

SOILWATER CONSULTANTS

MEMO

TO:	Corinne Chambers	COMPANY:	Animal Plant Mineral
FROM:	Joe Powers	PROJECT:	Sorby Hills
DATE:	12/11/12	DOCUMENT:	
SUBJECT:	Sorby Hills Plant Area sediment basin sizing		

Corinne,

Two scenarios are described below for the placement and sizing of sediment basins at Sorby Hills. These basins are intended collect runoff from the ROM pad and processing plant areas and to prevent the bulk of sediment from being discharged offsite. Locations have been suggested according to the land surface contours provided. Sizes have been calculated using rainfall frequency-intensity data from the Bureau of Meteorology (BOM, 2012) and the simplified design equations for a Type C Basin as described in BCC (2001). The critical dimension for Type C Basins is the surface area, which is based on fundamental settling velocity / retention time concepts. Both design scenarios assume:

- A relatively coarse surface material (i.e. < 33 % silt + clay)
- Minimum length to width ratio of 3:1 (2:1 if baffles are used).
- Depth of approximately 1 m, with cleaning 4 times per year
- The northern and eastern edges of the Plant Area are bunded to contain runoff and divert towards the basins.
- A drainage ditch is installed along at the bottom edge of the haul road batters

A preliminary analysis indicates that the proposed basins should fit within the current planning perimeter, so no additional approvals should be necessary. Because the design is based on a surface area requirement, they can be quite shallow (as shallow as 1 m), and are thus expected to be easy to maintain. If finer material is encountered (i.e. > 33 % silt + clay) a Type D or F Basin will likely be required, which will have different volumes and dimensions than listed below.

Alternatively, the proposed locations could be used as sump sites, to contain a 1:100 year event, as you suggested. This would require much larger volumes to be captured, as summarised under Scenario 3, below.

Scenario 1

Figure 1 shows the design catchment areas for the proposed sediment basins. The main catchment covers the ROM pad and the south end of the plant area. A secondary catchment covers the north end of the plant area and parking pad. A third catchment could be described for the northern and western slopes of the ROM pad. The access road and southern slope of the ROM pad will drain into the bunded area of the site, and will thus be covered by the main, site-wide drainage plan.

Catchment areas and pond sizes are listed on Figure 1 (note: sediment basins are not drawn to scale, and locations are approximate) and are summarised in Table 1.

Table 1: Basin sizes for Scenario 1

Basin ID	Catchment area (ha)	Basin surface area (ha)	Approximate dimensions
A	3	1,200	60 x 20 m
B	1.5	600	50 x 12 m
C	0.6	250	30 x 8 m

Scenario 2

Under this scenario, the ROM pad is constructed so that it drains to the south, and discharges into the bunded area of the site. Therefore, this area is not required to be included in the basin-sizing calculations because it will be covered by the site-wide drainage plan. Two sediment ponds are still required for the plant area, but Basin A will be smaller than in Scenario 1.

Catchment areas and pond sizes are listed on Figure 2 (note: sediment basins are not drawn to scale, and locations are approximate) and are summarised in Table 1.

Table 2: Basin sizes for Scenario 2

Basin ID	Catchment area (ha)	Basin surface area (ha)	Approximate dimensions
A	2.2	880	50 x 18 m
B	1.5	600	50 x 12 m
C	0.6	250	30 x 8 m

Scenario 3

Sump volumes required for containing a 1:100 year, 72-hour storm event are summarised in Table 3, according to the catchment areas described in Scenarios 1 and 2, above.

Table 2: Basin sizes for Scenario 2

Scenario	Sump ID	Catchment area (ha)	Sump volume (m ³)
1	A	3	21,800
	B	1.5	10,900
	C	0.6	4,400
2	A	2.2	16,000
	B	1.5	10,900
	C	0.6	4,400

References

BCC (2001): *Sediment basin design, construction and maintenance*. Brisbane City Council, Queensland, Australia.

BOM (2012): *Rainfall IFD Data System*, <http://www.bom.gov.au/hydro/has/cdirswebx/cdirswebx.shtml>, Bureau of Meteorology website, last accessed 9 November 2012.

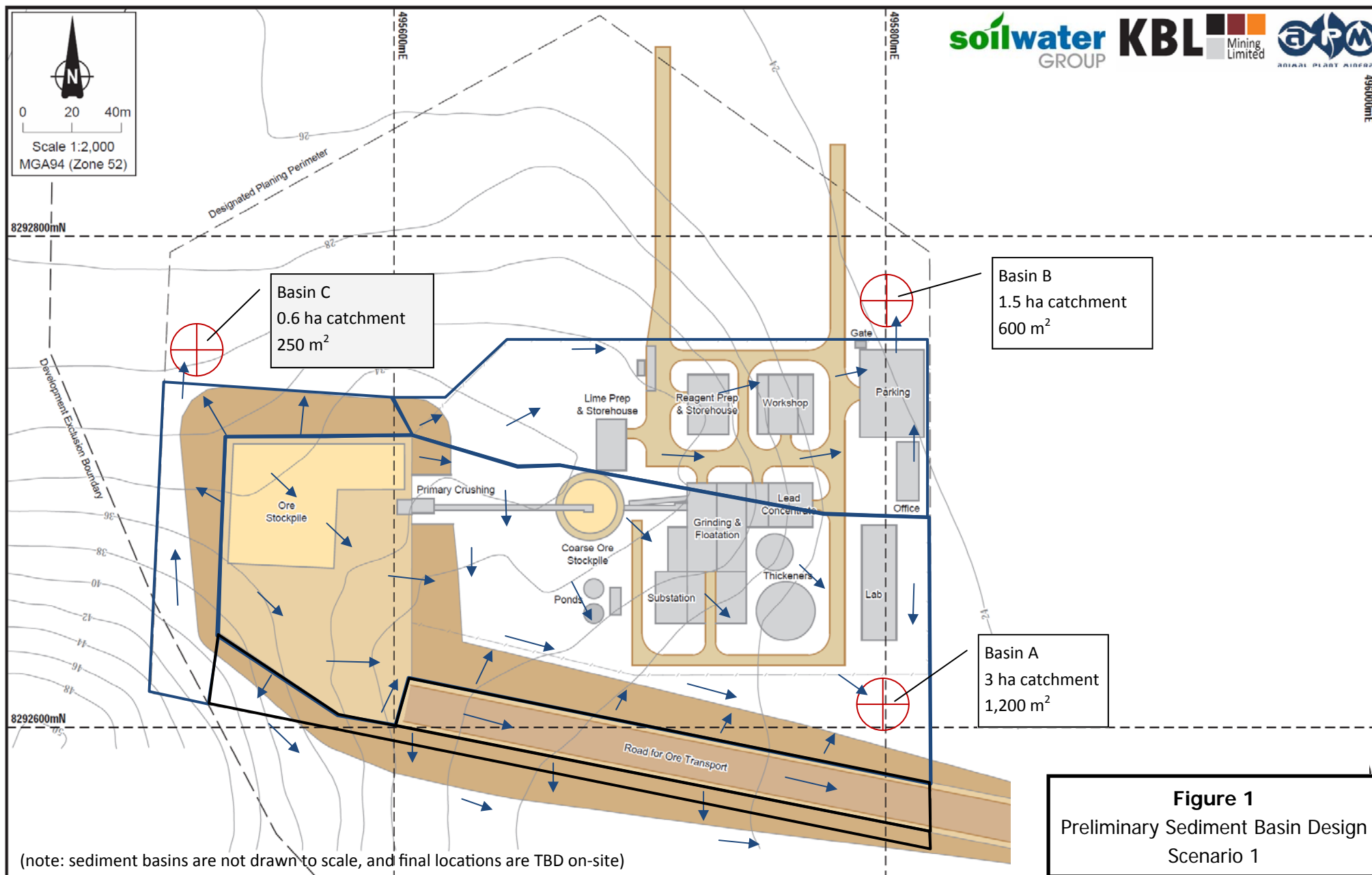


Figure 1
Preliminary Sediment Basin Design
Scenario 1

