9 IMPACT ASSESSMENT

9.1 Introduction

The significant environmental impacts identified in the Scoping Phase as well as any newly identified impacts during the EIA phase were assessed .

The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise as a result of the proposed project. The process of assessing the impacts of the project encompasses the following four activities:

- Identification and assessment of potential impacts;
- Prediction of the nature, extent, duration, magnitude and probability of potentially significant impacts;
- Identification of mitigation measures that could be implemented to reduce the severity or significance of the impacts of the activity; and
- Evaluation of the significance of the impact after the mitigation measures have been implemented i.e. the significance of the residual impact.
- Ranking the various sites according to preference based on the Impact Assessment.

The possible impacts associated with the proposed continuous dry ash disposal facility for Majuba Power Station were primarily identified in the Scoping Phase through desktop study and public consultation. Additional impacts have further been identified and assessed during the Impact Assessment Phase by means of more in-depth investigations along with consultation with interested and affected parties.

9.2 EIA process and methodology

In accordance with Government Notice R. 543, promulgated in terms of section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998), specialists were required to assess the significance of potential impacts in terms of the following criteria:

- Nature of the impact;
- Extent of the impact;
- Intensity of the impact;
- Duration of the impact;
- Probability of the impact occurring;
- Impact non-reversibility;
- Cumulative impacts;
- Impact on irreplaceable resources; and
- Confidence level.

Issues were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected and how it will be affected;
- The physical **extent**, wherein it is indicated whether:
  - 1 - the impact will be limited to the site;
  - 2 - the impact will be limited to the local area;
  - 3 - the impact will be limited to the region;
  - 4 - the impact will be national; or
  - 5 - the impact will be international;
- The **duration**, wherein it is indicated whether the lifetime of the impact will be:
  - 1 - of a very short duration (0–1 years);
  - 2 - of a short duration (2-5 years);
  - 3 - medium-term (5–15 years);
  - 4 - long term (> 15 years); or
  - 5 - permanent;
- The **magnitude of impact on ecological processes**, quantified on a scale from 0-10, where a score is assigned:
  - 0 - small and will have no effect on the environment;
  - 2 - minor and will not result in an impact on processes;
  - 4 - low and will cause a slight impact on processes;
  - 6 - moderate and will result in processes continuing but in a modified way;
  - 8 - high (processes are altered to the extent that they temporarily cease); or
  - 10 - very high and results in complete destruction of patterns and permanent cessation of processes;
- The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale where:
  - 1 - very improbable (probably will not happen;
  - 2 - improbable (some possibility, but low likelihood);
  - 3 - probable (distinct possibility);
  - 4 - highly probable (most likely); or
  - 5 - definite (impact will occur regardless of any prevention measures);
- the **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- the **status**, which is described as either positive, negative or neutral;
- the degree to which the impact can be reversed;
- the degree to which the impact may cause irreplaceable loss of resources; and
- the degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

S = (E+D+M)*P; where

S = Significance weighting
E = Extent
D = Duration

M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

Points	Significant Weighting	Discussion
< 30 points	Low	where this impact would not have a direct influence on the decision to develop in the area
31-60 points	Medium	where the impact could influence the decision to develop in the area unless it is effectively mitigated
> 60 points	High	where the impact must have an influence on the decision process to develop in the area

The findings of the impact assessment are consolidated into **Table 9.1** to **Table 9.8** below. The impacts are classified in terms of the phase of the development in which they are likely to occur namely construction phase (**Table 9.1**), operational phase (**Table 9.2**), decommissioning phase (**Tables 9.3**) and the cumulative impacts (**Table 9.4**). (**Tables 9.5 – 9.8**) is a summary of the results.

Table 9.0.1: Detailed assessment of identified impacts for the Construction Phase – Dry ash disposal facility

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Ash disposal facility – All Sites									
GEOLOGY									
Impact 1: Construction-related earthworks	**Nature of impact:**	Construction related earthworks may impact the local geology if not undertaken in accordance to relevant procedures.							
	with mitigation	1	3	2	2	**12**	**Low**	Neutral	High
	without mitigation	2	5	4	4	**44**	**Medium**	-	High
	degree to which impact can be reversed:	Low							Medium
	degree of impact on irreplaceable resources:	Low							High
Impact 2: Pollution of geological features in case of spillage or leakage of hydrocarbon and other hazardous material	**Nature of impact:**	Spillages and leaks from fuels, oil and other potentially hazardous substances during handling, use and storage can be kept to a minimum by applying a good housekeeping approach and observing and implementing the relevant mitigation measures.							
	with mitigation	1	1	2	2	**8**	**Low**	Neutral	High
	without mitigation	3	4	6	3	**39**	**Medium**	-	High
	degree to which impact can be reversed:	Low							Medium
	degree of impact on irreplaceable resources:	Low							High
AGRICULTURAL POTENTIAL									
Ash Disposal Facility - Alternative A									
Potential Impact	**Mitigation**	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**		**Status**	**Confidence**

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)		(+ve or -ve)	
Loss of agricultural soil	**Nature of impact:**	Unavailability of soil resource for agriculture due to positioning of ADF							
	without	1	5	10	5	**80**	**High**	-	Confident
	with	1	5	10	5	**80**	**High**		
	degree to which impact can be reversed:	Impossible to reverse as soils will be completely and permanently covered by ADF							
	degree of impact on irreplaceable resources:	Limited proportion of high potential soils means that there will not be a large-scale loss of irreplaceable resources within the local soil pattern.							

Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Loss of agricultural soil	**Nature of impact:**	Unavailability of soil resource for agriculture due to positioning of ADF							
	without	1	5	10	5	**80**	**High**	-	Confident
	with	1	5	10	5	**80**	**High**		
	degree to which impact can be reversed:	Impossible to reverse as soils will be completely and permanently covered by ADF							
	degree of impact on irreplaceable resources:	Higher proportion of high potential soils means that there will be some loss of irreplaceable resources within the local soil pattern.							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Ash Disposal Facility - Alternative C									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Loss of agricultural soil	**Nature of impact:**	Unavailability of soil resource for agriculture due to positioning of ADF							
	without	1	5	10	5	**80**	**High**	-	Confident
	with	1	5	10	5	**80**	**High**		
	degree to which impact can be reversed:	Impossible to reverse as soils will be completely and permanently covered by ADF							
	degree of impact on irreplaceable resources:	Limited proportion of high potential soils means that there will not be a large-scale loss of irreplaceable resources within the local soil pattern.							
Ash Disposal Facility - Alternative D									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Loss of agricultural soil	**Nature of impact:**	Unavailability of soil resource for agriculture due to positioning of ADF							
	without	1	5	10	5	**80**	**High**	-	Confident
	with	1	5	10	5	**80**	**High**		
	degree to which impact can be reversed:	Impossible to reverse as soils will be completely and permanently covered by ADF							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree of impact on irreplaceable resources:	Limited proportion of high potential soils means that there will not be a large-scale loss of irreplaceable resources within the local soil pattern.							
Ash Disposal Facility - Alternative E									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Loss of agricultural soil	**Nature of impact:**	Unavailability of soil resource for agriculture due to positioning of ADF							
	without	1	5	10	5	**80**	**High**	-	Confident
	with	1	5	10	5	**80**	**High**		
	degree to which impact can be reversed:	Impossible to reverse as soils will be completely and permanently covered by ADF							
	degree of impact on irreplaceable resources:	Limited proportion of high potential soils means that there will not be a large-scale loss of irreplaceable resources within the local soil pattern.							
Linear Infrastructure Corridor									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Loss of agricultural soil	**Nature of impact:**	Unavailability of soil resource for agriculture due to positioning of ADF							
	without	1	4	4	4	**36**	**Medium**	-	
	with	1	4	2	4	**28**	**Low**	-	

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)	Status (+ve or -ve)	Confidence
	degree to which impact can be reversed:	Only surface infrastructure will be involved, which can be restored at a later stage if care is taken during life of project						
	degree of impact on irreplaceable resources:	Potential wetland crossings are cause for concern - special care needs to be taken at such places to minimize impacts on wetland soils and ecosystems						
GROUND WATER								
Ash Disposal Facility - All alternatives								
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**
Deterioration of groundwater quality due to leachate from ash disposal facility	**Nature of impact:**	Rainwater percolating through initial ash disposed will dissolve potential contaminants in the ash (e.g. SO4, Hg, F, Na) and carry these contaminants downwards into the local groundwater.						
	without	1	2	2	4	**20**	**Low**	-	Medium
	with	1	1	2	3	**12**	**Low**	-	Medium
	degree to which impact can be reversed:	Difficult to reverse this impact, since keeping the stacked dry ash dry would be impractical. Any underdrain system that is used, together with measures to control surface water pollution (e.g. toe drains) should to be well maintained to minimise the impact.							Medium
	degree of impact on irreplaceable resources:	Impact likely to be on local groundwater only, which is not irreplaceable.							Medium
Deterioration of groundwater quality due to spillages during	**Nature of impact:**	Spillages of hydrocarbons (e.g. diesel) or solvents or other pollutants during the construction phase may have an impact on the quality of local groundwater resources.						
	without	2	2	6	2	**20**	**Low**	-	High
	with	1	1	4	1	**6**	**Low**	-	High

Potential Impact	Mitigation	Extent	Duration	Magnitude	Probability	Significance		Status	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)		(+ve or -ve)	
construction	**degree to which impact can be reversed:**	Once fuel, solvents or other pollutants are spilled and begin to migrate downwards, reversing the impact is difficult and expensive - i.e. the degree to which the impact can be reversed is low. However, if appropriate precautions are taken during the construction phase (e.g. the bunding of refuelling and fuel storage areas, control of all potentially polluting substances at the site), the threat of this impact can be nearly eliminated.							High
	degree of impact on irreplaceable resources:	Impact likely to be on local groundwater only, which is not irreplaceable.							Medium
Rise in water table during initial ash deposition	**Nature of impact:**	Possible small rise in the water table as ash is initially deposited and recharge is potentially increased.							
	without	1	2	2	2	**10**	**Low**	-	Medium
	with	1	2	2	2	**10**	**Low**	-	Medium
	degree to which impact can be reversed:	Difficult to reverse this impact, but impact improbable due to relatively short time needed for construction phase.							Medium
	degree of impact on irreplaceable resources:	Impact likely to be on local groundwater only, which is not irreplaceable.							Medium
Groundwater contamination in local area due to infiltration from surface water polluted by the ash disposal facility.	**Nature of impact:**	Surface water that is being impounded near the ash disposal facility and which is polluted by runoff from the ash disposal facility may leak from surface water impoundments into surface water system, and infiltrate into groundwater some distance (most likely local area) from the ash disposal facility.							
	without	2	2	6	3	**30**	**Low**	-	High
	with	1	1	2	1	**4**	**Low**	-	High
	degree to which impact can be reversed:	Impact can be reversed successfully if all surface water infrastructure kept in good condition and appropriately designed (e.g. for flood events)							Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree of impact on irreplaceable resources:	Impact likely to be on regional groundwater which may be expensive to replace if it is a sole source of supply to a nearby farm, for example.							Medium
SURFACE WATER									
Ash Disposal Facility - Alternative A									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Impacts on hydrology	**Nature of impact:**	Clearing of vegetation and removal of soil will result in the direct sterilisation of Wetlands 2, 4, 6, 33, 35, 36 and 37. Systems to be affected or localised depressions of a seasonal nature.							
	without	3	3	6	5	**60**	**Medium**	-	3
	with	3	3	6	5	**60**	**Medium**	-	3
	degree to which impact can be reversed:	Impact is not readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Impacts on surface water quality	**Nature of impact:**	More sensitive, receiving Wetlands 3 and 7 will not be directly affected by the ash disposal facility. Pan systems are relatively isolated and will further buffer receiving floodplains from possible water pollution.							
	without	3	3	8	4	**56**	**Medium**	-	3

Potential Impact	Mitigation	Extent	Duration	Magnitude	Probability	Significance		Status	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)		(+ve or -ve)	
	with	3	3	6	3	**36**	**Medium**	-	3
	degree to which impact can be reversed:	This impact is difficult to reverse at it has far reaching implications. Even once water constituents return back to background levels, subsequent biological responses might take much longer to recover.							3
	degree of impact on irreplaceable resources:	Low							3
Impacts related to erosion and sedimentation	**Nature of impact:**	Alternative represents the second steepest average slope, next to Alternative E. Steeper slopes relate to an increased probability for erosion. This impact can be mitigated through affective erosion control and isolating the construction site from receiving watercourses.							
	without	3	3	8	5	**70**	**High**	-	3
	with	3	3	6	4	**48**	**Medium**	-	3
	degree to which impact can be reversed:	Loss in direct wetland integrity and functioning due to erosion cannot be reversed easily. Loss due to downslope sedimentation might be easier to reinstate or might recover spontaneously provided sediment sources are stopped.							3
	degree of impact on irreplaceable resources:	Low							3
Impacts on wetland vegetation and disturbance of wetland habitat	**Nature of impact:**	Will impact in Wetlands 2, 4, 6, 33, 35, 36 and 37- depression systems with associated seeps on vertic soil. The likelihood of wetland loss within more sensitive floodplain systems (Wetlands 3 and 7) increase the probability and sensitivity scores. If the receiving downslope wetlands can be avoided this impact will decrease in significance.							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	without	3	3	8	5	**70**	**High**	-	3
	with	3	3	6	4	**48**	**Medium**	-	3
	degree to which impact can be reversed:	Low.							3
	degree of impact on irreplaceable resources:	Wetland loss will be permanent.							3
Impact related to increase alien/pioneer vegetation in disturbed areas	**Nature of impact:**	Disturbances to the wetlands on site will provide opportunity for invasion by alien and weedy species. This impact is more manageable and can be mitigated. Alternative A scored a higher magnitude and probability due to higher overall PES of wetlands in question.							
	without	3	3	8	4	**56**	**Medium**	-	3
	with	3	3	6	3	**36**	**Medium**	-	3
	degree to which impact can be reversed:	Can be reversed							3
	degree of impact on irreplaceable resources:	Low							3
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Impacts on hydrology	**Nature of impact:**	The removal of vegetation and soil on Wetland 3B will have serious downstream hydrological implications, while water from its catchment will also have to be managed. Possible mitigation will require diverting the system upslope of alternative B. If the							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
		water is returned to the downstream section this impact will decrease in magnitude and probability							
	without	5	3	8	5	**80**	**High**	-	3
	with	5	3	6	4	**56**	**Medium**	-	3
	degree to which impact can be reversed:	Impact is not readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Impacts on surface water quality	**Nature of impact:**	Surface water runoff associated with Wetland 3A scored a high magnitude due to the extent and connectivity of this wetland. Controlling the volumes of water linked to this wetland will be more difficult than for other wetlands and subsequently resulted in a probability score. This impact can be mitigated during the construction period, by isolating the runoff from the construction side.							
	without	5	3	8	4	**64**	**High**	-	3
	with	5	3	6	4	**56**	**Medium**	-	3
	degree to which impact can be reversed:	This impact is difficult to reverse at it has far reaching implications. Even once water constituents return back to background levels, subsequent biological responses might take much longer to recover.							3
	degree of impact on irreplaceable resources:	Low							3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Impacts related to erosion and sedimentation	**Nature of impact:**	Alternative B occupies the greatest extent of wetlands, albeit more transformed. It also has a lower average slope than Alternative A, C and E. This impact can be mitigated during the construction phase.							
	without	5	3	6	4	**56**	**Medium**	-	3
	with	5	3	6	4	**56**	**Medium**	-	3
	degree to which impact can be reversed:	Disturbances to the wetlands on site will provide opportunity for invasion by alien and weedy species. This impact is more manageable and can be mitigated. Alternative A scored a higher magnitude and probability due to higher overall PES of wetlands in question.							3
	degree of impact on irreplaceable resources:	Low							3
Impacts on wetland vegetation and disturbance of wetland habitat	**Nature of impact:**	The biological corridor function associated with? Wetland 3B and the high likelihood of disturbance of this Wetland contribute to a high magnitude and probability score. The impact will be difficult to mitigate and remain high post-mitigation							
	without	4	3	8	5	**75**	**High**	-	3
	with	4	3	8	5	**75**	**High**	-	3
	degree to which impact can be reversed:	Wetland loss will be permanent.							3
	degree of impact on irreplaceable resources:	Low.							3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Impact related to increase of alien/pioneer vegetation in disturbed areas	**Nature of impact:**	Disturbances to the wetlands on site will provide opportunity for invasion by alien and weedy species. Species such as *Bidens formosa* (Cosmos) are already prevalent on site and likely to increase, to the detriment of indigenous species. This alternative scored lower magnitude but greater extent ratings.							
	without	5	3	4	4	**48**	**Medium**	-	3
	with	5	3	4	3	**36**	**Medium**	-	3
	degree to which impact can be reversed:	Can be reversed							3
	degree of impact on irreplaceable resources:	Low							3
Ash Disposal Facility - Alternative C									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Impacts on hydrology	**Nature of impact:**	The nature and extent of Wetland 16 increases the magnitude of this impact, but is offset by its relatively small catchment. The extent of linear infrastructure resulted in a High Significance							
	without	4	3	6	5	**65**	**High**	-	3
	with	2	3	6	5	**55**	**Medium**	-	3
	degree to which impact can be reversed:	Impact is not readily reversed							3
	degree of impact on irreplaceable resources:	Low							3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Impacts on surface water quality	**Nature of impact:**	This impact scored lower due to a smaller extent and connectivity of wetlands to be affected on this site. Wetland 16 contributed towards a high magnitude and probability.							
	without	2	3	4	4	**36**	**Medium**	-	3
	with	2	3	4	3	**27**	**Low**	-	3
	degree to which impact can be reversed:	This impact is difficult to reverse at it has far reaching implications. Even once water constituents return back to background levels, subsequent biological responses might take much longer to recover.							3
	degree of impact on irreplaceable resources:	Low							3
Impacts related to erosion and sedimentation	**Nature of impact:**	Lower magnitude to transformed state of wetlands, but increased probability score due to relatively steep average slope. Alternative C scored the third highest average slope. The extent of linear infrastructure added to a higher extent, magnitude and probability for this impact. This impact can be mitigated by the suitable erosion control measures.							
	without	5	3	6	5	**70**	**High**	-	3
	with	2	3	4	4	**36**	**Medium**	-	3
	degree to which impact can be reversed:	Loss in direct wetland integrity and functioning due to erosion cannot be reversed easily. Loss due to downslope sedimentation might be easier to reinstate or might recover spontaneously provided sediment sources are stopped.							3
	degree of impact on irreplaceable resources:	Low							3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Impacts on wetland vegetation and disturbance of wetland habitat	**Nature of impact:**	lower extent of wetlands, but Wetland 16 provide good habitat.							
	without	2	3	6	5	**55**	**Medium**	-	3
	with	2	3	6	4	**44**	**Medium**		3
	degree to which impact can be reversed:	Wetland loss will be permanent.							3
	degree of impact on irreplaceable resources:	Low.							3
Impact related to increase alien/pioneer vegetation in disturbed areas	**Nature of impact:**	Alternative C occupies the second smallest extent of wetlands, next to Alternative D and really only reflect on sensitive wetland, Wetland 16.							
	without	2	3	4	4	**36**	**Medium**	-	3
	with	2	3	2	3	**21**	**Low**	-	3
	degree to which impact can be reversed:	Can be reversed							3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree of impact on irreplaceable resources:	Low							3
Ash Disposal Facility - Alternative D									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Impacts on hydrology	**Nature of impact:**	Headwater systems with low PES and EIS. Smallest extent of wetlands. Linear infrastructure increases the extent, magnitude and probability of the impact. Mitigation includes appropriate layout designs to avoid some of the more sensitive wetlands.							
	without	5	3	6	5	**70**	**High**	-	3
	with	1	3	4	5	**40**	**Medium**	-	3
	degree to which impact can be reversed:	Impact is not readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Impacts on surface water quality	**Nature of impact:**	Lowest extent of wetlands. Wetlands located within headwater reaches and relatively more transformed than other wetlands.							
	without	4	3	4	5	**55**	**Medium**	-	3
	with	1	3	2	4	**24**	**Low**	-	3

Potential Impact	Mitigation	Extent	Duration	Magnitude	Probability	Significance		Status	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)		(+ve or -ve)	
	degree to which impact can be reversed:	This impact is difficult to reverse at it has far reaching implications. Even once water constituents return back to background levels, subsequent biological responses might take much longer to recover.							3
	degree of impact on irreplaceable resources:	Low							3
Impacts related to erosion and sedimentation	**Nature of impact:**	Lowest average slopes decreased the probability of erosion. The nature of wetlands prompted the lowest magnitude score for erosion. This impact can further be mitigated. Linear infrastructure increases the extent, magnitude and probability of this impact.							
	without	5	3	6	5	**70**	**High**	-	3
	with	5	3	4	3	**36**	**Medium**	-	3
	degree to which impact can be reversed:	Loss in direct wetland integrity and functioning due to erosion cannot be reversed easily. Loss due to downslope sedimentation might be easier to reinstate or might recover spontaneously provided sediment sources are stopped.							3
	degree of impact on irreplaceable resources:	Low							3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Impacts on wetland vegetation and disturbance of wetland habitat	**Nature of impact:**	Transformed nature wetlands to be affected and the lower extent of this impact resulted in a lower significance.							
	without	1	3	2	5	**30**	**Low**	-	3
	with	1	3	2	4	**24**	**Low**	-	3
	degree to which impact can be reversed:	Wetland loss will be permanent.							3
	degree of impact on irreplaceable resources:	Low.							3
Impact related to increase alien/pioneer vegetation in disturbed areas	**Nature of impact:**	Low significance calculated for this impact due to the transformed state and relatively low extent of wetlands on this Alternative							
	without	1	3	2	4	**24**	**Low**	-	3
	with	1	3	0	3	**12**	**Low**	-	3
	degree to which impact can be reversed:	Can be reversed							3
	degree of impact on irreplaceable resources:	Low							3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Ash Disposal Facility - Alternative E									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Impacts on hydrology	**Nature of impact:**	Clearing of vegetation and removal of soil from large seep areas will result in serious direct and indirect hydrological impacts.							
	without	5	3	8	5	**80**	**High**	-	3
	with	5	3	8	5	**80**	**High**	-	3
	degree to which impact can be reversed:	Impact is not readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Impacts on surface water quality	**Nature of impact:**	Higher PES and greater extent of seep wetlands increase the magnitude and probability if this impact.							
	without	5	3	8	4	**64**	**High**	-	3
	with	5	3	6	3	**42**	**Medium**	-	3
	degree to which impact can be reversed:	This impact is difficult to reverse at it has far reaching implications. Even once water constituents return back to background levels, subsequent biological responses might take much longer to recover.							3

Potential Impact	Mitigation	Extent	Duration	Magnitude	Probability	Significance		Status	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)		(+ve or -ve)	
	degree of impact on irreplaceable resources:	Low							3
Impacts related to erosion and sedimentation	**Nature of impact:**	Second most extensive wetland area will be affected. Steepest average slope and erodible soils resulted in an increase probability while the PES resulted in a higher magnitude score. This impact can be mitigated .							
	without	4	3	8	5	**75**	**High**	-	3
	with	4	3	6	4	**52**	**Medium**	-	3
	degree to which impact can be reversed:	Loss in direct wetland integrity and functioning due to erosion cannot be reversed easily. Loss due to downslope sedimentation might be easier to reinstate or might recover spontaneously provided sediment sources are stopped.							3
	degree of impact on irreplaceable resources:	Low							3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Impacts on wetland vegetation and disturbance of wetland habitat	**Nature of impact:**	Large seasonal seep areas provide habitat heterogeneity. The corridor function of this Alternative scored lower than that of Alternatives A and B. However Alternative occupies the greatest extent of wetlands and as such scored a High significance for this impact. This impact cannot be mitigated as wetland habitat will be destroyed.							
	without	4	3	6	5	**65**	**High**	-	3
	with	4	3	6	5	**65**	**High**	-	3
	degree to which impact can be reversed:	Wetland loss will be permanent.							3
	degree of impact on irreplaceable resources:	Low.							3
Impact related to increase alien/pioneer vegetation in disturbed areas	**Nature of impact:**	Medium impact due to higher magnitude and relative large extent of wetlands that will be disturbed on this Alternative.							
	without	4	3	8	4	**60**	**Medium**	-	3
	with	4	3	6	3	**39**	**Medium**	-	3
	degree to which impact can be reversed:	Can be reversed							3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)	Status (+ve or -ve)	Confidence
	degree of impact on irreplaceable resources:	Low						3
BIODIVERSITY								
Ash Disposal Facility - Alternative A								
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**
Impacts on flora species of conservation importance (including habitat suitable for these species	**Nature of impact:**	Direct impacts of development of the ashing facillity on plants of conservation importance during construction and site preparation activities, such as soil disturbances and topsoil stripping. Also include impacts in habitat that are associated with the presence of conservation important species, although not necessarily recorded on the site						
	without	4	5	10	5	**95**	**High**	-	High
	with	4	5	8	4	**68**	**High**	-	High
Impacts on fauna species of conservation importance (including habitat suitable for these species)	**Nature of impact:**	Direct impacts of the development on animals of conservation importance during construction and site preparation activities, such as accidental killing and, particularly, habitat destruction. Also include impacts in habitat that are associated with the potential presence of conservation important species, although not necessarily recorded on the site during this assessment						
	without	4	5	10	5	**95**	**High**	-	High
	with	4	5	8	4	**68**	**High**	-	High
Impacts on unique or	**Nature of impact:**	Destruction or degradation of important/ protected ecological types that are typically restricted in distribution and also typically high in biodiversity. Wetlands are important in regards to the study area						

Potential Impact	Mitigation	Extent	Duration	Magnitude	Probability	Significance		Status	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)		(+ve or -ve)	
protected habitat types (including loss and degradation)	**without**	4	5	10	5	**95**	**High**	-	
	with	4	5	8	4	**68**	**High**	-	
Loss of sensitive/ natural habitat types (including plant diversity & abundance)	**Nature of impact:**	Destruction or degradation of remaining natural habitat during the development is irreversible. Although natural habitat is represented in surrounding region, destruction of local variations and communities are likely to cause changes in abundance of certain plants and habitat types on a local scale							
	without	4	5	8	5	**85**	**High**	-	High
	with	4	5	8	4	**68**	**High**	-	High
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	10	5	**85**	**High**	-	High
	with	3	4	6	4	**52**	**Medium**	-	High
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	3	4	8	5	**75**	**High**	-	High
	with	3	4	6	5	**65**	**High**	-	Medium
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	3	4	6	5	**65**	**High**	-	High

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	with	3	4	6	4	**52**	**Medium**	-	Medium
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Impacts on flora species of conservation importance (including habitat suitable for these species	**Nature of impact:**	Direct impacts of development of the ashing facillity on plants of conservation importance during construction and site preparation activities, such as soil disturbances and topsoil stripping. Also include impacts in habitat that are associated with the presence of conservation important species, although not necessarily recorded on the site							
	without	4	5	10	4	**76**	**High**	-	High
	with	4	5	8	3	**51**	**Medium**	-	High
Impacts on fauna species of conservation importance (including habitat suitable for these species)	**Nature of impact:**	Direct impacts of the development on animals of conservation importance during construction and site preparation asctivities, such as accidental killing and, particularly, habitat destruction. Also include impacts in habitat that are associated with the potential presence of conservation important species, although not necessarily recorded on the site during this assessment							
	without	4	5	10	4	**76**	**High**	-	High
	with	4	5	8	3	**51**	**Medium**	-	High
Impacts on unique or protected habitat types (including loss and	**Nature of impact:**	Destruction or degradation of important/ protected ecological types that are typically restricted in distribution and also typically high in biodiversity. Wetlands are important in regards to the study area							
	without	4	5	8	5	**85**	**High**	-	High
	with	4	5	8	4	**68**	**High**	-	Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
degradation)									
Loss of sensitive/ natural habitat types (including plant diversity & abundance)	**Nature of impact:**	Destruction or degradation of remaining natural habitat during the development is irreversible. Although natural habitat is represented in surrounding region, destruction of local variations and communities are likely to cause changes in abundance of certain plants and habitat types on a local scale							
	without	4	5	8	5	**85**	**High**	-	High
	with	4	5	6	4	**60**	**Medium**	-	Medium
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	8	5	**75**	**High**	-	High
	with	3	4	6	4	**52**	**Medium**	-	Medium
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	3	4	8	5	**75**	**High**	-	High
	with	3	4	6	5	**65**	**High**	-	Medium
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	3	4	6	5	**65**	**High**	-	High
	with	3	4	6	4	**52**	**Medium**	-	Medium

Ash Disposal Facility - Alternative C								
Potential	**Mitigation**	**Extent**	**Duration**	**Magnitude**	**Probabilit**	**Significance**	**Status**	**Confidence**

Potential Impact	Mitigation	Extent	Duration	Magnitude	Probability	Significance		Status	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)		(+ve or -ve)	
Impact		**(E)**	**(D)**	**(M)**	**y (P)**	**(S=(E+D+M)*P)**		**(+ve or -ve)**	
Impacts on flora species of conservation importance (including habitat suitable for these species	**Nature of impact:**	Direct impacts of development of the ashing facillity on plants of conservation importance during construction and site preparation activities, such as soil disturbances and topsoil stripping. Also include impacts in habitat that are associated with the presence of conservation important species, although not necessarily recorded on the site							
	without	4	5	10	5	**95**	**High**	-	High
	with	4	5	8	4	**68**	**High**	-	High
Impacts on fauna species of conservation importance (including habitat suitable for these species)	**Nature of impact:**	Direct impacts of the development on animals of conservation importance during construction and site preparation asctivities, such as accidental killing and, particularly, habitat destruction. Also include impacts in habitat that are associated with the potential presence of conservation important species, although not necessarily recorded on the site during this assessment							
	without	4	5	10	5	**95**	**High**	-	High
	with	4	5	8	4	**68**	**High**	-	High
Impacts on unique or protected habitat types (including loss and degradation)	**Nature of impact:**	Destruction or degradation of important/ protected ecological types that are typically restricted in distribution and also typically high in biodiversity. Wetlands are important in regards to the study area							
	without	4	5	10	5	**95**	**High**	-	High
	with	4	5	8	4	**68**	**High**	-	High

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Loss of sensitive/ natural habitat types (including plant diversity & abundance)	**Nature of impact:**	Destruction or degradation of remaining natural habitat during the development is irreversible. Although natural habitat is represented in surrounding region, destruction of local variations and communities are likely to cause changes in abundance of certain plants and habitat types on a local scale							
	without	4	5	8	5	**85**	**High**	-	High
	with	4	5	8	4	**68**	**High**	-	Medium
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	10	5	**85**	**High**	-	High
	with	3	4	6	5	**65**	**High**	-	Medium
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	3	4	8	5	**75**	**High**	-	High
	with	3	4	6	5	**65**	**High**	-	Medium
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	3	4	6	5	**65**	**High**	-	High
	with	3	4	6	4	**52**	**Medium**	-	Medium
Ash Disposal Facility - Alternative D									
Potential Impact	**Mitigation**	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**		**Status**	**Confidence**

Potential Impact	Mitigation	Extent	Duration	Magnitude	Probability	Significance		Status	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)		(+ve or -ve)	
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)		(+ve or -ve)	
Impacts on flora species of conservation importance (including habitat suitable for these species	**Nature of impact:**	Direct impacts of development of the ashing facillity on plants of conservation importance during construction and site preparation activities, such as soil disturbances and topsoil stripping. Also include impacts in habitat that are associated with the presence of conservation important species, although not necessarily recorded on the site							
	without	4	5	10	5	**95**	**High**	-	High
	with	4	5	10	4	**76**	**High**	-	High
Impacts on fauna species of conservation importance (including habitat suitable for these species)	**Nature of impact:**	Direct impacts of the development on animals of conservation importance during construction and site preparation asctivities, such as accidental killing and, particularly, habitat destruction. Also include impacts in habitat that are associated with the potential presence of conservation important species, although not necessarily recorded on the site during this assessment							
	without	4	5	10	5	**95**	**High**	-	High
	with	4	5	10	4	**76**	**High**	-	High
Impacts on unique or protected habitat types (including loss and degradation)	**Nature of impact:**	Destruction or degradation of important/ protected ecological types that are typically restricted in distribution and also typically high in biodiversity. Wetlands are important in regards to the study area							
	without	4	5	10	5	**95**	**High**	-	High
	with	4	5	10	4	**76**	**High**	-	High
Loss of sensitive/ natural habitat	**Nature of impact:**	Destruction or degradation of remaining natural habitat during the development is irreversible. Although natural habitat is represented in surrounding region, destruction of local variations and communities are likely to cause changes in abundance of certain plants and habitat types on a local scale							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
types (including plant diversity & abundance)	**without**	4	5	10	5	**95**	**High**	-	High
	with	4	5	10	4	**76**	**High**	-	Medium
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	10	5	**85**	**High**	-	High
	with	3	4	8	5	**75**	**High**	-	Medium
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	3	4	8	5	**75**	**High**	-	High
	with	3	4	6	5	**65**	**High**	-	Medium
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	3	4	6	5	**65**	**High**	-	High
	with	3	4	6	4	**52**	**Medium**	-	Medium
Ash Disposal Facility - Alternative E									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**

Potential Impact	Mitigation	Extent	Duration	Magnitude	Probability	Significance		Status	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)		(+ve or -ve)	
Impacts on flora species of conservation importance (including habitat suitable for these species	**Nature of impact:**	Direct impacts of development of the ashing facillity on plants of conservation importance during construction and site preparation activities, such as soil disturbances and topsoil stripping. Also include impacts in habitat that are associated with the presence of conservation important species, although not necessarily recorded on the site							
	without	4	5	10	5	**95**	**High**	-	High
	with	4	5	10	4	**76**	**High**	-	High
Impacts on fauna species of conservation importance (including habitat suitable for these species)	**Nature of impact:**	Direct impacts of the development on animals of conservation importance during construction and site preparation asctivities, such as accidental killing and, particularly, habitat destruction. Also include impacts in habitat that are associated with the potential presence of conservation important species, although not necessarily recorded on the site during this assessment							
	without	4	5	10	5	**95**	**High**	-	High
	with	4	5	10	4	**76**	**High**	-	High
Impacts on unique or protected habitat types (including loss and degradation)	**Nature of impact:**	Destruction or degradation of important/ protected ecological types that are typically restricted in distribution and also typically high in biodiversity. Wetlands are important in regards to the study area							
	without	4	5	10	5	**95**	**High**	-	High
	with	4	5	10	4	**76**	**High**	-	High
Loss of sensitive/ natural habitat types (including plant diversity & abundance)	**Nature of impact:**	Destruction or degradation of remaining natural habitat during the development is irreversible. Although natural habitat is represented in surrounding region, destruction of local variations and communities are likely to cause changes in abundance of certain plants and habitat types on a local scale							
	without	4	5	10	5	**95**	**High**	-	High
	with	4	5	10	4	**76**	**High**	-	Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	10	5	**85**	**High**	-	High
	with	3	4	6	5	**65**	**High**	-	Medium
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	3	4	8	5	**75**	**High**	-	High
	with	3	4	6	5	**65**	**High**	-	Medium
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	3	4	6	5	**65**	**High**	-	High
	with	3	4	6	4	**52**	**Medium**	-	Medium
AVIFAUNA									
Ash Disposal Facility - Alternative A									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Disturbance	**Nature of impact:**	Noise and movement, from staff and machinery, may disturb avifauna, and nests my be disturbed.							
	without	2	4	6	4	**48**	**Medium**		Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	with	2	4	4	3	**30**	**Low**		Medium
	degree to which impact can be reversed:	Partially reversible							
	degree of impact on irreplaceable resources:	Low							
Habitat Destruction	**Nature of impact:**	Permanent removal of habitat that is used, or may be used, by avifauna.							
	without	1	5	4	5	**50**	**Medium**		Medium
	with	1	5	4	5	**50**	**Medium**		Medium
	degree to which impact can be reversed:	Irreversible							
	degree of impact on irreplaceable resources:	Medium							
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Disturbance	**Nature of impact:**	Noise and movement, from staff and machinery, may disturb avifauna, and nests my be disturbed.							
	without	2	4	6	4	**48**	**Medium**		Medium
	with	2	4	4	3	**30**	**Low**		Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree to which impact can be reversed:	Partially reversable							
	degree of impact on irreplaceable resources:	Low							
Habitat Destruction	**Nature of impact:**	Permanent removal of habitat that is used, or may be used, by avifauna.							
	without	1	5	6	5	**60**	**Medium**		Medium
	with	1	5	6	5	**60**	**Medium**		Medium
	degree to which impact can be reversed:	Irreversible							
	degree of impact on irreplaceable resources:	Medium							
Ash Disposal Facility - Alternative C									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Disturbance	**Nature of impact:**	Noise and movement, from staff and machinery, may disturb avifauna, and nests my be disturbed.							
	without	2	4	6	4	**48**	**Medium**		Medium
	with	2	4	4	3	**30**	**Low**		Medium
	degree to which impact can be reversed:	Partially reversible							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree of impact on irreplaceable resources:	Low							
Habitat Destruction	**Nature of impact:**	Permanent removal of habitat that is used, or may be used, by avifauna.							
	without	1	5	4	5	**50**	**Medium**		Medium
	with	1	5	4	5	**50**	**Medium**		Medium
	degree to which impact can be reversed:	Irreversible							
	degree of impact on irreplaceable resources:	Medium							
Ash Disposal Facility - Alternative D									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Disturbance	**Nature of impact:**	Noise and movement, from staff and machinery, may disturb avifauna, and nests may be disturbed.							
	without	2	4	6	4	**48**	**Medium**		Medium
	with	2	4	4	3	**30**	**Low**		Medium
	degree to which impact can be reversed:	Partially reversible							
	degree of impact on irreplaceable resources:	Low							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Habitat Destruction	**Nature of impact:**	Permanent removal of habitat that is used, or may be used, by avifauna.							
	without	1	5	4	5	**50**	**Medium**		Medium
	with	1	5	4	5	**50**	**Medium**		Medium
	degree to which impact can be reversed:	Irreversible							
	degree of impact on irreplaceable resources:	Medium							
Ash Disposal Facility - Alternative E									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Disturbance	**Nature of impact:**	Noise and movement, from staff and machinery, may disturb avifauna, and nests may be disturbed.							
	without	2	4	6	4	**48**	**Medium**		Medium
	with	2	4	4	3	**30**	**Low**		Medium
	degree to which impact can be reversed:	Partially reversible							
	degree of impact on irreplaceable resources:	Low							
Habitat Destruction	**Nature of impact:**	Permanent removal of habitat that is used, or may be used, by avifauna.							
	without	1	5	6	5	**60**	**Medium**		Medium
	with	1	5	6	5	**60**	**Medium**		Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree to which impact can be reversed:	Irreversible							
	degree of impact on irreplaceable resources:	Medium							
HERITAGE									
Destruction of heritage sites and features	**Nature of impact:**	Destruction of heritage sites.							
	with mitigation	1	5	4	3	**30**	**Low**	-	High
	without mitigation	1	5	4	3	**30**	**Low**	-	High
	degree to which impact can be reversed:	Mitigation through excavation/documentation							High
	degree of impact on irreplaceable resources:	Not Applicable							High
VISUAL									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Transformation of the visual quality of the landscape	**Nature of impact:**	A new ash disposal facility will be developed on the selected site. This will be introduced as new features into the landscape, with moderate adverse visual impacts. No visual impacts are expected during construction of the facility.							
	with	2	2	2	5	**30**	**Low**	-	High

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	without	2	2	2	5	**30**	**Low**	-	High
	degree to which impact can be reversed:	The impact during construction cannot be reversed.							
	degree of impact on irreplaceable resources:	N/A							
SOCIAL									
Impact 1: Economic Development through employment	**Nature of impact:**	The impact is considered to minor, although positive, as most of the work will be undertaken by internal / existing Eskom employees. However where outside contractors are required economic development will be positively impacted.							
	with mitigation	3	3	4	3	**30**	**Low**	+	Medium
	without mitigation	2	2	2	3	**18**	**Low**	+	Medium
	degree to which impact can be reversed:	Moderate							medium
	degree of impact on irreplaceable resources:	Not Applicable							-
Impact 2: Inflow of temporary workers	**Nature of impact:**	Any construction activity will attract those looking for work and it is considered likely that there will be an influx of temporary workers seeking employment							
	with mitigation	2	2	2	3	**18**	**Low**	-	Medium
	without mitigation	2	2	2	3	**18**	**Low**	-	Medium
	degree to which impact can be reversed:	Moderate							Medium
	degree of impact on irreplaceable resources:	Not Applicable							-
Impact 3:	**Nature of impact:**	The construction phase of the new ash disposal facility will result in increased PM10 concentrations due to groundwork's							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Health Risk from elevated PM 10 Concentrations	**with mitigation**	1	4	4	3	**27**	**Low**	-	Medium
	without mitigation	2	4	6	4	**48**	**Medium**	-	Medium
	degree to which impact can be reversed:	High – with the implementation of the relevant mitigation measures							Medium
	degree of impact on irreplaceable resources:	Not Applicable							-
Impact 4: Nuisance from elevated dustfall rates	**Nature of impact:**	The construction phase of the new ash disposal facility will result in increased dust fall rates due to groundwork's							
	with mitigation	1	4	4	3	**27**	**Low**	-	Medium
	without mitigation	2	4	6	4	**48**	**Medium**	-	Medium
	degree to which impact can be reversed:	High – with the implementation of the relevant mitigation measures							Medium
	degree of impact on irreplaceable resources:	Not Applicable							-
Dry ash disposal facility - No-Go Alternative									
GEOLOGY									
In the event that the ash disposal facility is not constructed, there will be no impact on the underlying geology, therefore the status quo will remain.									
AGRICULTURAL POTENTIAL									
In the event that the ash disposal facility is not constructed, there will be no impact on the existing agricultural potential of the land in question, therefore the status quo will remain.									
GROUND WATER									
Impact 1: No change to groundwater conditions at the site	**Nature of impact:**	If the ash disposal facility is not implemented, then it is likely that there will be no change to the groundwater conditions underlying the proposed site, both in terms of quality and groundwater quality.							
	with mitigation	2	1	4	4	**28**	**Low**	+	high
	without mitigation	2	1	4	4	**28**	**Low**	+	high

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree to which impact can be reversed:	This positive impact (i.e. not building the ash disposal facility) could be reversed if some future activity affected the groundwater underlying the proposed site.							
	degree of impact on irreplaceable resources:	Groundwater resource near the proposed site is not considered to be irreplaceable, in the sense that alternative sources of water can be found if needed.							
SURFACE WATER									
Impact 1: Impacts associated with the surrounding catchment	**Nature of impact:**	The impacts associated with primary study area in its current state include: agricultural and industrial impacts as well as severe hydrological alterations.							
	with mitigation	3	4	8	4	**60**	**Medium**	+	High
	without mitigation	3	4	8	4	**60**	**Medium**	+	High
	degree to which impact can be reversed:	The impacts associated with the wetlands in the primary study area will not be easily reversed due to their altered state							Medium
	degree of impact on irreplaceable resources:	The state of the wetlands located within the primary study area is already in an impacted state as a result of anthropogenic activities taking place in the surrounding catchment							High
BIODIVERSITY									
In the event that the ash disposal facility is not constructed, no biodiversity impacts are expected and the status quo will remain.									
AVIFAUNA									
In the event that the ash disposal facility is not constructed, no avifauna impact can be expected and the status quo will remain.									
HERITAGE									
In the event that the ash disposal facility is not constructed, no Heritage impact can be expected as the grave will not be disturbed and the status quo will remain.									
VISUAL									
In the event that the ash disposal facility is not constructed, no visual impact can be expected and the status quo will remain.									
SOCIAL									
Impact 1: Economic Development through	**Nature of impact:**	In the event that the Power Station should close in the future as a result of lack of ashing space, many employees may lose their jobs, however, it is considered likely that a number of them would be able to find alternative work due to the fact that there are few unskilled employees at the Majuba power station							
	with mitigation	2	3	4	3	**27**	**Low**	-	Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
employment	**without mitigation**	2	3	6	4	**44**	**Medium**	-	Medium
	degree to which impact can be reversed:	Moderate – this impact can be mitigated by ensuring that the social closure objectives are implemented. Although job losses are of great concern there is an increase in mining activity in the area which could provide new employment opportunities							medium
	degree of impact on irreplaceable resources:	Not Applicable							-
Impact 2: Continued supply of electricity from Majuba power station	**Nature of impact:**	If the ash disposal facility is not constructed the power station will need to be closed once the existing ash disposal facilities are at their full capacity, this is expected to be 2018 at the current rates of ash disposal							
	with mitigation	No mitigation							High
	without mitigation	4	4	6	5	**70**	**High**	-	High
	degree to which impact can be reversed:	Moderate – this impact can only be avoided and reversed if the new wet ash disposal facility is constructed							High
	degree of impact on irreplaceable resources:	Not Applicable							-

Table 9.0.2: Detailed assessment of identified impacts for the Operational Phase – Ash disposal facility

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
GEOLOGY									
Impact 1: Pollution of geological features in case of spillage or leakage of hydrocarbon and other hazardous material	**Nature of impact:**	Spillages and leaks from fuels, oil and other potentially hazardous substances during handling, use and storage can be kept to a minimum by applying a good housekeeping approach and observing and implementing the relevant mitigation measures.							
	with mitigation	1	1	2	2	**8**	**Low**	Neutral	High
	without mitigation	3	4	6	3	**39**	**Medium**	-	High
	degree to which impact can be reversed:	Low							Medium
	degree of impact on irreplaceable resources:	Low							High
AGRICULTURAL POTENTIAL									
Ash Disposal Facility - Alternative A									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Loss of agricultural soil	**Nature of impact:**	Unavailability of soil resource for agriculture due to positioning of ADF							
	without	1	5	10	5	**80**	**High**	-	Confident
	with	1	5	10	5	**80**	**High**		
	degree to which impact can be reversed:	Impossible to reverse as soils will be completely and permanently covered by ADF							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree of impact on irreplaceable resources:	Limited proportion of high potential soils means that there will not be a large-scale loss of irreplaceable resources within the local soil pattern.							
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Loss of agricultural soil	**Nature of impact:**	Unavailability of soil resource for agriculture due to positioning of ADF							
	without	1	5	10	5	**80**	**High**	-	Confident
	with	1	5	10	5	**80**	**High**		
	degree to which impact can be reversed:	Impossible to reverse as soils will be completely and permanently covered by ADF							
	degree of impact on irreplaceable resources:	Probable higher proportion of high potential soils means that there will be some loss of irreplaceable resources within the local soil pattern.							
Ash Disposal Facility - Alternative C									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Loss of agricultural soil	**Nature of impact:**	Unavailability of soil resource for agriculture due to positioning of ADF							
	without	1	5	10	5	**80**	**High**	-	Confident
	with	1	5	10	5	**80**	**High**		

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)	Status (+ve or -ve)	Confidence
	degree to which impact can be reversed:	Impossible to reverse as soils will be completely and permanently covered by ADF						
	degree of impact on irreplaceable resources:	Limited proportion of high potential soils means that there will not be a large-scale loss of irreplaceable resources within the local soil pattern.						
Ash Disposal Facility - Alternative D								
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**
Loss of agricultural soil	**Nature of impact:**	Unavailability of soil resource for agriculture due to positioning of ADF						
	without	1	5	10	5	**80**	**High**	-	Confident
	with	1	5	10	5	**80**	**High**		
	degree to which impact can be reversed:	Impossible to reverse as soils will be completely and permanently covered by ADF						
	degree of impact on irreplaceable resources:	Limited proportion of high potential soils means that there will not be a large-scale loss of irreplaceable resources within the local soil pattern.						
Ash Disposal Facility - Alternative E								
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Loss of agricultural soil	**Nature of impact:**	Unavailability of soil resource for agriculture due to positioning of ADF							
	without	1	5	10	5	**80**	**High**	-	Confident
	with	1	5	10	5	**80**	**High**		
	degree to which impact can be reversed:	Impossible to reverse as soils will be completely and permanently covered by ADF							
	degree of impact on irreplaceable resources:	Limited proportion of high potential soils means that there will not be a large-scale loss of irreplaceable resources within the local soil pattern.							
Linear Infrastructure Corridor									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Loss of agricultural soil	**Nature of impact:**	Unavailability of soil resource for agriculture due to positioning of ADF							
	without	1	4	4	4	**36**	**Medium**	-	
	with	1	4	2	4	**28**	**Low**	-	
	degree to which impact can be reversed:	Only surface infrastructure will be involved, which can be restored at a later stage if care is taken during life of project							
	degree of impact on irreplaceable resources:	Potential wetland crossings are cause for concern - special care needs to be taken at such places to minimize impacts on wetland soils and ecosystems							
	with mitigation	1	1	2	4	**8**	**Low**	-	High
	without mitigation	3	4	6	3	**39**	**Medium**	-	High

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)	Status (+ve or -ve)	Confidence
GROUND WATER								
Ash Disposal Facility - All alternatives								
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**
Deterioration of groundwater quality due to leachate from ash disposal facility	**Nature of impact:**	Rainwater percolating through the ash disposed will dissolve potential contaminants in the ash (e.g. SO4, Hg, F, Na) and carry these contaminants downwards into the local groundwater.						
	without	2	4	4	4	**40**	**Medium**	-	Medium
	with	1	4	2	4	**28**	**Low**	-	Medium
	degree to which impact can be reversed:	It will be difficult to reverse this impact during ash dam operation. It is more feasible to reduce the amount of leachate as much as possible by ensuring that the under-drain and related systems (e.g. liner if installed) work as designed. When deposition ceases, natural attenuation over many years is likely to slowly reverse the impact. Installation of topsoil and revegetation during operations - i.e. as the disposal facility grows, rehabilitation is carried out behind the disposal area - will help to reduce both infiltration and runoff.						Medium
	degree of impact on irreplaceable resources:	Impact likely to be on local groundwater only, which is not irreplaceable.						Medium
Rise in local water table due to additional recharge caused by ash deposition and possible concentration of recharge	**Nature of impact:**	Possible rise in the water table as ash is deposited and recharge is potentially concentrated / increased. The rate of rise will depend on the rate of leachate migration in the ash disposal facility, and this is not known with certainty.						
	without	1	4	4	4	**36**	**Medium**	-	Medium
	with	1	4	2	3	**21**	**Low**	-	Medium
	degree to which impact can be reversed:	Difficult to entirely reverse this impact. A full liner used under the ash disposal facility would mostly prevent it, but would be very expensive. Leakage from surface water containment facilities such as toe drains and dirty water dams should be minimised by good maintenance, lining, and flood planning / prevention.						Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree of impact on irreplaceable resources:	Impact likely to be on local groundwater only, which is not irreplaceable.							Medium
Groundwater contamination in local area due to infiltration from surface water polluted by the ash disposal facility.	**Nature of impact:**	Surface water that is being impounded near the ash disposal facility and which is polluted by runoff from the ash disposal facility may leak from surface water impoundments into surface water system, and infiltrate into groundwater some distance (most likely local area) from the ash disposal facility.							
	without	2	4	4	3	**30**	**Low**	-	High
	with	1	2	2	2	**10**	**Low**	-	High
	degree to which impact can be reversed:	Impact can be reversed successfully if all surface water infrastructure kept in good condition and appropriately designed (e.g. for flood events)							Medium
	degree of impact on irreplaceable resources:	Impact likely to be on regional groundwater which may be expensive to replace if it is a sole source of supply to a nearby farm, for example.							Medium
Change in local groundwater flow directions due to possible rise in local water table	**Nature of impact:**	It is possible that the groundwater flow directions will be altered locally due to the rise or "mounding" of the local water table. This may affect some local springs and seeps (both in terms of volume and quality).							
	without	2	4	2	3	**24**	**Low**	-	Medium
	with	1	4	2	3	**21**	**Low**	-	Medium
	degree to which impact can be reversed:	Difficult to entirely reverse this impact unless a full liner is used under the ash disposal facility. Once the ash disposal facility is closed and revegetated groundwater levels in the vicinity will probably slowly return to their original state.							Medium
	degree of impact on irreplaceable resources:	Impact likely to be on local groundwater only, which is not irreplaceable.							Medium
SURFACE WATER									
Ash Disposal Facility - Alternative A									

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Impacts on hydrology and subsequent loss of functional integrity of downslope wetlands	**Nature of impact:**	Alternative A drains into two receiving floodplain systems. Considering the sub-catchment hydrological contributions to these floodplain systems, this impact scored a medium significance. Provided the floodplain systems are not infringed on this impact can decrease further in significance.							
	without	3	5	8	3	**48**	**Medium**	-	3
	with	3	5	8	2	**32**	**Medium**	-	3
	degree to which impact can be reversed:	Cannot be readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Impacts on surface water quality of downslope systems	**Nature of impact:**	Receiving Wetlands 3 and 7 are relatively well buffered- due to the presence of localised depressions and the nature of soil on this property. However some contamination during the operational phase is still likely. This impact can be mitigated through lining and isolating the ash disposal facility from the surrounding watercourses.							
	without	3	5	8	4	**64**	**High**	-	3
	with	3	5	8	3	**48**	**Medium**	-	3
	degree to which impact can be reversed:	Can not be readily reversed							3
	degree of impact on irreplaceable resources:	Low							3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Impacts on hydrology and subsequent loss of functional integrity	**Nature of impact:**	Downslope and upslope hydrological impacts of High significance are expected for Wetland 3B. This impact might be mitigated by diverting water underneath or around the ashing facility- however this is likely to pose other ecological risks.							
	without	5	5	4	5	**70**	**High**	-	3
	with	5	5	4	5	**70**	**High**	-	3
	degree to which impact can be reversed:	Can not be readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Impacts on surface water quality	**Nature of impact:**	The topography of Alternative B, along with the extent and lateral connectivity of wetlands to be affected resulted in a High significance for this impact. Affected isolation of the ash disposal facility from the surrounding catchment will be more difficult that for the other alternatives.							
	without	5	5	4	5	**70**	**High**	-	3
	with	5	5	4	4	**56**	**Medium**	-	3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)	Status (+ve or -ve)	Confidence
	degree to which impact can be reversed:	Can not be readily reversed						3
	degree of impact on irreplaceable resources:	Low						3
Ash Disposal Facility - Alternative C								
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**
Impacts on hydrology and subsequent loss of functional integrity	**Nature of impact:**	Proper design of linear infrastructure will mitigate hydrological impacts during the operational phase. Some consideration should be given to the hydrological contribution of Wetland 16 to downslope maintenance- in relation to the other alternatives this impact scores a Medium significance and may be mitigated to some extent.						
	without	2	5	4	5	**55**	**Medium**	-	3
	with	2	5	2	4	**36**	**Medium**	-	3
	degree to which impact can be reversed:	Can not be readily reversed						3
	degree of impact on irreplaceable resources:	Low						3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Impacts on surface water quality	**Nature of impact:**	Lining and isolating the ash disposal facility from surface water systems will be easier on this Alternative; however a Medium risk persists.							
	without	2	5	4	5	**55**	**Medium**	-	3
	with	2	5	4	3	**33**	**Medium**	-	3
	degree to which impact can be reversed:	Can not be readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Ash Disposal Facility - Alternative D									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Impacts on hydrology and subsequent loss of functional integrity	**Nature of impact:**	Small extent wetlands and their headwater catchments to be affected resulted in a lower magnitude and significance score. Possible avoidance of larger wetland areas will further decrease the significance due to the extent and nature of Wetland 16.							
	without	1	5	2	5	**40**	**Medium**		3
	with	1	5	2	4	**32**	**Medium**		3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree to which impact can be reversed:	Can not be readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Impacts on surface water quality	**Nature of impact:**	Small extent wetlands and their headwater catchments to be affected resulted in a lower magnitude and significance score.							
	without	1	5	2	5	**40**	**Medium**	-	3
	with	1	5	2	3	**24**	**Low**	-	3
	degree to which impact can be reversed:	Can not be readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Ash Disposal Facility - Alternative E									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Impacts on hydrology and subsequent loss of functional integrity of downslope wetlands	**Nature of impact:**	Large extent of seeps and the hydrological contribution to downslope valley bottom system resulted in a High significance of this impact for Alternative E. It will not be possible to mitigate this impact							
	without	4	5	8	5	**85**	**High**	-	3
	with	4	5	8	5	**85**	**High**		3
	degree to which impact can be reversed:	Can not be readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Impacts on surface water quality	**Nature of impact:**	The topography of this Alterative carries a larger runoff risk and seeps are connected to downstream valley bottom systems, which are relatively intact. If ash disposal facility can affectively be isolated the impact will decrease to medium significance							
	without	4	5	8	5	**85**	**High**	-	3
	with	4	5	8	3	**51**	**Medium**	-	3
	degree to which impact can be reversed:	Can not be readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
BIODIVERSITY									

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Ash Disposal Facility - Alternative A									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	8	4	**60**	**Medium**	-	High
	with	3	4	6	4	**52**	**Medium**	-	High
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	4	4	8	4	**64**	**High**	-	High
	with	4	4	8	3	**48**	**Medium**	-	High
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	4	4	8	4	**64**	**High**	-	High
	with	4	4	6	4	**56**	**Medium**	-	High
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**		**Status**	**Confidence**

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	8	4	**60**	**Medium**	-	High
	with	3	4	6	3	**39**	**Medium**	-	High
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	4	4	8	4	**64**	**High**	-	High
	with	4	4	6	3	**42**	**Medium**	-	High
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	4	4	**48**	**Medium**	-	High

Ash Disposal Facility - Alternative C								
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	8	5	**75**	**High**	-	High
	with	3	4	6	4	**52**	**Medium**	-	High
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	4	4	8	4	**64**	**High**	-	High
	with	4	4	8	3	**48**	**Medium**	-	High
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	4	4	8	5	**80**	**High**	-	High
	with	4	4	6	4	**56**	**Medium**	-	High
Ash Disposal Facility - Alternative D									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Displacement of fauna species, human-animal	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
conflicts & interactions (including diversity & abundance)	**without**	3	4	8	5	**75**	**High**	-	High
	with	3	4	6	4	**52**	**Medium**	-	High
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	4	4	8	4	**64**	**High**	-	High
	with	4	4	8	3	**48**	**Medium**	-	High
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	4	4	8	5	**80**	**High**	-	High
	with	4	4	6	4	**56**	**Medium**	-	High
Ash Disposal Facility - Alternative E									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Displacement of fauna species, human-animal conflicts & interactions (including diversity &	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	8	5	**75**	**High**	-	High
	with	3	4	6	4	**52**	**Medium**	-	High

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
abundance)									
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	4	4	8	4	**64**	**High**	-	High
	with	4	4	8	3	**48**	**Medium**	-	High
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	4	4	8	4	**64**	**High**	-	High
	with	4	4	6	4	**56**	**Medium**	-	High
AVIFAUNA									
Ash Disposal Facility - Alternative A									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Contamination of surrounding water.	**Nature of impact:**	Leachate containing heavy metals, could result in contamination of water sources, used by water birds.							
	without	2	4	6	3	**36**	**Medium**		Low
	with	2	4	4	2	**20**	**Low**		Low
	degree to which impact can be reversed:	Reversable							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree of impact on irreplaceable resources:	Low							
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Contamination of surrounding water.	**Nature of impact:**	Leachate containing heavy metals, could result in contamination of water sources, used by water birds.							
	without	2	4	6	3	**36**	**Medium**		Low
	with	2	4	4	2	**20**	**Low**		Low
	degree to which impact can be reversed:	Reversible							
	degree of impact on irreplaceable resources:	Low							
Ash Disposal Facility - Alternative C									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Contamination of surrounding water.	**Nature of impact:**	Leachate containing heavy metals, could result in contamination of water sources, used by water birds.							
	without	2	4	6	3	**36**	**Medium**		Low
	with	2	4	4	2	**20**	**Low**		Low

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)	Status (+ve or -ve)	Confidence
	degree to which impact can be reversed:	Reversible						
	degree of impact on irreplaceable resources:	Low						
Ash Disposal Facility - Alternative D								
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**
Contamination of surrounding water.	**Nature of impact:**	Leachate containing heavy metals, could result in contamination of water sources, used by water birds.						
	without	2	4	6	3	**36**	**Medium**	Low
	with	2	4	4	2	**20**	**Low**	Low
	degree to which impact can be reversed:	Reversible						
	degree of impact on irreplaceable resources:	Low						
Ash Disposal Facility - Alternative E								
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Contamination of surrounding water.	**Nature of impact:**	Leachate containing heavy metals, could result in contamination of water sources, used by water birds.							
	without	2	4	6	3	**36**	**Medium**		Low
	with	2	4	4	2	**20**	**Low**		Low
	degree to which impact can be reversed:	Reversible							
	degree of impact on irreplaceable resources:	Low							
VISUAL									
Visual exposure of the newly introduced ash disposal facility	**Nature of impact:**	Visual exposure of the newly introduced ash disposal facility is expected to create additional visual impacts by adding a new feature to the landscape that is large in spatial dimensions.							
	with	2	4	4	5	**50**	**Medium**	-	High
	without	2	4	6	5	**60**	**Medium**	-	High
	degree to which impact can be reversed:	Views of the ash disposal facility are expected to be absorbed visually into the mass and scale of the existing features, particularly as the appearance of the power station at large. By vegetating the side slopes of ash disposal facility, the visual impact can further be reduced.							
	degree of impact on irreplaceable resources:	N/A							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Transforming the visual quality and sense of place of the landscape	**Nature of impact:**	The historical visual quality of the area as an agricultural landscape has been transformed by the development of Majuba Power Station. It is expected that the proposed new development would add to cumulative impacts, but would not further degrade the visual quality and sense of place of the landscape.							
	with	2	4	4	3	**30**	**Low**	-	Medium
	without	2	4	6	5	**60**	**Medium**	-	High
	degree to which impact can be reversed:	The visual appearance of stockpile, consisting of topsoil, subsoil and overburden, can be changed by planting grass, shrubs and trees on the slopes that are visually exposed to the surrounding area. This will increase the possibility of visual absorption into the landscape in terms of texture and colour.							
SOCIAL									
Continued generation of electricity for the national grid	**Nature of impact:**	A positive impact through the continued provision of electricity to the region and the national grid							
	with mitigation	4	5	6	5	**75**	**High**	+	Medium
	without mitigation	4	5	6	5	**75**	**High**	+	Medium
	degree to which impact can be reversed:	Not Applicable							Medium
	degree of impact on irreplaceable resources:	High – through the continued supply of electricity more use will be made of non-renewable resources such as coal.							Medium
Health Risk from elevated PM 10 Concentrations	**Nature of impact:**	The new ash disposal facility will potentially result in increased PM10 concentrations in the local area							
	with mitigation	1	4	4	3	**27**	**Low**	-	Medium
	without mitigation	2	4	6	4	**48**	**Medium**	-	Medium
	degree to which impact can be reversed:	Moderate with the implementation of the relevant mitigation measures							Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree of impact on irreplaceable resources:	Not applicable							Medium
Nuisance from elevated dustfall rates	**Nature of impact:**	The continuation of the ash disposal facility will potentially result in increased dust fall rates in the local area							
	with mitigation	1	4	4	3	**27**	**Low**	-	Medium
	without mitigation	2	4	6	4	**48**	**Medium**	-	Medium
	degree to which impact can be reversed:	Moderate with the implementation of the relevant mitigation measures							Medium
	degree of impact on irreplaceable resources:	Not applicable							Medium
Ash disposal facility - No-Go Alternative									
GROUND WATER									
Impact 1: No change to groundwater conditions at the site	**Nature of impact:**	If the ash disposal facility is not built, then it is likely that there will be no change to the groundwater conditions underlying the proposed site, both in terms of quality and groundwater quality.							
	with mitigation	2	4	4	4	**40**	**Medium**	+	medium
	without mitigation	2	4	4	4	**40**	**Medium**	+	medium
	degree to which impact can be reversed:	This positive impact (i.e. not building the ash disposal facility) could be reversed if some future activity affected the groundwater underlying the proposed site.							medium
	degree of impact on irreplaceable resources:	The groundwater resource at the proposed site is not considered to be irreplaceable, in the sense that alternative sources of water can be found if needed.							medium
SURFACE WATER									
If the ash disposal facility is not constructed or operated, there will be no change to existing surface water conditions, and hence no potential impacts.									
BIODIVERSITY									
If the ash disposal facility is not constructed or operated, there is likely to be no change to existing conditions, and therefore no additional impacts on biodiversity are anticipated									
AVIFAUNA									

Potential Impact	Mitigation	Extent	Duration	Magnitude	Probability	Significance	Status	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)	(+ve or -ve)	
If the ash disposal facility is not constructed or operated, there is likely to be no change to existing conditions, and therefore no potential impact on the avifauna is anticipated								
VISUAL								
If the ash disposal facility is not constructed or operated, there is likely to be no change to existing conditions, and therefore no potential visual impacts are anticipated								
SOCIAL								
If the ash disposal facility is not constructed or operated, the power station might have to close down with negative impacts on the local community								

Table 9.0.3: Detailed assessment of identified impacts for the De-Commissioning Phase – Ash disposal facility

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
GROUND WATER									
Ash Disposal Facility - All alternatives									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Deterioration of groundwater quality due to leachate from ash disposal facility	**Nature of impact:**	Leachate from the ash disposal facility is likely to continue to percolate downwards even when slurry disposal has ceased, albeit at a much lower rate.							
	without	2	3	2	4	**28**	**Low**	-	Medium
	with	2	2	2	4	**24**	**Low**	-	Medium
	degree to which impact can be reversed:	This impact can be significantly mitigated against, but cannot be entirely reversed. If the drainage system is kept functional, groundwater monitoring continues and the ash disposal facility is vegetated and vegetation maintained then downward drainage of leachate into the groundwater will be minimised.							Medium
	degree of impact on irreplaceable resources:	The impact on local groundwater is thought to be low, and the local groundwater resource could be replaced by other water resources if necessary.							Medium
Minor changes to local water table and local groundwater flow direction	**Nature of impact:**	Once decommissioned, the water table under the ash disposal facility should begin to decline again, since the volume of water migrating downwards will be lower. However, there is likely to be a small residual effect on water table, since the infiltration and recharge characteristics of the overlying rehabilitated ash dam will not be the same as those of the original landcover. This may lead to a slight rise in water table and potential local changes in groundwater flow direction. These effects are likely to be minor, and limited to the local area.							
	without	2	4	2	3	**24**	**Low**	-	Medium
	with	2	3	2	3	**21**	**Low**	-	Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree to which impact can be reversed:	The impact can be lessened by vegetating the ash disposal facility, maintaining the vegetation, and preventing erosion etc, which will reduce movement of water /leachate downwards once ash depostion has ceased. The full impact would be difficult to reverse however, since this would most likely involve removing the rehabilitated ash disposal facility.							Medium
	degree of impact on irreplaceable resources:	Minor impact only.							Medium
Groundwater contamination in local area due to infiltration from surface water polluted by the ash disposal facility.	**Nature of impact:**	Surface water that is being impounded near the ash disposal facility and which is polluted by runoff from the ash disposal facility may leak from surface water impoundments into surface water system, and infiltrate into groundwater some distance (most likely local area) from the ash disposal facility.							
	without	2	4	4	3	**30**	**Low**	-	High
	with	1	2	2	2	**10**	**Low**	-	High
	degree to which impact can be reversed:	Impact can be reversed successfully if all surface water infrastructure kept in good condition and appropriately designed (e.g. for flood events)							Medium
	degree of impact on irreplaceable resources:	Impact likely to be on regional groundwater which may be expensive to replace if it is a sole source of supply to a nearby farm, for example.							Medium
SURFACE WATER									
No Impacts were predicted for the decommissioning phase by the specialist.									
BIODIVERSITY									
Ash Disposal Facility - Alternative A									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Displacement of	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacent areas of natural habitat, the presence of construction personnel,							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
fauna species, human-animal conflicts & interactions (including diversity & abundance)		vehicles and activities will likely result in conflict situations							
	without	3	4	6	5	**65**	**High**	-	High
	with	3	4	4	4	**44**	**Medium**	-	Medium
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	6	3	**42**	**Medium**	-	Medium
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	6	3	**42**	**Medium**	-	Medium
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Displacement of fauna species, human-animal conflicts & interactions (including diversity &	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacent areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	6	4	**52**	**Medium**	-	High
	with	3	4	4	3	**33**	**Medium**	-	Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
abundance)									
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	6	3	**42**	**Medium**	-	Medium
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	6	3	**42**	**Medium**	-	Medium

Ash Disposal Facility - Alternative C

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	6	5	**65**	**High**	-	High
	with	3	4	4	4	**44**	**Medium**	-	Medium
Impacts on ecological connectivity and ecosystem	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	4	4	6	4	**56**	**Medium**	-	High

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
functioning;	**with**	4	4	6	3	**42**	**Medium**	-	Medium
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	6	3	**42**	**Medium**	-	Medium
Ash Disposal Facility - Alternative D									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	6	5	**65**	**High**	-	High
	with	3	4	4	4	**44**	**Medium**	-	Medium
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	6	3	**42**	**Medium**	-	Medium
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	6	3	**42**	**Medium**	-	Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Ash Disposal Facility - Alternative E									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	**Nature of impact:**	Naturally occurring fauna species will be displaced into adjacend areas of natural habitat, the presence of construction personnel, vehicles and activities will likely result in conflict situations							
	without	3	4	8	4	**60**	**Medium**	-	High
	with	3	4	6	3	**39**	**Medium**	-	Medium
Impacts on ecological connectivity and ecosystem functioning;	**Nature of impact:**	The transformed nature of the landscape places a high premium on remaining natural habitat to serve as migration corridors. Effective ecological functioning of the habitat is also dependent on a minimum availability of natural habitat. Transformation of natural habitat increases disruption of movement corridors and functionality							
	without	4	4	8	3	**72**	**High**	-	High
	with	4	4	6	2	**28**	**Low**	-	Medium
Indirect impacts on surrounding habitat	**Nature of impact:**	Impacts on surrounding habitat can potentially include all of the above, as well as additional impacts such as habitat degradation and deterioration due to leaching, effluents, dust, etc							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	4	4	**48**	**Medium**	-	Medium
VISUAL									
Permanent transformation of the landscape	**Nature of impact:**	Stockpile highly visible in the horizon are visible as man-made structures. Should these remain as permanent features, the visual impact will remain permanently							
	with	2	4	4	3	**30**	**Low**		Medium
	without	3	5	6	5	**70**	**High**		Medium

Potential Impact	Mitigation	Extent	Duration	Magnitude	Probability	Significance	Status	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)	(+ve or -ve)	
	degree to which impact can be reversed:	The impact can be reversed by removal of the ash and restoring the vegetation to its original state.						
	degree of impact on irreplaceable resources:							

Table 9.0.4: Detailed assessment of identified cumulative impacts – Ash disposal facility

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)	Status (+ve or -ve)	Confidence
GROUND WATER								
Ash Disposal Facility - All alternatives								
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**
Deterioration of groundwater quality due to leachate from ash disposal facility	**Nature of impact:**	The ash disposal facility is likely to lead to deterioration of local groundwater quality, which will be most severe during facility operation but which will likely persist in some form long after the ash disposal facility has been decommissioned. This is because leachate will continue to be generated from the ash by natural rainfall percolation, even after ash stacking / deposition has ended.						
	without	2	4	6	4	**48**	**Medium**	-	Medium
	with	2	4	2	4	**32**	**Medium**	-	Medium
	degree to which impact can be reversed:	The impact can be lessened but not reversed completely by maintaining good practices during ash disposal facility construction and operation, and by revegetating and maintaining the ash disposal facility after closure. The cumulative impact WITH mitigation assumes that a very low permeability liner has been installed.						Medium
	degree of impact on irreplaceable resources:	The degree of impact on irreplaceable resources is thought to be low, since local groundwater resources are limited and are theoretically replaceable with alternatives. However, local groundwater users who have no other convenient alternatives may need to have alternative supplies provided, which may be expensive.						Medium
Rise in local water table and minor changes to local groundwater flow directions	**Nature of impact:**	Once decommissioned, the water table under the ash disposal facility should begin to decline again, since the volume of water migrating downwards will be lower. However, there is likely to be a small residual effect on water table, since the infiltration and recharge characteristics of the overlying rehabilitated ash dam will not be the same as those of the original Landover. This may lead to a slight rise in water table and potential local changes in groundwater flow direction. These effects are likely to be minor, and limited to the local area.						
	without	2	4	4	4	**40**	**Medium**	-	Medium

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	with	1	3	2	3	**18**	**Low**	-	Medium
	degree to which impact can be reversed:	The impact can be lessened by vegetating the ash disposal facility, maintaining the vegetation, and preventing erosion etc, which will reduce movement of water /leachate downwards once ash deposition has ceased. The full impact would be difficult to reverse however, since this would most likely involve removing the rehabilitated ash disposal facility.							Medium
	degree of impact on irreplaceable resources:	The degree of impact on irreplaceable resources is thought to be low, since local groundwater resources are limited and are theoretically replaceable with alternatives							Medium
Groundwater contamination in local area due to infiltration from surface water polluted by the ash disposal facility.	**Nature of impact:**	Surface water that is being impounded near the ash disposal facility and which is polluted by runoff from the ash disposal facility may leak from surface water impoundments into surface water system, and infiltrate into groundwater some distance (most likely local area) from the ash disposal facility.							
	without	2	4	6	3	**36**	**Medium**	-	High
	with	1	2	2	2	**10**	**Low**	-	High
	degree to which impact can be reversed:	Impact can be reversed successfully if all surface water infrastructure kept in good condition and appropriately designed (e.g. for flood events). This includes toe drains, dirty water / return water dams, and other surface water infrastructure.							Medium
	degree of impact on irreplaceable resources:	Impact likely to be on regional groundwater which may be expensive to replace if it is a sole source of supply to a nearby farm, for example.							Medium
SURFACE WATER									
Ash Disposal Facility - Alternative A									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Decrease PES of wetland type and downstream watercourse	**Nature of impact:**	Directly receiving watercourses are relatively well buffer, while further downstream system are moderately transformed, resulting a Medium significance.							
	without	3	5	8	3	**48**	**Medium**	-	3
	with	3	5	8	2	**32**	**Medium**	-	3
	degree to which impact can be reversed:	Can not be readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Decrease PES of wetland type and downstream watercourse	**Nature of impact:**	Directly receiving watercourses are not buffered and will respond aggressively.							
	without	5	5	4	5	**70**	**High**	-	3
	with	5	5	4	5	**70**	**High**	-	3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
	degree to which impact can be reversed:	Can not be readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Ash Disposal Facility - Alternative C									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Decrease PES of wetland type and downstream watercourse	**Nature of impact:**	Directly receiving watercourses are relatively well buffer, while further downstream system are moderately transformed, resulting a Medium significance.							
	without	2	5	4	5	**55**	**Medium**	-	3
	with	2	5	2	4	**36**	**Medium**	-	3
	degree to which impact can be reversed:	Can not be readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Ash Disposal Facility - Alternative D									
Potential Impact	**Mitigation**	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**		**Status**	**Confidence**

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Decrease PES of wetland type and downstream watercourse	**Nature of impact:**	Directly receiving watercourses are relatively well buffer, while further downstream system are moderately transformed, resulting a Medium significance.							
	without	1	5	2	5	**40**	**Medium**	-	3
	with	1	5	2	4	**32**	**Medium**	-	3
	degree to which impact can be reversed:	Can not be readily reversed							3
	degree of impact on irreplaceable resources:	Low							3
Ash Disposal Facility - Alternative E									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Decrease PES of wetland type and downstream watercourse	**Nature of impact:**	Directly receiving watercourses are relatively well buffer, while further downstream system are moderately transformed, resulting a Medium significance.							
	without	4	5	8	5	**85**	**High**	-	3
	with	4	5	8	5	**85**	**High**	-	3

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)	Status (+ve or -ve)	Confidence
	degree to which impact can be reversed:	Can not be readily reversed						3
	degree of impact on irreplaceable resources:	Low						3
BIODIVERSITY								
Ash Disposal Facility - Alternative A								
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**
Cumulative impacts on conservation obligations & targets (including national and regional)	**Nature of impact:**	The Amersfoort Clay Highveld Grassland is listed as Vulnerable and the continued loss of representative habitats will adversely impact on the conservation status of this unit						
	without	5	5	8	4	**72**	**High**	-	High
	with	5	5	8	4	**72**	**High**	-	High
Cumulative increase in local and regional fragmentation/ isolation of habitat	**Nature of impact:**	Current transformation and fragmentation levels of the landscape is mderately severe and the continued loss of natural habitat will result in augmentation of these levels						
	without	4	5	6	4	**60**	**Medium**	-	High
	with	4	5	6	4	**60**	**Medium**	-	High

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Cumulative increase in environmental degradation, pollution	**Nature of impact:**	Evidence indicates existing moderately significant impacts on surrounding areas of natural habitat. Existing impacts will be augmented by extension of the present ashing facility, particularly in view of the proximity of sensitive habitat to some alternatives							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	6	3	**42**	**Medium**	-	High
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Cumulative impacts on conservation obligations & targets (including national and regional)	**Nature of impact:**	The Amersfoort Clay Highveld Grassland is listed as Vulnerable and the continued loss of representative habitats will adversely impact on the conservation status of this unit							
	without	5	5	8	4	**72**	**High**	-	High
	with	5	5	8	4	**72**	**High**	-	High
Cumulative increase in local and regional fragmentation/ isolation of habitat	**Nature of impact:**	Current transformation and fragmentation levels of the landscape is mderately severe and the continued loss of natural habitat will result in augmentation of these levels							
	without	4	5	6	4	**60**	**Medium**	-	High
	with	4	5	6	4	**60**	**Medium**	-	High
Cumulative increase in environmental degradation,	**Nature of impact:**	Evidence indicates existing moderately significant impacts on surrounding areas of natural habitat. Existing impacts will be augmented by extension of the present ashing facility, particularly in view of the proximity of sensitive habitat to some alternatives							
	without	4	4	6	4	**56**	**Medium**	-	High

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
pollution	**with**	4	4	6	3	**42**	**Medium**	-	High
Ash Disposal Facility - Alternative C									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Cumulative impacts on conservation obligations & targets (including national and regional)	**Nature of impact:**	The Amersfoort Clay Highveld Grassland is listed as Vulnerable and the continued loss of representative habitats will adversely impact on the conservation status of this unit							
	without	5	5	8	4	**72**	**High**	-	High
	with	5	5	8	4	**72**	**High**	-	High
Cumulative increase in local and regional fragmentation/ isolation of habitat	**Nature of impact:**	Current transformation and fragmentation levels of the landscape is mderately severe and the continued loss of natural habitat will result in augmentation of these levels							
	without	4	5	6	4	**60**	**Medium**	-	High
	with	4	5	6	4	**60**	**Medium**	-	High
Cumulative increase in environmental degradation, pollution	**Nature of impact:**	Evidence indicates existing moderately significant impacts on surrounding areas of natural habitat. Existing impacts will be augmented by extension of the present ashing facility, particularly in view of the proximity of sensitive habitat to some alternatives							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	6	3	**42**	**Medium**	-	High
Ash Disposal Facility - Alternative D									
Potential Impact	**Mitigation**	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**		**Status**	**Confidence**

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
Cumulative impacts on conservation obligations & targets (including national and regional)	**Nature of impact:**	The Amersfoort Clay Highveld Grassland is listed as Vulnerable and the continued loss of representative habitats will adversely impact on the conservation status of this unit							
	without	5	5	8	4	**72**	**High**	-	High
	with	5	5	8	4	**72**	**High**	-	High
Cumulative increase in local and regional fragmentation/ isolation of habitat	**Nature of impact:**	Current transformation and fragmentation levels of the landscape is mderately severe and the continued loss of natural habitat will result in augmentation of these levels							
	without	4	5	6	4	**60**	**Medium**	-	High
	with	4	5	6	4	**60**	**Medium**	-	High
Cumulative increase in environmental degradation, pollution	**Nature of impact:**	Evidence indicates existing moderately significant impacts on surrounding areas of natural habitat. Existing impacts will be augmented by extension of the present ashing facility, particularly in view of the proximity of sensitive habitat to some alternatives							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	6	3	**42**	**Medium**	-	High
Ash Disposal Facility - Alternative E									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Cumulative impacts on	**Nature of impact:**	The Amersfoort Clay Highveld Grassland is listed as Vulnerable and the continued loss of representative habitats will adversely impact on the conservation status of this unit							

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
conservation obligations & targets (including national and regional)	**without**	5	5	8	4	**72**	**High**	-	High
	with	5	5	8	4	**72**	**High**	-	High
Cumulative increase in local and regional fragmentation/ isolation of habitat	**Nature of impact:**	Current transformation and fragmentation levels of the landscape is mderately severe and the continued loss of natural habitat will result in augmentation of these levels							
	without	4	5	6	4	**60**	**Medium**	-	High
	with	4	5	6	4	**60**	**Medium**	-	High
Cumulative increase in environmental degradation, pollution	**Nature of impact:**	Evidence indicates existing moderately significant impacts on surrounding areas of natural habitat. Existing impacts will be augmented by extension of the present ashing facility, particularly in view of the proximity of sensitive habitat to some alternatives							
	without	4	4	6	4	**56**	**Medium**	-	High
	with	4	4	6	3	**42**	**Medium**	-	High
Ash Disposal Facility - No-Go									
No impacts identified should the No-Go Option be exercised									
VISUAL									
Incremental cumulative impact with the addition of an ash disposal facility in the visual landscape where and existing	**Nature of impact:**	Cumulative impacts are likely to occur, but are not regarded as sufficient enough to fundamentally change the landscape character.							
	with								
	without	2	4	4	3	**30**	**Low**	-	High
	degree to which impact can be reversed:	The impact cannot be reversed							

Potential Impact	Mitigation	Extent	Duration	Magnitude	Probability	Significance	Status	Confidence
		(E)	(D)	(M)	(P)	(S=(E+D+M)*P)	(+ve or -ve)	
facility is already visible and not regarded as part of the natural environment.								

The above impact analysis is summarised in **Table 9.5 – 9.8**.

Table 9.0.5: Summary of identified impacts for the Construction Phase – Ash disposal facility

Potential Impact	Mitigation	Significance					
		Ash disposal facility – Site					No-GO
		A	B	C	D	E	
GEOLOGY							
Construction-related earthworks	Without	Medium	Medium	Medium	Medium	Medium	N/A
	With	Low	Low	Low	Low	Low	
Pollution of geological features in case of spillage or leakage of hydrocarbon and other hazardous material	Without	Medium	Medium	Medium	Medium	Medium	
	With	Low	Low	Low	Low	Low	
AGRICULTURAL POTENTIAL							
Loss of agricultural soil	Without	High	High	High	High	High	N/A
	With	High	High	High	High	High	
GROUNWATER							
Deterioration of groundwater quality due to leachate from ash disposal facility	Without	Medium	Medium	Medium	Medium	Medium	N/A
	With	Medium	Medium	Medium	Medium	Medium	
Rise in local water table and minor changes to local groundwater flow directions	Without	Medium	Medium	Medium	Medium	Medium	
	With	Low	Low	Low	Low	Low	
Groundwater contamination in local area due to infiltration from surface water polluted by the ash disposal facility.	Without	Medium	Medium	Medium	Medium	Medium	
	With	Low	Low	Low	Low	Low	
No change to groundwater conditions at the site	Without						Low
	With						Low
SURFACE WATER							
Impacts on hydrology	Without	Medium	High	High	High	High	N/A
	With	Medium	Medium	Medium	Medium	High	
Impacts on surface water quality	Without	Medium	High	Medium	Medium	High	
	With	Medium	Medium	Low	Low	Medium	
Impacts related to erosion and sedimentation	Without	High	Medium	High	High	High	
	With	Medium	Medium	Medium	Medium	Medium	
Impacts on wetland vegetation and disturbance of wetland habitat	Without	High	High	Medium	Low	High	
	With	Medium	High	Medium	Low	High	
Impact related to increase alien/pioneer vegetation in disturbed areas	Without	Medium	Medium	Medium	Low	High	
	With	Medium	Medium	Low	Low	Medium	
Impacts associated with the surrounding catchment	Without						Medium
	With						Medium
BIODIVERSITY							
Impacts on flora species of conservation importance (including habitat suitable for these species	Without	High	High	High	High	High	N/A
	With	High	Medium	High	High	High	
Impacts on fauna species of conservation importance (including habitat suitable for these	Without	High	High	High	High	High	
	With	High	Medium	High	High	High	
Impacts on unique or protected habitat types (including loss and degradation)	Without	High	High	High	High	High	
	With	High	High	High	High	High	
Loss of sensitive/ natural habitat types (including plant diversity & abundance)	Without	High	High	High	High	High	
	With	High	Medium	High	High	High	
conflicts & interactions (including diversity & abundance)	Without	High	High	High	High	High	
	With	Medium	Medium	High	High	High	
Impacts on ecological connectivity and ecosystem functioning;	Without	High	High	High	High	High	
	With	High	High	High	High	High	
Indirect impacts on surrounding habitat	Without	High	High	High	High	High	
	With	Medium	Medium	Medium	Medium	Medium	
AVIFAUNA							
Disturbance	Without	Medium	Medium	Medium	Medium	Medium	N/A
	With	Low	Low	Low	Low	Low	
Habitat Destruction	Without	Medium	Medium	Medium	Medium	Medium	
	With	Medium	Medium	Medium	Medium	Medium	
HERITAGE							
Destruction of heritage sites and features	Without	High	High	High	High	High	N/A
	With	Medium	Medium	Medium	Medium	Medium	
VISUAL							
Transformation of the visual quality of the landscape	Without	Low	Low	Low	Low	Low	N/A
	With	Low	Low	Low	Low	Low	
SOCIAL							
Impact 1: Economic Development through employment	Without	Low	Low	Low	Low	Low	Medium
	With	Low	Low	Low	Low	Low	Low
Impact 2: Inflow of temporary workers	Without	Low	Low	Low	Low	Low	N/A
	With	Low	Low	Low	Low	Low	
Impact 3: Health Risk from elevated PM 10 Concentrations	Without	Low	Low	Low	Low	Low	
	With	Medium	Medium	Medium	Medium	Medium	
Impact 4: Nuisance from elevated dustfall rates	Without	Low	Low	Low	Low	Low	
	With	Medium	Medium	Medium	Medium	Medium	
Continued supply of electricity from Majuba power station	Without						High
	With						N/A

Table 9.0.6: Summary of identified impacts for the Operational Phase – Ash disposal facility

Potential Impact	Mitigation	Significance					
		Ash disposal facility – Site					No-GO
		A	B	C	D	E	
GEOLOGY							
Pollution of geological features in case of spillage or leakage of hydrocarbon and other hazardous material	Without	Medium	Medium	Medium	Medium	Medium	
	With	Low	Low	Low	Low	Low	
AGRICULTURAL POTENTIAL							
Loss of agricultural soil	Without	High	High	High	High	High	N/A
	With	High	High	High	High	High	
GROUNWATER							
Deterioration of groundwater quality due to leachate from ash disposal facility	Without	Medium	Medium	Medium	Medium	Medium	N/A
	With	Low	Low	Low	Low	Low	
Rise in local water table due to additional recharge caused by ash deposition and possible concentration of recharge	Without	Medium	Medium	Medium	Medium	Medium	
	With	Low	Low	Low	Low	Low	
Groundwater contamination in local area due to infiltration from surface water polluted by the ash disposal facility.	Without	Low	Low	Low	Low	Low	
	With	Low	Low	Low	Low	Low	
Change in local groundwater flow directions due to possible rise in local water table	Without	Low	Low	Low	Low	Low	
	With	Low	Low	Low	Low	Low	
No change to groundwater conditions at the site	Without						Medium
	With						Medium
SURFACE WATER							
Impacts on hydrology and subsequent loss of functional integrity of downslope wetlands	Without	Medium	High	Medium	Medium	High	N/A
	With	Medium	High	Medium	Medium	High	
Impacts on surface water quality of downslope systems	Without	High	High	Medium	Medium	High	
	With	Medium	Medium	Medium	Low	Medium	
Impacts associated with the surrounding catchment	Without						
	With						
BIODIVERSITY							
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	Without	Medium	Medium	High	High	High	N/A
	With	Medium	Medium	Medium	Medium	Medium	
Impacts on ecological connectivity and ecosystem functioning;	Without	High	High	High	High	High	
	With	Medium	Medium	Medium	Medium	Medium	
Indirect impacts on surrounding habitat	Without	High	Medium	High	High	High	
	With	Medium	Medium	Medium	Medium	Medium	
AVIFAUNA							
Contamination of surrounding water.	Without	Medium	Medium	Medium	Medium	Medium	N/A
	With	Low	Low	Low	Low	Low	
HERITAGE							
Destruction of heritage sites and features	Without	High	High	High	High	High	N/A
	With	Medium	Medium	Medium	Medium	Medium	
VISUAL							
Visual exposure of the newly introduced ash disposal facility	Without	Medium	Low	Low	Low	Low	N/A
	With	Medium	Low	Low	Low	Low	
Transforming the visual quality and sense of place of the landscape	Without	Medium	Low	Low	Low	Low	
	With	Low	Low	Low	Low	Low	
SOCIAL							
Continued generation of electricity for the national grid	Without	High	High	High	High	High	N/A
	With	High	High	High	High	High	
Health Risk from elevated PM 10 Concentrations	Without	Medium	Medium	Medium	Medium	Medium	
	With	Low	Low	Low	Low	Low	
Nuisance from elevated dustfall rates	Without	Medium	Medium	Medium	Medium	Medium	
	With	Low	Low	Low	Low	Low	

Table 9.0.7: Summary of identified impacts for the De-Commissioning Phase – Ash disposal facility

Potential Impact	Mitigation	Significance					
		Ash disposal facility – Site					No-GO
		A	B	C	D	E	
GROUND WATER							
Deterioration of groundwater quality due to leachate from ash disposal facility	Without	**Low**	**Low**	**Low**	**Low**	**Low**	**N/A**
	With	**Low**	**Low**	**Low**	**Low**	**Low**	
Minor changes to local water table and local groundwater flow direction	Without	**Low**	**Low**	**Low**	**Low**	**Low**	
	With	**Low**	**Low**	**Low**	**Low**	**Low**	
Groundwater contamination in local area due to infiltration from surface water polluted by the ash disposal facility.	Without	**Low**	**Low**	**Low**	**Low**	**Low**	
	With	**Low**	**Low**	**Low**	**Low**	**Low**	
BIODIVERSITY							
Displacement of fauna species, human-animal conflicts & interactions (including diversity & abundance)	Without	**High**	**Medium**	**High**	**High**	**Medium**	**N/A**
	With	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	
Impacts on ecological connectivity and ecosystem functioning;	Without	**Medium**	**Medium**	**Medium**	**Medium**	**High**	
	With	**Medium**	**Medium**	**Medium**	**Medium**	**Low**	
Indirect impacts on surrounding habitat	Without	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	
	With	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	
VISUAL							
Permanent transformation of the landscape	Without	**High**	**High**	**High**	**High**	**High**	**N/A**
	With	**Low**	**Low**	**Low**	**Low**	**Low**	

Table 9.0.8: Summary of identified cumulative impacts – Ash disposal facility

Potential Impact	Mitigation	Significance					
		Ash disposal facility – Site					No-GO
		A	B	C	D	E	
GROUNWATER							
Deterioration of groundwater quality due to leachate from ash disposal facility	Without	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	**N/A**
	With	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	
Rise in local water table and minor changes to local groundwater flow directions	Without	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	
	With	**Low**	**Low**	**Low**	**Low**	**Low**	
Groundwater contamination in local area due to infiltration from surface water polluted by the ash disposal facility.	Without	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	
	With	**Low**	**Low**	**Low**	**Low**	**Low**	
SURFACE WATER							
Decrease PES of wetland type and downstream watercourse	Without	**Medium**	**High**	**Medium**	**Medium**	**High**	**N/A**
	With	**Medium**	**High**	**Medium**	**Medium**	**High**	
BIODIVERSITY							
Cumulative impacts on conservation obligations & targets (including national and regional)	Without	**High**	**High**	**High**	**High**	**High**	**N/A**
	With	**High**	**High**	**High**	**High**	**High**	
Cumulative increase in local and regional fragmentation/ isolation of habitat	Without	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	
	With	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	
Cumulative increase in environmental degradation, pollution	Without	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	
	With	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	
VISUAL							
Incremental cumulative impact with the addition of an ash disposal facility in the visual landscape where and existing facility is already visible and not regarded as part of the natural environment.	Without	**Low**	**Low**	**Low**	**Low**	**Low**	**N/A**
	With	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	

9.3 Final Specialist Conclusions

9.3.1 Air Quality

The following can be concluded from the air quality impact assessment:

- Particulate matter, categorised as dust fall-out, PM_{10} and $PM_{2.5}$, was identified as the pollutants of concern.
- Annual average ground-level concentrations of PM_{10} and $PM_{2.5}$ simulated by dispersion modelling did not exceed ambient standards.
- Daily limits for PM_{10} and $PM_{2.5}$ are expected to be exceeded only within the near vicinity of the facility boundary. Compliance with daily NAAQS (i.e. fewer than 4 days exceeding the applicable limit value) is likely to be achievable with the recommended mitigation measures: rehabilitation and/or dust suppression.
- Effective and continuous application of the mitigation measures will be essential to maintaining compliance with the NAAQS.
- Alternatives Extended A, or individual sites C and D (or the combination of C and D), are the most preferred sites (**Table 9.9**).

9.3.2 Ground Water

The main impact on groundwater of the proposed ash disposal facility (or combination of facilities) is likely to be a reduction in water quality beneath the chosen site, and in the vicinity of the site. If toxic or persistent pollutants are disposed of onto the ash disposal facility then local groundwater pollution will be more serious (it is acknowledged that Eskom do not intend to do this). The numerical model results suggest that the movement of leachate away from the ash disposal facility as a groundwater plume should take place relatively slowly, with plume extents being generally less than 1 km from the ash disposal facility after 150 years. Another impact is the anticipated water table mounding beneath the site and the potential alteration of local groundwater flow directions. The main way to mitigate these impacts is to maintain the ash disposal facility in good condition (especially the drainage system, including toe drains and return water facilities) and to ensure that only ash is disposed of. Runoff water contaminated by the ash leaking into surface drainage systems has the potential to contaminate groundwater at some distance from the ash disposal facility. Once the ash disposal facility is fully decommissioned, topsoil installation and re-vegetation done during operation should be maintained and consolidated to minimise infiltration and to improve runoff quality, and the drainage system maintained to reduce downward movement of leachate from the base of the ash disposal facility. Groundwater monitoring from suitable boreholes as well as the monitoring of surface water should be done during all phases of ash disposal facility operation, and after closure. If required the numerical model could be updated with new monitoring data.

From a groundwater point of view, none of the five individual Sites has a clear advantage over the others. Sites A and B are marginally preferred since they do not cross a surface water divide. Alternative site A already has existing monitoring infrastructure down-gradient, and considering that there is already pollution present in the vicinity of alternative site A, this may be the best option.

9.3.3 Surface Water

This assessment highlighted the importance of interpreting wetland assessment results in context with wetland size and catchment. Conservation preference is often given to systems purely on the bases of their PES. However, larger wetland systems, draining bigger catchments warrant conservation preference, especially if they are longitudinal systems. Wetlands 3, 7, 16 and 29 have been identified as more important wetlands. The most significant perceived impacts will result in a loss in downstream functional integrity and water pollution in these systems. The severity and probability of these impacts relate predominantly to the extent of impairment to Wetlands 3, 7, 16 and 29. This being said, smaller more isolated systems which retain a good PES are also important and residual impacts to these systems should be avoided as far as possible.

Considering the hectare extent related to different Alternative combinations provided, and the likely impacts associated with linear infrastructure and the number of possible contamination pathways, Alternative A and its Extension remain consistent with an environmental least cost option. However, to curtail residual impacts and ecological risks, the feasibility of combining

less sensitive parts of alternatives should be considered. Using parts of Alternative A and B might accomplish this aim (**Error! Reference source not found.**). It might also be possible to simulate hydrological functions of wetlands. For instance the residual impact of placing the ash disposal facility on Wetland 3B (Alternative B) might be mitigated by diversion and downstream release or by creating a means of hydrological connectivity between upstream and downstream sections. This might reduce the overall impact, but may also result in other ecological complications.

9.3.4 Biodiversity

The potential use of any combinations including Alternatives C, D and E is significantly challenged by the need for an extensive conveyor connection to the source. Such a linear infrastructure will undoubtedly increase local and regional habitat fragmentation levels, impact adversely on movement and migration corridors as well as crossing and effects on sensitive species and habitat types, specifically at wetland crossings. Additionally, conservation important taxa have been recorded on all of these sites and habitat is furthermore regarded particularly suitable for the persistence of several other species. Connectivity of these sites to surrounding pristine habitat is high and potential and likely impacts on these surrounding areas are likely to be severe and unacceptable.

Ultimately, all of the site alternatives exhibit aspects of high biodiversity sensitivity and the preference of alternatives, in terms of the holistic EIA process that considers input from other disciplines are unlikely to be driven by the biodiversity component. Therefore, despite the alternative ultimately being recommended and approved, expected and likely impacts will undoubtedly be severe and significant mitigation measures will be required to ameliorate these impacts.

9.3.5 Soils & Agriculture

Of the various alternatives or combinations under consideration, none shows signs of widespread cultivation, mainly due to the dominantly low potential soils, with only small areas of moderate potential in places. There is therefore not a significant difference between the Alternatives in terms of the soils occurring, as well as the associated agricultural potential.

Alternative A + extension is the only individual site large enough to accommodate the desired size as specified by Eskom. If any other combination of sites is used, there will have to be some sort of conveyer system to link them, and there will be a risk of contamination, either by windblown or by spillage, of otherwise unaffected soils and waterways.

9.3.6 Avifauna and bats?

In conclusion, no fatal flaws have been identified in terms of avifauna and the proposed ash disposal facility can be built, provided that the various mitigation measures recommended in this report are implemented. From an avifaunal perspective, site alternatives A and E are

preferred for development. In general, the area has moderate to high sensitivity. The greatest impact of the proposed project is likely to be that of habitat destruction, while leachate from fly ash, into water systems used by avifauna is also of concern. Possible impacts of associated infrastructure (e.g. roads, pollution control dams, conveyors, pipelines and pump stations). Furthermore the following conclusions and recommendations are made:

- Habitat destruction and disturbance are impacts that are associated with all activities of the proposed project; however they are not expected to be highly significant, and should be mitigated for as per this report and the use of the Construction EMP.
- Should any of the focal species be found to be nesting, breeding or roosting on the site, during any future phase, the EWT should be contacted for further instruction.
- An "avifaunal walk through" by an avifaunal specialist, of the chosen site is recommended in order to identify potential breeding sites or nest of focal species.

Any species that occurs in the area of the proposed continuous disposal of ash at the Majuba Power Station is vulnerable to disturbance and/or displacement as a result of the construction. At least one of the bat species identified as potentially occurring in the area of the study site is Vulnerable (Cleotis percivali), four Near Threatened (*Hipposideros gigas, Miniopterus natalensis, Rhinolophus blasii* and *Rhinolophus swinnyi*) and seven Least Concern. Acoustic recording confirmed that at least two of the bats occurring in the area were present on the site (*Neromicia capensi, Miniopterus natalensis, Tadarida aegyptiaca, Eptesicus hottentotus* and *Rhinolophus clivosus*). The uniformity of the habitat around the site also means that localized habitat destruction and disturbance would impact on bats but the habitat is not unique or important for bats and as such the surrounding habitats would be equally available to bats to utilize. The overall impact of the development on the bat population in the area is likely to be low, particularly if steps to mitigate impacts are taken.

9.3.7 Noise

- The extent of the significant noise impact, i.e. where the increase in ambient noise level will be equal or less than 3 dB, is limited to within approximately 560 m from the boundary of each of the alternatives;
- There are only four farmsteads where the increase in ambient noise level could be in excess of 3 dB. Without exception these are located right at the boundary of the respective alternatives;
- For each of the investigated alternatives and phases the significance rating is LOW; and
- In terms of their noise impacts the preferred site is Alternative B, while the rest are acceptable.

9.3.8 Heritage

The aim of this study, broadly speaking, is to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the primary study area where it is proposed to develop the continuous ash disposal facility for the Majuba Power Station. For the

purpose of the continuous ash disposal facility, four siting alternatives (3 combinations of sites and an extension of Alternative A) have been identified and were evaluated in order to select the most suitable as to the best option for future use.

The cultural landscape qualities of the region essentially consist of a single component. This is a rural area in which the human occupation is made up of a limited pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer) component.

The following heritage sites were identified in the study area:

- A number of old farmstead and associated outbuildings occur sporadically over the larger area. Central to all is the farmhouse with associated outbuildings and in some cases, associated features such as stock enclosures, sheep dips, etc. located some distance away.
- A number of farm labourer homesteads occur sporadically on some of the alternatives.
- A number of informal cemeteries/burial sites occur sporadically over the larger area.
- According to present understanding, some of the identified sites, features or objects of cultural significance would be impacted on by the proposed development. Fortunately, all the identified sites are judged to have Grade III heritage significance and would therefore not prevent the proposed development from continuing on any of the five alternatives as well as in the proposed conveyor routes

- Based on an analysis of available information and the field survey, it is our opinion that all five Alternatives would be suitable for the development of the continuous ash disposal facility as well as the proposed conveyor routes.

- However, for the project to continue, we propose the following:
  - The mitigation measures set out for each category of sites is implemented if development takes place in the vicinity of any of these.
  - The management measures, as set out in Section 8 of the Heritage report should be implemented prior to construction taking place.
  - We recommend that if archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage consultant so that an investigation and evaluation of the finds can be made.
  - No impact on heritage sites, features or objects can be allowed without a valid permit from SAHRA.

9.3.9 Visual

The proposed continuous ash disposal facility for Majuba Power Station is required to continue power generation at the plant.

The visual quality of the receiving environment has been modified by views of the power station and associated infrastructure, which includes the existing ash disposal facility south of the plant. The power station dominates views in the foreground and middle ground, with the existing ash disposal facility less visible and largely integrated into the topography of the area. The severity of impact is influenced by the perception of viewers, which is assumed to be neutral. The visual absorption capacity of the environment is assessed to be sufficient to integrate the proposed continuous ash disposal facility into the existing landscape, provided the preferred site is chosen and proposed mitigation measures are carried out.

It is concluded that the visual impact of the proposed development is moderate to low and that the proposed development could be implemented, provided the proposed mitigation measures are taken into account.

9.4 Site Preference Rankings (Combined)

Table 9.9: Averages and weighted averages indicating the preferred site**.**

SPECIALIST	Weight	SITE					SITING ALTERNATINE				
		A	B	C	D	E	A&E	A&D	C&D	A Extended	
Air 1	**2.19**	3	2	3	3	2	2	1	3	4	
Air 2	**2.19**	3	2	3	4	2	2	3	3	3	
Air 3	**2.19**	3	3	3	3	2	2	3	3	3	
Groundwater	**2.39**	3	3	3	3	3	3	3	3	3	
Bats	**2.1**	3	3	3	3	4					
Birds	**2.1**	3	2	2	2	3					
Heritage	**1.55**	3	2	3	3	3	2	3	3	3	
Noise	**1.32**	3	4	3	3	3					
Agric	**1.61**						1	1	2	4	
Surface Water	**2.39**	3	3	3	3	3	3	3	3	4	
Biodiversity	**2.52**	4	3	2	2	2	2	2	2	3	
Visual	**1.55**						4	2.5	2.5	4	
		3.1	2.7	2.8	2.9	2.7	2.333333	2.388889	2.722222	3.44444444	**Average**
		6.534	8.4	7.6	8.3	7.8	4.444444	5.888889	6.694444	9.33333333	**Weighted Average**

(**Table 9.9**) indicates the preference rankings of all the original sites that were part of the Primary study area as well as the more recent Siting alternatives (Combinations of A&E; A&D; C&D and Alternative A extended).

Alternative A (Extended) has been identified as the most preferred Alternative through the combination of all the specialist results. This means that it has been identified as the alternative with the least environmental impacts overall.

The Siting alternatives were compared with each other as well as with the original (smaller) alternatives by all the specialists. This comparison were done to bring into account the additional impact of the required linear infrastructure associated with a combination of alternatives. The linear infrastructure impact is more relevant to the combinations than to the individual sites and have impacts on most of the disciplines.

This comparison allows for a possible combination (Siting Alternative) with a "spill over" area, should the proposed combination have some features such as wetlands that needs to be avoided. This ensured that although **Alternative A** are the preferred alternative to ensure the minimisation of Environmental Impacts certain sensitive areas within the Alternative can be avoided by using Site B (second preferred) as a spill over area for example.

9.5 Impact Assessment Conclusions

9.5.1 Construction phase impacts

Some significant impacts has been identified that will occur during the construction phase. This is especially applicable to the Biodiversity study. A number of impacts have been categorised as high even with the appropriate mitigation. Significant impacts on biodiversity are applicable to all the site alternatives that have been identified without much distinction with regard to preference between alternatives.

With this in mind it is important to realise that each of the four siting alternatives have been identified as areas with the minimum impact on the Environment in relation to the study area. This has been done by incorporating the results from all the different specialist studies.

This means that although there will be significant biodiversity impacts by using the Alternative A extension (as recommended above), the cumulative impacts on all aspects studied will most probably be less than for any other area within the 12 km radius.

9.5.2 Operational phase impacts

A number of residual impacts have been identified with high significance as part of the operational phase. It is important to notice that the Biodiversity impacts of significance that formed part of the construction phase could be mitigated to acceptable levels during the operational phase.

All surface water impacts could be mitigated to acceptable levels at Alternative A & Extension. The only residual impact with High significance during the operational phase, is the irreversible loss of Agricultural soil. This impact will be relevant to any area identified for disposal and the impact has been minimised as far as possible by selecting the lowest possible potential soils.

9.5.3 Decommissioning phase impacts

No new impacts will be introduced during the decommissioning phase with high significance. By aligning operations with all mitigations proposed in the Environmental Management Programme

(EMPr) impacts will be minimised as far as possible. After De-commissioning these impacts are expected to decrease in Severity.

Socio-Economic impacts were not assessed for the de-commissioning phase. It is also anticipated that all environmental impacts will be revisited at power station closure in order to update the impact analysis to take all new information and plans into account.

9.5.4 Cumulative Impacts

Cumulative impacts on conservation objectives and targets have been identified as the most important biodiversity impact. This together with the loss of Agricultural land can be raised as the most important cumulative impacts of the Majuba Continues Ash Disposal Facility project.

9.6 Conclusion and recommendation of preferred alternative

Taking into account the post mitigation impacts of the EIA proposed: extended Site A, as well as the preference rankings from the various specialists it is clear that the **Alternative A** plus the extension (see **Figure 9.1)**, is the preferred alternative for the project. It is important to realise that as with all the other alternatives some wetlands will be affected by using this area.

It is proposed that the proposed footprint are amended in such a manner as to avoid the important wetlands 3A and 7 including the buffer areas as presented in the Surface Water specialist study **Appendix Q**. This could be achieved through a further extension into a less sensitive area or by combining the extended Alternative A with a small part of one of the other alternatives.

Alternative B has been excluded from a practical point of view due to a power line servitude that cross the area – the High Voltage (HV) power lines that transmit the electricity from the power station to the grid cross through the Alternative B, and as this infrastructure cannot be relocated without shutting down the power stage (which is not in the interest of the country and continuous electricity supply), this alternative was included as a 'no-go' area. This however will not prevent the use of some least sensitive areas across the rest of the alternative.

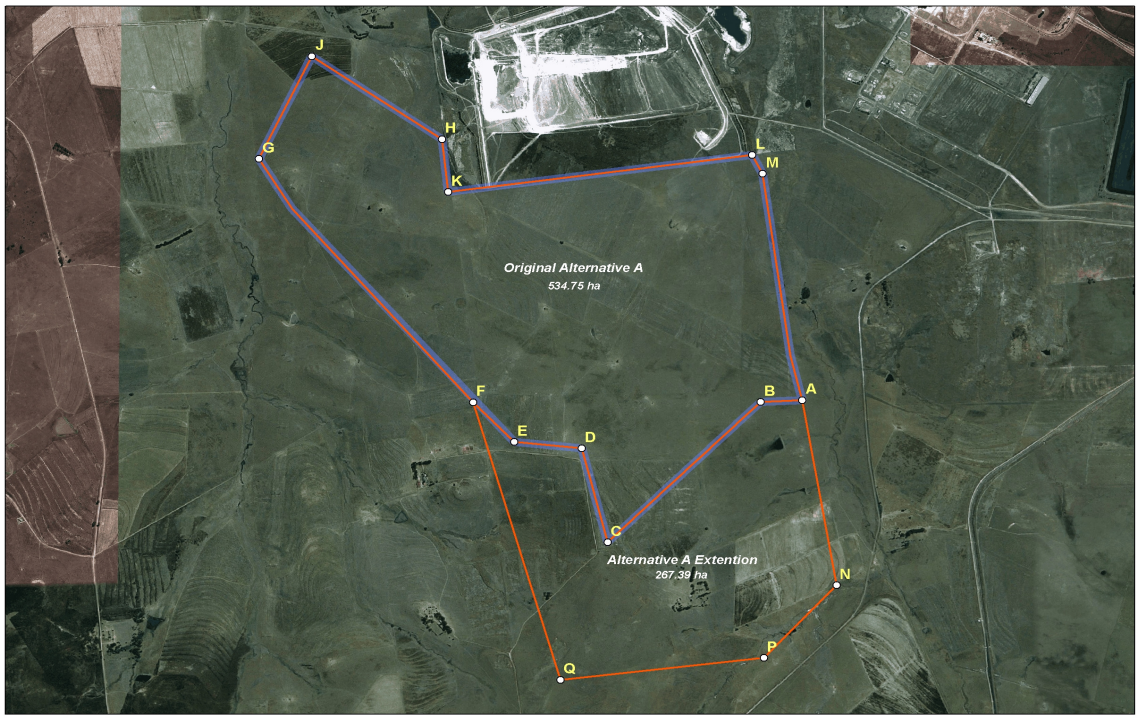

Figure 9.1. The Extended Alternative A footprint for the proposed Majuba Continuous Ash Disposal facility. Please see detailed Engineering design.

Taking all the various factors and studies into account the client propose a layout as indicated in the conceptual design **Appendix C**. This design incorporates all the Environmental sensitivities to achieve a "least environmental cost" solution that is still practical and financially feasible. It is therefore recommended by the Environmental Assessment Practitioner that the proposed Extended Alternative A site is approved subject to the implementation and monitoring of all the mitigation measures as listed in the specialist studies and carried over to the Environmental Management Programme (EMPr).