Appendix H: Construction

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Appendix H1:
Construction - Traffic

2016 Construction Conditions without the Proposed Actions

			AM				Midday				PM			
Signalized Intersection	**Node**	**Approach**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**
Tenth Avenue @ 29th Street	9914	WB	TR	0.75	33.0	C	TR	0.97	56.7	E	TR	1.17	433.1	F
		NB	LT	0.65	10.5	B	LT	0.72	11.5	B	LT	0.44	8.3	A
		INTERSECTION			16.1	B			22.5	C			150.2	F
Tenth Avenue @ 30th Street	9061	EB	LT	2.01	770.0	F	LT	2.88	1178.0	F	LT	2.89	1149.0	F
		NB	T	0.58	9.6	A	T	0.66	10.6	B	T	0.41	8.0	A
			R	0.83	29.6	C	R	1.55	442.6	F	R	1.30	269.2	F
		INTERSECTION			238.5	F			443.8	F			486.7	F
Tenth Avenue @ 31st Street	9933	WB	R	1.25	344.0	F	R	2.20	853.5	F	R	2.37	849.1	F
		NB	T	0.68	10.9	B	T	0.79	12.9	B	T	0.89	17.9	B
		INTERSECTION			82.9	F			197.5	F			288.0	F
Tenth Avenue @ 33rd Street	9077	WB	TR	0.97	57.7	E	TR	1.00	64.4	E	TR	0.96	53.7	D
		NB	LT	0.75	13.1	B	LT	1.06	152.2	F	LT	1.06	149.1	F
		INTERSECTION			22.4	C			135.5	F			130.7	F
Tenth Avenue @ 34th Street	9076	EB	LT	1.62	874.2	F	LT	1.73	927.8	F	LT	1.96	1077.0	F
		WB	T	0.62	28.7	C	T	0.53	26.7	C	T	0.69	30.7	C
			R	0.69	41.3	D	R	1.26	473.4	F	R	2.28	867.1	F
		NB	LTR	0.92	18.5	B	LTR	1.08	108.9	F	LTR	1.37	227.5	F
		INTERSECTION			105.4	F			197.0	F			352.6	F
Tenth Avenue @ 35th Street	9075	WB	TR	1.55	455.3	F	TR	1.35	376.7	F	TR	1.08	253.8	F
		NB	LT	0.87	15.7	B	LT	0.99	27.8	C	LT	0.87	14.6	B
		INTERSECTION			95.9	F			76.4	E			40.8	D
Tenth Avenue @ 36th Street	9074	EB	LT	0.61	28.9	C	LT	0.40	129.7	F	LT	0.38	24.3	C
		NB	TR	0.91	17.5	B	TR	1.04	88.6	F	TR	1.75	405.9	F
		INTERSECTION			19.2	B			92.2	F			373.9	F
Tenth Avenue @ 37th Street	9073	WB	TR	0.59	27.2	C	TR	0.57	27.1	C	TR	0.68	30.3	C
		NB	LT	0.91	19.2	B	LT	0.94	22.0	C	LT	1.65	369.0	F
		INTERSECTION			20.3	C			22.6	C			325.1	F
Eleventh Avenue @ 26th Street	9924	EB	TR	1.08	399.8	F	TR	0.91	64.3	E	TR	1.10	397.8	F
		SB	LT	0.54	4.8	A	LT	0.55	4.8	A	LT	0.51	4.5	A
		INTERSECTION			80.8	F			15.1	B			81.4	F
Eleventh Avenue @ 27th Street	63721	WB	LT	0.44	26.4	C	LT	0.51	27.9	C	LT	0.58	30.2	C
		SB	TR	0.92	24.8	C	TR	0.92	23.7	C	TR	0.82	16.5	B
		INTERSECTION			25.0	C			24.2	C			18.5	B
Eleventh Avenue @ 28th Street	9916	EB	TR	0.47	24.2	C	TR	0.36	21.8	C	TR	0.24	19.8	B
		SB	LT	0.86	20.4	C	LT	0.87	21.1	C	LT	0.78	17.0	B
		INTERSECTION			20.8	C			21.2	C			17.2	B
Eleventh Avenue @ 29th Street	9912	WB	LT	0.84	36.5	D	LT	0.90	43.5	D	LT	1.02	137.1	F
		SB	TR	0.56	16.5	B	TR	0.56	16.5	B	TR	0.50	15.6	B
		INTERSECTION			21.2	C			22.8	C			49.4	D
Eleventh Avenue @ 30th Street	9909	EB	TR	1.02	142.7	F	TR	1.17	331.6	F	TR	0.93	47.2	D
		SB	LT	1.08	134.4	F	LT	1.16	166.5	F	LT	1.07	127.1	F
		INTERSECTION			136.2	F			205.1	F			110.9	F

			AM				Midday				PM			
Signalized Intersection	**Node**	**Approach**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**
Eleventh Avenue @ 31st Street	61131	WB	L	0.18	25.8	C	L	0.59	35.3	D	L	0.43	30.4	C
		SB	T	0.63	7.1	A	T	0.57	6.5	A	T	0.53	6.1	A
		INTERSECTION			7.7	A			9.3	A			7.9	A
Eleventh Avenue @ 32nd Street	61132	SB	LT	0.65	7.3	A	LT	0.62	6.9	A	LT	0.58	6.5	A
		INTERSECTION			7.3	A			6.9	A			6.5	A
Eleventh Avenue @ 33rd Street	9907	WB	L	0.61	36.4	D	L	1.11	294.5	F	L	0.69	42.2	D
			LT	0.61	32.3	C	LT	1.03	177.9	F	LT	0.78	38.8	D
		SB	TR	1.03	87.8	F	TR	0.96	23.5	C	TR	0.93	18.8	B
		INTERSECTION			72.6	E			79.3	E			25.1	C
Eleventh Avenue @ 34th Street	9904	EB	L	0.48	24.5	C	L	0.51	27.3	C	L	0.46	26.0	C
			TR	0.90	61.8	E	TR	0.88	59.7	E	TR	0.80	48.8	D
		WB	L	0.75	41.6	D	L	0.57	25.4	C	L	0.74	39.8	D
			TR	1.32	579.0	F	TR	1.38	543.0	F	TR	1.94	890.7	F
		SB	LTR	1.41	268.7	F	LTR	1.48	296.5	F	LTR	1.42	266.6	F
		INTERSECTION			267.4	F			291.5	F			340.9	F
Eleventh Avenue @ 35th Street	9901	WB	L	0.50	22.4	C	L	0.66	28.3	C	L	0.86	46.4	D
			R	0.47	21.9	C	R	0.33	19.3	B	R	0.20	16.9	B
		NB	T	0.08	14.5	B	T	0.09	14.6	B	T	0.16	12.8	B
		SB	T	0.60	17.1	B	T	0.57	19.6	B	T	0.55	19.2	B
		INTERSECTION			17.8	B			20.4	C			22.2	C
Eleventh Avenue @ 36th Street	9898	NB	TR	0.15	6.4	A	TR	0.14	6.4	A	TR	0.15	3.0	A
		SB	DefL	0.65	10.9	B	LT	0.56	9.7	A	LT	0.56	9.7	A
			T	0.55	4.9	A								
		INTERSECTION			6.1	A			9.2	A			8.6	A
Eleventh Avenue @ 37th Street	9034	EB	LR	0.10	27.1	C	LR	0.16	28.2	C	LR	0.11	27.2	C
		WB	L	0.75	53.1	D	L	0.81	60.1	E	L	0.77	53.9	D
			R	0.57	42.4	D	R	0.43	36.2	D	R	0.29	31.4	C
		NB	T	0.08	6.1	A	T	0.08	6.1	A	T	0.12	2.9	A
		SB	T	0.59	5.2	A	T	0.53	9.4	A	T	0.53	9.4	A
		INTERSECTION			11.1	B			15.0	B			13.1	B
Twelfth Avenue @ 29th Street	9875	WB	LR	1.96	1056.0	F	LR	1.48	720.8	F	LR	2.34	1206.0	F
		NB	T	0.61	9.1	A	T	0.60	10.4	B	T	0.76	3.8	A
		SB	T	1.03	68.1	E	T	1.01	65.4	E	T	0.97	29.1	C
		INTERSECTION			113.9	F			90.6	F			109.4	F
Twelfth Avenue @ 30th Street	9874	EB	LTR	0.00	64.4	E	LTR	0.00	49.5	D	LTR	0.00	64.4	E
		NB	TR	1.02	67.2	E	TR	1.08	90.8	F	TR	1.28	171.7	F
		SB	L	1.26	381.6	F	L	1.33	372.3	F	L	1.36	438.7	F
			TR	1.21	147.8	F	TR	1.20	142.9	F	TR	1.17	127.0	F
		INTERSECTION			117.1	F			128.9	F			163.0	F

			AM				Midday				PM			
Signalized Intersection	**Node**	**Approach**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**
Twelfth Avenue @ 34th Street	9872	WB	L	0.48	60.6	E	L	0.48	44.1	D	L	0.43	58.0	E
			LR	0.46	59.9	E	LR	0.50	44.4	D	LR	0.50	60.5	E
			R	0.62	42.8	D	R	0.50	30.0	C	R	0.62	50.9	D
		NB	T	1.20	207.0	F	T	1.12	173.7	F	T	1.30	231.3	F
			R	0.18	18.7	B	R	0.25	18.1	B	R	0.13	7.0	A
		SB	L	0.55	61.3	E	L	0.65	57.8	E	L	1.12	595.8	F
			T	1.21	297.8	F	T	1.06	257.3	F	T	1.06	230.8	F
		INTERSECTION			226.5	F			185.5	F			232.1	F
Twelfth Avenue @ 37th Street	9871	EB	LR	0.12	52.6	D	LR	0.14	43.1	D	LR	0.25	60.5	E
			R	0.13	53.2	D	R	0.14	43.6	D	R	0.25	61.9	E
		NB	L	0.10	63.7	E	L	0.20	50.4	D	L	0.30	72.6	E
			T	0.95	38.3	D	T	0.82	21.4	C	T	0.90	7.3	A
		SB	TR	1.12	133.8	F	TR	1.06	110.4	F	TR	0.92	27.0	C
		INTERSECTION			85.9	F			65.7	E			16.8	B

			AM				Midday				PM			
Unsignalized Intersection	**Node**	**Approach**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**
Twelfth Avenue @ 33rd Street	9873	WB	R	0.50	21.6	C	R	0.69	31.2	D	R	0.96	72.6	F
		INTERSECTION			-	-			-	-			-	-

2016 Construction Conditions with the Proposed Actions

			AM				Midday				PM			
Signalized Intersection	**Node**	**Approach**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**
Tenth Avenue @ 29th Street	9914	WB	TR	0.75	33.0	C	TR	0.97	56.7	E	TR	1.17	433.1	F
		NB	LT	0.65	10.5	B	LT	0.72	11.6	B	LT	0.44	8.3	A
		INTERSECTION			16.1	B			22.6	C			149.9	F
Tenth Avenue @ 30th Street	9061	EB	LT	2.05	790.9	F	LT	2.94	1205.0	F	LT	3.02	1208.0	F
		NB	T	0.59	9.7	A	T	0.66	10.6	B	T	0.41	8.0	A
			R	0.83	29.9	C	R	1.55	442.6	F	R	1.31	273.1	F
		INTERSECTION			246.8	F			456.2	F			519.9	F
Tenth Avenue @ 31st Street	9933	WB	R	1.25	345.0	F	R	2.20	853.5	F	R	2.46	888.7	F
		NB	T	0.69	11.0	B	T	0.80	13.1	B	T	0.91	18.8	B
		INTERSECTION			82.7	F			196.5	F			305.8	F
Tenth Avenue @ 33rd Street	9077	WB	TR	1.11	490.5	F	TR	1.16	507.2	F	TR	1.18	513.3	F
		NB	LT	0.74	13.0	B	LT	1.06	147.3	F	LT	1.05	144.4	F
		INTERSECTION			112.2	F			215.4	F			214.3	F
Tenth Avenue @ 34th Street	9076	EB	LT	1.71	927.9	F	LT	1.73	927.8	F	LT	2.14	1171.0	F
		WB	T	0.63	28.9	C	T	0.54	26.7	C	T	0.69	30.8	C
			R	0.71	42.3	D	R	1.26	473.4	F	R	2.30	876.7	F
		NB	LTR	1.01	75.8	E	LTR	1.20	159.1	F	LTR	1.58	325.9	F
		INTERSECTION			149.5	F			229.3	F			424.7	F
Tenth Avenue @ 35th Street	9075	WB	TR	1.60	477.7	F	TR	1.35	376.7	F	TR	1.09	255.9	F
		NB	LT	0.88	15.9	B	LT	0.99	27.8	C	LT	0.90	15.9	B
		INTERSECTION			101.6	F			76.4	E			41.6	D
Tenth Avenue @ 36th Street	9074	EB	LT	0.61	28.9	C	LT	0.40	129.7	F	LT	0.39	24.4	C
		NB	TR	0.91	17.5	B	TR	1.04	88.6	F	TR	1.85	454.0	F
		INTERSECTION			19.2	B			92.2	F			418.9	F
Tenth Avenue @ 37th Street	9073	WB	TR	0.59	27.3	C	TR	0.57	27.1	C	TR	0.68	30.3	C
		NB	LT	0.91	19.3	B	LT	0.94	22.0	C	LT	1.70	391.3	F
		INTERSECTION			20.4	C			22.6	C			345.8	F
Eleventh Avenue @ 26th Street	9924	EB	TR	1.08	399.8	F	TR	0.91	64.3	E	TR	1.10	397.8	F
		SB	LT	0.54	4.8	A	LT	0.55	4.9	A	LT	0.51	4.5	A
		INTERSECTION			80.5	F			15.1	B			80.9	F
Eleventh Avenue @ 27th Street	63721	WB	LT	0.44	26.4	C	LT	0.51	27.9	C	LT	0.58	30.2	C
		SB	TR	0.94	26.4	C	TR	0.92	24.0	C	TR	0.82	16.8	B
		INTERSECTION			26.4	C			24.6	C			18.8	B
Eleventh Avenue @ 28th Street	9916	EB	TR	0.47	24.2	C	TR	0.36	21.8	C	TR	0.24	19.8	B
		SB	LT	0.86	20.9	C	LT	0.88	21.3	C	LT	0.78	17.2	B
		INTERSECTION			21.3	C			21.4	C			17.3	B
Eleventh Avenue @ 29th Street	9912	WB	LT	0.85	36.9	D	LT	0.90	43.5	D	LT	1.02	137.1	F
		SB	TR	0.57	16.6	B	TR	0.57	16.5	B	TR	0.51	15.7	B
		INTERSECTION			21.3	C			22.8	C			49.1	D
Eleventh Avenue @ 30th Street	9909	EB	TR	1.04	216.7	F	TR	1.19	343.6	F	TR	0.93	47.2	D
		SB	LT	1.10	141.8	F	LT	1.17	173.0	F	LT	1.08	130.0	F
		INTERSECTION			158.1	F			212.9	F			113.3	F
Eleventh Avenue @ 31st Street	61131	WB	L	0.18	25.8	C	L	0.59	35.3	D	L	0.43	30.4	C
		SB	T	0.64	7.2	A	T	0.58	6.5	A	T	0.53	6.1	A
		INTERSECTION			7.8	A			9.3	A			7.9	A
Eleventh Avenue @ 32nd Street	61132	SB	LT	0.66	7.3	A	LT	0.63	7.0	A	LT	0.58	6.5	A
		INTERSECTION			7.3	A			7.0	A			6.5	A

			AM				Midday				PM			
Signalized Intersection	**Node**	**Approach**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**	**Movt.**	**V/C Ratio**	**Delay Sec/Veh**	**LOS**
Eleventh Avenue @ 33rd Street	9907	WB	L	0.50	29.2	C	L	1.12	284.8	F	L	0.57	31.1	C
		SB	T	1.01	79.4	E	T	0.93	18.9	B	T	0.90	16.4	B
		INTERSECTION			68.2	E			81.7	F			19.4	B
Eleventh Avenue @ 34th Street	9904	EB	L	0.51	27.6	C	L	0.50	27.3	C	L	0.45	25.7	C
			TR	0.91	64.0	E	TR	0.89	61.3	E	TR	0.80	48.8	D
		WB	L	0.76	42.7	D	L	0.58	25.5	C	L	0.75	40.5	D
			TR	1.78	740.7	F	TR	1.96	782.0	F	TR	2.66	1150.0	F
		SB	LTR	1.45	283.1	F	LTR	1.51	309.4	F	LTR	1.46	287.4	F
		INTERSECTION			331.8	F			378.5	F			478.5	F
Eleventh Avenue @ 35th Street	9901	WB	L	0.50	22.4	C	L	0.66	28.3	C	L	0.88	49.3	D
			R	0.47	21.9	C	R	0.33	19.3	B	R	0.21	16.9	B
		NB	T	0.08	14.5	B	T	0.09	14.6	B	T	0.16	12.8	B
		SB	T	0.60	17.2	B	T	0.57	19.6	B	T	0.55	19.3	B
		INTERSECTION			17.9	B			20.4	C			22.7	C
Eleventh Avenue @ 36th Street	9898	NB	TR	0.15	6.4	A	TR	0.14	6.4	A	TR	0.16	3.0	A
		SB	DefL	0.65	11.0	B	LT	0.56	9.7	A	LT	0.57	9.8	A
			T	0.56	4.9	A								
		INTERSECTION			6.1	A			9.2	A			8.6	A
Eleventh Avenue @ 37th Street	9034	EB	LR	0.10	27.1	C	LR	0.16	28.2	C	LR	0.11	27.2	C
		WB	L	0.75	53.1	D	L	0.81	60.1	E	L	0.77	53.9	D
			R	0.57	42.4	D	R	0.43	36.2	D	R	0.29	31.4	C
		NB	T	0.08	6.1	A	T	0.08	6.1	A	T	0.12	2.9	A
		SB	T	0.60	5.2	A	T	0.53	9.4	A	T	0.53	9.4	A
		INTERSECTION			11.1	B			15.0	B			13.1	B
Twelfth Avenue @ 29th Street	9875	WB	LR	1.99	1072.0	F	LR	1.49	725.9	F	LR	2.37	1215.0	F
		NB	T	0.61	9.1	A	T	0.60	10.4	B	T	0.76	3.8	A
		SB	T	1.03	68.1	E	T	1.01	65.4	E	T	0.97	29.3	C
		INTERSECTION			115.7	F			91.3	F			111.5	F
Twelfth Avenue @ 30th Street	9874	EB	LTR	0.00	64.4	E	LTR	0.00	49.5	D	LTR	0.00	64.4	E
		NB	TR	1.02	68.9	E	TR	1.08	91.6	F	TR	1.28	171.9	F
		SB	L	1.28	393.8	F	L	1.36	385.5	F	L	1.36	438.7	F
			TR	1.21	147.8	F	TR	1.20	142.9	F	TR	1.17	127.6	F
		INTERSECTION			118.4	F			130.0	F			163.3	F
Twelfth Avenue @ 34th Street	9872	WB	L	0.67	70.5	E	L	0.65	50.6	D	L	0.54	62.0	E
			LR	0.71	72.7	E	LR	0.67	51.4	D	LR	1.01	157.1	F
			R	0.80	53.6	D	R	0.78	41.9	D	R	1.04	253.5	F
		NB	T	1.10	168.1	F	T	0.98	46.2	D	T	1.18	179.3	F
			R	0.19	18.8	B	R	0.25	18.1	B	R	0.13	7.0	A
		SB	L	0.55	61.4	E	L	0.65	57.9	E	L	1.12	595.8	F
			T	1.21	298.0	F	T	1.06	257.4	F	T	1.06	230.8	F
		INTERSECTION			208.3	F			135.1	F			216.8	F
Twelfth Avenue @ 37th Street	9871	EB	LR	0.13	52.8	D	LR	0.13	42.9	D	LR	0.24	60.1	E
			R	0.12	52.9	D	R	0.15	43.9	D	R	0.26	62.4	E
		NB	L	0.10	63.7	E	L	0.20	50.4	D	L	0.30	72.6	E
			T	0.96	39.8	D	T	0.82	21.5	C	T	0.91	7.5	A
		SB	TR	1.12	134.3	F	TR	1.06	110.8	F	TR	0.92	27.0	C
		INTERSECTION			86.9	F			65.9	E			16.9	B

Appendix H2:
Construction – Air Quality

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Development Site Construction

1. Construction Emissions
Emission tables
2. Stationary Source Analysis example
Receptor locations
4. Cumulative Analysis example
Receptor locations

CONSTRUCTION EMISSIONS

CO Summary Table

Year	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6	All Locations
2010	4.190	4.190	0.000	0.000	0.000	0.000	8.380
2011	7.141	7.139	0.000	0.000	0.000	0.000	14.280
2012	1.193	4.370	5.952	5.939	0.000	2.806	20.261
2013	0.000	19.074	5.785	5.771	0.000	20.686	51.316
2014	0.016	15.952	0.013	2.334	0.001	36.583	54.899
2015	37.463	22.117	0.013	5.584	11.375	25.720	102.273
2016	32.830	19.403	1.571	2.909	24.019	4.958	85.690
2017	10.625	8.432	18.682	13.427	12.574	0.000	63.739
2018	2.690	2.689	3.230	2.687	2.662	0.000	13.958
2019	0.000	0.000	0.013	0.000	0.000	0.000	0.013
2020	0.000	0.000	0.013	0.000	0.000	0.000	0.013
2021	0.000	0.000	0.013	0.000	0.000	0.000	0.013
2022	0.000	0.000	0.013	0.000	0.000	0.000	0.013
2023	0.000	0.000	0.000	0.000	0.000	0.000	0.013
Maximum Yearly Value	**37.463**	**22.1171**	**18.682**	**13.427**	**24.0189**	**36.583**	**102.273**
Year	**2015**	**2015**	**2017**	**2017**	**2016**	**2014**	**2015**
Highest month from highest year - 2010-2016	**3.123**	**2.107**	**0.000**	**0.000**	**2.002**	**3.341**	**9.384**
Highest month from highest year 2017 - 2023	**0.000**	**0.000**	**1.558**	**1.194**	**0.000**	**0.000**	
Highest Monthly Value from highest year	**3.123**	**2.107**	**1.558**	**1.194**	**0.000**	**3.341**	**9.384**
Highest Monthly Value - from all years	**3.124**	**2.107**	**1.558**	**1.194**	**2.003**	**3.341**	**9.384**
Month and Year Highest Monthly Value occurs in	**10/1/2015**	**7/1/2015**	**8/1/2017**	**12/1/2016**	**1/1/2010**	**4/1/2014**	**4/1/2015**

$PM_{2.5}$ Summary Table (Tons)

Year	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6	All Locations
2010	0.147	0.147	0.000	0.000	0.000	0.000	0.294
2011	0.312	0.312	0.000	0.000	0.000	0.000	0.624
2012	0.064	0.071	0.248	0.247	0.000	0.074	0.705
2013	0.000	0.043	0.291	0.291	0.000	0.298	0.923
2014	0.001	0.038	0.001	0.009	0.000	0.086	0.134
2015	0.083	0.053	0.001	0.020	0.132	0.062	0.351
2016	0.075	0.046	0.004	0.011	0.050	0.015	0.202
2017	0.030	0.021	0.042	0.024	0.029	0.000	0.147
2018	0.007	0.007	0.011	0.005	0.007	0.000	0.037
2019	0.000	0.000	0.001	0.000	0.000	0.000	0.001
2020	0.000	0.000	0.001	0.000	0.000	0.000	0.001
2021	0.000	0.000	0.001	0.000	0.000	0.000	0.001
2022	0.000	0.000	0.001	0.000	0.000	0.000	0.001
2023	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Maximum Yearly Value	**0.312**	**0.3120**	**0.291**	**0.291**	**0.1320**	**0.298**	**0.923**
Year	**2011**	**2011**	**2013**	**2013**	**2015**	**2013**	**2013**
Highest month from highest year - 2010-2016	**0.026**	**0.026**	**0.027**	**0.027**	**0.020**	**0.028**	**0.085**
Highest month from highest year 2017 - 2023	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Highest Monthly Value from highest year	**0.026**	**0.026**	**0.027**	**0.027**	**0.020**	**0.028**	**0.085**
Highest Monthly Value - from all years	**0.027**	**0.027**	**0.027**	**0.027**	**0.020**	**0.028**	**0.085**
Month and Year Highest Monthly Value occurs in	**12/1/2011**	**9/1/2011**	**8/1/2013**	**6/1/2013**	**10/1/2015**	**10/1/2013**	**10/1/2013**

PM_{10} Summary Table

Year	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6	All Locations
2010	0.491	0.491	0.000	0.000	0.000	0.000	0.982
2011	1.140	1.140	0.000	0.000	0.000	0.000	2.279
2012	0.272	0.280	0.870	0.862	0.000	0.399	2.683
2013	0.000	0.051	1.051	1.042	0.000	1.492	3.637
2014	0.001	0.047	0.008	0.011	0.001	0.102	0.170
2015	0.096	0.057	0.008	0.027	0.700	0.083	0.971
2016	0.092	0.048	0.013	0.017	0.061	0.019	0.252
2017	0.040	0.021	0.060	0.024	0.042	0.000	0.187
2018	0.008	0.007	0.024	0.005	0.010	0.000	0.055
2019	0.000	0.000	0.008	0.000	0.000	0.000	0.008
2020	0.000	0.000	0.008	0.000	0.000	0.000	0.008
2021	0.000	0.000	0.008	0.000	0.000	0.000	0.008
2022	0.000	0.000	0.008	0.000	0.000	0.000	0.008
2023	0.000	0.000	0.000	0.000	0.000	0.000	0.008
Maximum Yearly Value	**1.140**	**1.1395**	**1.051**	**1.042**	**0.7000**	**1.492**	**3.637**
Year	**2011**	**2011**	**2013**	**2013**	**2015**	**2013**	**2013**
Highest month from highest year - 2010-2016	**0.095**	**0.095**	**0.096**	**0.095**	**0.101**	**0.136**	**0.331**
Highest month from highest year 2017 - 2023	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Highest Monthly Value from highest year	**0.095**	**0.095**	**0.096**	**0.095**	**0.101**	**0.136**	**0.331**
Highest Monthly Value - from all years	**0.095**	**0.095**	**0.096**	**0.095**	**0.101**	**0.136**	**0.331**
Month and Year Highest Monthly Value occurs in	**1/1/2011**	**1/1/2011**	**8/1/2013**	**6/1/2013**	**10/1/2015**	**10/1/2013**	**8/1/2013**

NOx Summary Table

Year	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6	All Locations
2010	10.966	10.966	0.000	0.000	0.000	0.000	21.933
2011	20.978	20.948	0.000	0.000	0.000	0.000	41.926
2012	3.514	3.730	16.278	16.260	0.000	0.484	40.266
2013	0.000	1.401	18.393	18.371	0.000	3.372	41.536
2014	0.064	1.424	0.020	0.329	0.001	3.075	4.913
2015	2.002	1.872	0.020	0.718	0.573	2.397	7.583
2016	2.041	1.574	0.090	0.519	1.030	0.852	6.106
2017	1.342	0.790	0.806	0.451	0.803	0.000	4.192
2018	0.255	0.253	0.449	0.187	0.241	0.000	1.385
2019	0.000	0.000	0.020	0.000	0.000	0.000	0.020
2020	0.000	0.000	0.020	0.000	0.000	0.000	0.020
2021	0.000	0.000	0.020	0.000	0.000	0.000	0.020
2022	0.000	0.000	0.020	0.000	0.000	0.000	0.020
2023	0.000	0.000	0.000	0.000	0.000	0.000	0.020
Maximum Yearly Value	**20.978**	**20.9479**	**18.393**	**18.371**	**1.0299**	**3.372**	**41.926**
Year	**2011**	**2011**	**2013**	**2013**	**2016**	**2013**	**2011**
Highest month from highest year - 2010-2016	**1.756**	**1.756**	**1.692**	**1.689**	**0.089**	**0.328**	**3.511**
Highest month from highest year 2017 - 2023	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Highest Monthly Value from highest year	**1.756**	**1.756**	**1.692**	**1.689**	**0.000**	**0.328**	**3.511**
Highest Monthly Value - from all years	**1.835**	**1.835**	**1.692**	**1.689**	**0.101**	**0.330**	**3.834**
Month and Year Highest Monthly Value occurs in	**12/1/2011**	**9/1/2011**	**8/1/2013**	**6/1/2013**	**1/1/2010**	**4/1/2013**	**9/1/2011**

$PM_{2.5}$ Summary Table (Tons)

Year	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6	All Locations
2010	0.117	0.117	0.000	0.000	0.000	0.000	0.233
2011	0.254	0.254	0.000	0.000	0.000	0.000	0.508
2012	0.055	0.059	0.199	0.199	0.000	0.071	0.582
2013	0.000	0.026	0.236	0.235	0.000	0.276	0.773
2014	0.001	0.023	0.001	0.004	0.000	0.049	0.077
2015	0.050	0.032	0.001	0.010	0.121	0.037	0.250
2016	0.045	0.028	0.003	0.007	0.029	0.009	0.122
2017	0.020	0.013	0.025	0.016	0.018	0.000	0.092
2018	0.004	0.004	0.008	0.003	0.004	0.000	0.024
2019	0.000	0.000	0.001	0.000	0.000	0.000	0.001
2020	0.000	0.000	0.001	0.000	0.000	0.000	0.001
2021	0.000	0.000	0.001	0.000	0.000	0.000	0.001
2022	0.000	0.000	0.001	0.000	0.000	0.000	0.001
2023	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Maximum Yearly Value	**0.254**	**0.2538**	**0.236**	**0.235**	**0.1210**	**0.276**	**0.773**
Year	**2011**	**2011**	**2013**	**2013**	**2015**	**2013**	**2013**
Highest month from highest year - 2010-2016	**0.021**	**0.021**	**0.022**	**0.022**	**0.018**	**0.025**	**0.071**
Highest month from highest year 2017 - 2023	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Highest Monthly Value from highest year	**0.021**	**0.021**	**0.022**	**0.022**	**0.018**	**0.025**	**0.071**
Highest Monthly Value - from all years	**0.022**	**0.022**	**0.022**	**0.022**	**0.018**	**0.025**	**0.071**
Month and Year Highest Monthly Value occurs in	**12/1/2011**	**9/1/2011**	**8/1/2013**	**6/1/2013**	**10/1/2015**	**10/1/2013**	**10/1/2013**

STATIONARY SOURCE ANALYSIS EXAMPLE


PM and NO_2 Analyses Receptor Locations
12th Ave.
11th Ave.
10th Ave.
W 34th St.
W 33rd St.
W 30th St.
W 29th St.
W 28th St.
Image © 2008 Sanborn
© 2008 Tele Atlas
Image © 2008 DigitalGlobe


CO Analysis
Receptor Locations
12th Ave.
11th Ave.
10th Ave.
W 34th St.
W 33rd St.
W 30th St.
W 29th St.
W 28th St.
Image © 2008 Sanborn
© 2008 Tele Atlas
Image © 2008 DigitalGlobe

CUMULATIVE ANALYSIS

WESTERN RAIL YARDS CUMULATIVE CONSTRUCTION EMISSIONS

IN 2011, THE HIGHEST YEAR OF WRY NO_x EMISSIONS

ERY

Modeling Period	Time period	Hours	Highest ER		Area	ER for AERMOD	
			NO_x	NO_x		NO_x	NO_2
			ton	g/sec	m^2	g/sec-m^2	g/sec-m^2
Annual	year	8760	22.865	0.65776	35,297	1.863E-05	**7.268E-06**

Note:

Conversion factor for NO_2/NO_x of 0.39 was applied as consistent with P.Wan et al, Atmospheric Transformation of Vehicular Emissions from Nearby Tunnel Portals, AWMA 1996.

ARC NO_x

Location	2011 Highest Annual ER	Working Hours per Year	Average ER per Year	Source Area	Annual ER per Area	
					NO_x	NO_2
	ton/year	hr	g/sec	m2	g/sec-m2	g/sec-m2
12th Avenue Manhattan	6.0348	8760	0.0007	8960	**7.6887E-08**	**2.92171E-08**

Note: Use 0.38 for NO_2/NO_x conversion factor consistent with the DEIS analysis.

N7 Station

Modeling Period	Time period	Hours	Highest ER		Area	ER for AERMOD
			ton	g/sec	m^2	g/sec-m^2
24 Hour	quarter	2160	9.31	1.09	10,050	**4.217E-05**

Note:
Conversion factor for NO_2/NO_x of 0.39 was applied as consistent with P.Wan et al, Atmospheric Transformation of Vehicular Emissions from Nearby Tunnel Portals, AWMA 1996.

WESTERN RAIL YARDS CUMULATIVE CONSTRUCTION EMISSIONS

IN 2013, THE HIGHEST YEAR OF WRY PM_{10} EMISSIONS

ERY

Modeling Period	Time period	Hours	Highest ER		Area	ER for AERMOD
			ton	g/sec	m^2	g/sec-m^2
24 Hour	month	720	0.050	0.01750	12,590	**1.390E-06**

ARC PM10

Location	September 2013 Highest Monthly ER	Working Hours per Month	Working Hours per Year	Average ER per Day	Source Area	Daily ER per Area
	ton/month	hr	hr	g/sec	m2	g/sec-m2
12th Avenue Manhattan	0.0116	720	8760	0.1294	8960	**1.4446E-05**

N7 Station

Modeling Period	Time period	Hours	Highest ER		Area	ER for AERMOD
			ton	g/sec	m^2	g/sec-m^2
24 Hour	quarter	2160	0.24	0.03	10,050	**2.739E-06**

Appendix H3:
Construction – Noise

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1. **Total noise results for weekday conditions**
2. **Total noise results for nighttime conditions**
3. **Total noise results for weekend conditions**
4. **Construction Equipment Noise Emission Levels**

Figure 1 - Weekdays–Receptor R1

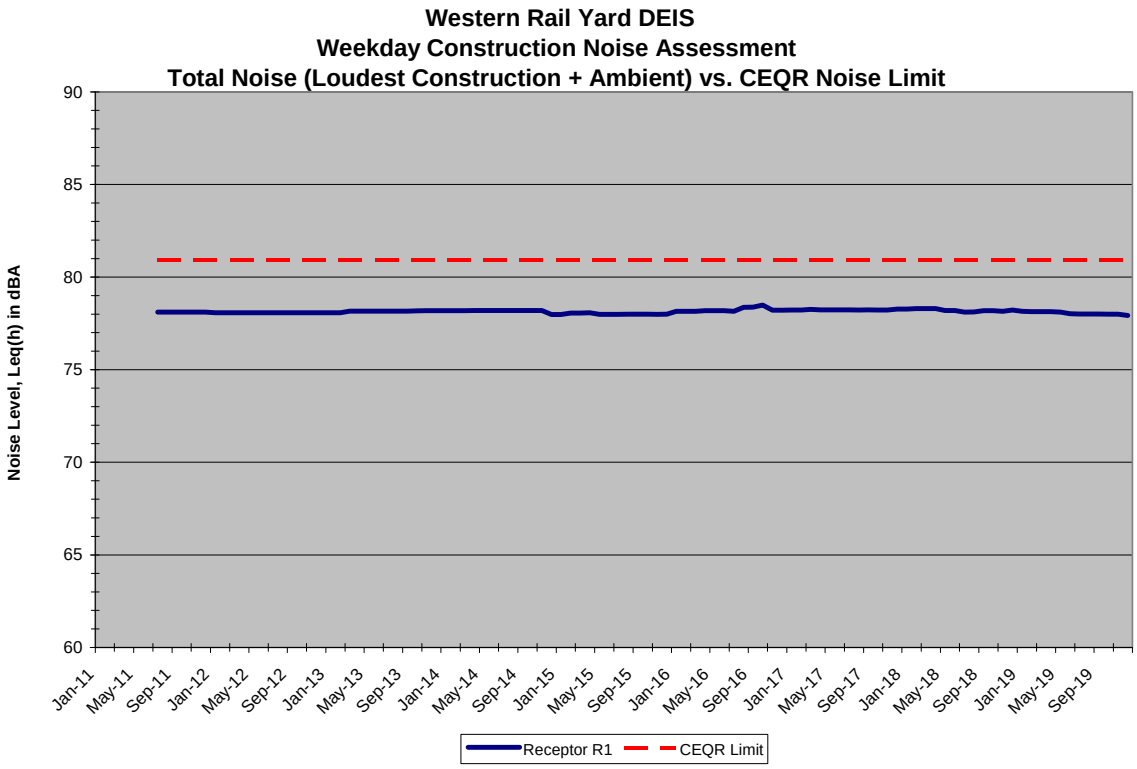
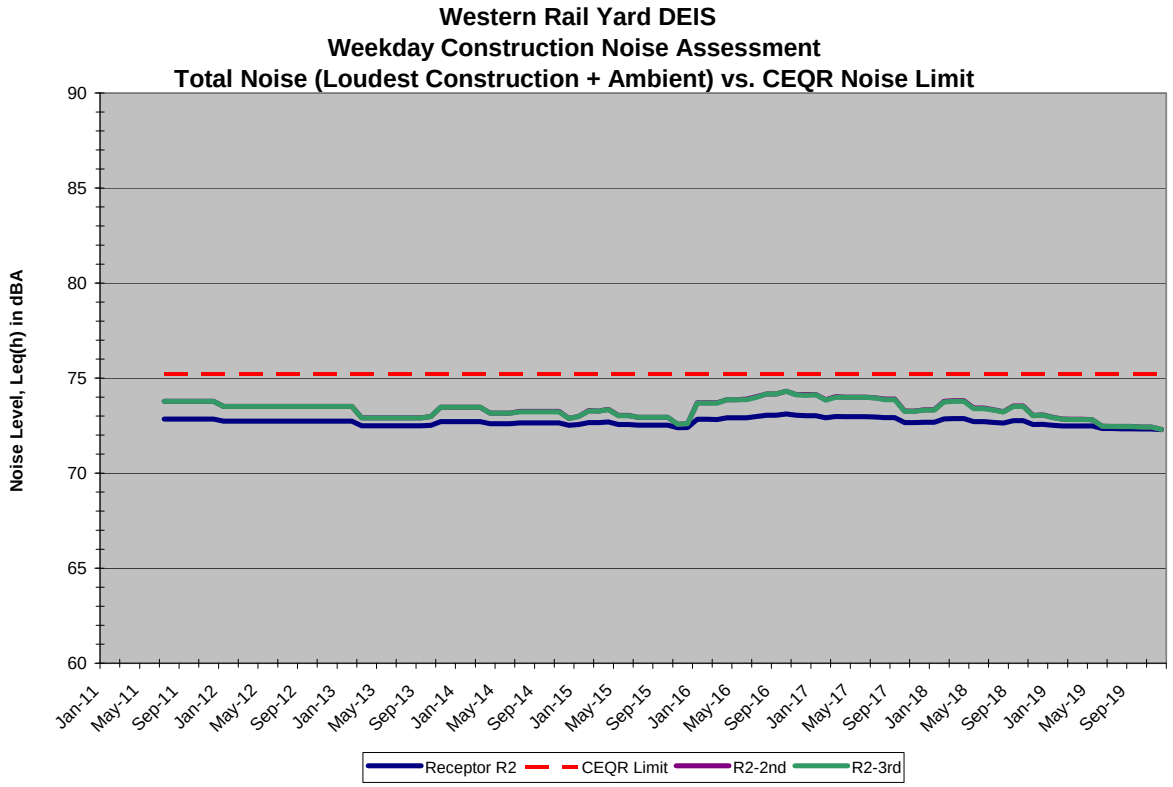


Figure 2 - Weekdays–Receptor R2



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 3 - Weekdays–Receptor R3

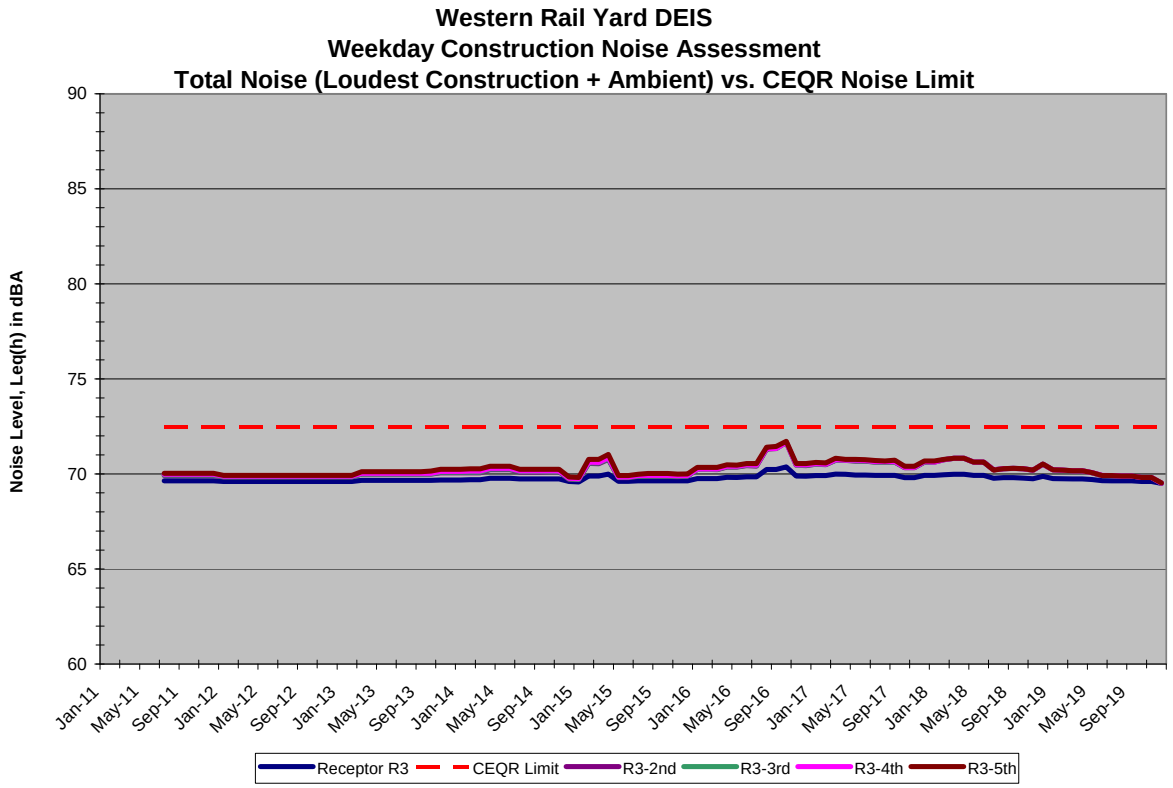
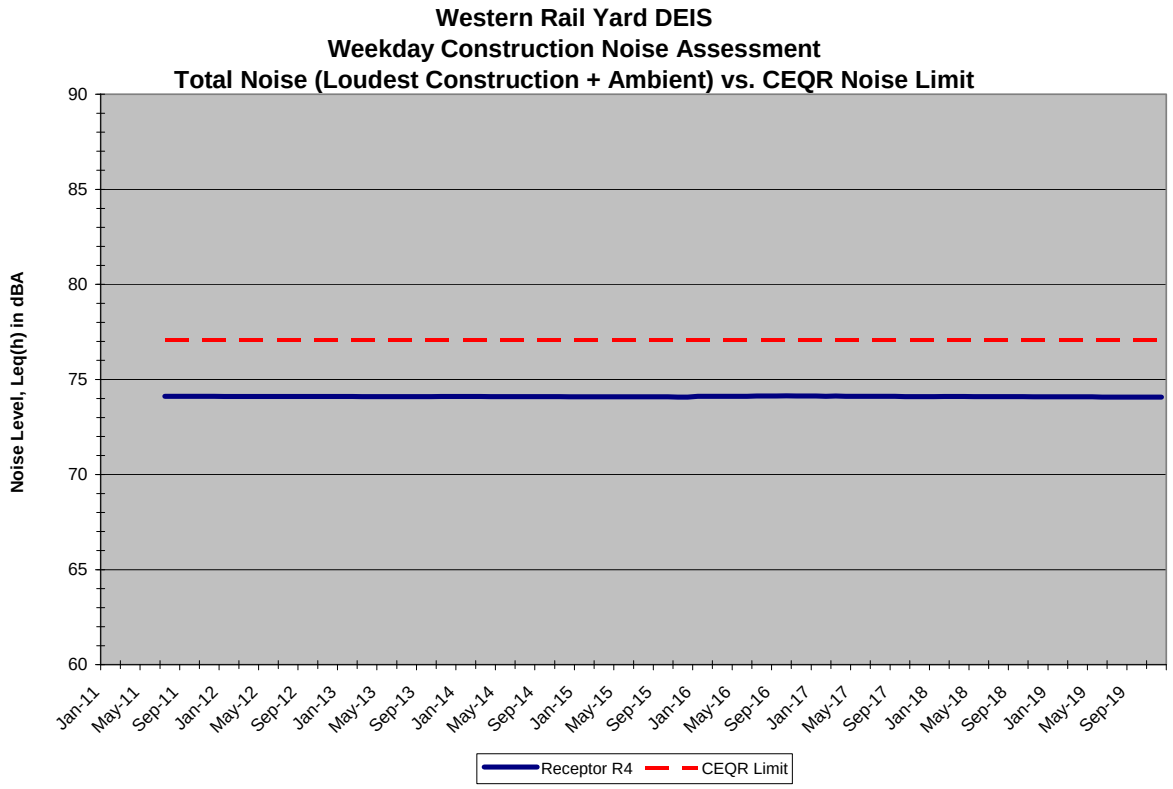


Figure 4 - Weekdays–Receptor R4



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 5 -Weekdays–Receptor R5

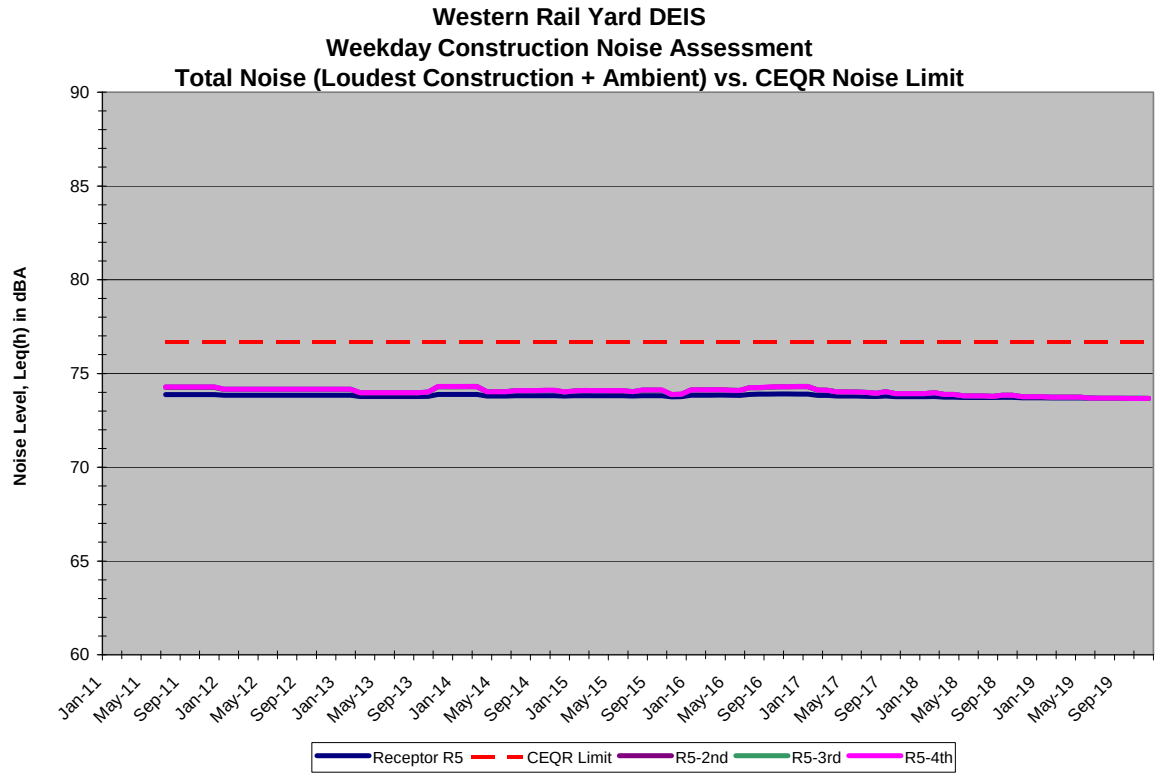
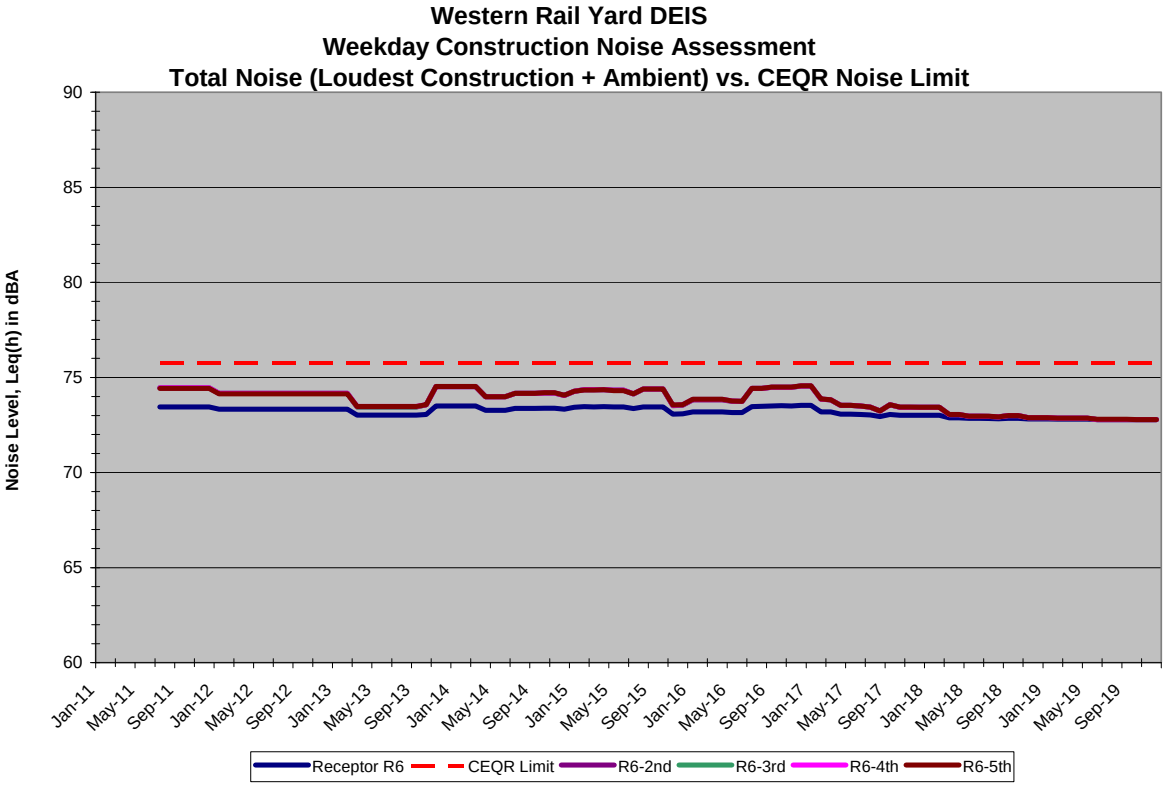


Figure 6 - Weekdays–Receptor R6



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 7 - Weekdays–Receptor R7

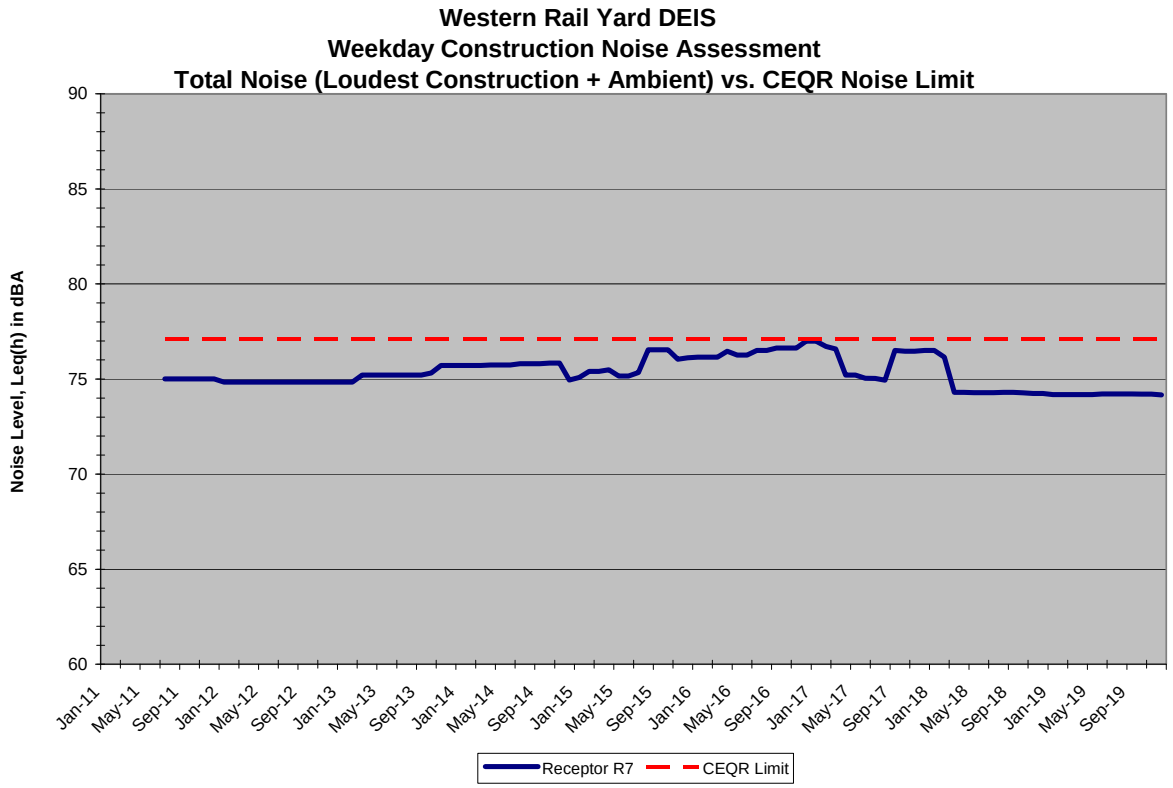
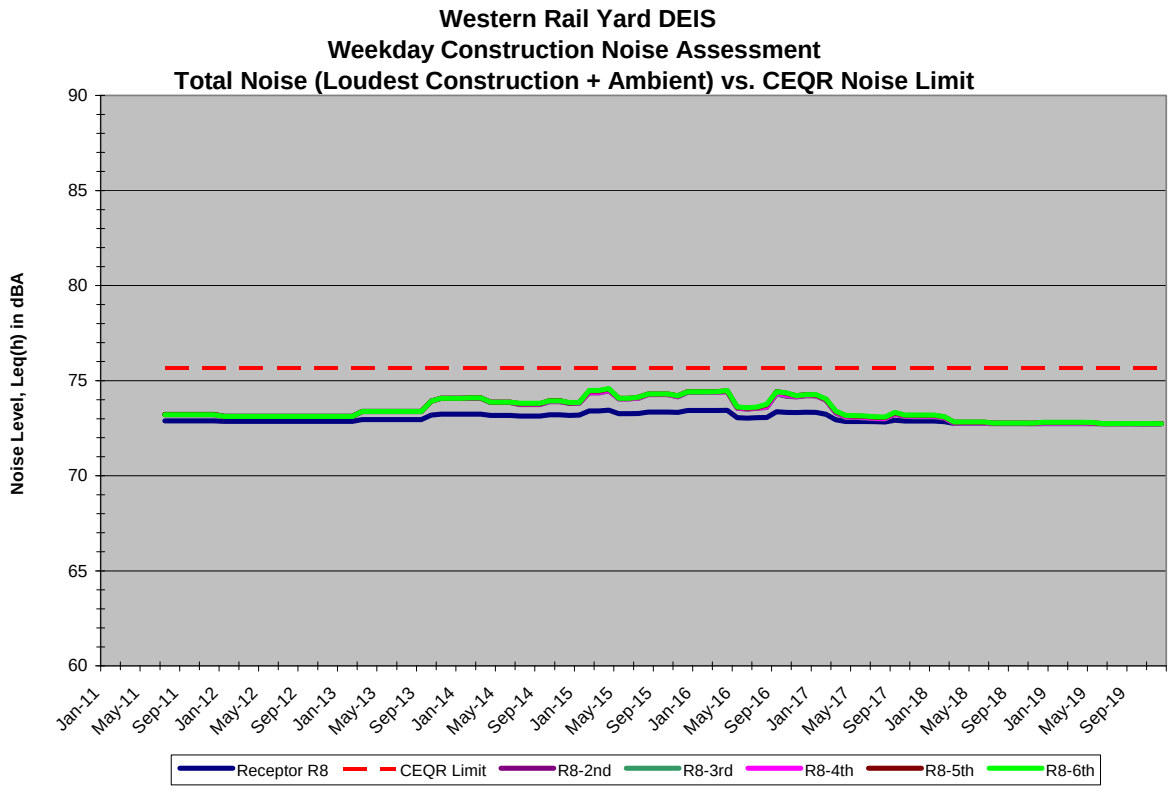


Figure 8 - Weekdays–Receptor R8



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 9 - Weekdays–Receptor R9

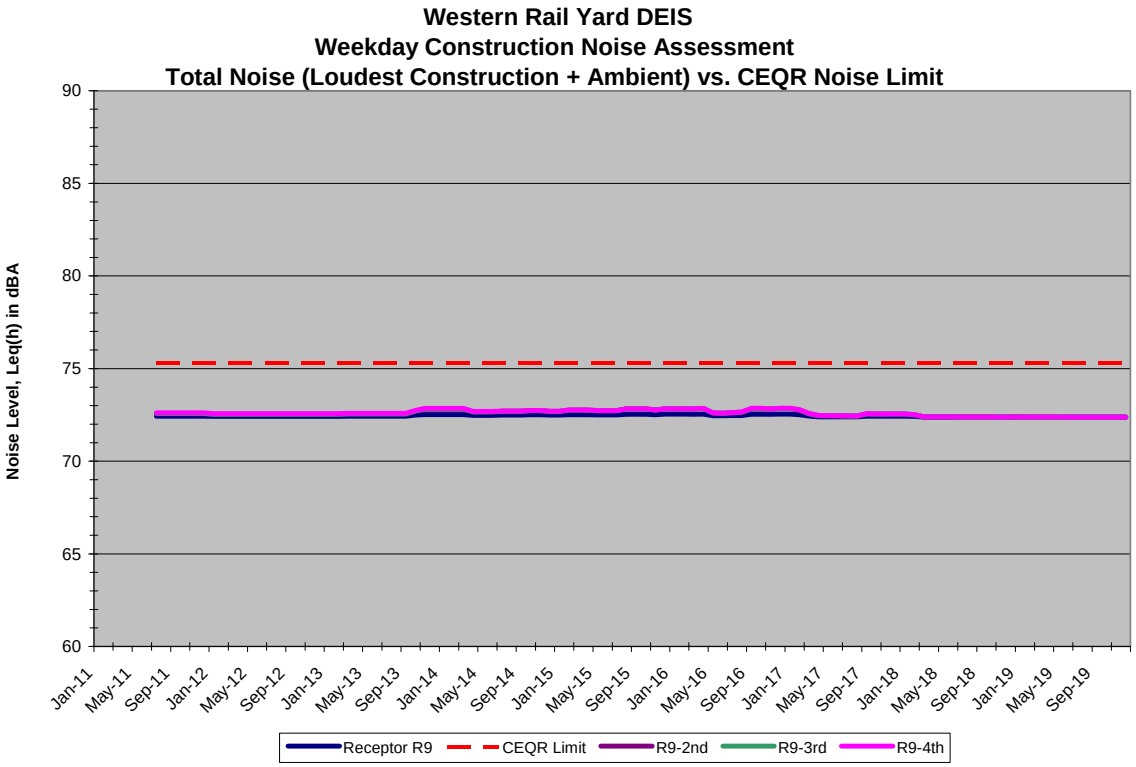
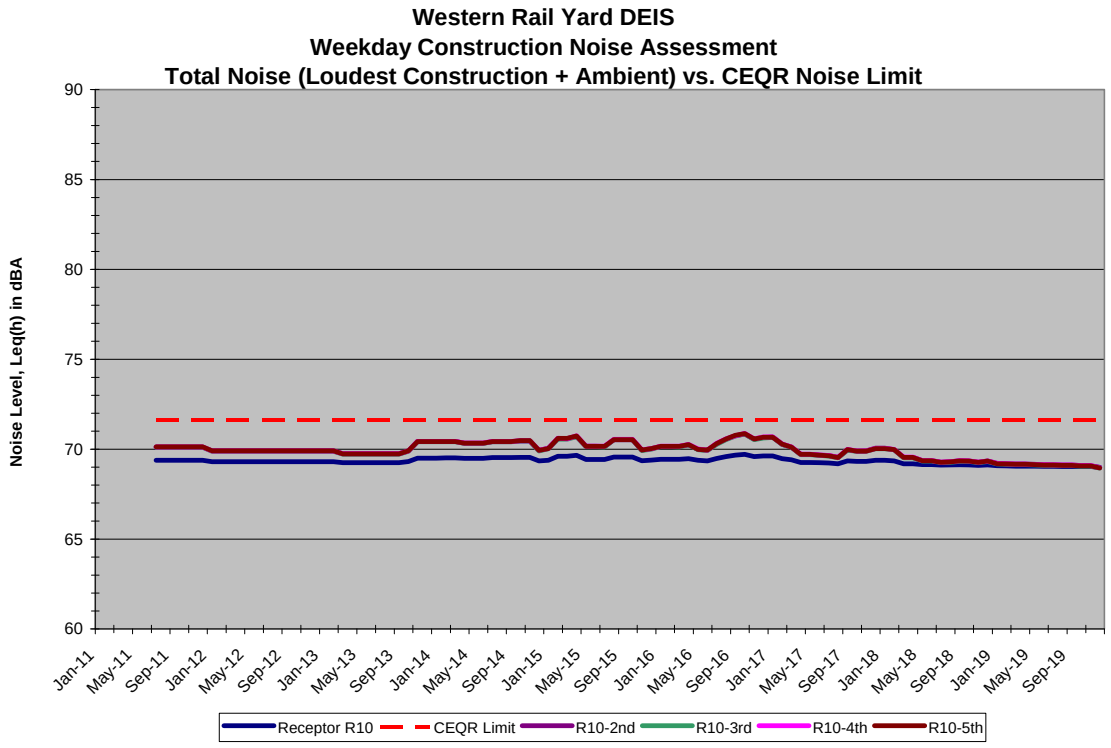


Figure 10 - Weekdays–Receptor R10



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 11 - Weekdays–Receptor R11

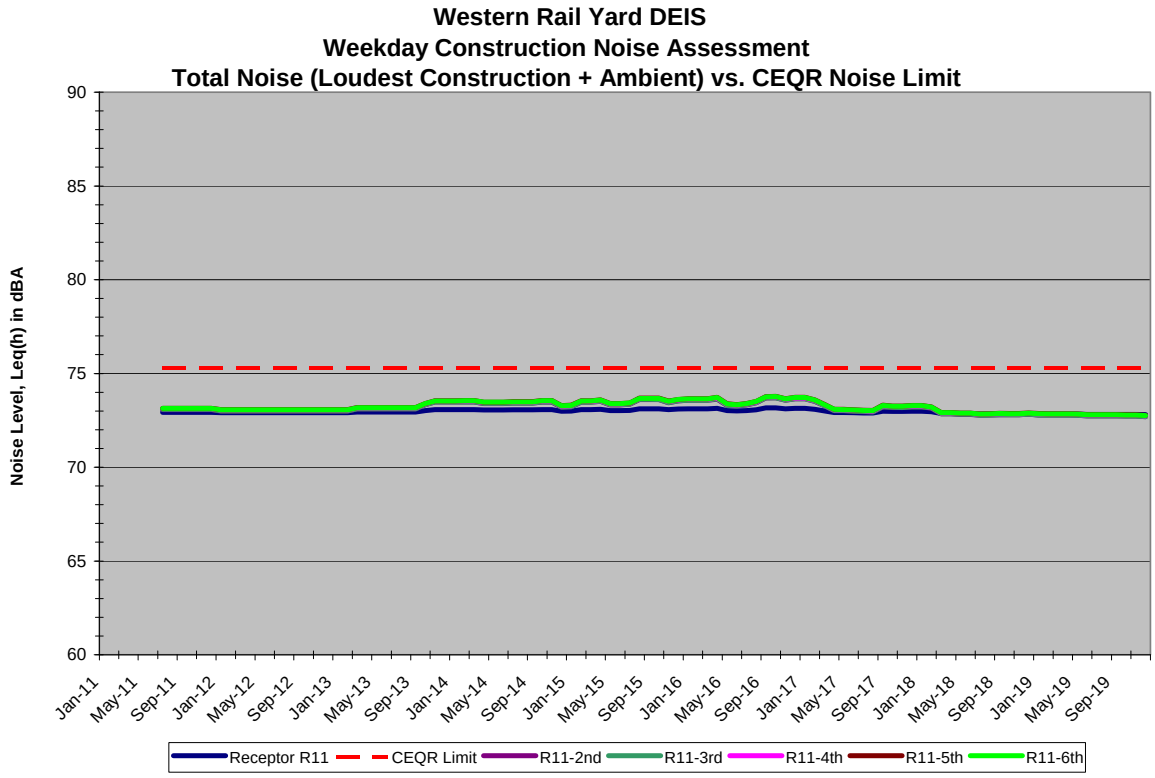
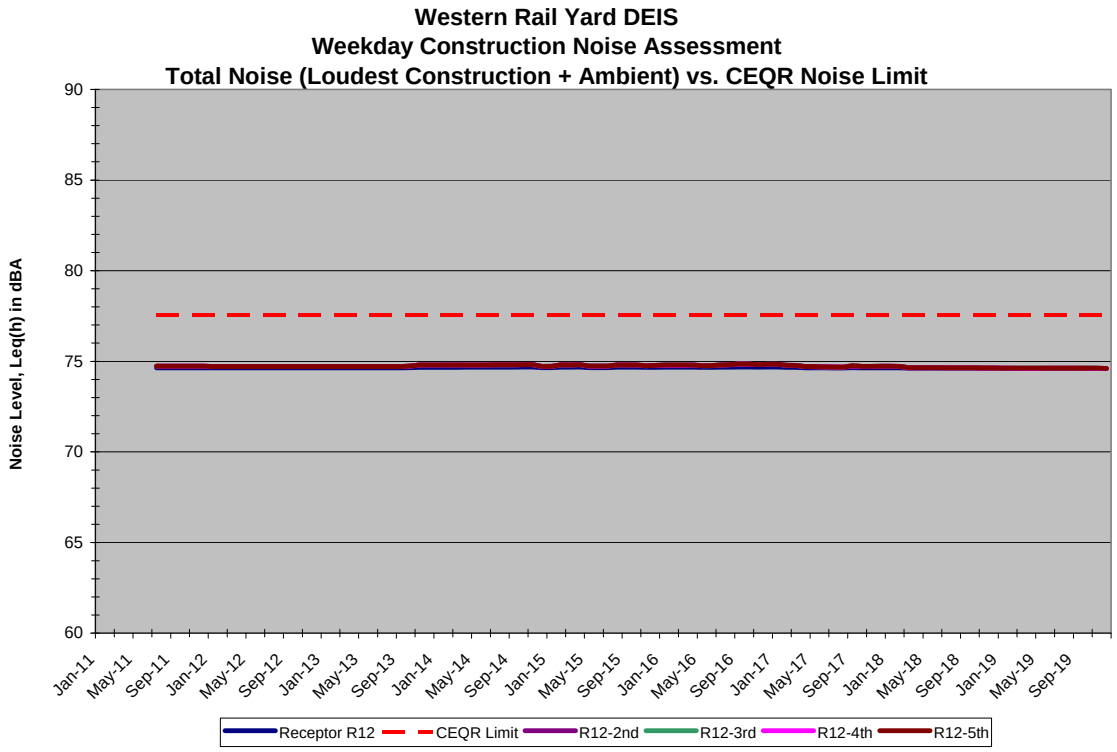


Figure 12 - Weekdays–Receptor R12



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 13 - Weekdays–Receptor R13

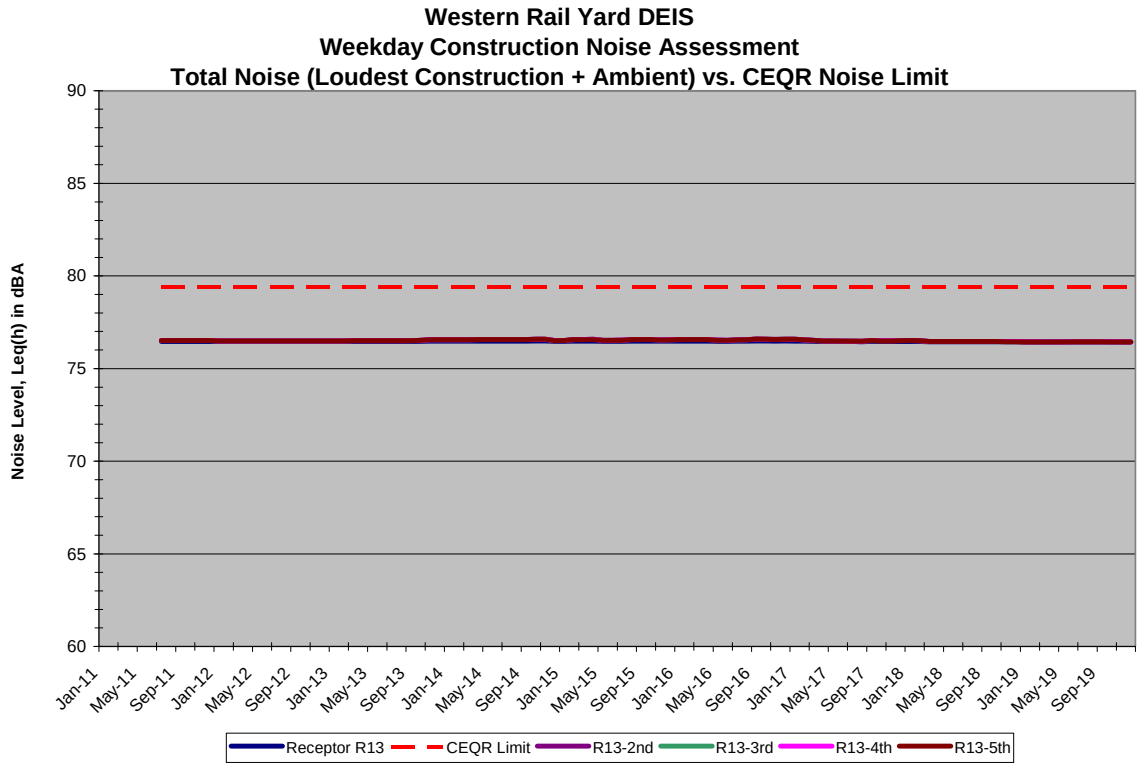
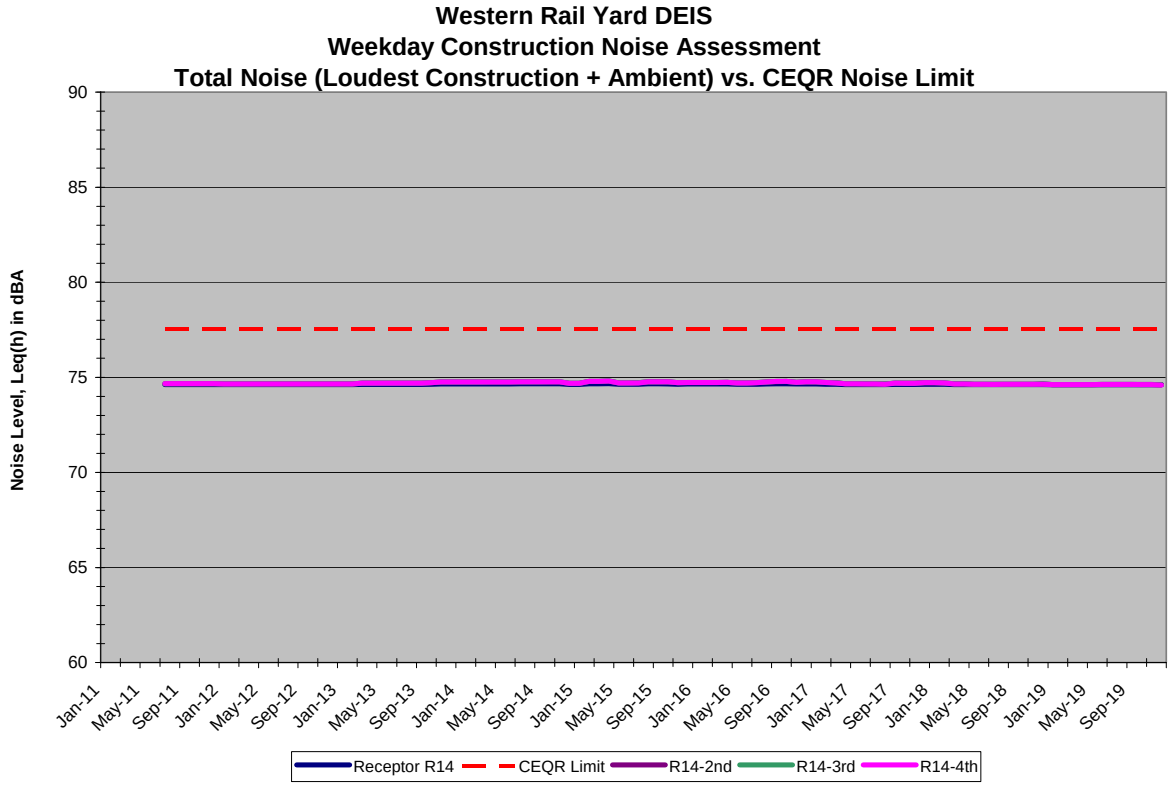
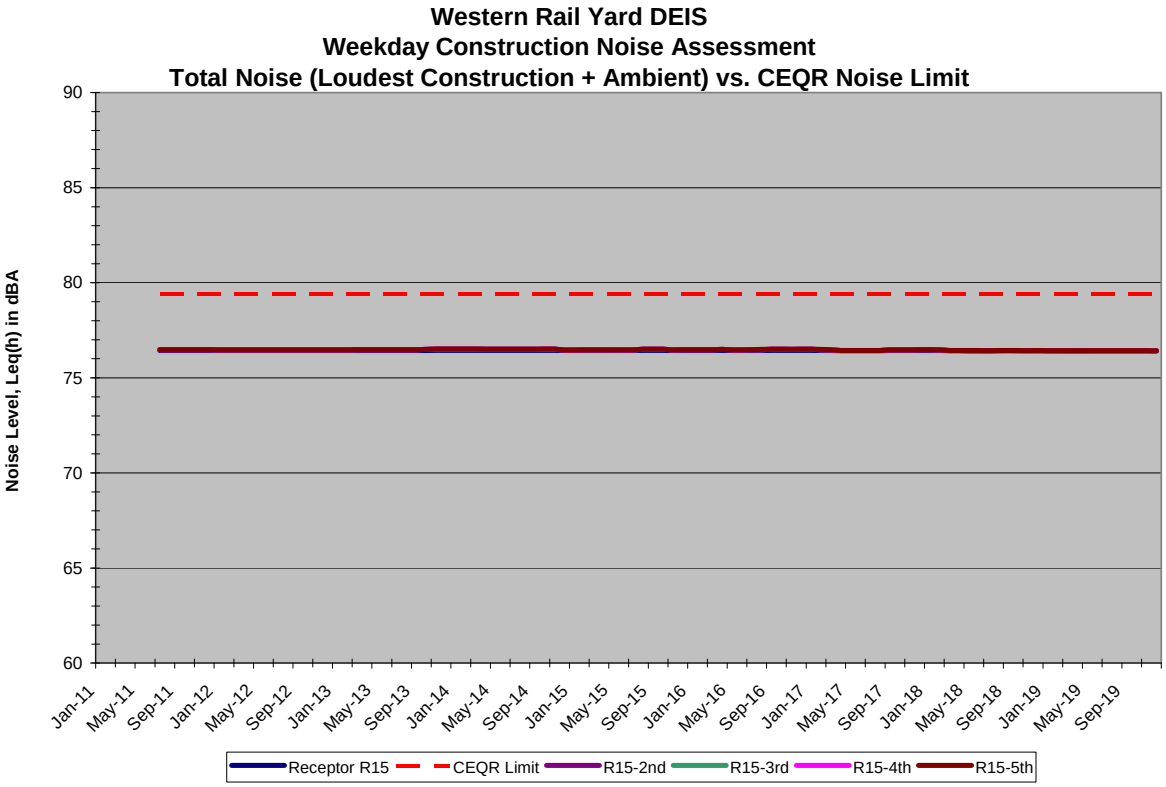


Figure 14 - Weekdays–Receptor R14



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 15 - Weekdays–Receptor R15



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 16 - Evenings–Receptor R1

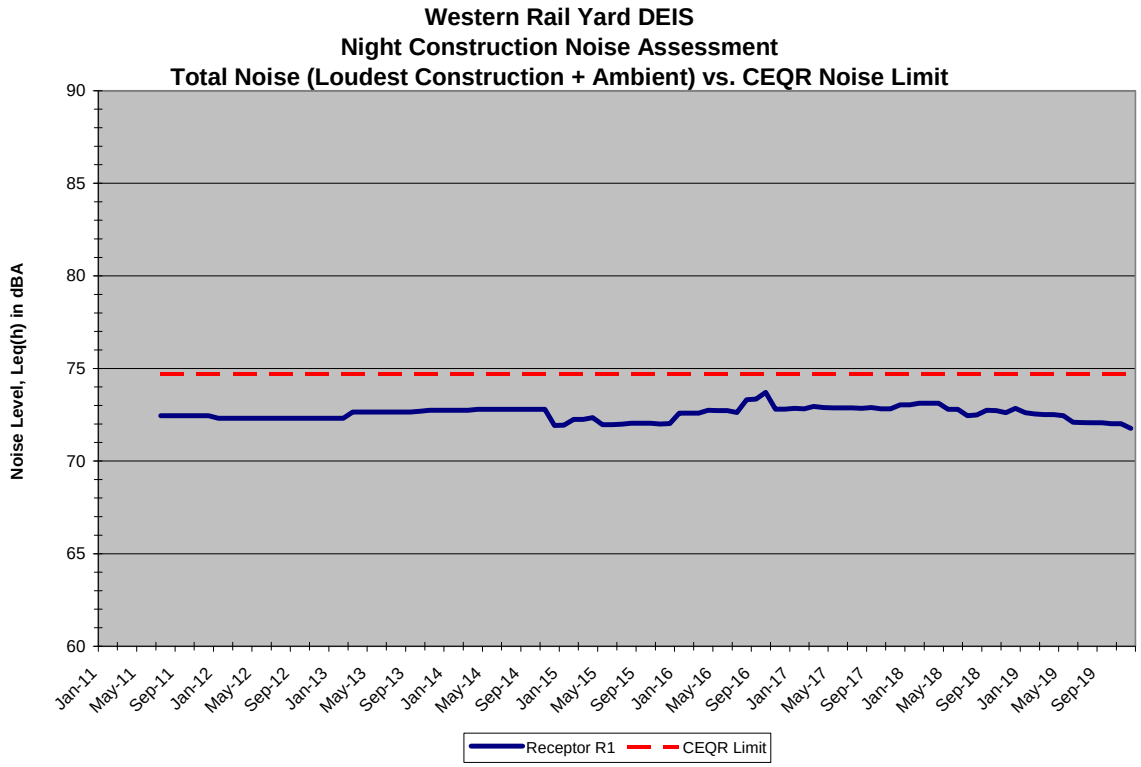
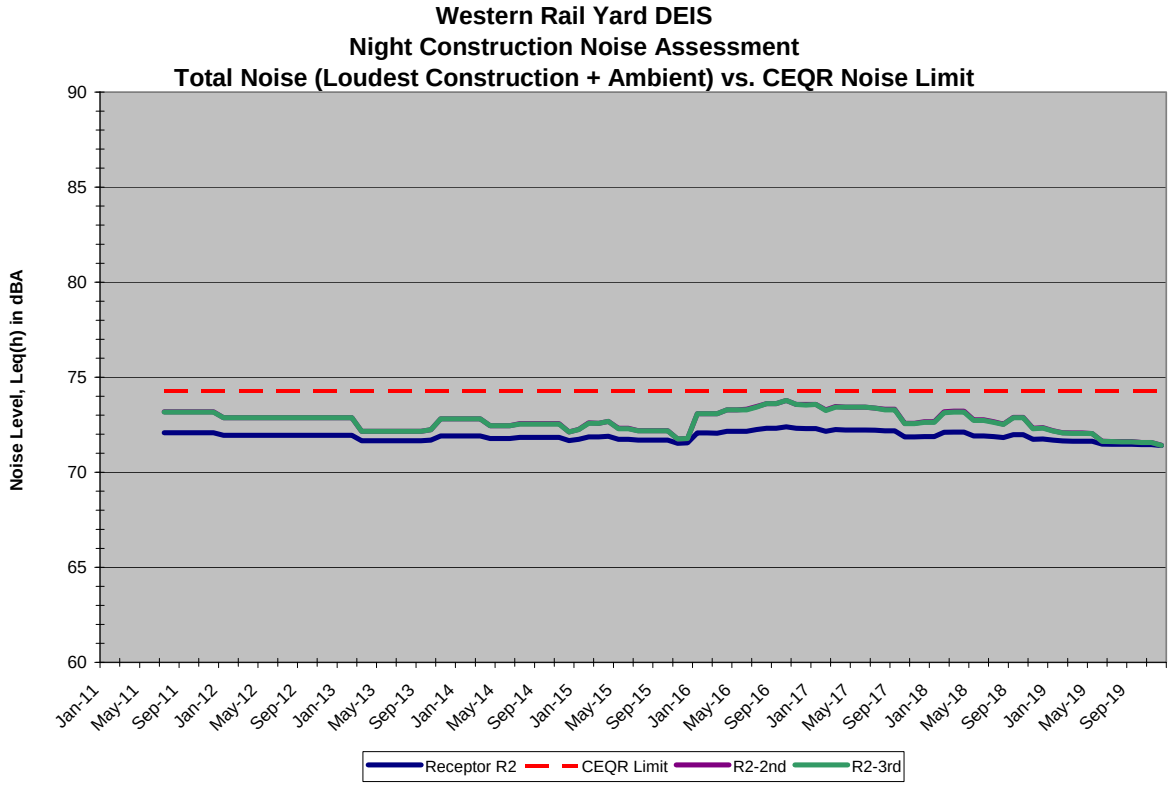


Figure 17 - Evenings–Receptor R2



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 18 - Evenings–Receptor R3

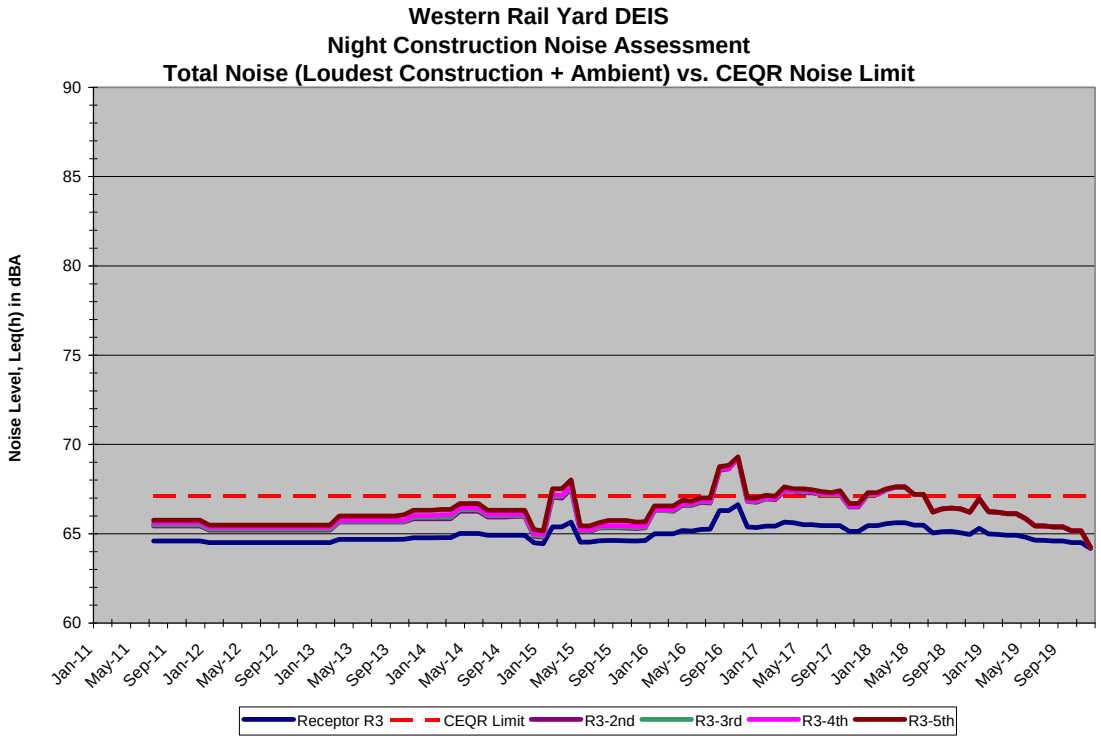
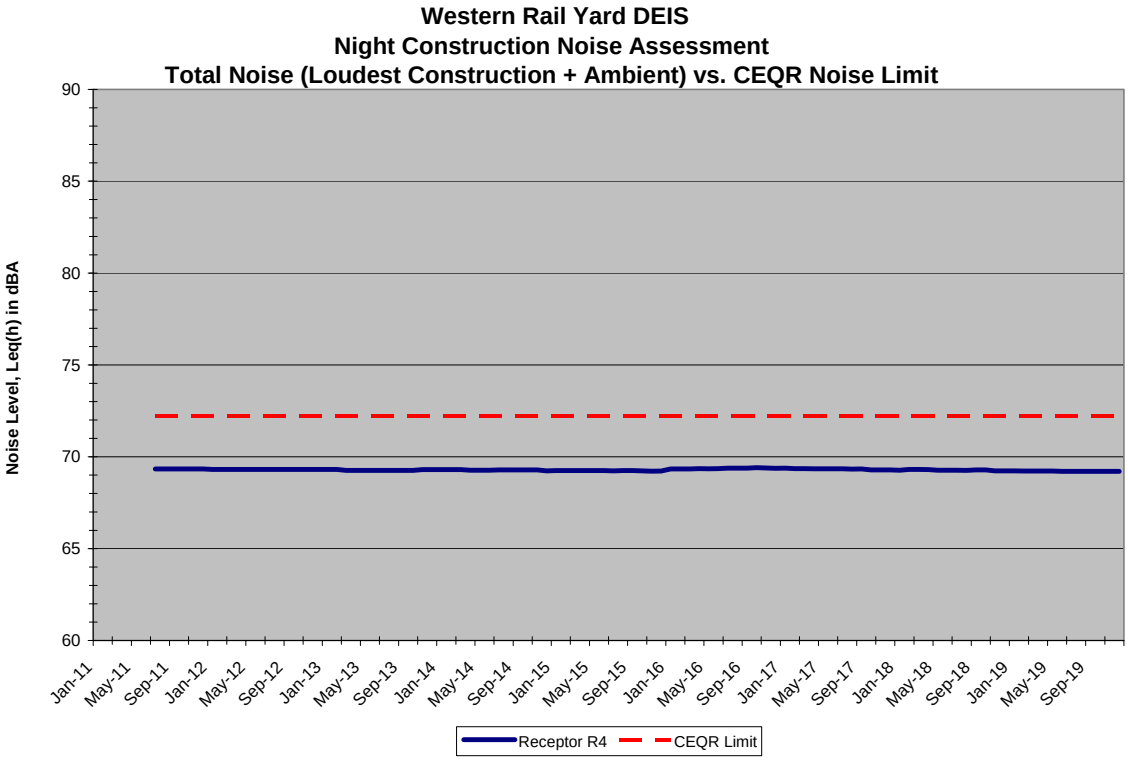
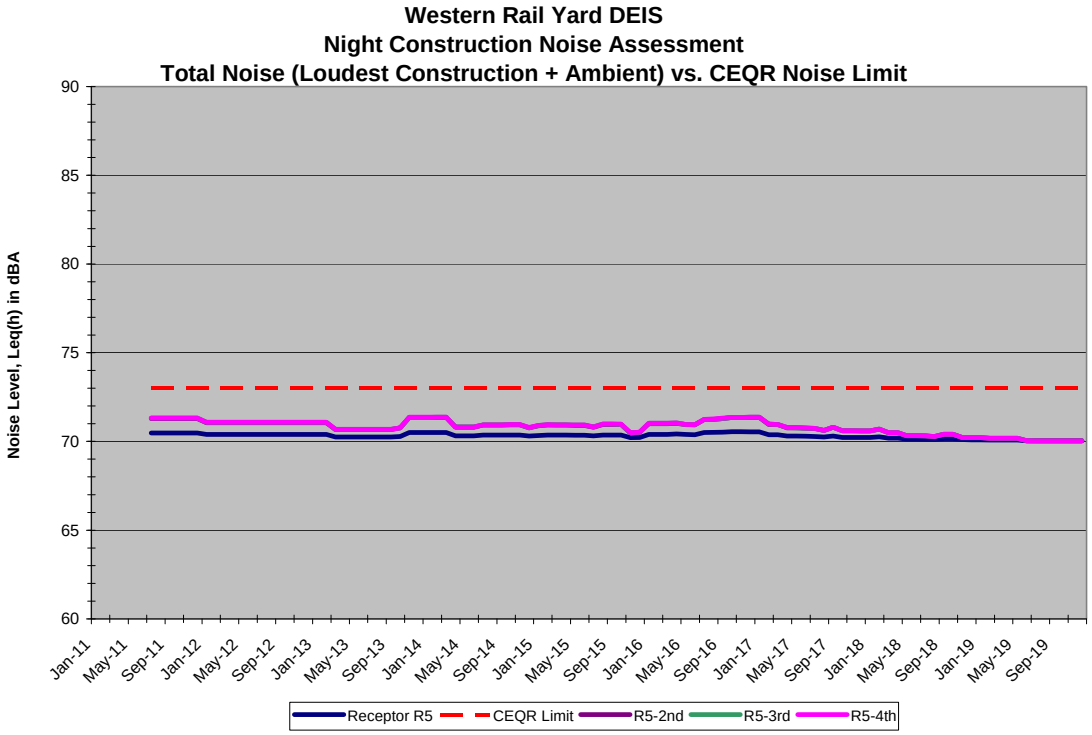


Figure 19 - Evenings–Receptor R4



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 20 - Evenings–Receptor R5



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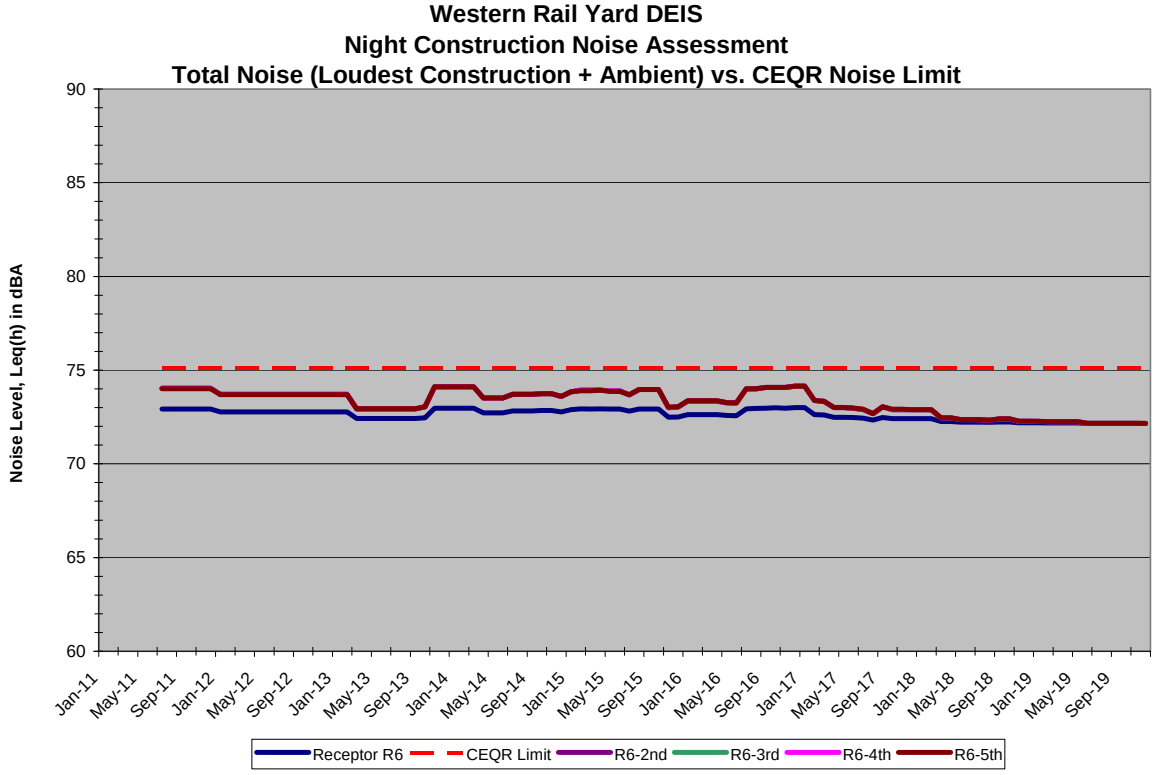


* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 22 - Evenings–Receptor R7

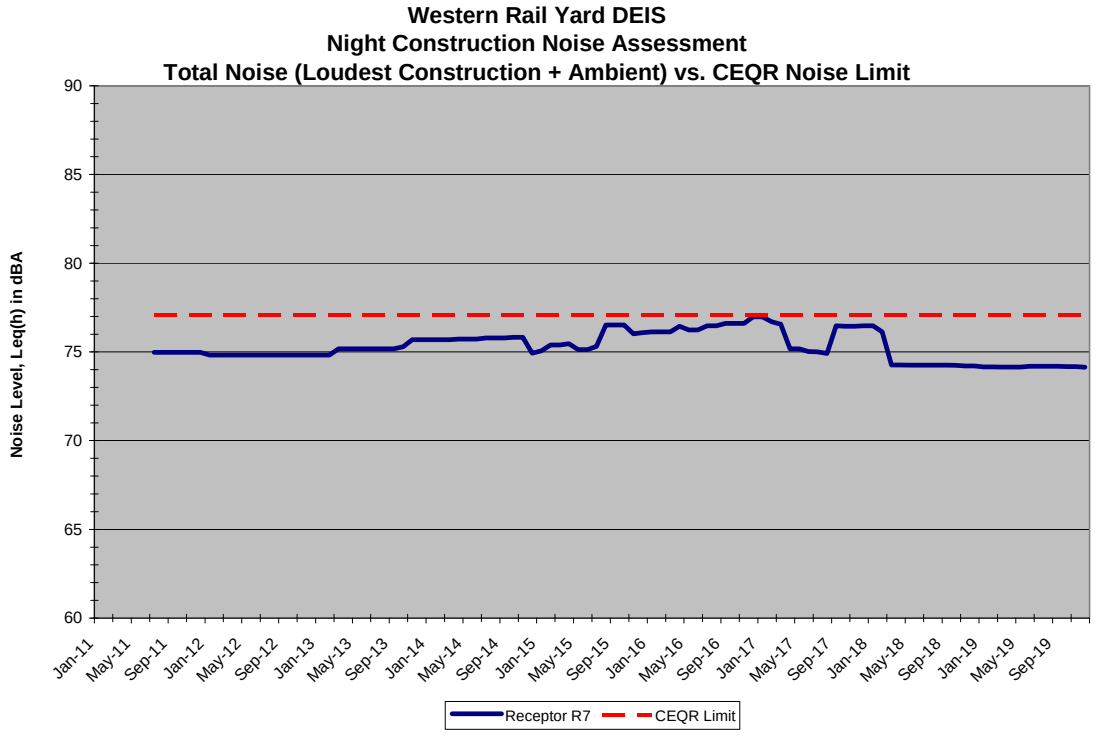
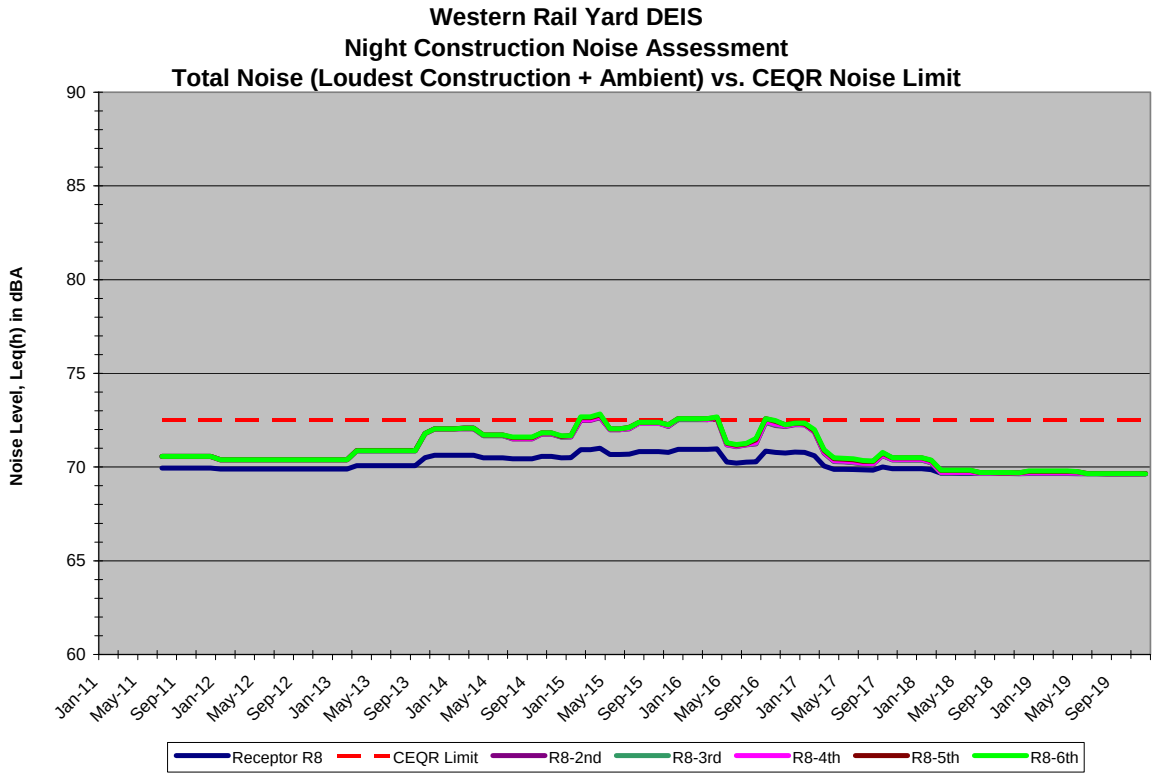


Figure 23 - Evenings–Receptor R8



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 24 - Evenings–Receptor R9

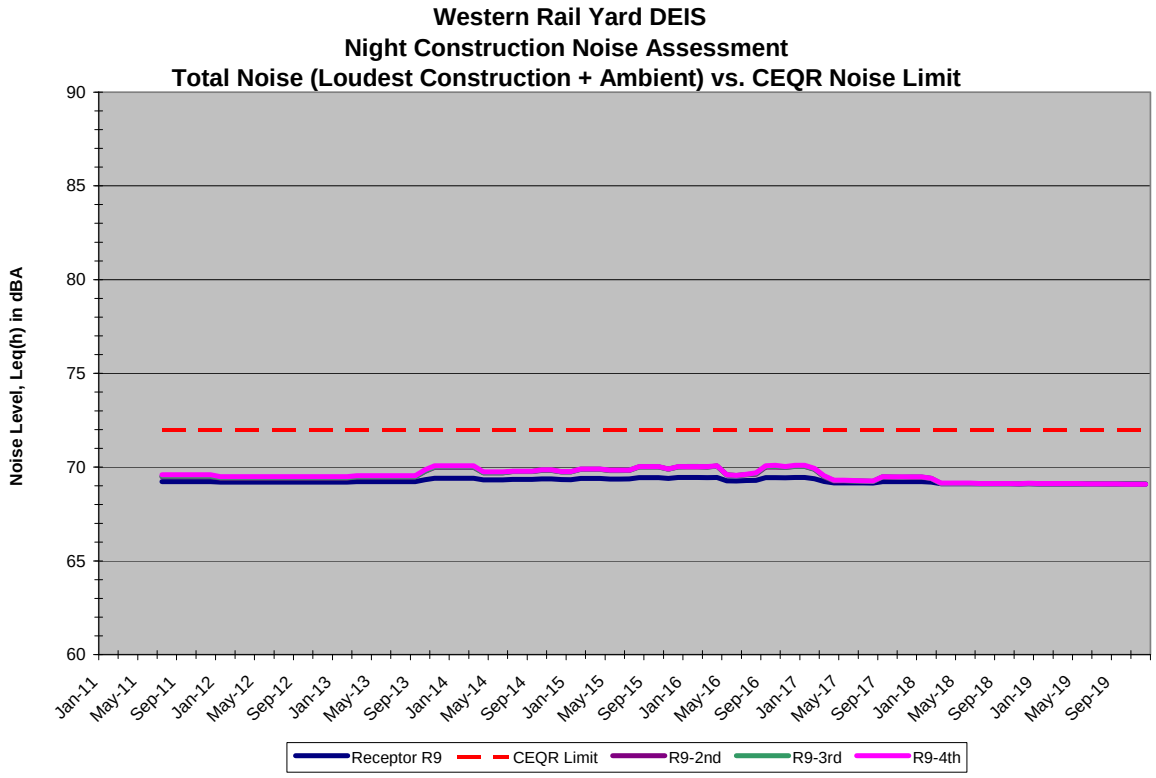
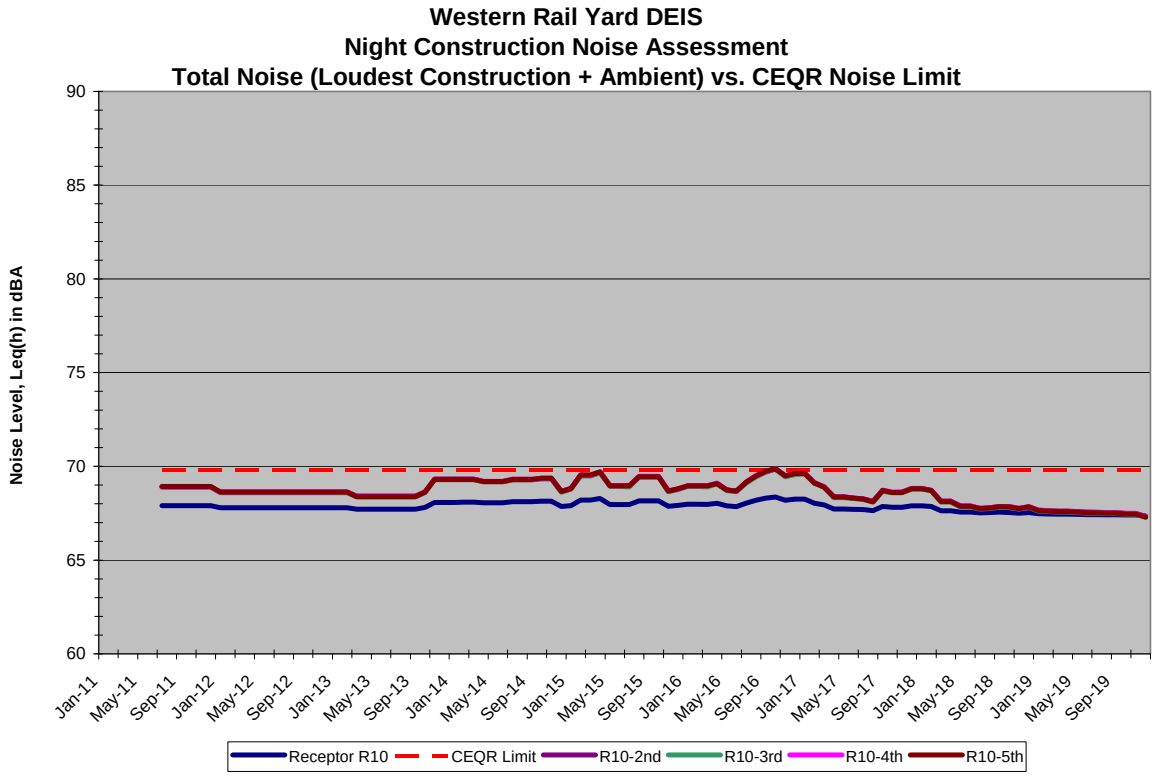


Figure 25 - Evenings–Receptor R10



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 26 -Evenings–Receptor R11

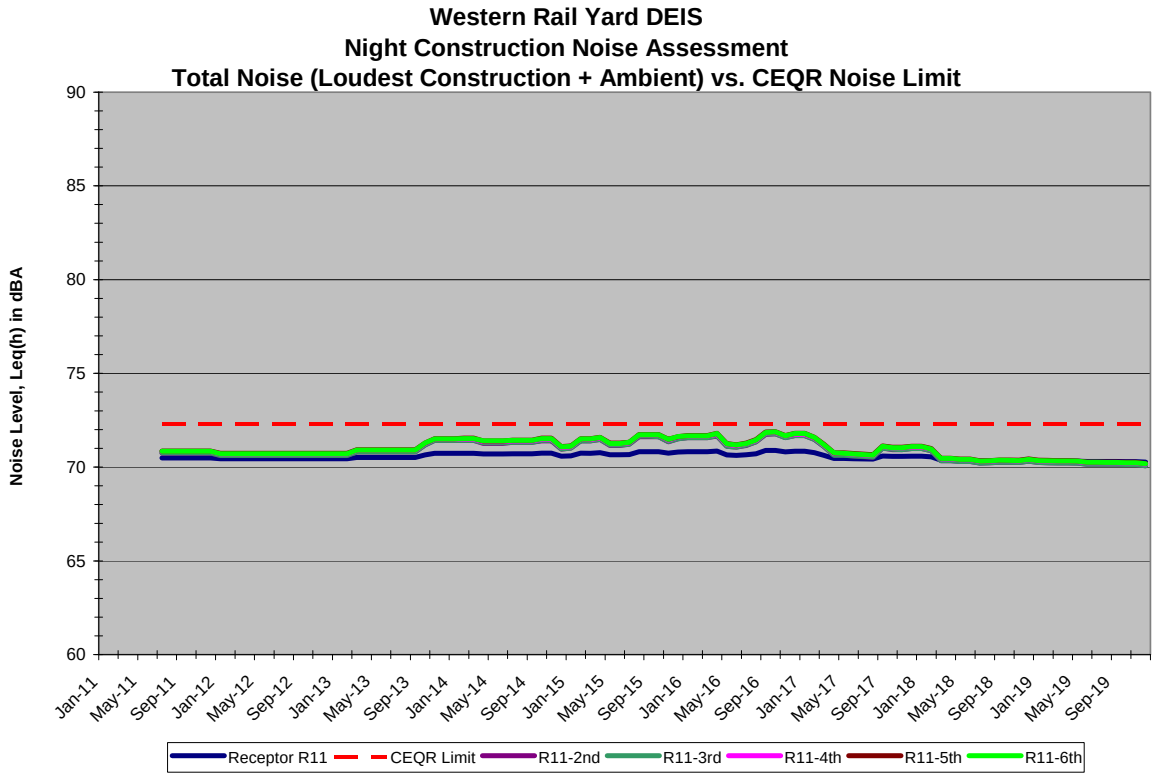
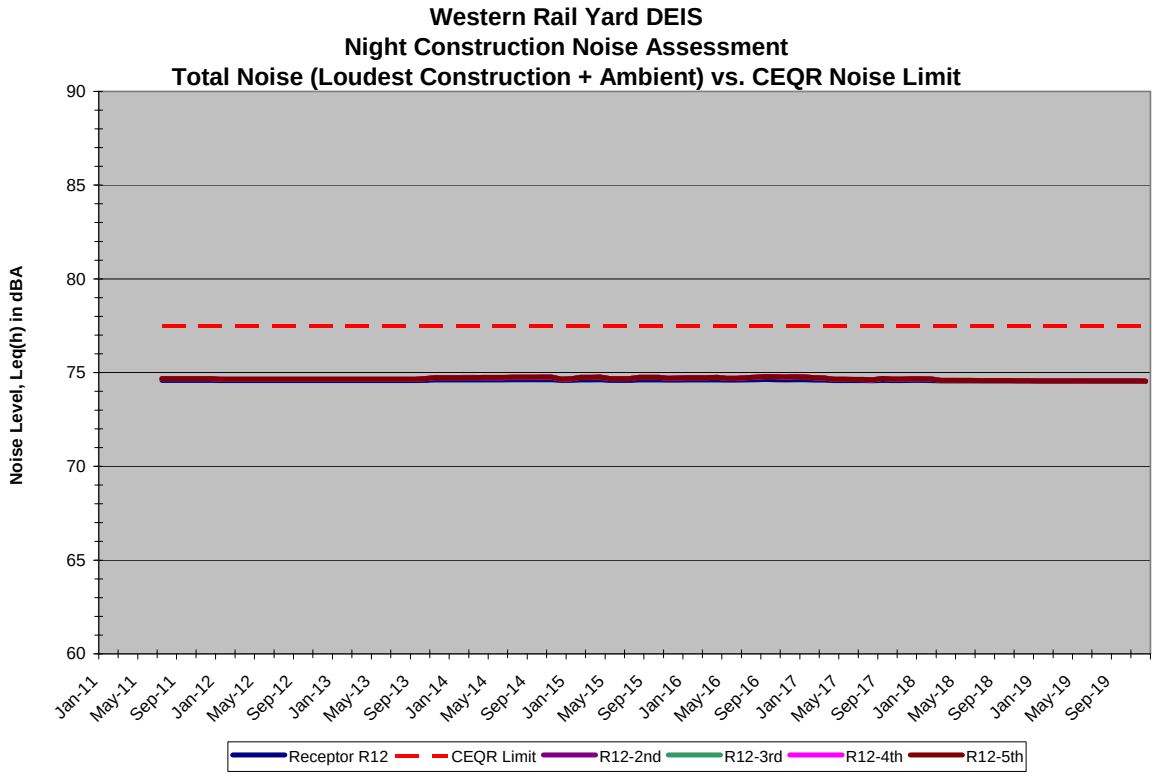


Figure 27 - Evenings–Receptor R12



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 28 - Evenings–Receptor R13

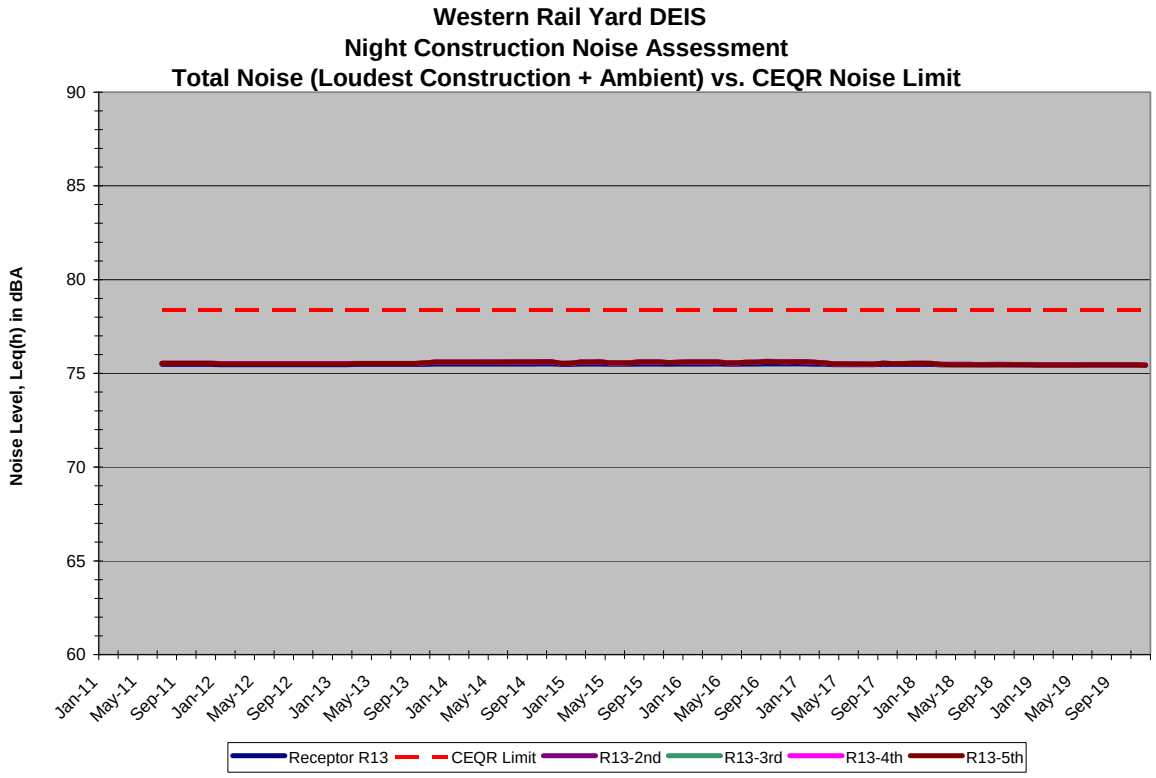
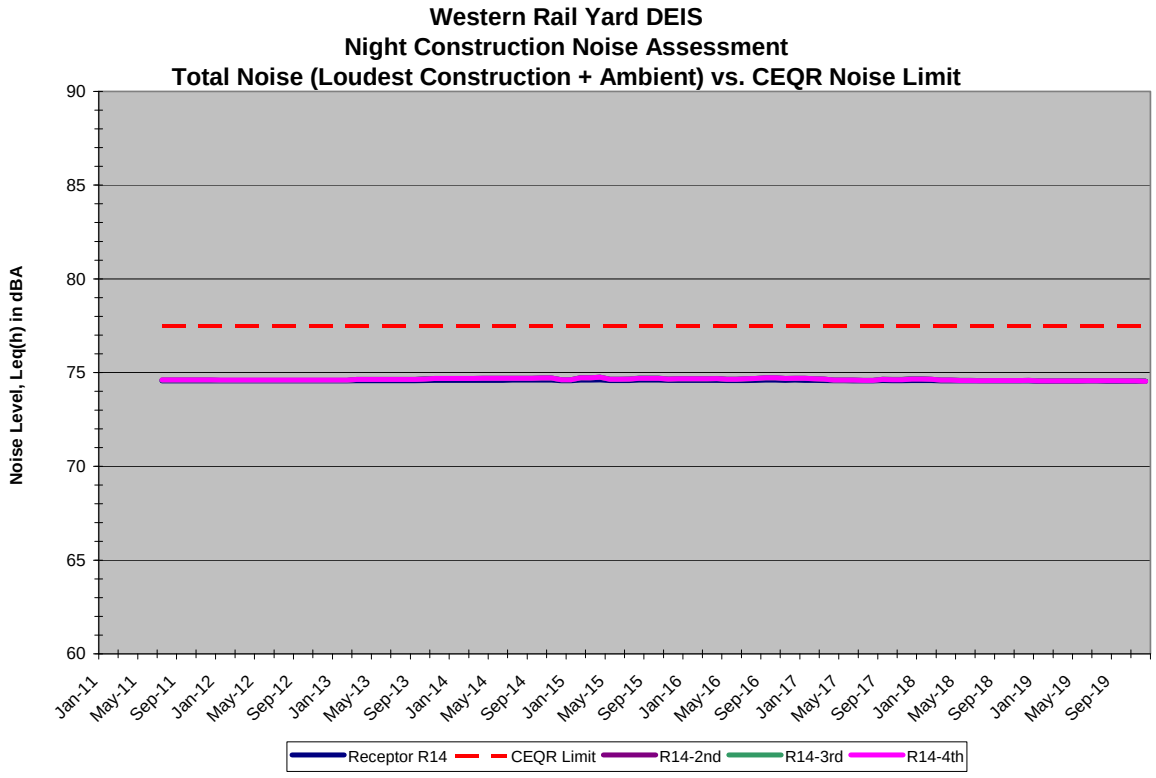
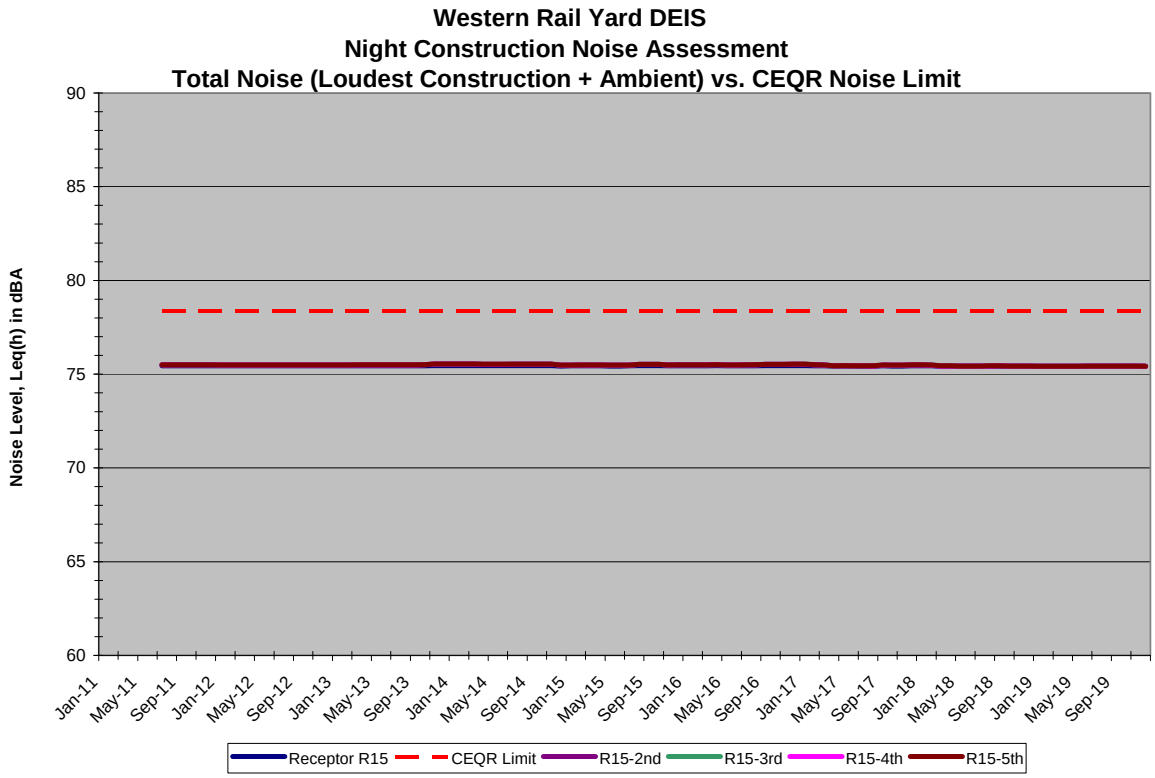


Figure 29 - Evenings–Receptor R14



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 30 - Evenings–Receptor R15



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 31 - Weekend–Receptor R1

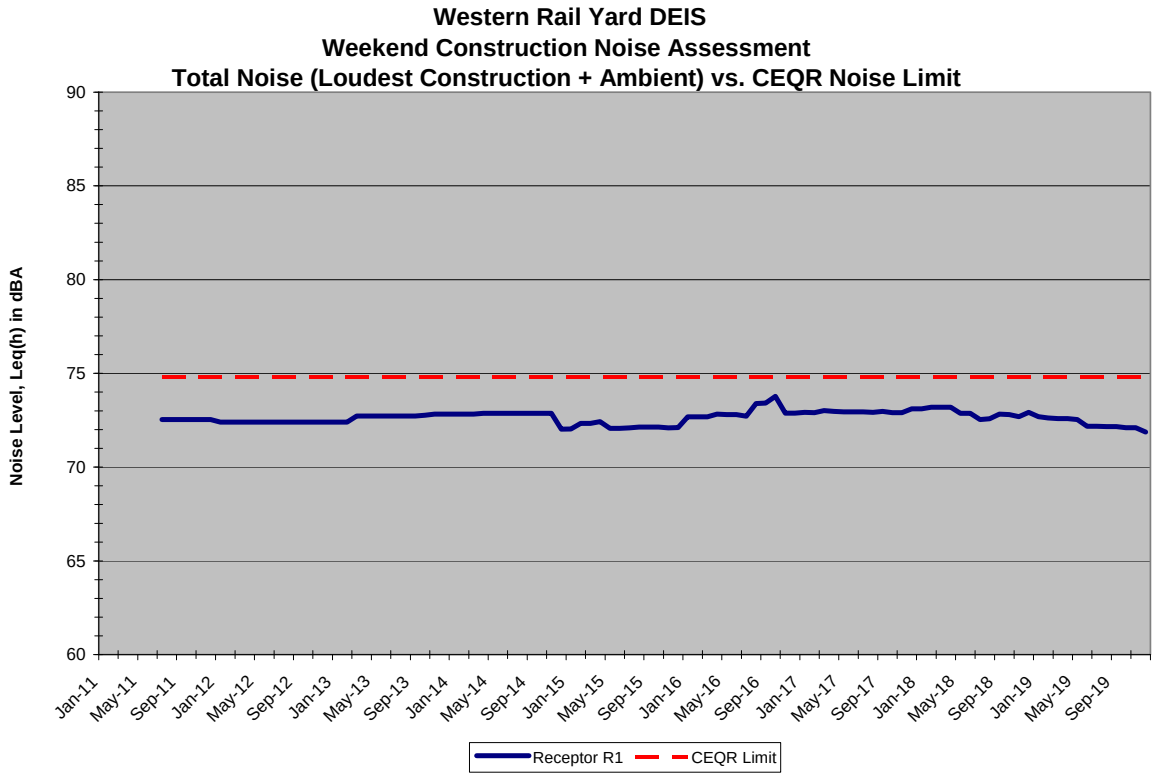
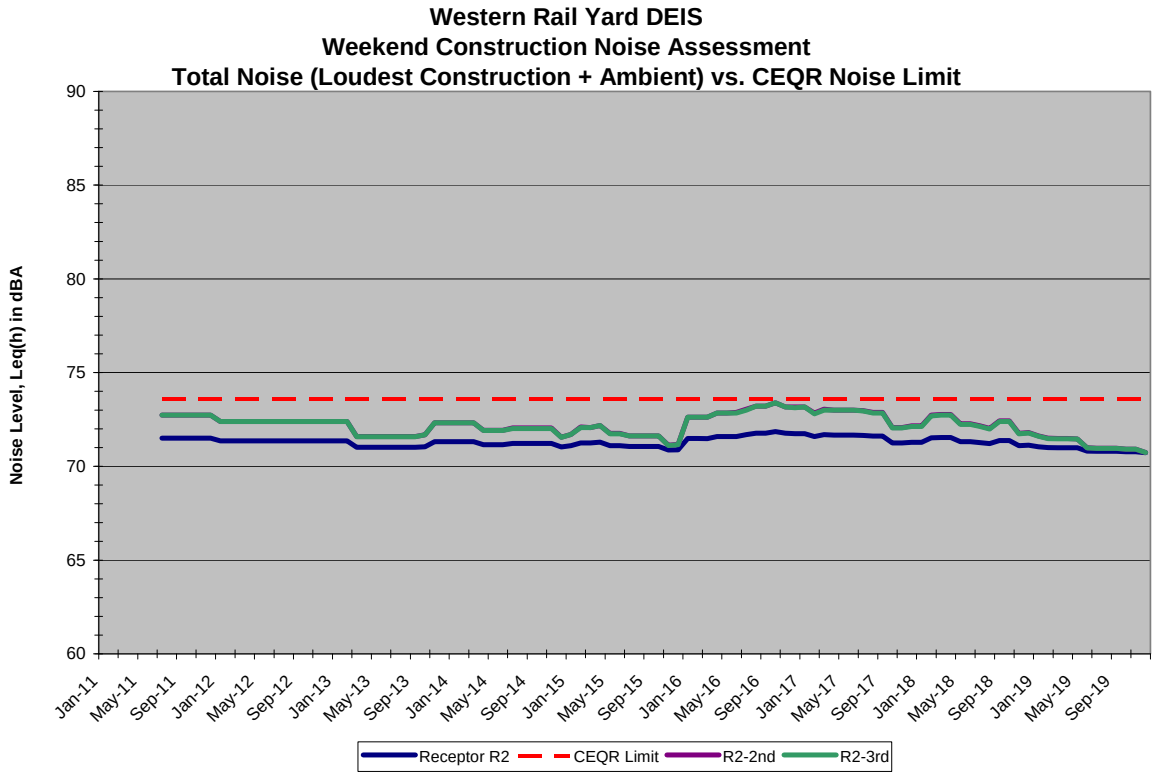


Figure 32 - Weekend–Receptor R2



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 33 - Weekend–Receptor R3

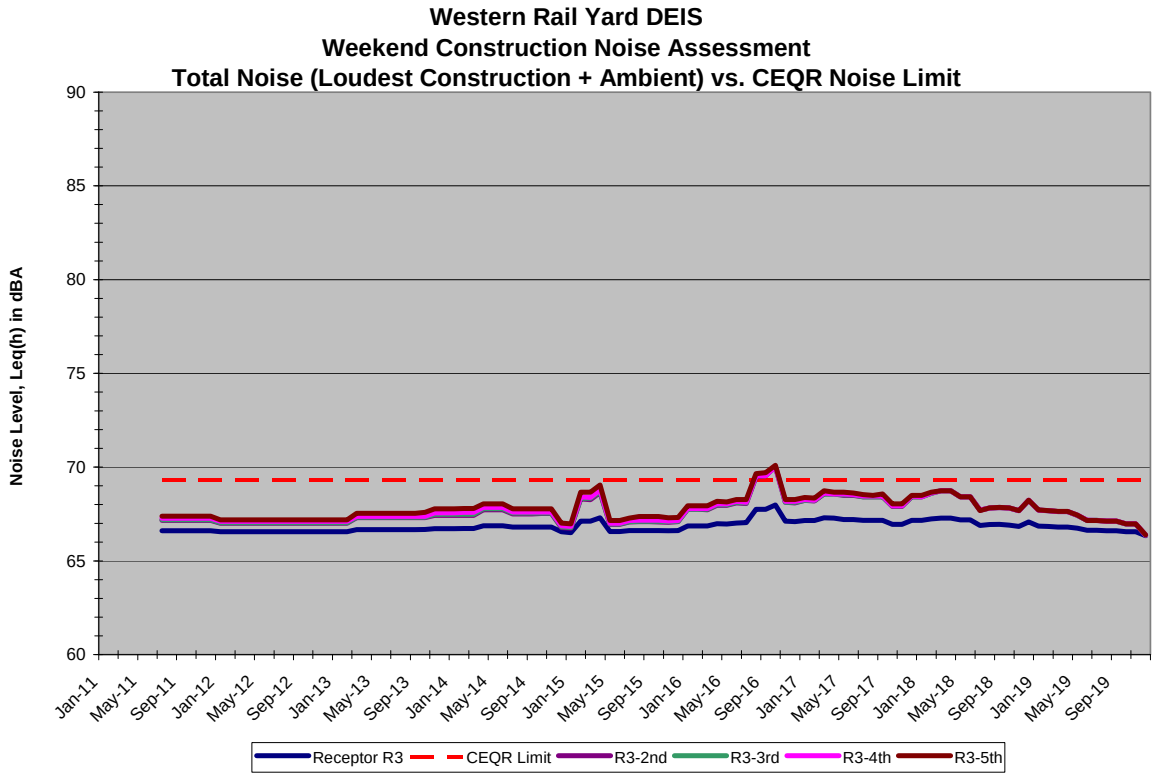
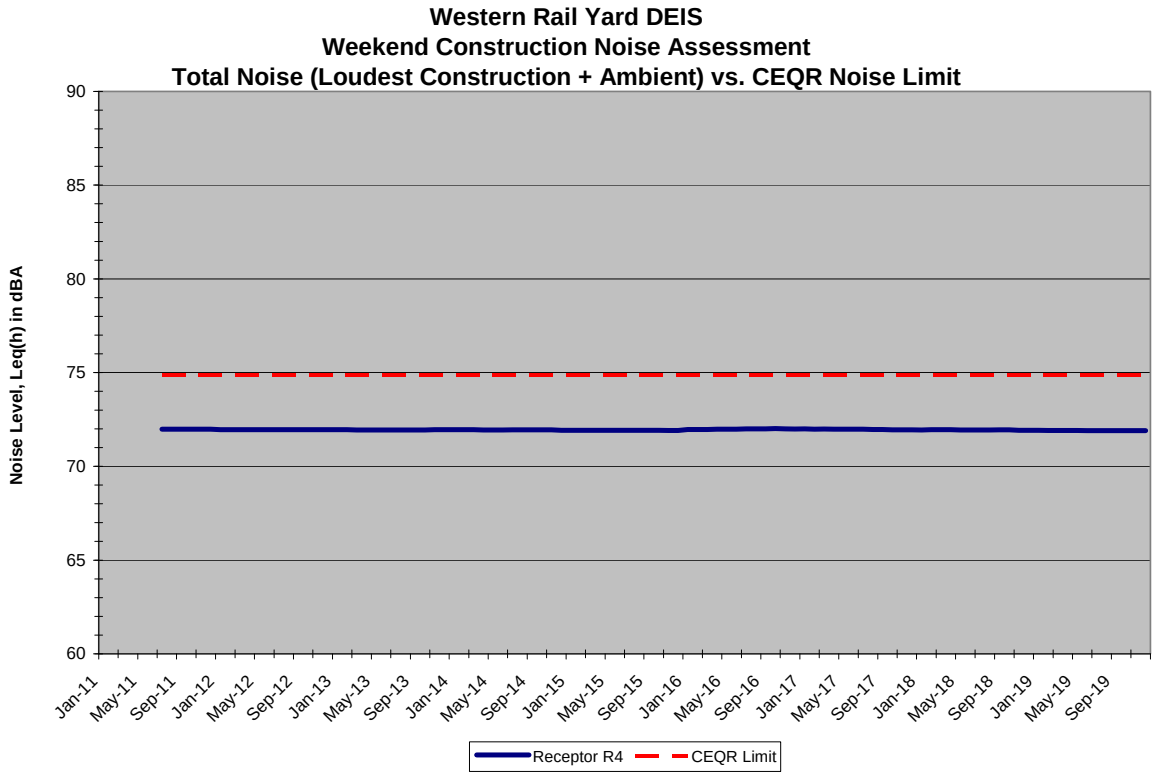
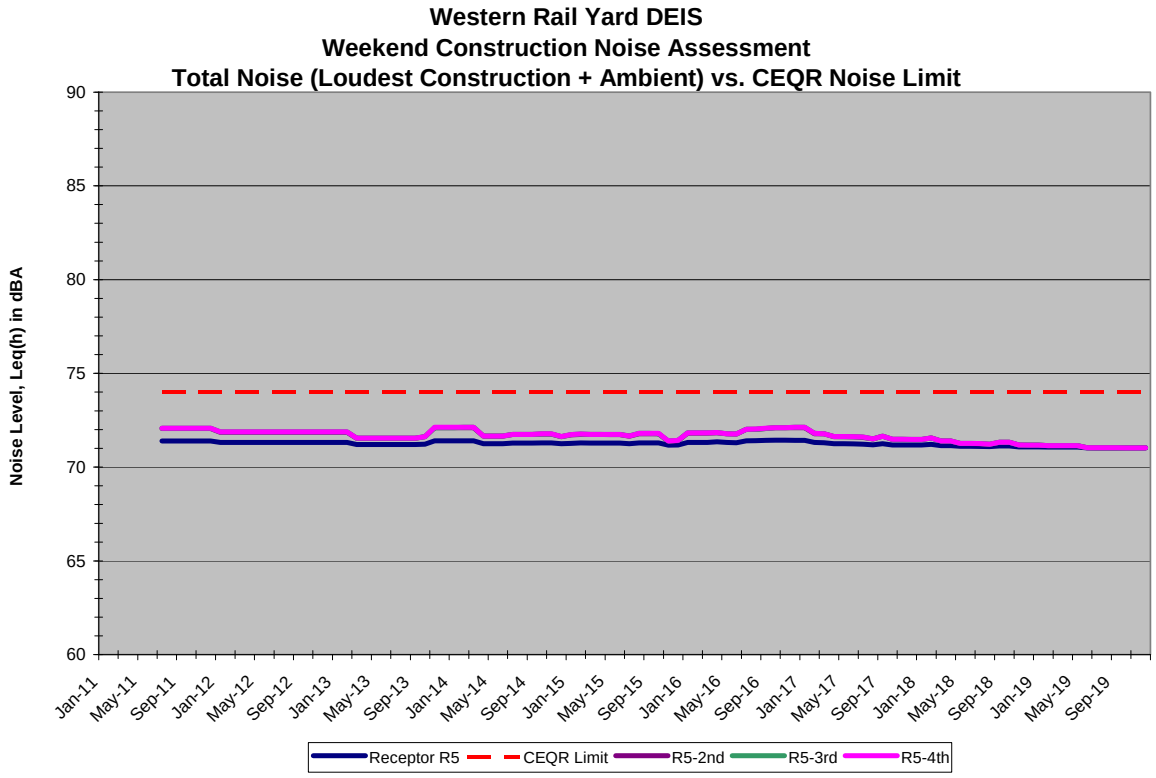


Figure 34 - Weekend–Receptor R4



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 35 - Weekend–Receptor R5



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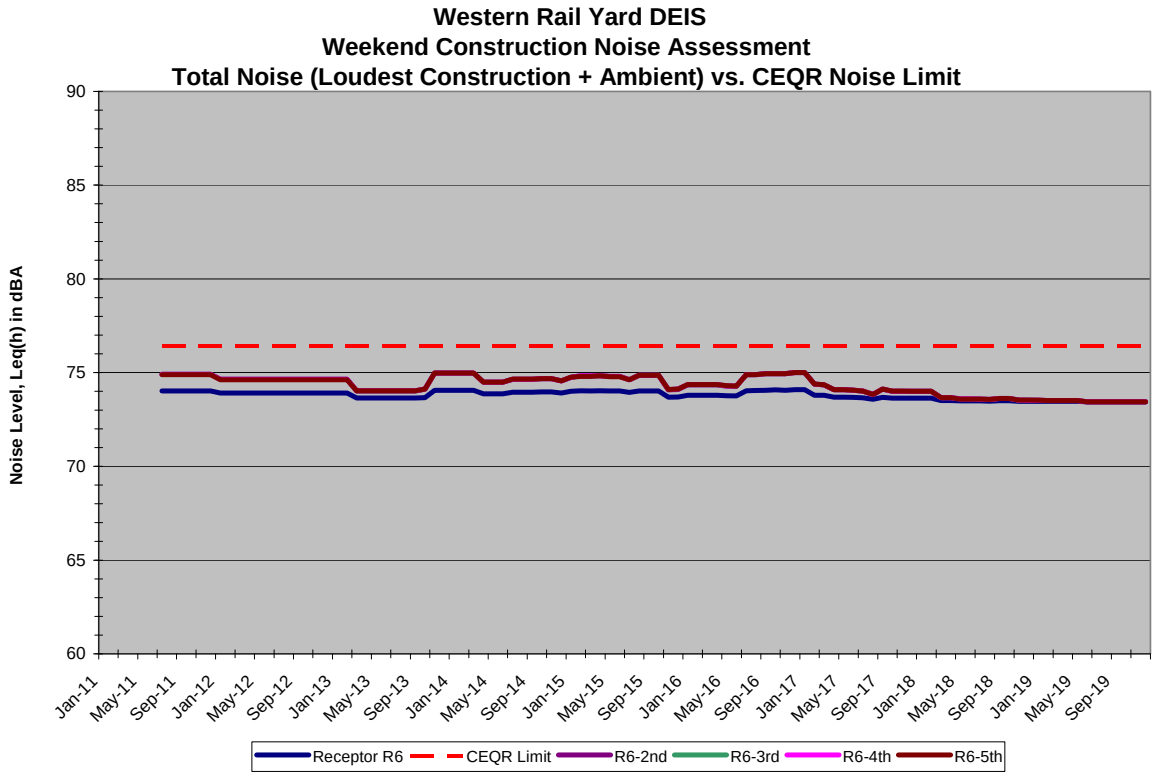


* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 37 - Weekend–Receptor R7

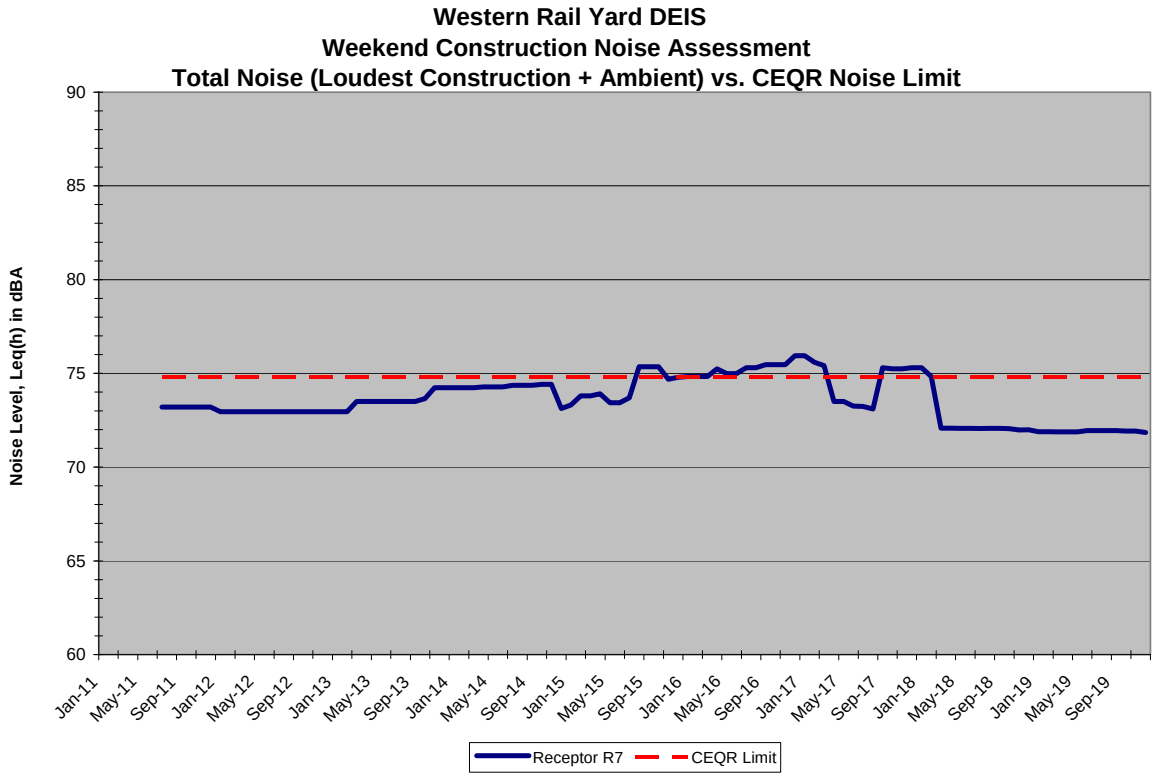
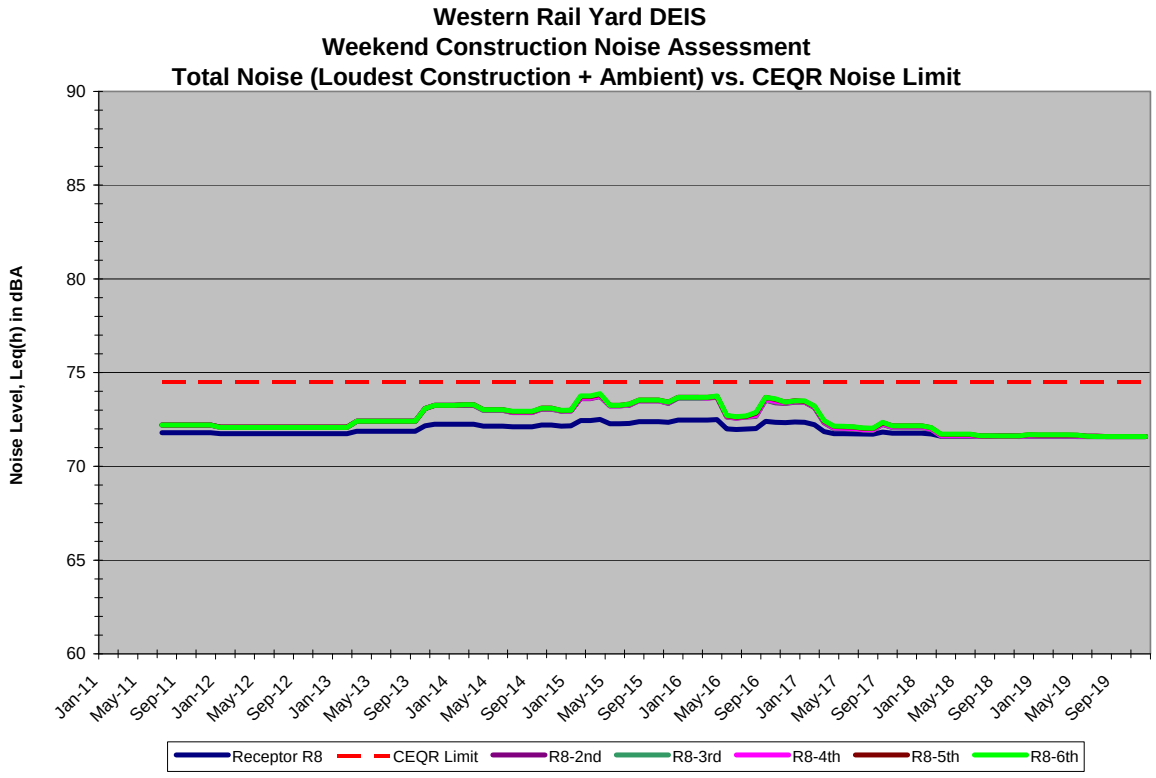


Figure 38 - Weekend–Receptor R8



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 39 - Weekend–Receptor R9

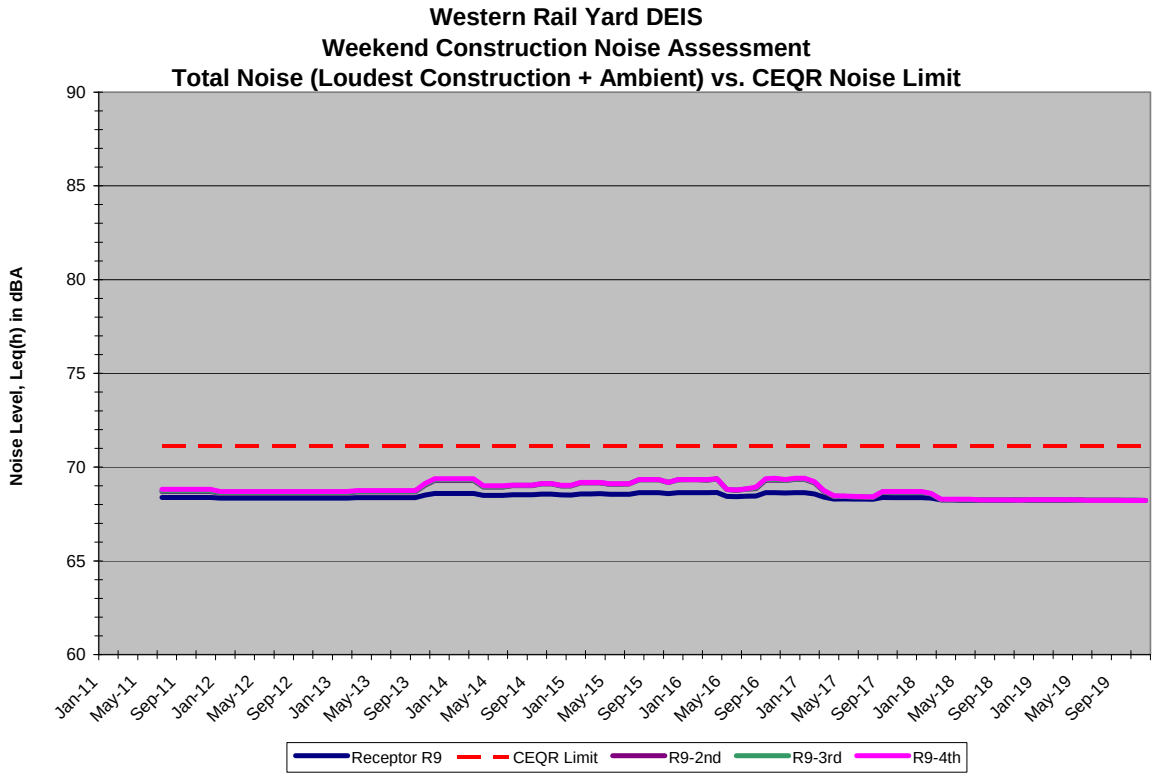
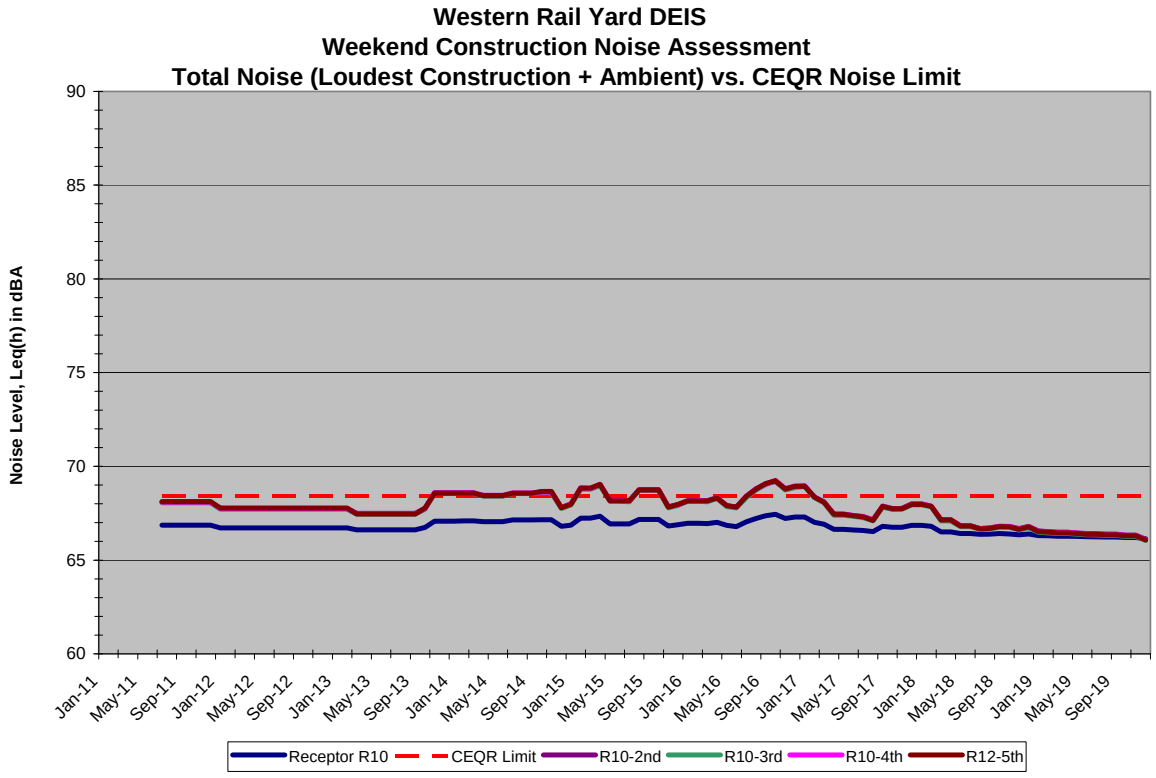
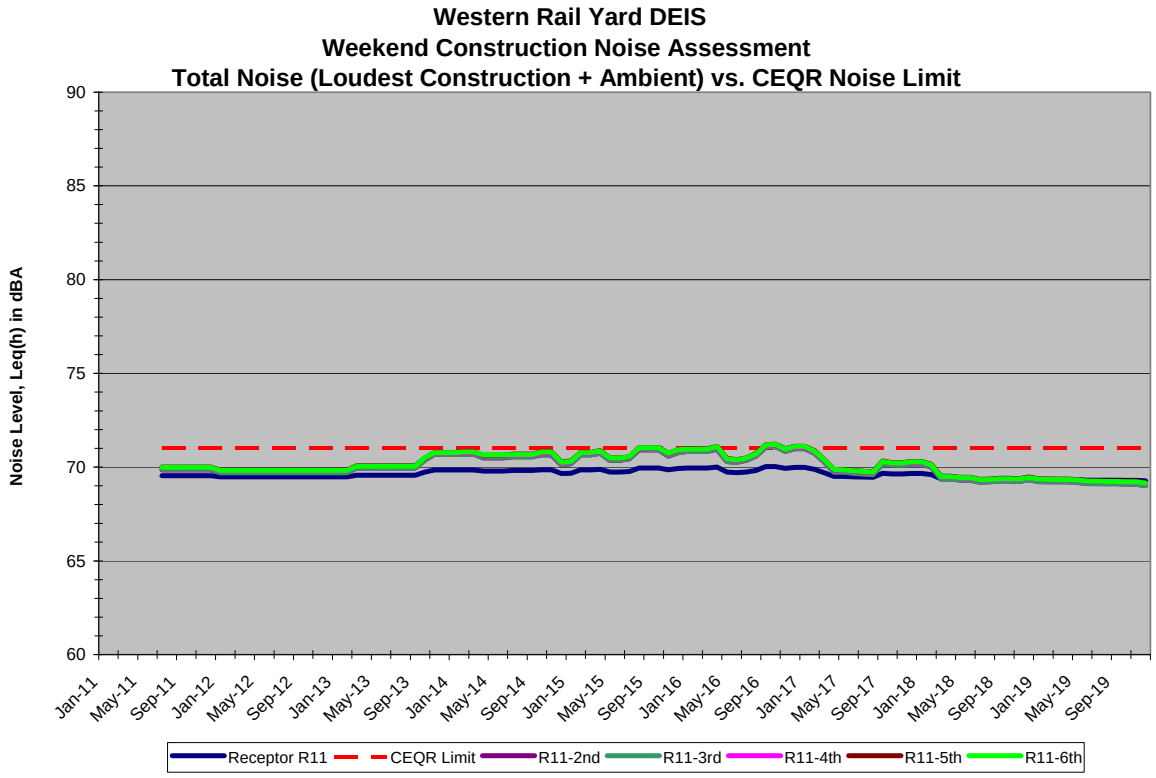


Figure 40 -Weekend–Receptor R10



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 41 -Weekend–Receptor R11



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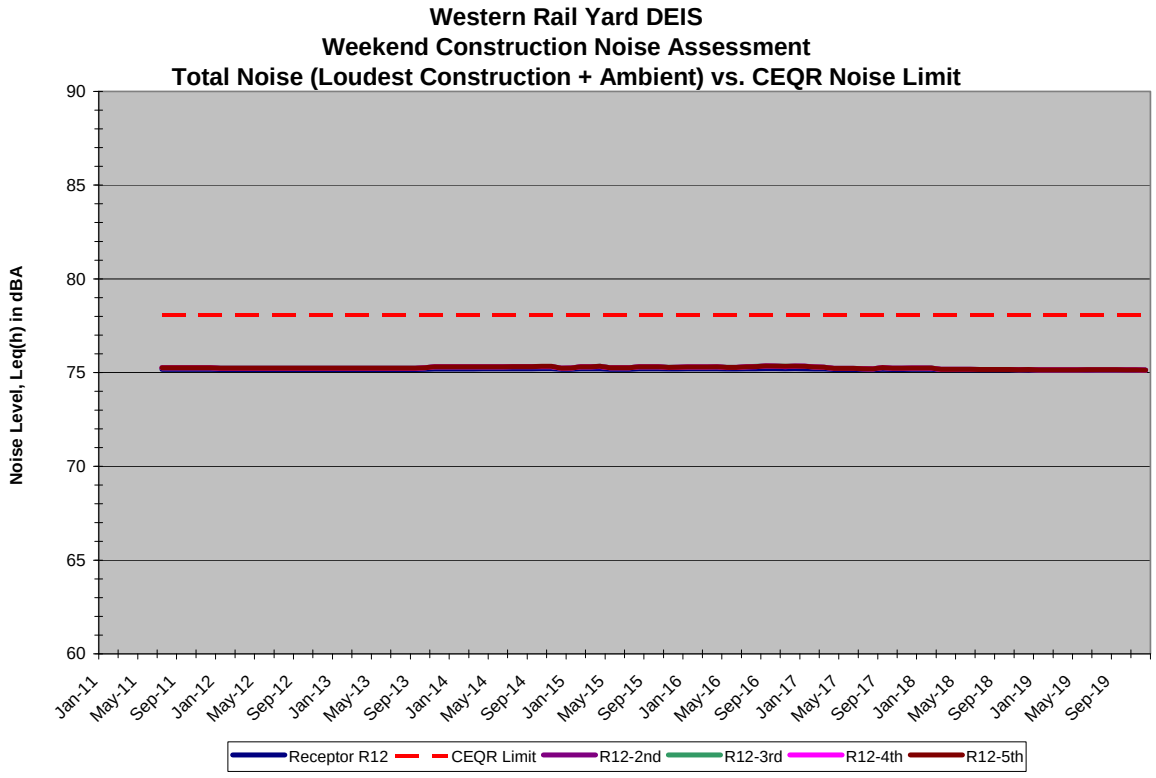


* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 43 - Weekend–Receptor R13

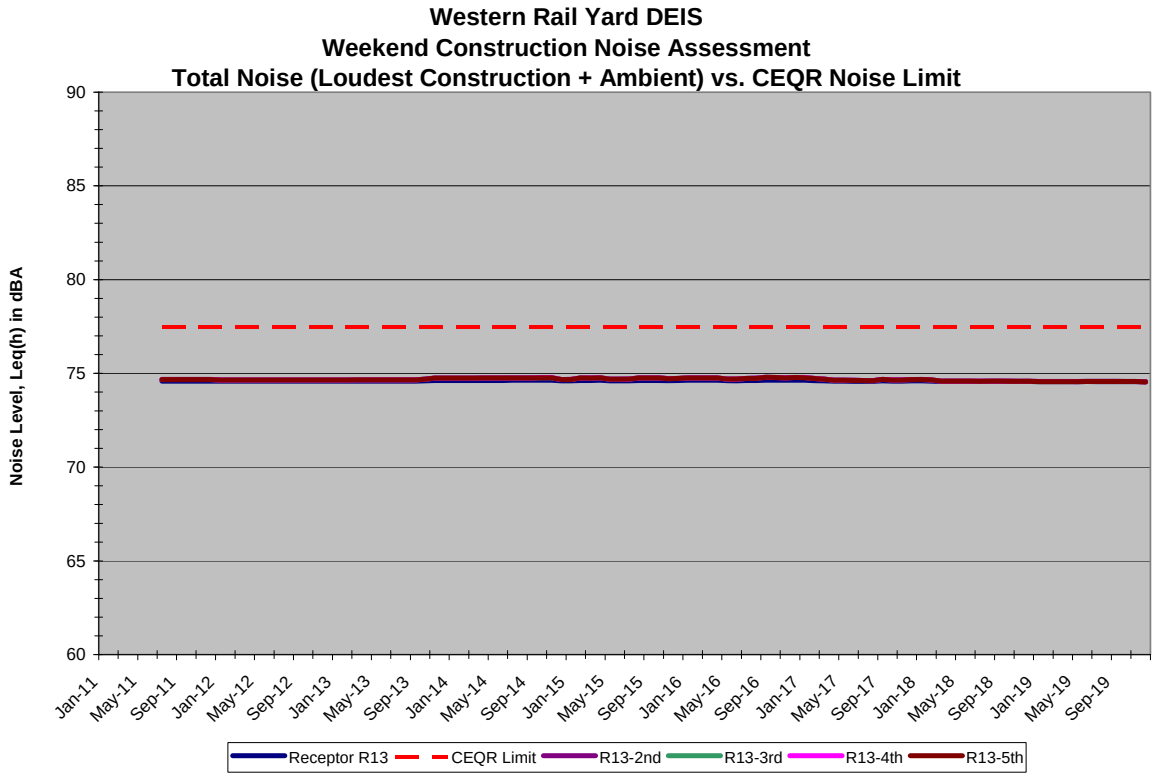
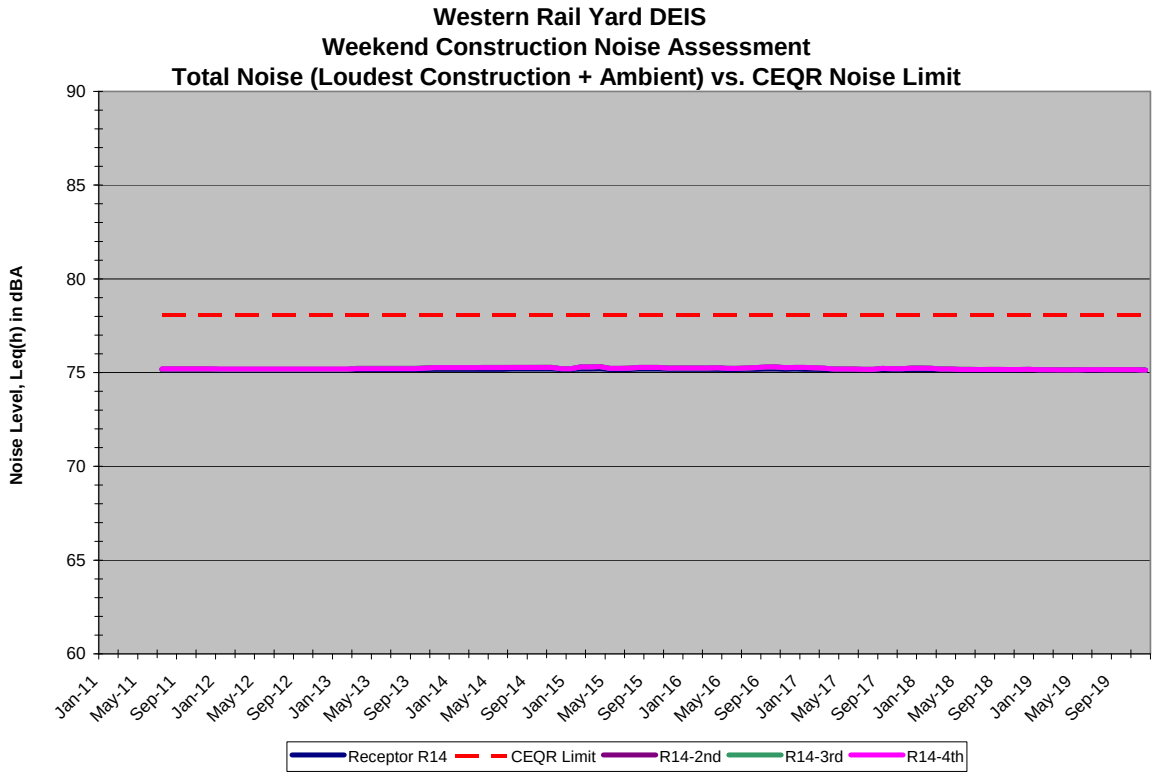
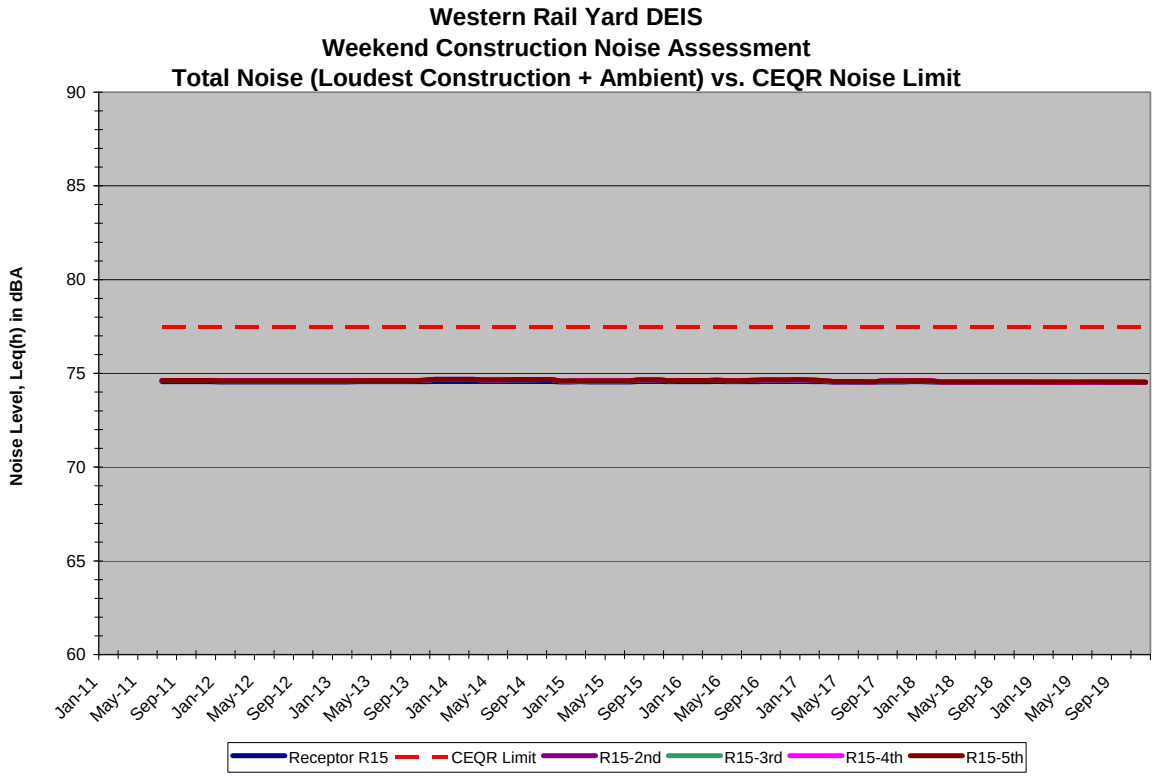


Figure 44 - Weekend–Receptor R14



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Figure 45 - Weekend–Receptor R15



* Does not include the effects of noise fencing per NYC Noise Code Regulations

Table H3-1
Construction Equipment Noise Emission Levels (dBA)

Equipment List	DEP & FTA Typical Noise Level at 50 feet[1]
Asphalt Paver	85
Asphalt Roller	85
Backhoe/Loader	80
Compressors	80
Concrete Pump	82
Concrete Trucks	85
Cranes	85
Cranes (Tower Cranes)	85
Delivery Trucks	84
Drill Rigs	84
Dump Trucks	84
Excavator	85
Excavator with Ram Hoe	90
Fuel Truck	84
Generators	82
Hoist	85
Impact Wrenches	85
Jack Hammer	85
Mortar Mixer	80
Power Trowel	85
Powder Actuated Device	85
Pump (Spray On Fire Proof)	82
Pump (Water)	77
Rebar Bender	80
Rivet Buster	85
Rock Drill	85
Saw (Chain Saw)	85
Saw (Concrete Saw)	90
Saw (Masonry Bench)	85
Saw (Circular & Cut off)	76
Saw (Table Saw)	76
Sledge Hammers	85
Street Cleaner	80
Tractor Trailer	84
Vibratory Plate Compactor	80
Welding Machines	73

Notes:
1 Sources: Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007. Transit Noise and Vibration Impact Assessment, FTA, May 2006