APPENDIX 9.5 – PREDICTED NOISE LEVELS

1. HOURLY NOISE LEVEL CALCULATION METHODOLOGY

1.1 In order to calculate an hourly noise level for a specific event it is necessary to determine how many events will happen in an hour period and how long each of them will take. For the purposes of this assessment, a HGV delivery of peat or biomass (including Pellet Silo) is assumed to take 15 minutes to unload, a train manoeuvre is assumed to take 30 seconds and loading an HGV from a biomass slab is assumed to take 20 minutes. Table 9.2 within the main noise assessment chapter specifies the numbers of each event that could be expected within a worst-case hour. With this information it is then possible to calculate an hourly L_{Aeq} as follows:

$$L_{Aeq,1\,hr} = L_{Aeq,T} + 10Log\left(\frac{nT}{60}\right)$$

Where:
T is the duration of an event in minutes and
n is the number of events in an hour

2. RESULTS

2.1 The predicted hourly L_{Aeq} level has been calculated for each of the six noise generating activities identified at Table 9.2 of the noise assessment chapter. In addition to these noise sources, the underlying 'base' level produced from the power generating plant (assumed to be emitted primarily from the top of the main chimney) has also been predicted at the NSLs considered in this assessment. The 'base' level is assumed to be steady in level and continuous which means that no correction is required to calculate an hourly L_{Aeq} for this noise source. The six predicted L_{Aeq} levels and the base level are then logarithmically summed to arrive at the total 'worst-case' hourly L_{Aeq} level at each NSL. Table 1 shows the results for road based peat delivery noise.

Table 1: Road Based Peat Deliveries – L_{Aeq} Calculation

		Road Peat Noise Level	
Location	Operational Mode	HGV $L_{Aeq,T}$	$L_{Aeq,\,1hr}$
NSL 1	Peat	35.9	40.6
NSL 2	Peat	21.6	26.4
NSL 3	Peat	20.1	24.8
NSL 4	Peat	31.6	36.3

2.2 For rail based peat deliveries, the noise has been modelled as a pass-by occurring at a single point on the track (in line with how the noise was measured and how it is experienced). In order to model the worst-case levels of pass-by noise at each NSL two points were selected (along the section of track within the site boundary) from which to model train pass-by noise; one to the north and one to the east. Table 2 shows the L_{Aeq} calculation for each of these two train pass-by locations.

Table 2: Rail Based Peat deliveries – L_{Aeq} Calculation

		Rail Peat Noise Level			
Location	Operational Mode	North $L_{Aeq,T}$	$L_{Aeq\ 1hr}$	East $L_{Aeq,T}$	$L_{Aeq\ 1hr}$
NSL 1	Peat	51.4	38.4	55.0	42.0
NSL 2	Peat	32.9	19.9	15.8	2.8
NSL 3	Peat	38.8	25.8	34.8	21.8
NSL 4	Peat	49.4	36.4	50.9	37.9

2.3 Table 3 shows the L_{Aeq} calculation for road based biomass deliveries.

Table 3: Road Based Biomass Deliveries – L_{Aeq} calculation

		Biomass Road	
Location	Operational Mode	HGV $L_{Aeq,T}$	$L_{Aeq\ 1hr}$
NSL 1	Biomass	35.9	40.6
NSL 2	Biomass	21.6	26.4
NSL 3	Biomass	32.1	36.9
NSL 4	Biomass	37.8	42.6

2.4 In order to model the worst-case levels of noise generated through moving biomass from the slabs, two points have been selected from which to model the noise; one to represent the HGV and one to represent the associated wheeled loader filling the HGV on the slab. It should also be noted that two separate locations for the wheeled loader have been modelled for each slab and the worst-case location (highest noise level) has been selected for each NSL to be used in the calculations. Table 4 and Table 5 show the L_{Aeq} calculations for Slab A and Slab B respectively.

Table 4: Slab A Biomass Movements – L_{Aeq} calculation

		Biomass - Slab A Noise Level			
Location	Operational Mode	HGV	$L_{Aeq\ 1hr}$	Loader	$L_{Aeq\ 1hr}$
NSL 1	Biomass	21.7	20.5	38.6	38.6
NSL 2	Biomass	15.9	14.7	33.3	33.3
NSL 3	Biomass	20.7	19.5	35.7	35.7
NSL 4	Biomass	29.5	28.3	44.5	44.5

Table 5: Slab B Biomass Movements – L_{Aeq} calculation

		Biomass - Slab B Noise Level			
Location	Operational Mode	HGV	$L_{Aeq\ 1hr}$	Loader	$L_{Aeq\ 1hr}$
NSL 1	Biomass	33.4	32.2	53.5	53.5
NSL 2	Biomass	20.5	19.3	37.4	37.4
NSL 3	Biomass	11.5	10.3	32.1	32.1
NSL 4	Biomass	37.8	36.6	57.2	57.2

2.5 Table 6 shows the L_{Aeq} calculation for biomass pellet deliveries to the pellet silo.

Table 6: Pellet Silo Deliveries – L_{Aeq} calculation

		Pellet Silo	
Location	Operational Mode	Loading	$L_{Aeq\ 1hr}$
NSL 1	Biomass	33.0	33.0
NSL 2	Biomass	39.7	39.7
NSL 3	Biomass	33.4	33.4
NSL 4	Biomass	35.7	35.7

2.6 Table 7 below shows the predicted base noise level along with the calculated total hourly L_{Aeq} for each NSL as presented at Table 9.8 within the main noise assessment chapter.

Table 7: Base Level and Total Hourly L_{Aeq}

		Base	**Overall**
Location	Operational Mode	$L_{Aeq\ 1hr}$	**$L_{Aeq\ 1hr}$**
NSL 1	Peat	40.7	**46.6**
	Biomass	40.7	**54.1**
NSL 2	Peat	35.0	**35.7**
	Biomass	35.0	**43.2**
NSL 3	Peat	31.3	**33.4**
	Biomass	31.3	**41.4**
NSL 4	Peat	38.2	**43.3**
	Biomass	38.2	**57.7**

2.7 The locations of all noise sources detailed in these results are given in Table 9.3 within the main noise assessment chapter.