Appendix B-3
Noise

General Construction Noise Assessment

Bridge Construction Noise Assessment Results

Time	Location	Equipment	Noise Level at 50 feet				Impact Distance	
			Quantity	Lmax @ 50 ft	Mitigation*	Total dBA	Threshold dBA	Distance (feet)
Daytime (7:00 am to 10:00 pm)	Residential	Pile driver	1	101	0			
		Jack Hammer	1	88	0	101.2	90	182
	Commercial/Industrial	Pile driver	1	101	0			
		Jack Hammer	1	88	0	101.2	100	57
Nighttime (10:00 pm to 7:00 am)	Residential	Rail Saw	1	90	0			
		Truck	1	88	0	92.1	80	202
	Commercial/Industrial	Rail Saw	1	90	0			
		Truck	1	88	0	92.1	100	20

* 10 dBA attenuation was assumed by using a portable noise barrier/curtain at the construction site.

Track Construction Noise Assessment Results

Phase	Location	Equipment	Source				Impact Distance	
			Quantity	Lmax @ 50 ft	Mitigation*	Total dBA	Threshold dBA	Distance (feet)
Daytime (7:00 am to 10:00 pm)	Residential	Rail Saw	1	90	0			
		Truck	1	88	0	92.1	90	64
	Commercial/Industrial	Rail Saw	1	90	0			
		Truck	1	88	0	92.1	100	20
Nighttime (10:00 pm to 7:00 am)	Residential	Rail Saw	1	90	0			
		Truck	1	88	0	92.1	80	202
	Commercial/Industrial	Rail Saw	1	90	0			
		Truck	1	88	0	92.1	100	20

* 10 dBA attenuation was assumed by using a portable noise barrier/curtain at the construction site.

Track Construction Noise Assessment Results - Mitigation

Phase	Location	Equipment	Source				Impact Distance	
			Quantity	Lmax @ 50 ft	Mitigation*	Total dBA	Threshold dBA	Distance (feet)
Daytime (7:00 am to 10:00 pm)	Residential	Rail Saw	1	80	10			
		Truck	1	78	10	82.1	90	20
	Commercial/Industrial	Rail Saw	1	80	10			
		Truck	1	78	10	82.1	100	6
Nighttime (10:00 pm to 7:00 am)	Residential	Rail Saw	1	80	10			
		Truck	1	78	10	82.1	80	64
	Commercial/Industrial	Rail Saw	1	80	10			
		Truck	1	78	10	82.1	100	6

* 10 dBA attenuation was assumed by using a portable noise barrier/curtain at the construction site.

General Noise Assessment

No Action Alternative

Segment Description	Receptor	Distance from Railroad (feet)	Noise Metric	Existing (dBA)		No Action (dBA)		Project Increment (dBA)	Total Noise Level (dBA)	Impact Threshold (dBA)	Severe Impact Threshold (dBA)	Impact?	Exceed Impact Threshold in dBA	Drop-off Distance (Feet)
				Ambient	Railroad	Distance	Railroad							
Western bridge approach in Albany	1	122	Ldn	60.0	68.1	122	69.1	62.4	64.3	62.9	68.2	No Impact	0	0
Western bridge approach in Albany	2	99	Leq	65.0	70.9	99	70.9	0.0	65.0	65.0	70.1	No Impact	0	0
Troy Industrial Line		50	Ldn		67.1	50	67.1							
Eastern bridge approach in Rensselaer		260	Ldn		60.6	260	60.7							
Combined	3		Ldn	70.0	67.9		68.0	44.1	70.0	62.8	68.1	No Impact	0	0
Eastern bridge approach in Rensselaer	4	30	Ldn	75.0	74.7	30	74.8	58.1	75.1	68.1	72.9	No Impact	0	0

Action Alternatives 1

Segment Description	Receptor	Distance from Railroad	Noise Metric	Existing		Action (dBA)		Project Increment	Total Noise Level with Alternative	Impact Threshold	Severe Impact Threshold	Impact?	Exceed Impact Threshold in dBA	Drop-off Distance in Feet
				Ambient	Railroad	Distance	Railroad							
Western bridge approach in Albany	1	122	Ldn	60.0	68.1	122	64.1	0.0	60.0	62.9	68.2	No Impact	0	0
Western bridge approach in Albany	2	99	Leq	65.0	70.9	124	64.5	0.0	65.0	65.0	70.1	No Impact	0	0
Troy Industrial Line		50	Ldn		67.1	50	62.1							
Eastern bridge approach in Rensselaer		260	Ldn		60.6	100	61.7							
Combined	3		Ldn	70.0	67.9		64.9	0.0	70.0	62.8	68.1	No Impact	0	0
Eastern bridge approach in Rensselaer	4	30	Ldn	75.0	74.7	30	69.5	0.0	75.0	68.1	72.9	No Impact	0	0

Action Alternatives 2

Segment Description	Receptor	Distance from Railroad	Noise Metric	Existing		Action (dBA)		Project Increment	Total Noise Level with Alternative	Impact Threshold	Severe Impact Threshold	Impact?	Exceed Impact Threshold in dBA	Drop-off Distance in Feet
				Ambient	Railroad	Distance	Railroad							
Western bridge approach in Albany	1	122	Ldn	60.0	68.1	122.0	64.1	0.0	60.0	62.9	68.2	No Impact	0	0
Western bridge approach in Albany	2	99	Leq	65.0	70.9	50.0	70.4	0.0	65.0	65.0	70.1	No Impact	0	0
Troy Industrial Line		50	Ldn		67.1	50.0	62.1							
Eastern bridge approach in Rensselaer		260	Ldn		60.6	215.0	56.7							
Combined	3		Ldn	70.0	67.9		63.2	0.0	70.0	62.8	68.1	No Impact	0	0
Eastern bridge approach in Rensselaer	4	30	Ldn	75.0	74.7	30.0	69.5	0.0	75.0	68.1	72.9	No Impact	0	0

General Noise Assessment

Train Movements

Noise Receptor Site	Segment Description	Operator	Analysis Method	Number of Trains			Number of Cars per Train	Locomotives		Maximum Speed (mph)	Number of Trains		
				Peak Hour	7am-10pm	10pm-7am		Horns	# per Train		Daytime Average	Nighttime Average	Total
Existing													
1	Western bridge approach in Albany	Passenger	FTA	3	12	2	8	No	1	30	0.8000	0.2222	14.0
		Freight	FTA	1	3	3	12	No	1	30	0.2000	0.3333	6.0
2	Western bridge approach in Albany	Passenger	FTA	3	12	2	8	No	1	15	0.8000	0.2222	14.0
		Freight	FTA	1	3	3	12	No	1	15	0.2000	0.3333	6.0
3	Troy Industrial Line	Passenger	FTA	3	6	2	8	No	1	15	0.4000	0.2222	8.0
		Freight	FTA	1	0	1	12	No	1	15	0.0000	0.1111	1.0
4	Eastern bridge approach in	Passenger	FTA	3	18	4	8	No	1	15	1.2000	0.4444	22.0
		Freight	FTA	1	3	4	12	No	1	15	0.2000	0.4444	7.0
No Action Alternative													
1	Western bridge approach in Albany	Passenger	FTA	3	14	2	8	No	1	40	0.9333	0.2222	16.0
		Freight	FTA	1	3	3	12	No	1	40	0.2000	0.3333	6.0
2	Western bridge approach in Albany	Passenger	FTA	3	14	2	8	No	1	15	0.9333	0.2222	16.0
		Freight	FTA	1	3	3	12	No	1	15	0.2000	0.3333	6.0
3	Troy Industrial Line	Passenger	FTA	3	6	2	8	No	1	15	0.4000	0.2222	8.0
		Freight	FTA	1	0	1	12	No	1	15	0.0000	0.1111	1.0
4	Eastern bridge approach in	Passenger	FTA	3	20	4	8	No	1	15	1.3333	0.4444	24.0
		Freight	FTA	1	3	4	12	No	1	15	0.2000	0.4444	7.0
With Action Alternatives 1 and 2													
1	Western bridge approach in Albany	Passenger	FTA	3	14	2	8	No	1	40	0.9333	0.2222	16.0
		Freight	FTA	1	3	3	12	No	1	40	0.2000	0.3333	6.0
2	Western bridge approach in Albany	Passenger	FTA	3	14	2	8	No	1	40	0.9333	0.2222	16.0
		Freight	FTA	1	3	3	12	No	1	40	0.2000	0.3333	6.0
3	Troy Industrial Line	Passenger	FTA	3	6	2	8	No	1	15	0.4000	0.2222	8.0
		Freight	FTA	1	0	1	12	No	1	15	0.0000	0.1111	1.0
4	Eastern bridge approach in	Passenger	FTA	3	20	4	8	No	1	30	1.3333	0.4444	24.0
		Freight	FTA	1	3	4	12	No	1	25	0.2000	0.4444	7.0

Revised on May 2013

Revised on July 2013

General Vibration Assessment

General Vibration Assessment Results

Receptor Site	FTA Land Use Category	Ground-Borne Vibration Impact Assessment					Ground-Borne Noise Impact Assessment				
		FTA Criteria (VdB)	Existing Vibration Level (VdB)	No Action Alternative Vibration Level (VdB)	Action Alternative 1 Vibration Level (VdB)	Action Alternative 2 Vibration Level (VdB)	FTA Impact Criteria (dBA)	Existing Noise Level (dBA)	No Action Alternative Noise Level (dBA)	Action Alternative 1 Noise Level (dBA)	Action Alternative 2 Noise Level (dBA)
1	2	80	77	79	74	74	43	42	44	39	39
3	2	80	74	74	71	69	43	39	39	36	34
4	2	80	76	76	77	77	43	41	41	42	42

Exceed the FTA/FRA impact thresholds

General Vibration Assessment

Exisitng Vibration Calculations

			Transit	ASSUMED	ASSUMED	GIS/TRAIN	TRAIN	DIAGONAL DISTANC	TRAIN	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE
		Event	Structure	FOUNDATION TYPE	FUNDATION DEPTH	DISTANCE FROM	RAIL DEPTH		TRAIN SPEED	LISTED VIBRATION	SPEED ADJUSTMEN	Trackwork /JOINTS	L Trackwork /CROS	VEHICLE	F TRANSIT ADJUS	F TRANSIT ADJUS	ATION TYPE ADJUS	AND BASEMENT AT	ED SOUND ADJUS	USTED VIBRATION	VIBRATION ADJUS	STED VIBRATION	L NOISE ADJUSTM	ROUND NOISE LEVI	VIB THRESHOLD	NOISE THRESHOLD	VIB VIO	NOISE VIO
Distance Set Back if Impacts	Condition	"Frequent events" is defined as more than 70 vibration events per day.			Height Includes foundation depth in feet; used with bedrock depth to determine Assumed Foundation Depth			Distance from track to building foundation level		VdB; based on Distance to Foundation taken from curve on page 10-3	VdB; 20*LOG10(|P/30|)	5 VdB adjustment for special trackwork (Jointed Track)	10 VdB adjustment for special trackwork (crossover)	8 VdB adjustment for old vehicles with still primary suspension	10 VdB adjustment for elevated transit structure	10 VdB adjustment for propagation in soil	5 VdB adjustment for wood frame and 10 VdB adjustment for masonry	VdB;+6 Vdb for amplification due to resonances	VdB; a VdB deduction that applies only to the Ground Noise Level, 35 for Soil and 55 for Rock	VdB; based on Distance to Foundation; 90-(20*LOG10(T/25))); same as previous	VdB; total of all Vibration Adjustments	VdB; Unadjusted Vibraiton Level + Total Vibration Adjustments	VdB; based on Noise Path Adjustment	VdB; Adjusted Vibration Level + Total Noise Adjustment				
Receptor Site																												
1 (Trains on Albany aproach)		Infrequent	at-grade	Wood Frame	6.0	122.0	20.0	124.7	30.0	76.0	0.0	5.0	0.0	0.0	-5.0	0.0	-5.0	6.0	-35.0	76.0	1.0	77	-35	42	80	43	No Impact	No Impact
3 (Trains on north of LVB)		Infrequent	at-grade	Wood Frame	6.0	171.0	0.0	171.1	15.0	74.0	-6.0	5.0	0.0	0.0	0.0	0.0	-5.0	6.0	-35.0	74.0	0.0	74	-35	39	80	43		
3 (Trains on LVB)		Infrequent	at-grade	Wood Frame	6.0	361.0	0.0	361.0	15.0	65.0	-6.0	5.0	0.0	0.0	0.0	0.0	-5.0	6.0	-35.0	65.0	0.0	65	-35	30	80	43		
3 Sum																						74		39	80	43	No Impact	No Impact
4 (Trains on South of LVB)		Infrequent	at-grade	Wood Frame	6.0	125.0	0.0	125.1	15.0	76.0	-6.0	5.0	0.0	0.0	0.0	0.0	-5.0	6.0	-35.0	76.0	0.0	76	-35	41	80	43	No Impact	No Impact

5 VdB adjustment was assumed due to partial elevated transit structure on Broadway.

General Vibration Assessment

			Transit	ASSUMED	ASSUMED	GIS/TRAIN	TRAIN	HAGONAL DISTANC	TRAIN	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE
		Event	Structure	FOUNDATION TYPE	FUNDATION DEPTH	DISTANCE FROM	RAIL DEPTH		TRAIN SPEED	LISTED VIBRATION	PEED ADJUSTMEN	Trackwork (JOINTE	NL Trackwork (CROS	VEHICLE	F TRANSIT ADJUS	F TRANSIT ADJUS	ATION TYPE ADJUS	AND BASEMENT AI	TED SOUND ADJUS	LISTED VIBRATION	VIBRATION ADJUS	LISTED VIBRATION	L NOISE ADJUSTM	ROUND NOISE LEVI	VIB THRESHOLD	NOISE THRESHOLD	VIB VIO	NOISE VIO
Distance Set Back if Impacts	Condition	"Frequent events" is defined as more than 70 vibration events per day			Height Indicates foundation depth in feet; used with bedrock depth to determine Assumed Foundation Depth			Distance from track to building foundation level		VdB; based on Distance to Foundation taken from curve on page 10-3	VdB; 20*\LOG10(P130)\	5 VdB adjustment for special trackwork (Jointed Track)	10 VdB adjustment for special trackwork (crossover)	8 VdB adjustment for old vehicles with still primary suspension	10 VdB adjustment for elevated transit structure	10 VdB adjustment for propagation in soil	5 VdB adjustment for wood frame and 10 VdB adjustment for masonry	VdB;+6 Vdb for amplification due to resonances	VdB; a VdB deduction that applies only to the Ground Noise Level, 35 for Soil and 20 for Rock	VdB; based on Distance to Foundation; 90-(20*\LOG10(T25)\ (i. same as previous	VdB; total of all Vibration Adjustments	VdB; Unadjusted Vibration Level + Total Vibration Adjustments	VdB; based on Noise Path Adjustment	VdB; Adjusted Vibration Level + Total Noise Adjustment				
Receptor Site																											
1 (Trains on Albany approach)		Infrequent	at-grade	Wood Frame	6.0	122.0	20.0	124.7	40.0	76.0	2.5	5.0	0.0	0.0	-5.0	6.0	-5.0	6.0	-35.0	76.0	3.5	79	-35	44	80	43	No Impact	Impact
3 (Trains on north of LVB)		Infrequent	at-grade	Wood Frame	6.0	171.0	0.0	171.1	15.0	74.0	-6.0	5.0	0.0	0.0	0.0	0.0	-5.0	6.0	-35.0	74.0	0.0	74	-35	39	80	43		
3 (Trains on LVB)		Infrequent	at-grade	Wood Frame	6.0	361.0	0.0	361.0	15.0	65.0	-6.0	5.0	0.0	0.0	0.0	0.0	-5.0	6.0	-35.0	65.0	0.0	65	-35	30	80	43		
4 Sum																						74		39	80	43	No Impact	No Impact
4 (Trains on South of LVB)		Infrequent	at-grade	Wood Frame	6.0	125.0	0.0	125.1	15.0	76.0	-6.0	5.0	0.0	0.0	0.0	0.0	-5.0	6.0	-35.0	76.0	0.0	76	-35	41	80	43	No Impact	No Impact

5 VdB adjustment was assumed due to partial elevated transit structure on Broadway.

General Vibration Assessment

Action Alternative 1 Vibration Calculations

		Event	Transit Structure	ASSUMED FOUNDATION TYPE	ASSUMED FOUNDATION DEPTH	GIS/TRAIN DISTANCE FROM	TRAIN RAIL DEPTH	DIAGONAL DISTANC	TRAIN TRAIN SPEED	VIBNOISE USTED VIBRATION	VIBNOISE PEED ADJUSTMEN	VIBNOISE Trackwork (JOINTED	VIBNOISE L Trackwork (CROSS	VIBNOISE VEHICLE	VIBNOISE F TRANSIT ADJUS	VIBNOISE F TRANSIT ADJUS	VIBNOISE ATION TYPE ADJUS	VIBNOISE AND BASEMENT AT	VIBNOISE TED SOUND ADJUS	VIBNOISE USTED VIBRATION	VIBNOISE VIBRATION ADJUS	VIBNOISE USTED VIBRATION	VIBNOISE L NOISE ADJUSTM	VIBNOISE ROUND NOISE LEV	VIBNOISE VIB THRESHOLD	VIBNOISE NOISE THRESHOLD	VIBNOISE VIB VIO	VIBNOISE NOISE VIO
Distance Set Back if Impacts	Condition	"Frequen events" is defined as more than 70 vibration events per day.			Height- Increase foundation depth in feet; used with bedrock depth to determine Assumed Foundation Depth			Distance from track to building foundation level	30mph, constant conservative estimate	VdB; based on Distance to Foundation taken from curve on page 10-3	VdB; 20*(LOG10((P/30)))	5 VdB adjustment for special trackwork (Jointed Track)	10 VdB adjustment for special trackwork (crossover)	8 VdB adjustment for old vehicles with still primary suspension	10 VdB adjustment for elevated transit structure	10 VdB adjustment for propagation in soil	5 VdB adjustment for wood frame and 10 VdB adjustment for masonry	VdB;+6 Vdb for amplification due to resonances	VdB; a VdB deduction that applies only to the Ground Noise Level, 35 for Soil west 7/5 for Rock	VdB; based on Distance to Foundation(90-(20*(LOG10((7/25)))); same as previous	VdB; total of all Vibration Adjustments	VdB; Unadjusted Vibration Level + Total Vibration Adjustments	VdB; based on Noise Path Adjustment	VdB; Adjusted Vibration Level + Total Noise Adjustment				
Receptor Site																												
1 (Trains on Albany approach)		Infrequent	at-grade	Wood Frame	6.0	122.0	20.0	124.7	40.0	76.0	2.5	0.0	0.0	0.0	-5.0	0.0	-5.0	6.0	-35.0	76.0	-1.5	74	-35	39	80	43	No Impact	No Impact
3 (Trains on north of LVB)		Infrequent	at-grade	Wood Frame	6.0	171.0	0.0	171.1	15.0	74.0	-8.0	0.0	0.0	0.0	0.0	0.0	-5.0	6.0	-35.0	74.0	-5.0	69	-35	34	80	43		
3 (Trains on LVB)		Infrequent	at-grade	Wood Frame	6.0	201.0	0.0	201.1	15.0	71.0	-8.0	0.0	0.0	0.0	0.0	0.0	-5.0	6.0	-35.0	71.0	-5.0	66	-35	31	80	43		
3 Sum																						71		36	80	43	No Impact	No Impact
4 (Trains on South of LVB)		Infrequent	at-grade	Wood Frame	6.0	125.0	0.0	125.1	30.0	76.0	0.0	0.0	0.0	0.0	0.0	0.0	-5.0	6.0	-35.0	76.0	1.0	77	-35	42	80	43	No Impact	No Impact

5 VdB adjustment was assumed due to partial elevated transit structure on Broadway.

General Vibration Assessment

Action Alternative 2 Vibration Calculations

		Trenst	ASSUMED	ASSUMED	GIS/TRAIN	TRAIN	DIAGONAL DISTANC	TRAIN	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE	VIBNOISE
		Event	Structure	FOUNDATION TYPE	UNDATION DEPTH	DISTANCE FROM	RAIL DEPTH			TRAIN SPEED	LISTED VIBRATION	PEED ADJUSTMEN	L Trackwork (JOINTED	L Trackwork (CROSS	VEHICLE	OF TRANSIT ADJUS	OF TRANSIT ADJUS	ATION TYPE ADJUS	AND BASEMENT AT	TED SOUND ADJUS	LISTED VIBRATION	VIBRATION ADJUS	LISTED VIBRATION	L NOISE ADJUSTM	ROUND NOISE LEV	VIB THRESHOLD	NOISE THRESHOLD	VIB VIO	NOISE VIO
Distance Set Back if Impacts	Condition	"Frequen events" is defined as more than 70 vibration events per day.			Height- Inside of foundation depth in feet; used with bedrock depth to determine Assumed Foundation Depth			Distance from track to building foundation level	30mph, constant conservative estimate	VdB; based on Distance to Foundation taken from curve on page 10-3	VdB; 20*(LOG10((P/30)))	5 VdB adjustment for special trackwork (Jointed Track)	10 VdB adjustment for special trackwork (crossover)	8 VdB adjustment for old vehicles with still primary suspension	10 VdB adjustment for elevated transit structure	10 VdB adjustment for propagation in soil	5 VdB adjustment for wood frame and 10 VdB adjustment for masonry	VdB;+6 Vdb for amplification due to resonances	VdB; a VdB deduction that applies only to the Ground Noise Level, 35 for Soil west 7/5 for Rock	VdB; based on Distance to Foundation(90-(20*(LOG10((7/25)))); same as previous	VdB; total of all Vibration Adjustments	VdB; Unadjusted Vibration Level + Total Vibration Adjustments	VdB; based on Noise Path Adjustment	VdB; Adjusted Vibration Level + Total Noise Adjustment				
Receptor Site																												
1 (Trains on Albany approach)		Infrequent	at-grade	Wood Frame	6.0	122.0	20.0	124.7	40.0	76.0	2.5	0.0	0.0	0.0	-5.0	0.0	-5.0	6.0	-35.0	76.0	-1.5	74	-35	39	80	43	No Impact	No Impact
3 (Trains on north of LVB)		Infrequent	at-grade	Wood Frame	6.0	171.0	0.0	171.1	15.0	74.0	-8.0	0.0	0.0	0.0	0.0	0.0	-5.0	6.0	-35.0	74.0	-5.0	69	-35	34	80	43		
3 (Trains on LVB)		Infrequent	at-grade	Wood Frame	6.0	318.0	0.0	318.1	15.0	65.0	-8.0	0.0	0.0	0.0	0.0	0.0	-5.0	6.0	-35.0	65.0	-5.0	60	-35	25	80	43		
3 Sum																						69		34	80	43	No Impact	No Impact
4 (Trains on South of LVB)		Infrequent	at-grade	Wood Frame	6.0	125.0	0.0	125.1	30.0	76.0	0.0	0.0	0.0	0.0	0.0	0.0	-5.0	6.0	-35.0	76.0	1.0	77	-35	42	80	43	No Impact	No Impact

5 VdB adjustment was assumed due to partial elevated transit structure on Broadway.