Appendix J1: Memorandum on advantages and Disadvantages of the seven options for the new Kathu Cemetery

Memorandum

To:	Refilwe Apools-Sebogodi	**At:**	Gamagara Municipality
	Marie Brits		Kumba Iron Ore
	Werner Voigt		Sishen Iron Ore Company
To:	Mashau Fhatuwani	**At:**	Kumba Iron Ore
	Teboho Sejake		Synergy
From:	Marline Medallie	**At:**	Synergistics Environmental Services
Date:	**15 September 2016**	**Ref:**	**755.23023.00008**

Subject: **Site Selection for the Proposed Kathu Cemetery**

Seven cemetery site location alternatives were identified by Kumba Iron Ore and the key factor to the feasibility of the site is the presence of calcrete (Figure 1). A high level calcrete assessment was conducted by Roadlab (Pty) Ltd. The assessment was completed over a period of 2 weeks during September 2016. This memo serves to present the findings of the site selection process and recommends a preferred option.

A basic alternative selection matrix was compiled in order to provide a discussion in terms of the advantages and disadvantages of each site option. Table 1 presents the results of the related site selection process. The ranking system is a simple seven score relative ranking system. For each criterion, a score of one is allocated to the best option and a score of seven to the worst. The option with the lowest total score is the preferred option.

The assumption was made that if the soil depth is 2000mm and deeper this will allow for free digging of graves by the community or with the use of a TLB. In areas where the soil depth is shallower than 2000mm, a machine e.g. a pecker will be required to break through the calcrete layer.

TABLE 1: ADVANTAGES AND DISADVANTAGES ASSOCIATED WITH THE KATHU CEMETERY SITE LOCATION ALTERNATIVES

CRITERIA	RELATIVE RANKING						
	SITE 1	SITE 2	SITE 3	SITE 4	SITE 5	SITE 6	SITE 7
Biodiversity (terrestrial fauna and flora)	7 Located ~ 3km from the protected Kathu Forest.	3 Located ~ 4km from the protected Kathu Forest	1 Located ~ 12km from the protected Kathu Forest	7 Located ~ 2km from the protected Kathu Forest.	7 Located ~ 4km from the protected Kathu Forest.	3 Located ~ 3km from the protected Kathu Forest.	1 Located ~ 9km from the protected Kathu Forest
Biodiversity (aquatic fauna and flora)	7 Located within a wetland pan feature.	3 Located ~ 100m from the nearest wetland pan feature.	1 Located ~ 1km from the nearest wetland pan feature.	7 Located within a wetland pan feature.	7 Located ~400m from the nearest wetland pan feature.	3 Located ~ 20m from the nearest wetland pan feature.	1 Located ~ 1km from the nearest wetland pan feature.
Proximity to primary streams and tributaries	1 Located outside the 1:100 year floodline from any streams.	1 Located outside the 1:100 year floodline from any streams.	3 Might be located within the 1:100 year floodline from the Gamagara River tributaries. Floodlines were determined previously by Sishen Mine and need to be consulted.	1 Located outside the 1:100 year floodline from any streams.	1 Located outside the 1:100 year floodline from any streams.	1 Located outside the 1:100 year floodline from any streams.	1 Located outside the 1:100 year floodline from any streams.
Heritage resources	1 No known existing heritage resources.	1 No known existing heritage resources.	1 No known existing heritage resources.	1 No known existing heritage resources.	3 Located ~ 300m from the Kathu Pan Sites Complex which is a proposed Grade 1 heritage	1 No known existing heritage resources.	1 No known existing heritage resources.

CRITERIA	RELATIVE RANKING						
	SITE 1	SITE 2	SITE 3	SITE 4	SITE 5	SITE 6	SITE 7
					resource.		
Landowner	1 Sishen Iron Ore Company (SIOC)	1 SIOC	1 SIOC	1 SIOC	1 SIOC	1 SIOC	7 SIOC and Private
Proximity to residential areas from a dust, noise and visual perspective	7 Located ~ 140m from potential receptor.	2 Located ~ 2km from potential receptor.	1 Located ~ 5km from potential receptor.	7 Located ~ 40m from potential receptor.	2 Located ~ 1km from potential receptor.	7 Located ~ 140m from potential receptor.	2 Located ~ 2km from potential receptor.
Proximity to the Local Municipality from an access and service perspective	1 Located ~130m from the N14/R380 intersection.	2 Located ~1km from the N14/R380 intersection.	7 Located ~8km from the N14/R380 intersection.	1 Located ~ 80m from the N14/R380 intersection.	7 Located ~8km from the N14/R380 intersection.	2 Located ~300m from the N14/R380 intersection.	7 Located ~ 6km from the N14/R380 intersection.
Presence of calcrete	7 Calcrete layer present at a depth varying between 200mm and 1000mm. Machinery (other than a TLB) e.g. pecker, will be required for digging of graves.	7 Calcrete layer present at a depth varying between 200mm and 1000mm. Machinery (other than a TLB) e.g. pecker, will be required for digging of graves.	1 Calcrete layer present at depth of 2000mm and deeper. Machinery will not be required for digging of graves. Can use a TLB.	7 Calcrete layer present at a depth varying between 200mm and 1000mm. Machinery (other than a TLB) e.g. pecker, will be required for digging of graves.	7 Calcrete layer present at a depth varying between 300mm and 400mm. Machinery (other than a TLB) e.g. pecker, will be required for digging of graves.	7 Calcrete layer present at a depth varying between 200mm and 1000mm. Machinery (other than a TLB) e.g. pecker, will be required for digging of graves.	3 Calcrete layer present at a depth between 1000mm and 2000mm. Machinery (other than a TLB) e.g. pecker, will be required for digging of graves.
Sterilisation of mineral resources	1 Not an issue.	1 Not an issue.	1 Not an issue.	1 Not an issue.	1 Not an issue.	1 Not an issue.	1 Not an issue.
Loss of arable land	1 Located on non-arable natural land in terms of the regional	1 Located on non-arable natural land in terms of the	1 Located on non-arable natural land in terms of the regional land	1 Located on non-arable natural land in terms of the regional land	1 Located on non-arable natural land in terms of the	1 Located on non-arable natural land in terms of the regional land	1 Located on non-arable natural land in terms of the regional land capability map of the

CRITERIA	RELATIVE RANKING						
	SITE 1	**SITE 2**	**SITE 3**	**SITE 4**	**SITE 5**	**SITE 6**	**SITE 7**
	land capability map of the National Department of Agriculture.	regional land capability map of the National Department of Agriculture.	capability map of the National Department of Agriculture.	capability map of the National Department of Agriculture.	regional land capability map of the National Department of Agriculture.	capability map of the National Department of Agriculture.	National Department of Agriculture.
Interference with surface infrastructure	2 Located on the proposed location of the new Lategan Dam.	1 Not an issue.	2 Located directly adjacent to the Sishen Lyleveld rail turnout to Sishen load-out station servitude.	1 Not an issue.	1 Not an issue.	1 Not an issue.	1 Not an issue.
Total	36	23	20	35	38	28	26

In conclusion, seven cemetery site location alternatives were considered for the extension of the Kathu Cemetery. With reference to Table 1, site option 3 is the preferred option for the following reasons:

- No sensitive seasonal and ephemeral wetlands will be disturbed.
- Limited proximity to towns and communities from a noise, visual and dust perspective.
- Suitable depth to calcrete layer to allow for free digging/ TLB.