

SSS Calculation Result for Fixed Plant at NSR

Mitigated

NSR	Shunting				Long Train Idling in Shed				Shuttle Idling outside				Crane Operation				Car Washing				Loco Shunting + Idling				Total			
	Leq, day	Leq, night	Leq, 24h	Lmax	Leq, day	Leq, night	Leq, 24h	Lmax	Leq, day	Leq, night	Leq, 24h	Lmax	Leq, day	Leq, night	Leq, 24h	Lmax	Leq, day	Leq, night	Leq, 24h	Lmax	Leq, day	Leq, night	Leq, 24h	Lmax	Leq, day	Leq, night	Leq, 24h	Lmax
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
SS2	38.4	36.6	37.9	41.8	24.5	24.5	24.5	24.5	26.2	-	24.4	26.2	23.8	-	22.0	23.8	39.0	-	37.3	39.0	40.6	-	38.6	68.1	44	37	43	68
SS4	41.1	39.3	40.6	46.0	24.7	24.7	24.7	24.7	26.9	-	25.2	26.9	18.1	-	16.3	18.1	41.5	-	39.7	41.5	43.7	-	41.8	64.4	47	39	46	64
SS5	41.5	39.8	41.0	43.6	32.3	32.3	32.3	32.3	29.6	-	27.9	29.6	26.6	-	24.8	26.6	36.2	-	34.5	36.2	43.8	-	40.6	66.7	47	40	45	67
SS6	36.3	34.6	35.8	41.2	31.1	31.1	31.1	31.1	25.3	-	23.5	25.3	27.5	-	25.7	27.5	33.5	-	31.8	33.5	39.8	-	37.4	59.0	43	36	41	59
SS7	42.8	41.1	42.3	53.8	33.7	33.7	33.7	33.7	42.3	-	40.5	42.3	30.4	-	28.7	30.4	16.8	-	15.0	16.8	29.9	-	27.0	57.9	46	42	45	58
SS10	41.0	39.2	40.5	51.7	32.2	32.2	32.2	32.2	39.0	-	37.2	39.0	30.2	-	28.4	30.2	29.4	-	27.6	29.4	36.4	-	28.0	56.5	45	40	43	56
SS11a	35.2	33.5	34.7	41.5	33.1	33.1	33.1	33.1	20.8	-	19.1	20.8	26.5	-	24.7	26.5	36.2	-	34.5	36.2	50.3	-	43.9	73.7	51	36	45	74
SS12	31.1	29.3	30.6	43.2	31.0	31.0	31.0	31.0	36.5	-	34.7	36.5	29.7	-	27.9	29.7	14.0	-	12.3	14.0	36.5	-	27.4	54.4	41	33	38	54
SS14	42.8	41.0	42.2	49.1	35.0	35.0	35.0	35.0	36.4	-	34.6	36.4	29.7	-	27.9	29.7	32.4	-	30.7	32.4	42.4	-	37.7	67.8	47	42	45	68
SS15	44.6	42.8	44.1	53.5	35.8	35.8	35.8	35.8	40.3	-	38.6	40.3	30.8	-	29.0	30.8	22.3	-	20.5	22.3	39.8	-	36.9	67.0	47	44	46	67

SSS Calculation at NSR SS5				Mitigated		Barrier height (m)=		8											
NSR	No. of	Ground Level	Hr	ASR															
SS5	Storey	mPD	m	B															
	3	17.3	7.5	B															
Loco launch / Arrive				NIGHT		Remark: plus 10log(2) is for converting of Leq(30min) to Leq(1hr).													
				At NSR, no shield												At NSR, incl façade			
Segment	Hor D	Angle	SEL	SEL	Leq	Shield	Track Level	Hb	Dsb	Dbr	Hs	D	P	A barrier	IL barrier	Wheel Squeal	Leq, night	Shadow zone?	
	m	Deg	15m	NSR	NSR		mPD	m	m	m	m	m	m			dB			
Loco	1a	244	61.3	85	71.2	38.6	Mainten' Shed	15	11.15	30	214	3	244.1	1.0	15.0	15.0	0	26.6	Yes
	1b	244	15.5	85	65.2	32.7	Mainten' Shed	15	11.15	30	214	3	244.1	1.0	15.0	15.0	6	26.7	Yes
	2	238	45.7	85	70.1	37.5	Barrier	15	8	106	132	3	238.1	0.0	4.3	4.3	0	36.2	Yes
	3	123	6	85	64.1	31.5	-	15		123			123.4	9.4	0.0	0.0	6	40.5	-
Remark: For legend of parameters and remark for equations, please refers to the bottom of spreadsheet "SS2".																			
At NSR, incl façade																			
Night time																			
Noise criteria																			
	Leq	ASR	Leq, night	Status	Lmax	Hor D	Lmax												
	15m				15m		NSR												
	42.1	B	50	OK	86	238	66.7												
Loco Idling																			
				Direction		At NSR, no shield												At NSR, incl façade	
	Hor D	Exit Angle	Correction	Lw	Leq	Shield	Track Level	Hb	Dsb	Dbr	Hs	D	P	A barrier	IL barrier		Leq, night	Shadow zone?	
	m	Deg			NSR		mPD	m	m	m	m	m	m						
at Gate	271	62.1	6.3	96.7	33.7	Barrier	15	8	160	111	4.7	271.0	0.0	0.1	0.1		36.6	Yes	
at Side Louvre	282	-	0	85.8	28.8	Barrier	15	8	162	120	4.7	282.0	0.0	0.2	0.2		31.6	Yes	
at Roof Louvre	288	-	6	91.9	28.7	Barrier	15	8	170	118	9.45	288.0	0.0	0.0	0.0		31.7	No	
At NSR, incl façade																			
	Total	Leq, day	Leq, night	Leq, 24h	Lmax														
	38.7	-	24.9	38.7															
Legend:																			
Remark for Equations:																			
Hr: Height of highest floor at receiver (1): distance attenuation and angle of view adjustment.																			
Hor D: Horizontal distance plus 10log(2) is for one set of works train having a loco car at two ends.																			
Angle: Angle of View (2): SEL conversion to Leq: Leq = SEL + 10 log V -35.6 ref: FTA Guidance Manual Table 5-2 Rail vehicle ;																			
Hb: Height of barrier or shield plus 10log(2) is to convert Leq(30min) to Leq(1hr).																			
Dsb: Horizontal distance from noise source to barrier (3): Barrier effect, ref: FTA Guidance Manual, Table 6-9.																			
Dbr: Horizontal distance from barrier to receiver (4): To check whether the direct path ray is under shadow zone of shielding.																			
Hs: Height of noise source (5): Loco distance adjustment: 20 log (D1/D2) adjusted to point source.																			
D: Direct path (6): Direction correction factor for angle between shed exit direction to NSR or direction correction for roof louvre to NSR.																			
P: Path difference=Shielded path - D (7): general equation for calculating sound pressure from sound power in free field.																			
A barrier: Barrier attenuation (dB)																			
IL barrier: Barrier loss (dB)																			

SSS Calculation at NSR SS14				Mitigated		Barrier height (m)=		8													
NSR	No. of	Ground Level	Hr	ASR																	
SS14	Storey	mPD	m	B																	
	3	17	7.5	B																	
Loco launch / Arrive				NIGHT		Remark: plus 10log(2) is for converting of Leq(30min) to Leq(1hr).															
				At NSR, no shield												At NSR, incl façade					
Segment	Hor D	Angle	SEL	SEL	Leq	Shield	Track Level	Hb	Dsb	Dbr	Hs	D	P	A barrier	IL barrier	Wheel Squeal	Leq, night	Shadow zone?			
	m	Deg	15m	NSR	NSR		mPD	m	m	m	m	m	m			dB					
Loco	1a	190	84.1	85	73.7	41.1	Mainten' Shed	15	11.15	30	160	3	190.1	1.0	15.0	15.0	0	29.1	Yes		
	1b	181	21	85	67.9	35.3	Mainten' Shed	15	11.15	21	160	3	181.1	1.4	15.0	15.0	6	29.3	Yes		
	2a	220	29	85	68.4	35.8	Barrier	15	8	117	103	3	220.1	0.0	3.1	3.1	0	35.7	Yes		
	2b	220	5.3	85	61.0	28.4	Barrier	15	8	117	103	3	220.1	0.0	3.1	3.1	6	34.3	Yes		
Remark: For legend of parameters and remark for equations, please refers to the bottom of spreadsheet "SS2".																					
At NSR, incl façade																					
Night time				Noise criteria																	
	Leq	ASR	Leq, night	Status	Lmax	Hor D	Lmax														
	Total				15m	NSR															
	39.1	B	50	OK	86	190	51.9	shield by mainten' shed													
					86	239	67.8	shield by barrier													
							67.8	Total													
Loco Idling																					
				Direction		At NSR, no shield												At NSR, incl façade			
	Hor D	Exit Angle	Correction	Lw	Leq	Shield	Track Level	Hb	Dsb	Dbr	Hs	D	P	A barrier	IL barrier	Leq, night		Shadow zone?			
	m	Deg			NSR		mPD	m	m	m	m	m	m								
at Gate	275	42.3	4.7	96.7	35.2	Barrier	15	8	209	66	4.7	275.0	0.0	0.0	0.0	38.2		No			
at Side Louvre	296	-	0	85.8	28.4	Barrier	15	8	222	74	4.7	296.0	0.0	0.0	0.0	31.4		No			
at Roof Louvre	300	-	6	91.9	28.4	Barrier	15	8	228	72	9.45	300.0	0.0	0.0	0.0	31.4		No			
At NSR, incl façade																					
	Total	Leq, day	Leq, night	Leq, 24h	Lmax																
	39.7	-	25.9	39.7																	
Legend:				Remark for Equations:																	
Hr: Height of highest floor at receiver				(1): distance attenuation and angle of view adjustment.																	
Hor D: Horizontal distance				plus 10log(2) is for one set of works train having a loco car at two ends.																	
Angle: Angle of View				(2): SEL conversion to Leq: Leq = SEL + 10 log V -35.6 ref: FTA Guidance Manual Table 5-2 Rail vehicle ;																	
Hb: Height of barrier or shield				plus 10log(2) is to convert Leq(30min) to Leq(1hr).																	
Dsb: Horizontal distance from noise source to barrier				(3): Barrier effect, ref: FTA Guidance Manual, Table 6-9.																	
Dbr: Horizontal distance from barrier to receiver				(4): To check whether the direct path ray is under shadow zone of shielding.																	
Hs: Height of noise source				(5): Loco distance adjustment: 20 log (D1/D2) adjusted to point source.																	
D: Direct path				(6): Direction correction factor for angle between shed exit direction to NSR or direction correction for roof louvre to NSR.																	
P: Path difference=Shielded path - D				(7): general equation for calculating sound pressure from sound power in free field.																	
A barrier: Barrier attenuation (dB)																					
IL barrier: Barrier loss (dB)																					

SSS Calculation at NSR SS15				Mitigated		Barrier height (m)=		8											
NSR	No. of	Ground Level	Hr	ASR															
SS15	Storey	mPD	m	B															
	3	15.7	7.5	B															
Loco launch / Arrive				NIGHT		Remark: plus 10log(2) is for converting of Leq(30min) to Leq(1hr).													
				At NSR, no shield												At NSR, incl façade			
Segment	Hor D	Angle	SEL	SEL	Leq	Shield	Track Level	Hb	Dsb	Dbr	Hs	D	P	A barrier	IL barrier	Wheel Squeal	Leq, night	Shadow zone?	
	m	Deg	15m	NSR	NSR		mPD	m	m	m	m	m	m			dB			
Loco	1a	168	96.6	85	74.8	42.2	Mainten' Shed	15	11.15	23	145	3	168.1	1.4	15.0	15.0	0	30.2	Yes
	1b	168	17.1	85	67.3	34.7	Mainten' Shed	15	11.15	23	145	3	168.1	1.4	15.0	15.0	6	28.7	Yes
	2a	220	19.1	85	66.6	34.0	Barrier	15	8	161	59	3	220.1	0.0	2.5	2.5	0	34.5	Yes
	2b	220	8.1	85	62.9	30.3	Barrier	15	8	111	109	3	220.1	0.1	5.7	5.7	6	33.6	Yes
Remark: For legend of parameters and remark for equations, please refers to the bottom of spreadsheet "SS2".																			
At NSR, incl façade																			
Night time																			
Noise criteria																			
	Leq	ASR	Leq, night	Status	Lmax	Hor D	Lmax												
	Total	B	50	OK	15m	NSR													
	38.4				86	159	53.5	shield by mainten' shed											
					86	281	67.0	shield by barrier											
							67.0	Total											
Loco Idling																			
				Direction		At NSR, no shield												At NSR, incl façade	
Hor D	Exit Angle	Correction	Lw	Leq	Shield	Track Level	Hb	Dsb	Dbr	Hs	D	P	A barrier	IL barrier	Leq, night	Shadow zone?			
m	Deg			NSR		mPD	m	m	m	m	m	m							
at Gate	288	34.6	3.8	96.7	35.6	Mainten' Shed	15	11.15	69	219	4.7	288.0	0.3	12.9	12.9	25.7	Yes		
at Side Louvre	312	-	0	85.8	27.9	Barrier	15	8	255	57	4.7	312.0	0.0	0.4	0.4	30.5	Yes		
at Roof Louvre	316	-	6	91.9	27.9	Barrier	15	8	261	55	9.45	316.0	0.0	0.0	0.0	30.9	No		
At NSR, incl façade																			
	Total	Leq, day	Leq, night	Leq, 24h	Lmax														
	34.4	-	20.6	34.4															
Legend:																			
Remark for Equations:																			
Hr: Height of highest floor at receiver (1): distance attenuation and angle of view adjustment.																			
Hor D: Horizontal distance plus 10log(2) is for one set of works train having a loco car at two ends.																			
Angle: Angle of View (2): SEL conversion to Leq: Leq = SEL + 10 log V -35.6 ref: FTA Guidance Manual Table 5-2 Rail vehicle ;																			
Hb: Height of barrier or shield plus 10log(2) is to convert Leq(30min) to Leq(1hr).																			
Dsb: Horizontal distance from noise source to barrier (3): Barrier effect, ref: FTA Guidance Manual, Table 6-9.																			
Dbr: Horizontal distance from barrier to receiver (4): To check whether the direct path ray is under shadow zone of shielding.																			
Hs: Height of noise source (5): Loco distance adjustment: 20 log (D1/D2) adjusted to point source.																			
D: Direct path (6): Direction correction factor for angle between shed exit direction to NSR or direction correction for roof louvre to NSR.																			
P: Path difference=Shielded path - D (7): general equation for calculating sound pressure from sound power in free field.																			
A barrier: Barrier attenuation (dB)																			
IL barrier: Barrier loss (dB)																			