

---

**APPENDIX 7.6**

**CALCULATION OF OPERATIONAL NOISE  
LEVELS AT REPRESENTATIVE NOISE  
SENSITIVE RECEIVER- UNMITIGATED  
SCENARIO**

---

**Appendix 7.6 Calculation of Operational Noise Levels at NSR - Unmitigated**

**The Predicted Noise Levels at NSR TP1 due to the new proposed equipment**

Treatment Units	No of Item	Reference	SWL, dB(A)	Total SWL, dB(A)	Distance in m	Enclosure Reduction <sup>(2)</sup> , dB(A)	Screening Reduction <sup>(3)</sup> , dB(A)	SPL, dB(A)	Enclosed	Remark	Horsepower (kW) and rpm of pump	Air Flow rate in m3/s
<b>Stage III Works</b>												
Influent Pumping station												
Inlet pump	1	Ref 1 <sup>(1)</sup>	104	104	22	20		52	enclosed			
Final Sedimentation Tanks	2											
Mixed Liquor channel												
SAS Pumps	1	Ref 4 <sup>(3)</sup>	88	88	30		10	43	in chamber	duty		
SAS Pumps	1	Ref 4 <sup>(3)</sup>	88	88	30		10	43	in chamber	standby*		
Scum Pumps	1	Ref 4 <sup>(3)</sup>	88	88	30		10	43	in chamber	duty		
Scum Pumps	1	Ref 4 <sup>(3)</sup>	88	88	30		10	43	in chamber	standby*		
SBR												
Air Blower	1	Ref 5 <sup>(1)</sup>	104	104	168		10	44		1 duty+1 standby		
Pump used for Equalisation Tank	1	Ref 4 <sup>(3)</sup>	92	92	168		10	32	in chamber	1 duty+1 standby	3-7	less than 1800
Sludge pump	1	Ref 4 <sup>(3)</sup>	92	92	168		10	32	in chamber	1 duty+1 standby	3-7	less than 1800
Pump Effluent pumping chamber	1	Ref 4 <sup>(3)</sup>	92	92	168		10	32	in chamber	1 duty+1 standby	3-7	less than 1800
<b>Stage IV Works</b>												
Influent Pumping station												
Inlet pump	1	Ref 1 <sup>(1)</sup>	104	104	224	20		32	enclosed			
Screen												
mechanically raked bar screen	4	Ref 4 <sup>(3)</sup>	92	98	204		10	37		duty		
mechanically raked bar screen	1	Ref 4 <sup>(3)</sup>	92	92	204		10	31		standby*		
Grit Removal Units												
Detritor	1	Ref 4 <sup>(3)</sup>	80	80	210		10	19		duty		
Grit pump	2	Ref 3 <sup>(3)</sup>	92	95	210		10	34			2.2	1390
New grit classifiers	2	Ref 4 <sup>(3)</sup>	80	83	210		10	22				
Primary Sedimentation Tanks	1											
primary sludge pump	1	Ref 3 <sup>(3)</sup>	92	92	280		10	26	in chamber	duty	11	1440
primary sludge pump	1	Ref 3 <sup>(3)</sup>	92	92	280		10	26	in chamber	standby*		
Bioreactors	3											
Bioreactor internal recycle pumps	6	Ref 3 <sup>(3)</sup>	92	100	274		10	36		duty	10	475
Bioreactor internal recycle pumps	1	Ref 3 <sup>(3)</sup>	92	92	274		10	28		standby*	10	475
Final Sedimentation Tanks	12											
Sludge Digestion Tank												
Sludge Digester	1											
Air Blower House												
Air Blower	5	Ref 5 <sup>(1)</sup>	104	111	270	20		37	enclosed	duty		
Air Blower	1	Ref 5 <sup>(1)</sup>	104	104	270	20		30	enclosed	standby*		
Primary Sludge Thickeners	2											
Thickened sludge pumps for Primary Sludge Thickeners	2	Ref 3 <sup>(3)</sup>	94	97	274		10	33	in chamber	duty	18.5	1460
Mixed Liquor channel												
SAS Pumps	1	Ref 4 <sup>(3)</sup>	88	88	330		10	23	in chamber	duty	12.5	1460
SAS Pumps	1	Ref 4 <sup>(3)</sup>	88	88	330		10	23	in chamber	standby*	12.5	1460
Scum Pumps	1	Ref 4 <sup>(3)</sup>	88	88	330		10	23	in chamber	duty	12.5	1460
Scum Pumps	1	Ref 4 <sup>(3)</sup>	88	88	330		10	23	in chamber	standby*	12.5	1460
Common Facilities												
Disinfection	(2+1)											
Surplus Activated Sludge Thickeners	(3+1)											
Sludge Thickening House					284	20			enclosed	3 duty+1 standby		
Exhaust Fan	9	Ref 4 <sup>(3)</sup>	89	98	284	20		24	enclosed			
Thickened sludge pumps	3	Ref 3 <sup>(3)</sup>	92	97	284	20		22	enclosed	duty	11	1450
Thickened sludge pumps	1	Ref 3 <sup>(3)</sup>	92	92	284	20		18	enclosed	standby*	11	1450
Exhaust Fan	1	Ref 4 <sup>(3)</sup>	89	89	284	20		14	enclosed			
Sludge Dewatering Units	(5+1)											
Extended Sludge Dewatering House												
Exhaust Fan	10	Ref 4 <sup>(3)</sup>	89	99	258		10	35		5 duty+1 standby		
Plate filter Presses	2	Ref 6 <sup>(3)</sup>	100	103	258	20		30	enclosed			
Dewatering House												
Feed Pump	5	Ref 3 <sup>(3)</sup>	92	99	258	20		26	enclosed		11	1470
Transfer pump	4	Ref 3 <sup>(3)</sup>	92	96	258	20		25	enclosed		7.5	1400
Deodorizing Unit												
Exhaust Fan	1	Ref 3 <sup>(3)</sup>	79	79	52			40				0.28
Exhaust Fan	1	Ref 3 <sup>(3)</sup>	79	79	205		10	18				0.01
Exhaust Fan	1	Ref 3 <sup>(3)</sup>	83	83	278		10	19				0.68
Exhaust Fan	1	Ref 3 <sup>(3)</sup>	83	83	262		10	20				0.57
Exhaust Fan	1	Ref 3 <sup>(3)</sup>	83	83	241		10	20				0.61
Exhaust Fan	1	Ref 3 <sup>(3)</sup>	79	79	205		10	18				0.01
Exhaust Fan	1	Ref 3 <sup>(3)</sup>	83	83	215		10	21				0.74
								<b>Total SPL :</b>	<b>64</b>			
<b>Note:</b>												
Ref1 <sup>(1)</sup> - The estimated SWLs of equipment were made reference to EIA Report "Main Drainage Channel and Protected Village Protection Schemes for San Tin, MWNT"												
Ref2 <sup>(2)</sup> - The estimated SWLs was determined by on-site measurement												
Ref3 <sup>(3)</sup> - Good Practice on Pumping System Noise Control / Good Practices on Ventilation Noise Control												
Ref4 <sup>(4)</sup> - The estimated SWLs of some items of equipment (SAS Pumps, Exhaust fan, mechanically raked bar screen, vortex type grit trap and new grit classifier and filter press) were made reference to the specifications of similar items of equipment provided by contractor												
Ref5 <sup>(5)</sup> - The estimated SWLs were made reference to the EIA Report "Outlying Islands Sewerage Stage Phase I, Nipong Ping Sewerage Treatment Works, Sewerage Investigation - D&C"												
Ref6 <sup>(6)</sup> - The estimated SWLs were made reference to the Final Report "Tai Po Sewerage Treatment Works - Stage V, Preliminary Project Feasibility Study"												
Enclosure Reduction <sup>(2)</sup> - Reduction of SWL due to the enclosure for the equipment												
Screening Reduction <sup>(3)</sup> - Reduction of SWL due to the screening of line of sight by building or structures within the site												
* Standby item was not included in the noise assessment												

Appendix 7.6 Calculation of Operational Noise Levels at NSR - Unmitigated

Treatment Units	No of Item	Reference	SWL, dB(A)	Total SWL, dB(A)	Distance in m	Enclosure Reduction(2), dB(A)	Screening Reduction(3), dB(A)	SPL, dB(A)	Enclosed	Remark	Horsepower (kW) and rpm of pump	Air Flow rate in m <sup>3</sup> /s
<b>Stage 1/1 Works</b>												
Influent Pumping station												
Inlet pump	2	Ref 1 (1)	104	107	22	20		55	enclosed	duty	75	1450
Inlet pump	1	Ref 1 (1)	104	104	30	20		49	enclosed	duty		
Inlet pump	1	Ref 1 (1)	104	104	30	20		49	enclosed	standby*		
Screen + Grit Removal Units												
Mechanically raked bar screen	3	Ref 2 (1)	81	86	24			53		(3 duty+1 standby)		
Screw type grit classifier	2	Ref 2 (1)	84	87	24			54				
Primary Sedimentation Tanks	8											
Blowers	6											
Internal recycle pumps	3	Ref 3 (1)	92	97	70		10	45	in tanks	duty	10	470
Internal recycle pumps	3	Ref 3 (1)	92	97	120		10	40	in tanks	duty	10	470
Final Sedimentation Tanks	10											
Sludge Digester	2											
Sludge Consolidation Tank												
Sludge Holding Tanks	2											
Sludge pumps	2	Ref 3 (1)	92	95	240		10	32	in chamber		15	1455
Mixed Liquor channel												
SAS Pumps	1	Ref 4 (1)	88	88	30		10	43	in chamber	duty		
SAS Pumps	1	Ref 4 (1)	88	88	30		10	43	in chamber	standby*		
Scum Pumps	1	Ref 4 (1)	88	88	30		10	43	in chamber	duty		
Scum Pumps	1	Ref 4 (1)	88	88	30		10	43	in chamber	standby*		
Blower house	4	Ref 5 (1)	104	110	180			40	enclosed			
Air blowers	1	Ref 5 (1)	104	104	180			34	enclosed			
RAS Pumping Station												
RAS pump	2	Ref 3 (1)	100	103	210			32	enclosed	duty	61	1500
RAS pump	1	Ref 3 (1)	100	100	210			29	enclosed	standby*	61	1500
Gas Holder												
Primary Sludge Thickeners	2											
Thickened primary sludge pumps	5	Ref 3 (1)	92	99	242			26	enclosed		15	1475
Chemical House												
Effluent Pumping Station												
Effluent pump	4	Ref 5 (1)	100	106	220			34	enclosed		400	585
Sludge Pumping Station												
Thickened Primary Sludge Pumps	4	Ref 3 (1)	92	98	204			27	enclosed		15	1475
Exhaust Fan	1	Ref 4 (1)	89	89	200		10	27	enclosed			
SBR												
Air Blower	1	Ref 5 (1)	104	104	180		10	44		1 duty+1 standby		
Pump used for Equalisation Tank	1	Ref 4 (1)	92	92	168		10	32	in chamber	1 duty+1 standby	3-7	less than 1800
Sludge pump	1	Ref 4 (1)	92	92	168		10	32	in chamber	1 duty+1 standby	3-7	less than 1800
Pump Effluent pumping chamber	1	Ref 4 (1)	92	92	168		10	32	in chamber	1 duty+1 standby	3-7	less than 1800

**Appendix 7.6 Calculation of Operational Noise Levels at NSR - Unmitigated**

Treatment Units Stage IV Works		No of Item	Reference	SWL, dB(A)	Total SWL, dB(A)	Distance in m	Enclosure Reduction(2), dB(A)	Screening Reduction(3), dB(A)	SPL, dB(A)	Enclosed	Remark	Horsepower (kW) and rpm of pump	Air Flow rate in m <sup>3</sup> /s
<b>Influent Pumping station</b>													
	Inlet pump	3	Ref 1(1)	104	109	224	20		37	enclosed	duty		
	Inlet pump	1	Ref 1(1)	104	104	224	20		32	enclosed	standby*		
<b>Screen</b>													
	mechanically raked bar screen	4	Ref 4(1)	92	98	204		10	37		duty		
	mechanically raked bar screen	1	Ref 4(1)	92	92	204		10	31		standby*		
	Screening Conveyor	2											
	Screening Compactor	1											
<b>Grit Removal Units</b>													
	Detritor	2	Ref 4(1)	80	83	210		10	22		duty		
	Grit pump	2	Ref 3(1)	92	95	210		10	34			2.2	1390
	New grit classifiers	2	Ref 4(1)	80	83	210		10	22				
<b>Primary Sedimentation Tanks</b>													
	primary sludge pump	1	Ref 3(1)	92	92	280		10	28	in chamber	4 duty + 1 standby	11	1440
	primary sludge pump	1	Ref 3(1)	92	92	280		10	28	in chamber	standby*		
<b>Bioreactors</b>													
	Bioreactor internal recycle pumps	7											
	Bioreactor internal recycle pumps	14	Ref 3(1)	92	103	274		10	40		duty	10	475
	Bioreactor internal recycle pumps	1	Ref 3(1)	92	92	274		10	28		standby*	10	475
<b>Final Sedimentation Tanks</b>													
<b>RAS Pumping Station</b>													
	RAS pump	4	Ref 3(1)	97	103	346			27	enclosed	duty	37	580
	RAS pump	1	Ref 3(1)	97	97	346			21	enclosed	standby*	37	580
<b>Sludge Digestion Tank</b>													
	Sludge Digester	3											
<b>Sludge Consolidation Tanks</b>													
	Sludge pumps	3	Ref 3(1)	92	97	190		10	36	in pipe gallery		11	1460
<b>Central Building Complex</b>													
	Thickened Primary Sludge Pumps	3	Ref 3(1)	92	97	226			25	enclosed		11	1450
	SAS Pumps	4	Ref 3(1)	92	98	226			26	enclosed		12.5	1460
	Air Blower House	5	Ref 5(1)	104	111	270			37	enclosed	duty		
	Air Blower	1	Ref 5(1)	104	104	270			30	enclosed	standby*		
<b>Primary Sludge Thickeners</b>													
	Thickened sludge pumps for Primary Sludge Thickeners	2	Ref 3(1)	94	97	274		10	33	in chamber	duty	18.5	1460
<b>Mixed Liquor channel</b>													
	SAS Pumps	1	Ref 4(1)	88	88	330		10	23	in chamber	duty	12.5	1460
	SAS Pumps	1	Ref 4(1)	88	88	330		10	23	in chamber	standby*	12.5	1460
	Scum Pumps	1	Ref 4(1)	88	88	330		10	23	in chamber	duty	12.5	1460
	Scum Pumps	1	Ref 4(1)	88	88	330		10	23	in chamber	standby*	12.5	1460

**Appendix 7.6 Calculation of Operational Noise Levels at NSR - Unmitigated**

Treatment Units Common Facilities	No of Item (2+1)	Reference	SWL dB(A)	Total SWL dB(A)	Distance in m	Enclosure Reduction(2), dB(A)	Screening Reduction(3) dB(A)	SPL <sub>e</sub> dB(A)	Enclosed	Remark	Horsepower (kW) and rpm of pump	Air flow rate in m <sup>3</sup> /s
<b>Surplus Activated Sludge Thickeners (3+1)</b>												
Sludge Thickening House	9	Ref 4(1)	89	98	294	20			enclosed			
Exhaust Fan	3	Ref 3(1)	92	97	294	20		24	enclosed			
Thickened sludge pumps	1	Ref 3(1)	92	92	294	20		18	enclosed	duty standby*	11	1450
Exhaust Fan	1	Ref 4(1)	89	89	294	20		14	enclosed			
<b>Sludge Dewatering Units (5+1)</b>												
Extended Sludge Dewatering House	10	Ref 4(1)	89	99	258		10					
Exhaust Fan	2	Ref 5(1)	100	103	258	20		30	enclosed			
Plate filter Presses	3	Ref 6(1)	100	105	258	20		32	enclosed			
Filter Press	1	Ref 6(1)	100	100	258	20		27	enclosed	duty standby*		
Feed Pump	5	Ref 3(1)	92	99	258	20		26	enclosed		11	1470
Transfer Pump	4	Ref 3(1)	92	96	258	20		25	enclosed		7.5	1400
Leachate Pre-treatment Work	2	Ref 3(1)	103	106	257		10	43	in tank	(2 duty + 1 standby)	11	less than 3600
Depositing Unit	1	Ref 3(1)	79	79	52			40				0.28
Exhaust Fan	1	Ref 3(1)	79	79	205		10	18				0.01
Exhaust Fan	1	Ref 3(1)	83	83	278		10	19				0.88
Exhaust Fan	1	Ref 3(1)	83	83	262		10	20				0.87
Exhaust Fan	1	Ref 3(1)	83	83	241		10	20				0.61
Exhaust Fan	1	Ref 3(1)	79	79	205		10	18				0.01
Exhaust Fan	1	Ref 3(1)	83	83	215		10	21				0.74
<b>Total SPL :</b>											<b>60</b>	
<p>Note:                      Ref<sup>(1)</sup>: The estimated SWLs of equipment were made reference to EIA Report "Main Drainage Channel and Paired Village Protection Schemes for San Tin, NWT".                      Ref<sup>(2)</sup>: The estimated SWLs was determined by on-site measurement.                      Ref<sup>(3)</sup>: Good Practice on Pumping System Noise Control / Good Practices on Ventilation Noise Control.</p>												
<p>Ref<sup>(4)</sup>: The estimated SWLs of some items of equipment (SAS Pumps, Exhaust fan, mechanically raked bar screen, vortex type grit trap and new grit classifier and filter press) were made reference to the specifications of similar items of equipment provided by contractor.                      Ref<sup>(5)</sup>: The estimated SWLs were made reference to the EIA Report "Outlying Islands Sewerage Stage Phase 1, Ngong Ping Sewerage Treatment Works Sewerage Investigation - DAC".                      Ref<sup>(6)</sup>: The estimated SWLs were made reference to the Final Report "Tai Po Sewage Treatment Works Stage V, Preliminary Project Feasibility Study".                      Enclosure Reduction<sup>(2)</sup>: Reduction of SWL due to the enclosure for the equipment.                      Screening Reduction<sup>(3)</sup>: Reduction of SWL due to the screening of line of sight by building or structures within the site.                      * Standby item was not included in the noise assessment.</p>												