to anthropogenic impacts.

9. Question Why if, as the report states, the groundwater flows into the Sand River aquifer, and this system with good quality water is highly vulnerable to human impacts, why is this not mentioned in the conclusions – or for that matter, more detailed in any of the impact analyses?

Table Mountain Group Aquifer
The TMG Aquifer is classified as a major aquifer system. The aquifer is classified as having a moderate vulnerability to anthropogenic impacts.

10. Question : earlier, the report states that groundwater systems are interconnected and flows eastwards. Where is the detailed assessment of risk to the water system of the Sand River? The interconnectedness implies that activities at Thyspunt will affect the artesian well of St Francis Bay. Given the scarcity of water in the greater St Francis Bay and NMMetro region, no threat to artesian wells should be tolerated. (These wells have supported Greater St Francis Bay for many years).

Hydraulic heads
The hydraulic head values as calculated during the steady simulations were specified in the model.
Scenario using regional model: Potential groundwater contamination due to air pollution from site –
Scenario 1: Deposition of tritium
In this scenario the movement of tritium is simulated from the deposition thereof on the ground, to the movement of it in the groundwater system. Tritium is modelled as though it is conservative. It is once again important to note that the nature of the subsurface (vegetation and soil types present) will also play a role in their movement. Therefore, this scenario can only serve as an indication of what can occur and must be seen as qualitative and not quantitative. *Using average annual emissions assuming two EPR and three AP1000 units (to make up the 4 000 MWe)* it is clear that most of the wetlands and the St. Francis Bay boreholes will be affected by emissions, but by low concentrations of ~2.5 TU. *This is for a 20 year indicative simulation period.*
All potential NPS contaminants of the groundwater system would migrate towards the sea and as such very little groundwater contamination is expected. This does not include potential contamination of groundwater due to air emissions.

11. Question Why is the potential contaminationof wetlands and groundwater by emissions (of any level) not mentioned in the Conclusions?

Quote from Report 2.4Site Sensitivity
Site sensitivity has been assessed according to the categories listed below.
Category Description
High sensitivity These are no go areas or severelyprohibited areas for development; they may be protected by legislation
Medium sensitivity These are areas that may have thepotential for development, if adequate mitigation measures are prescribed
Low sensitivity These areas have no sensitivity todevelopment
The sensitivity of each of the sites is shown in Figure 2.67 (Duynefontein), Figure 2.68 (Bantamsklip) and Figure 2.69 (Thyspunt) for the defined site areas.
Criteria used for defining site sensitivity were the presence of any of the following:

- Major aquifers;
- Existing supply boreholes/springs;
- Wetlands/seeps;
- Surface water features such as rivers and dams; and
- 500 m buffer zones around the above.

Thyspunt
Site sensitivity analysis indicates a low to medium sensitivity over most of the site with a high sensitivity for the wetland areas.

12. Question How can the report state that the Thyspunt site has a low to medium sensitivity over most of the site in view of the fact that the Thyspunt site has all five criteria for sensitivity listed above?

Report states the following:
It is recommended that the system be further monitored and the model re-calibrated as further monitoring data are collected, especially in terms of groundwater/wetlands interactions. However, it is considered unlikely that widely differing results will be obtained.

13. Question On what basis it is it considered that widely differing results will be obtained?

14. Question Will the next final report describe the impacts – not only immediate but also the longer term records - of the July rainfall events, and what are the conclusions?

4 ENVIRONMENTAL ASSESSMENT
4.1 Construction Phase
Flooding by Groundwater – Direct Impact
As the natural groundwater levels at the sites are shallow, flooding will occur immediately when excavations extend below the water table. This potential impact refers to the natural effect of the environment on the construction works, whereby groundwater inflow into excavations will hinder and be a danger to construction activities. Without mitigation the *intensity* (i.e. the management of the impact in relation to the sensitivity of the receiving environment) is assessed to be *medium* because the natural geohydrological processes (i.e. movement of groundwater) will continue, albeit in a modified way. Localised flow directions may be altered as a result of the change in hydraulic gradient. However, the *duration* of this potential impact is assessed to be *short-term*, as once the excavation works have been completed, the environment will mostly recover to equilibrium with groundwater levels and flow directions achieving pre-construction conditions. With mitigation, the *intensity* is assessed to be *low*.

15.QuestionDescribe mitigation in detail and also costs and explain how intensity becomes low – also explain the assumption with recovery to equilibrium. Explain how the redirected "modified"water flows will achieve re-construction conditions when a massive infrastructure has been built in the original path?

Degradation of Ecologically Sensitive Wetlands / Phreatophytes / Seeps / Springs – Indirect Impact
Potential impacts relating to a declining water table may also include the drying up/degradation of any coastal springs, seeps, phreatophytes and / or wetlands in close proximity to the sites. These bodies may sustain sensitive ecosystems and are mostly fed and sustained by groundwater from the primary aquifers. The survival of

such ecosystems may be threatened due to dewatering activities and/or foundations or cut-off walls. The *intensity* is assessed to be *medium*, as the functioning of such coastal springs, seeps and / or wetlands may be temporarily modified. The duration will be *short-term* during construction but could be *long-term* during operation. With mitigation, the *intensity* is assessed to be *low*.

16.Question why the phrase “these (water) bodies may sustain sensitive ecosystems” when the wetlands expert in the EIAssessment has stated these as being of global and unique importance”?
17.Question if the mitigatoryactivities of building cut-off walls also pose a threat to the sensitive wetlands etc, why is this not mentioned in the Conclusions?
18.Question why is there no proper justification for the confidence (or not) in low impacts? We need more information that just an opinion. The EIA specialist reports state that this is a unique system in the world. Therefore there is a need for proper justification that these activities will have low impacts. Why is there no proper assessment of the impacts of the mitigation?

An assessment of impacts to these surface freshwater ecosystems has been carried out and includes identification and mapping of the wetlands in the vicinity of the sites, classification of the wetlands and an assessment of wetland sensitivity and importance (Day, 2007a and Day, 2007b). Modelling has shown that it will be possible to site the NPS within the EIA Corridor so that these impacts will be minimal to absent. However, further investigation, monitoring and modelling is planned for these areas to firm-up predictions and mitigation measures.

19.Question the conclusions need to include the fact that the mitigation methods in themselves pose threats to the wetland, seep etc systems. Mitigation must be more fully described and report must explain how intensity becomes low.

Quote from report pg**150** ***Degradation of Infrastructure – Direct Impact***
In scale forming water, a precipitate or coating of calcium or magnesium carbonate can form on the inside of the piping. This coating can inhibit the corrosion of the pipe, because it acts as a barrier, but it can also cause the pipe to clog. Water with high levels of sodium, chloride, or other ions will increase the conductivity of the water and
promote corrosion. Corrosion can also be accelerated by:
- **low pH (acidic water) and high pH (alkaline water),**
- **high flow rate within the piping,**
- **high water temperature,**
- **oxygen and dissolved CO2,**
- **high dissolved solids, such as: salts, sulphates,**
- **corrosion related bacteria and electrochemical corrosion, and**
- **presence of suspended solids, such as sand, sediment, corrosion by-products, and rust.**

The Langelier index indicates the corrosivity of water (Langelier Saturation index). If its value is lower than - 0.5, then water is corrosive, if it is higher than + 0.5 then the water has a high scaling potential, and it can form deposits in piping.

Table 4.3: Langelier Indices for the Thyspunt site with degradation indication (corrosion or scaling)

20.QuestionThis table gives data for 7 sites analysed at Thuyspunt , of which 5 indicate scale-forming. However, the conclusion reads =Results indicate that corrosion is unlikely to

be a problem at this site. Explain why the conclusion makes no mention of the earlier problems associated with scale forming. This scale forming is likely to cause great problems with infrastructure involving pipes, pumps etc. and cannot be ignored.

Table 4.6: Impact assessment table for the Thyspunt site during the construction phase

Fig 2.69 Sensitivity zones.
The well point area as well as western access roads areshown very close to these highly sensitive zones.

21.QuestionGiven the high sensitivity of the zones of Fig 2.69, justify the close positioning of the well points as well as the western access road to these sensitive sites. Why does this proposal ignore the precautionary principle?

The report includes the following row of headings for various impacts.

Table 4.6 Impact assessment tale for the Thuyspunt site during the construction phase.

Impact	*Nature*	*Inten-sity*	*Extent*	*Duration*	*Impact onIrreplaceable resources*	*Consequence*	*Probability*	*SIGNIFICANCE*

Extracts from the above table are given below with relevant questions

Impact	*Nature*	*Intensity*	*Consequence*	*Probability*	*SIGNIFICANCE*
Impact 1: Flooding of the excavated areas by groundwater	*Negative*	*Medium*	*Medium*	*High*	*Medium*
With mitigation	*Negative*	*Low*	*Low*	*Low*	*Low*

22.Question : Provide details on how Impact 1 will be mitigated and explain how this mitigation can justify the significance from medium to low, given the high probability.

Impact	*Nature*	*Intensity*	*Consequence*	*Probability*	*SIGNIFICANCE*
Impact 3: Drying up of coastal springs	*Negative*	*Medium*	*Medium*	*High*	*Medium*
With mitigation	*Negative*	*Low*	*Low*	*Low*	*Low*

23.Question : Explain how the consequences of Impact 3 will only be medium, given the national legislation regarding the shoreline and wetlands. Provide details on how will this be mitigated and explain how this mitigation can justify the significance from medium to low, given the high probability.

Impact	*Nature*	*Intensity*	*Consequence*	*Probability*	*SIGNIFICANCE*
Impact 4: Degradation of wetlands	*Negative*	*Medium*	*Medium*	*High*	*Medium*
With mitigation	*Negative*	*Low*	*Low*	*Low*	*Low*

24.Question : Explain how the consequences of Impact 4 will only be medium, particularly given that the wetlands expert in this EIReport has identified the wetlands of being unique and of global importance. Provide details on how this will be mitigated and explain how this mitigation can justify the significance of the impact from medium to low, given the high probability.

Quote from report Pg 150 “Leaks of any radioactivity into the subsurface and ultimately into the underlyingaquifers (both the primary and secondary aquifers) will not directly affect existing groundwater users (but will affect the receiving environment), but air emissions from the sites could be transported inland by prevailing winds and contaminate groundwater by being incorporated into rainfall recharge.”

25. Comment and questionIn view of the problems of reliable water supply for the greater St Francis area (the recent drought conditions led to water restrictions for 18months which raised the prospect of the towns once again relying on groundwater supplies from local boreholes) the above comment is of great concern. Question how does this report justify any threat of contamination of groundwater local water supply in the regions which is notorious for droughts and floods?

Table 4.9: Impact assessment table for the Thyspunt site during the operational phase

Impact	*Nature*	*Inten-sity*	*Extent*	*Duration*	*Impact on Irreplaceable resources*	*Consequence*	*Probability*	*SIGNIFICANCE*

Impact	*Nature*	*Intensity*	*Consequence*	*Probability*	*SIGNIFICANCE*
Impact 1: Radioactive and toxic contamination of groundwater	*Negative*	*High*	*Medium*	*Low*	*Low-Medium*
With mitigation	*Negative*	*Low*	*Low*	*Low*	*Low*

26. Question : Provide details on how Impact 1 will be mitigated and explain how this mitigation can justify the significance from medium to low.

Impact	*Nature*	*Intensity*	*Consequence*	*Probability*	*SIGNIFICANCE*
Impact 2: Hydrocarbon contamination of groundwater	*Negative*	*Low*	*Low*	*High*	*Low-Medium*
With mitigation	*Negative*	*Low*	*Low*	*Low*	*Low*

27. Question : Provide details on how Impact 2 will be mitigated and explain how this mitigation can reduce the HIGH probability to low.

Impact	*Nature*	*Intensity*	*Consequence*	*Probability*	*SIGNIFICANCE*
Impact 3: Organic and bacteriological contamination of groundwater	*Negative*	*Low*	*Low*	*High*	*Low-Medium*
With mitigation	*Negative*	*Low*	*Low*	*Low*	*Low*

28. Question : Provide details on how Impact 3 will be mitigated and explain how this mitigation can reduce the HIGH probability to low.

Impact	*Nature*	*Duration*	*Consequence*	*Probability*	*SIGNIFICANCE*
Impact 4: Decreased yields of existing production boreholes	*Negative*	*High*	*Low*	*Low*	*Low-Medium*
With mitigation	*Negative*	*Low*	*Low*	*Low*	*Low*

29. Question : Provide details on how Impact 4 will be mitigated and explain how this mitigation can change theduration from HIGH to low.

Impact	*Nature*	*Intensity*	*Duration*	*Impact on irreplaceable resources*	*Consequence*	*Probability*	*SIGNIFICANCE*
Impact 6: Degradation of wetlands	*Neg*	*Medium*	*Med*	*Low*	*Med*	*Med*	*Medium*
With mitigation	*Neg*	*Low*	*Low*	*Low*	*Low*	*Low*	*Low*

30. Question : What is the justification for classifying the impact on the irreplaceable resources of wetlands of global significance as low?

31. Question: It is requested that each of the cells in these tables be re-analysed in collaboration with the following critical people:

1) The wetlands expert
2) Dr Fred Ellery
3) An expert in local St Francis water supplies who will confirm that the Greater St Francis Area will need to become reliant on its water supplies from groundwater boreholes, just as it was in the past,. The current supply from the Churchill Dam has been in operation for only a few years. This supply is in the form of a pipeline from the Churchill Dam to the Nelson Mandela Metro whose water demand is becoming untenable. Furthermore, the water supply pipeline to St Francis is currently out of commission owing to the fall of the Sand River bridge. Until this bridge is properly rebuilt, this pipeline is under threat. The town is in the process of recommissioning its groundwater boreholes.

Quote “4.4 No Go Option
In the event that the sites are not developed for NPSs, Eskom will sell the Bantamsklip and Thyspunt properties and non-essential parts of Duynefontein could also be sold. In this scenario the impact is seen to be of *low* intensity, *neutral* consequence and *low* significance for the Bantamsklip site but of *medium* intensity, *negative* consequence and *high* significance for the Thyspunt and Duynefontein sites as it is unlikely that a similar level of site control and preservation of aquifers and ecological features could be enforced or afforded by private land owners/developers as would have been the case with a nuclear site. The main mitigation measure for this scenario would be strict enforcement of conditions applicable to any approved future development of the sites, which would presumably cover preservation of these features.

32. Comment and question : The above text indicates the overwhelmingly strong bias of the specialist in favour of the client. Private owners or developers wishing to develop would have to undergo the same stringent requirements for an EIA as this proposal. Furthermore, private developers are highly unlikely to have the funds to propose a development of the same scale, or size or hazardous threat as a nuclear power station. On the grounds of this opinion, this comment clearly indicates a serious bias .
The land has been purchased with State funds and could become a state asset of a well managed water catchment which could provide a sustainable water supply to local communities, in such a way that the area becomes a natural and cultural heritage site.

Quote 155 All industrial wastewater that will be generated at the sites from various operations must be safely and effectively processed and disposed of (essential mitigationmeasure).

33. Comment and question. Report must provide details on such a facility, its siting and how it will function.

Quote pg 157 A groundwater monitoring programme is essential, as it will provide:
Baseline information on aquifer behaviour for at least a two-year period before construction commences;

34. QuestionWhy isn't this vital point included in the Report's conclusions?

Mitigation measures / management actions are recommended in order to aid with the following:

- Minimising or eliminating negative impacts;
- Enhancing beneficial impacts; and
- For assistance with the project design to prevent or minimise negative impacts.

5.2 Recommended Mitigation Measures

Dewatering to prevent: Flooding by Groundwater

To mitigate this, the construction area and subsequent excavated areas must be dewatered by constructing a cut-off / diaphragm wall and installing a series of wellpoints and boreholes. The design of a dewatering scheme is beyond the scope of this specialist study, but the dewatering activity and associated groundwater monitoring programme are considered essential mitigation measures. A form of cutoff wall is considered to be the most suitable and reliable design to minimise the extent of drawdown. The siting of the NPS within the EIA Corridor should take this aspect/impact into account.

Mitigation Hierarchy: Avoidance

35. QuestionThis impact of flooding by groundwater is a threat to the construction of the infrastructure butaccording to the report, the design of the mitigatory method is unknown. Furthermore, the mitigation poses another threat of its own. This further threat should be noted in the conclusions.

Cut off Wall and Monitoring to prevent: Depletion of Local Aquifers

This impact may be mitigated by constructing a cut-off or diaphragm wall, and by carrying out groundwater level monitoring to assess the efficiency of such a design. Monitoring is considered an essential mitigation measure so that remedial actions can be carried out timeously, if required. The final design of dewatering schemes has not been established. However, based on results from this EIR study, the construction of such a barrier is considered to be an essential mitigation measure at the Duynefontein and Thyspunt sites. The siting of the NPS within the EIA Corridor should take this aspect/impact into account.

Mitigation Hierarchy: Avoidance

36. Question How can the report conclude with such confidence that impacts can be reduced with mitigation, lowering impacts from high to low, yet use language such as "This impact **may** be mitigated.."

Cut off wall and Monitoring to prevent: Degradation of Ecologically Sensitive Wetlands / Seeps / Springs

This impact may be mitigated by constructing a cut-off or diaphragm wall, and by carrying out groundwater level monitoring. Groundwater monitoring is considered an essential mitigation measure so that timeous remediation measures can be taken, if required. The final design of dewatering schemes has not been established. However, based on results from this EIR study, the construction of such a barrier is considered to be an essential mitigation measure at the Duynefontein and Thyspunt sites. The siting of the NPS within the EIA Corridor should also take into account the optimal position from this point of view.

Abstraction should preferably not take place from aquifers with direct links to freshwater ecosystems. Roads, cables, foundations and pipelines should all avoid passing through/intruding areas identified as important hydrological corridors and no roads, pipelines, cable routes or other structures should be passed through wetland areas.

36. Question How can the report conclude with such confidence that impacts can be reduced with mitigation, lowering impacts from high to low, yet use language such as "This impact **may** be mitigated.." with dewatering schemes which the report states have "not yet been designed".

37.Question Given the last paragraph of the box above, the conclusions of this report should surely recommend this site as unsuitable