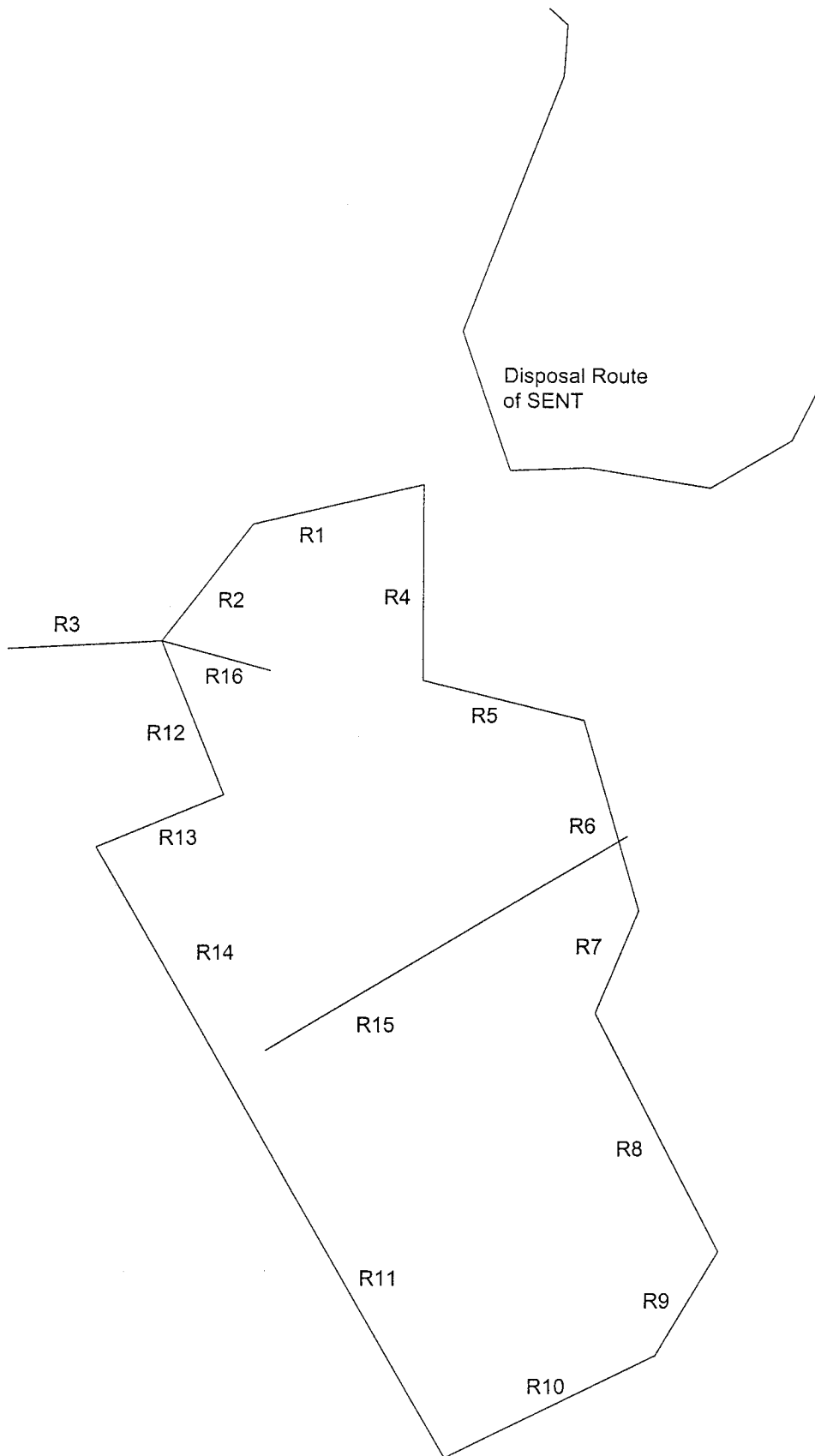


**Appendix 4-1**  
**Indicative alignment of the main haul roads modelled and**  
**Worksheets showing Calculation of Dust Emission Rates,**  
**Operational Phase Dust Emission Impact Assessment**



**CH2M HILL (China) Limited**  
*in association with*  
*MVA Hong Kong Limited*  
*ACL Asia Limited*

AGREEMENT NO. CE 57/2001  
ENVIRONMENTAL AND TRAFFIC IMPACT ASSESSMENT STUDY  
FOR FILL BANK AT TSEUNG KWAN O AREA 137 - INVESTIGATION



土木工程署  
Civil Engineering  
Department

Road Segments Inputted in the FDM Model

SCALE	NTS	DATE	Mar 2002
DESIGNED	AW	DRAWN	AW
FIGURE 4A			REV 1

**Scenario 1 (with concurrent reclamation at the north during operational phase)**

Types of Dust Emission	Coordinates		Source ID (in order of FDM input data file)	No. of operation/ truck load per hour (Peak operation)	No. of operation/ truck load per hour (Normal Operation)	Emission Rate for Peak Hourly TSP Level Modelling	Emission Rate for Averaged Daily TSP Level Modelling under Normal Operation	Unit	Note
	x	y							
Material Handling at Barging Facility	845704	815093	1	100	100	0.1536	0.1536	g/s	1
Material Handling (Stockpiling Area)	846237	814535	2	225	225	0.3456	0.3456	g/s	1
Over-sized Material Crushing	846005	814346	3	225	225	0.1066	0.1066	g/s	2
Screening	846005	814346	4	225	225	4.8628	4.8628	g/s	2
Wind erosion	846184	814759	5	NA	NA	0.8080	0.8080	g/s	3
Material Handling (Reclamation/Buffer Storage Area)	846184	814759	6	64	64	0.0985	0.0985	g/s	1
Haul Road (R1 & R2)	See Figure 4A	See Figure 4A	7, 8	240 (unladen)	125 (unladen)	0.00128	0.00128	g/m/s	4
Haul Road (R3)	See Figure 4A	See Figure 4A	9	100 (unladen) + 100 (laden)	100 (unladen) + 100 (laden)	0.00145	0.00145	g/m/s	4
Haul Road (R4 to R11)	See Figure 4A	See Figure 4A	10 to 17	240 (laden)	125 (laden)	0.00211	0.00211	g/m/s	4
Haul Road (R12 to R14)	See Figure 4A	See Figure 4A	18 to 20	340 (unladen) + 100 (laden)	225 (unladen) + 100 (laden)	0.00273	0.00273	g/m/s	4
Haul Road (R15)	See Figure 4A	See Figure 4A	21	225 (unladen) + 225 (laden)	225 (unladen) + 225 (laden)	0.00448	0.00448	g/m/s	4
Haul Road (R16)	See Figure 4A	See Figure 4A	22 to 29	176 (unladen) + 176 (laden)	109 (unladen) + 109 (laden)	0.00285	0.00285	g/m/s	4

**Scenario 2 (with concurrent decommissioning during operational phase)**

Types of Dust Emission	Coordinates		Source ID (in order of FDM input data file)	No. of operation/ truck load per hour (Peak operation)	No. of operation/ truck load per hour (Normal Operation)	Emission Rate for Peak Hourly TSP Level Modelling	Emission Rate for Averaged Daily TSP Level Modelling under Normal Operation	Unit	Note
	x	y							
Material Handling at Barging Facility	845704	815093	1	100	100	0.1536	0.1536	g/s	1
Material Handling (Stockpiling Area)	846184	814759	2	225	225	0.3456	0.3456	g/s	1
Over-sized Material Crushing	846005	814346	3	225	225	0.1066	0.1066	g/s	2
Screening	846005	814346	4	225	225	4.8628	4.8628	g/s	2
Wind erosion	846184	814759	5	NA	NA	0.8080	0.8080	g/s	3
Material Handling at Barging Facility (decommissioning)	845704	815093	6	100	100	0.1536	0.1536	g/s	1
Excavation (decommissioning)	845988	815099	7	*	*	0.00128	0.00128	g/m/s	4
Haul Road (R1 & R2)	See Figure 4A	See Figure 4A	8, 9	240 (unladen)	125 (unladen)	0.00145	0.00145	g/m/s	4
Haul Road (R3)	See Figure 4A	See Figure 4A	10	100 (unladen) + 100 (laden)	100 (unladen) + 100 (laden)	0.00221	0.00221	g/m/s	4
Haul Road (R4 to R11)	See Figure 4A	See Figure 4A	11 to 18	240 (laden)	125 (laden)	0.00273	0.00273	g/m/s	4
Haul Road (R12 to R14)	See Figure 4A	See Figure 4A	19 to 21	340 (unladen) + 100 (laden)	225 (unladen) + 100 (laden)	0.00448	0.00448	g/m/s	4
Haul Road (R15)	See Figure 4A	See Figure 4A	22	225 (unladen) + 225 (laden)	225 (unladen) + 225 (laden)	0.00189	0.00189	g/m/s	4
Haul Road (R16)	See Figure 4A	See Figure 4A	23	100 (unladen) + 100 (laden)	100 (unladen) + 100 (laden)	0.00285	0.00285	g/m/s	4
Disposal Route	See Figure 4A	See Figure 4A	24 to 31	176 (unladen) + 176 (laden)	109 (unladen) + 109 (laden)	0.00285	0.00285	g/m/s	4

Note

1 Emission rate for material handling derived based on USEPA AP-42 Section 13.2.4 (edition 01/95),  $E (kg/Mg) = k(0.0016)(U/2.2)^{-2}(M/2)^{1.4}$

Where  $k = 0.74$ ,  $U = 2.1$  m/s,  $M = 2.0$  t

Density of the public fill ( $kg/m^3$ ) = 2500

Capacity of a typical truck = 6.5 m<sup>3</sup>

Control efficiency = 70%

(USEPA AP-42 Section 13.2.4.4 - Control efficiency up to 90% by continuous chemical treating of materials, coupled with watering)

2 Emission rate for crushing/screening derived based on USEPA AP-42 Section 11.19.2 (edition 01/95),  $E (kg/Mg) = 0.00035 (kg/Mg)$  and  $0.01596 (kg/Mg)$  for crushing and screening respectively

Where density of the public fill ( $kg/m^3$ ) = 2500

Capacity of a typical truck = 6.5 m<sup>3</sup>

Control efficiency = 70%

(Control Techniques for Particulate Emissions from Stationary Sources Vol. 2 Section 9.7.1.2.2 - efficiency is more than 99% for fabric filters with continuous cleaning)

3 Emission rate derived for wind erosion based on USEPA AP-42 Section 11.9 (edition 10/98),  $E (Mg/ha/yr) = 0.85$

Where stockpiling area (ha) = 60

Control efficiency = 50%

4 Emission rates for haul road based on USEPA AP-42 Section 13.2.2 (edition 09/98)  $E (kg/v-km) = K(s/12)^{1/3}(W/3)^{1/3}(M/0.2)^{1/3}(S/15)$

Where  $k = 10$ ,  $a = 0.8$ ,  $b = 0.5$ ,  $c = 0.4$ ,  $S = 6.2$  mph,  $M = 10$  t

(average vehicle speed = 10 km/hr; moisture content of 10% based on presence of water spraying)

For Haul Road R1 to R14 with Area 137,  $s = 4.8\%$

For Haul Road R15 & R16 with Area 137,  $s = 7.1\%$

For Disposal Route within SENT,  $s = 6.4\%$

For Haul Roads R1 to R16,  $W = 8$  ton (unladen) & 24 ton (laden)

For Disposal Routes within SENT,  $W = 9.8$  ton (unladen) & 13.8 ton (laden)

(Information from SENT Landfill/EFD)

(Control Techniques for Particulate Emissions from Stationary Sources Vol. 2 Section 9.12.2.1 - a dust control efficiency of up to 95% is achievable when a dust suppression chemical is used)

Control efficiency = 90%

\* Max. excavation rate ( $m^3/hr$ ) = 650

Density of the public fill ( $kg/m^3$ ) = 2500

Max. excavation rate ( $Mg/hr$ ) = 1625

Particle distribution - 80% (30µm) & 20% (10µm)

† (Guide to Rock and Soil Descriptions issued by Geotechnical Control Office, Civil Engineering Department, Hong Kong (1988))