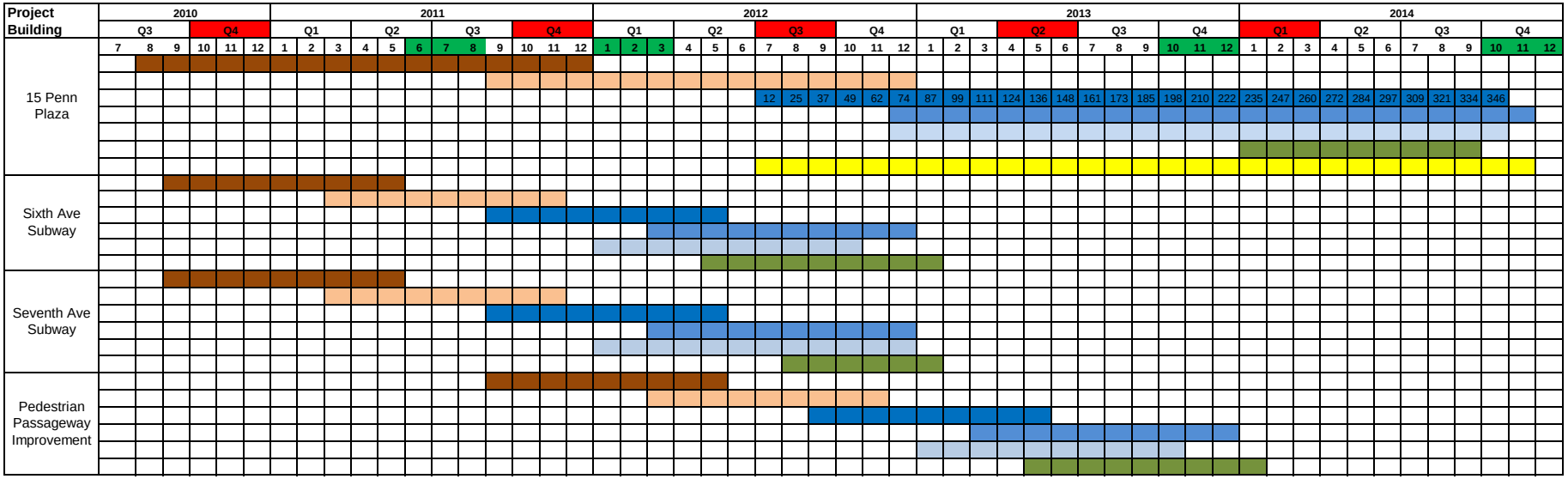
APPENDIX G
Construction Noise

APPENDIX G.1
Construction Schedule

15 Penn Plaza

Most noisy quarter (CadnaA)
Less noisy Quarter (CadnaA)



Demolition
Foundation
Structural
Interior Construction
Interior Finishing
Sitework
General requirement

15 Penn Plaza Building	
Story #	**67**
Height (f)	**1134**
Height (m)	**346**

APPENDIX G.2
Equipment Information

Construction Equipment Noise Emission Data (dBA)

Equipment	Equipment Type	Size (hp)	Lmax (dBA) at 50 feet					
			Mandated Noise Level			Project (quieter) Equipment	Path Control (NYCDEP)*	Final Lmax
			FTA	DEP	NYC Noise Code			
Asphalt Laying Equipment	diesel	80		85				85
Bar Bender	electric	15amps		80				80
Bobcat w/ Bucket	diesel	75		80				80
Bobcat w/ Ram	diesel	75		90			80	80
Cement Mixer	electric	5		75		63		63
Compressor (air)	diesel	30		80	56			56
Concrete Pump				82				82
Concrete Truck				85		79		79
Concrete Vibrator	electric	3		80		75		75
Crane	diesel	300		85		82		82
Crane (tower Crane)	diesel	300		85			75	75
Delivery Truck				84		79		79
Dump Truck				84		79		79
Dual Hoist - High Rise	electric	200		85		75		75
Excavator	diesel	200		85		77		77
Forklift	prop	25		55				55
Fuel Truck				84		79		79
Generator	gas	25		82		78		78
Impact Wrench	air	NA	85				75	75
Jackhammer	air	NA		85	71			71
Miscellaneous Small Tools	electric	0.5		85		59		59
Paver Cutter	electric	0.5		85			75	75
Roller	diesel	80	74					74
Saw	electric	0.5	76					76
Scissor Lift	electric	15		75				75
Sprayer	electric	25		75				75
Tamper	diesel	4		80				80
Trailer/Tractor				84		79		79
Trash hauling				85	77			77
Troweling machine	gas	11		85			75	75
Welder / Torch	electric	NA		73				73

NYSDEC
USDOT
FHWA
Electric
Typical Equipment

* Portable barriers, enclosures, curtains, tents, etc.,10 dBA is an average noise reduction value for breaking a line-of-sigh between receivers a

NYCDEP

Assuming

Equipment Description	Spec (dBA) at 50 feet	Use Factor (%)	Spec (dBA, slow)	Use Factor (%)
All Other Equipment < 5 HP or Electric	No	50	75	0.5
All Other Equipment > 5 HP	No	50	85	0.5
Auger Drill Rig	No	20	85	0.2
Backhoe	No	40	80	0.4
Bar Bender	No	20	80	0.2
Blasting	Yes	N/A	94	#VALUE!
Boring Jack Power Unit	No	50	80	0.5
Chain Saw	No	20	85	0.2
Clam Shovel (dropping)	Yes	20	93	0.2
Compactor (ground)	No	20	80	0.2
Compressor (air)	No	40	80	0.4
Concrete Batch Plant	No	15	83	0.15
Concrete Mixer Truck	No	40	85	0.4
Concrete Pump Truck	No	20	82	0.2
Concrete Saw	No	20	90	0.2
Crane	No	16	85	0.16
Dozer	No	40	85	0.4
Drill Rig Truck	No	20	84	0.2
Drum Mixer	No	50	80	0.5
Dump Truck	No	40	84	0.4
Excavator	No	40	85	0.4
Flat Bed Truck	No	40	84	0.4
Front End Loader	No	40	80	0.4
Generator	No	50	82	0.5
Generator (<25KVA, VMS signs)	No	50	70	0.5
Gradall	No	40	85	0.4
Grader	No	40	85	0.4
Grapple (on backhoe)	No	40	85	0.4
Horizontal Boring Hydr. Jack	No	25	80	0.25
Hydra Break Ram	Yes	10	90	0.1
Impact Pile Driver	Yes	20	95	0.2
Jackhammer	Yes	20	85	0.2
Man Lift	No	20	85	0.2
Mounted Impact Hammer (hoe ram)	Yes	20	90	0.2
Pavement Scarafier	No	20		0.2
Paver	No	50	85	0.5
Pickup Truck	No	40	55	0.4
Pneumatic Tools	No	50	85	0.5
Pumps	No	50	77	0.5
Refrigerator Unit	No	100	82	1
Rivet Buster/chipping gun	Yes	20	85	0.2
Rock Drill	No	20	85	0.2
Roller	No	20	85	0.2
Sand Blasting	No	20	85	0.2
Scraper	No	40	85	0.4
Shears (on backhoe)	No	40	85	0.4
Slurry Plant	No	100	78	1
Slurry Trenching Machine	No	50	82	0.5
Soil Mix Drill Rig	No	50	80	0.5
Tractor	No	40	84	0.4
Vacuum Excavator (Vac-truck)	No	40	85	0.4
Vacuum Street Sweeper	No	10	80	0.1
Ventilation Fan	No	100	85	1
Vibrating Hopper	No	50	85	0.5
Vibratory Concrete Mixer	No	20	80	0.2
Vibratory Pile Driver	No	20	95	0.2
Warning Horn	No	5	85	0.05
Water Jet deleading	No	20	85	0.2
Welder / Torch	No	40	73	0.4

New York City Noise Control Code

Equipment Description	Spec (dBA) at 50 feet	Subchapter 5
Refuse collection vehicle	77	80 dBA at 35 feet (24-225 (a))
Compressor (air)	56	80 dBA at 1 meter (24-226 (b))
Concrete Saw	85	85 dBA at 50 feet (24-228 (a)(1))
Paving breaker/Jackhammer	71	95 dBA at 1 meter (24-230 (b))
Vibratory Pile Driver	85	85 dBA at 50 feet (24-228 (a)(1))

New York State Department of Environmental Conservation
February, 2001

Assessing and Mitigating Noise Impact - Table D
Common Equipment Sound Levels at 50 feet

Equipment Description	Decibel Level
Auger earth drill	80
Backhoe	83
Bulldozer	80
Cement Mixer	63
Chain Saw	75
Compressor	67
Garbage Truck	71
Generator	78
Grader	85
Jackhammer	82
Paving Breaker	82
Truck	91
Rock Drill	98
Wood Chipper	89

Final Report for USDOT
Noise Abatement Techniques for Construction Equipment
William J. Toth, 1979

Spec (dBA) at 50 feet

Table 3. Summary of Field Survey Data					
	Number Tested		Noise Level (dB(A))		
EQUIPMENT TYPE	Muffled	Unmuffled	Loudest	Quietest	Average
Compactors	3	-	83	80	81.7
Front End Loaders	16	3	99	78	86.5
Backhoes, Excavators	4	1	95.5	77	83.5
Tractors	3	5	96	81	87.9
Scrapers	5	2	93	81	88.7
Graders	6	1	88	78	83.0
Pavers	-	1	-	-	80.0
Trucks	5	2 unmuffled	96	79	88.7
Concrete Pumps (Located on only 1 site, not in operation)	-	11 heated box	-	-	-
Cranes (moveable and derrick)	4	-	90	85	86.0
Pumps	1	-	-	-	80.0
Generators	2	1	99	81	84.0
Compressors	7	1	99	78	90.25

Special Report: Highway Construction Noise: Measurement, Prediction, and Mitigation

Appendix A Construction Equipment Noise Levels and Ranges

Construction Equipment Noise Levels* *Based on Limited Data Samples Cranes				
Manufacturer	**Type or Model**	**Exhaust**	**Peak Noise Level (dBA)**	**Remarks**
Northwestern	80D		77	Within 15m 1958 mod
Northwestern	8		84	Within 15m 1940 mod
Northwestern	6		72	Within 15m 1965 mod
American	7260		82	Within 15m 1967 mod
American	599		76	Within 15m 1969 mod
American	5299		70	Within 15m 1972 mod
American	4210		82	Within 15m 1968 mod
Buc Ere	45C		79	Within 15m 1972 mod
Buc Ere	308		74	Within 15m 1968 mod
Buc Ere	30B		73	Within 15m 1965 mod
Buc Ere	30B		70	Within 15m 1959 mod
Link Belt	LS98		76	Within 15m 1956 mod
Manitowoc	4000		94	Within 15m 1956 mod
Grove	RF59		82	Within 15m 1973 mod
Koehr	605		76	Within 15m 1967 mod
Koehr	435		86	Within 15m 1969 mod
Koehr	405		84	Within 15m 1969 mod
*Except where noted, all data provided by ARBA				

Federal Transit Administration

Table 21-1, Transit Noise and Vibration Impact Assessment
May-06

CONSTRUCTION EQUIPMENT NOISE EMISSION LEVELS	
Equipment	**Typical Noise Level (dBA)**
	Spec (dBA) at 50 feet
	(FTA Manual based on EPA)
Air compressor	81
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer, Drills	88
Loader	85
Paver	89
Pile Driver (Impact)	101
Pile Driver (Sonic)	96
Pneumatic Tool	85
Pump	76
Rail Saw	90
Rock Drill	98
Roller	74
Saw	76
Scarifier	83
Scraper	89
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	88

Typical Equipment

Equipment Description	Engine Type	Spec (dBA, slow)		dBA at 50 feet	Resource/Model
		dBA	feet		
Power Tools	Spec (dBA) at 50 feet	83	3	59	Noise from Construction....December 31, 1971. Bolt, Beranek and Newman. p104
Welder-Light Tower	diesel			69	MLT-SDW7
Generator	diesel	67	23	60	MMD PowerPro 100
Generator	diesel			60	Olympian D20P1
Lift	electric	70	23	63	JLG models
Pile Driving Rig		69	23	62	Giken America Corp., 69 dBA at 7 m (23 feet)

APPENDIX G.3
Measured Existing Noise Levels

Measured Existing Noise Levels

Assuming Background noise level

Site	Location	Time	$L_{eq(1)}$	$L_{1(1)}$	$L_{10(1)}$	$L_{50(1)}$	$L_{90(1)}$	$L_{min(1)}$	$L_{max(1)}$	Everage Leq	Everage Lmin	Measured date
1	7th Avenue between West 32nd and West 33rd Streets	AM	71.5	78.8	74.2	69.8	67.0	64.0	88.0	71.4	64.3	5/17/2007
		Midday	71.8	79.2	74.6	70.2	67.0	63.8	92.4			5/17/2007
		Pre-PM	71.0	78.4	72.9	69.8	67.4	65.1	84.4			3/11/2010
2	West 32nd Street between 6th and 7th Avenues	AM	72.9	79.9	75.8	71.6	65.6	63.7	83.8	71.7	65.2	1/10/2008
		Midday	71.6	78.9	73.4	70.4	69.0	67.9	84.7			1/10/2008
		Pre-PM	70.5	79.7	72.5	68.0	66.2	63.9	86.2			3/4/2010
3	West 33rd Street between 6th and 7th Avenues	AM	70.8	77.1	72.9	69.9	66.1	62.6	85.8	71.2	63.6	1/10/2008
		Midday	71.1	80.8	73.5	68.8	65.5	63.6	83.8			1/10/2008
		Pre-PM	71.7	78.5	75.4	69.6	67.6	64.7	82.0			3/11/2010
4	West 31st Street between 6th and 7th Avenues	AM	69.9	79.5	72.1	67.4	64.5	61.4	85.0	68.5	61.5	3/4/2010
		Midday	67.4	75.5	69.8	65.6	63.2	60.8	79.7			3/4/2010
		Pre-PM	68.3	77.1	72.3	65.1	63.3	62.3	83.1			3/4/2010
5	West 30th Street between 6th and 7th Avenues	AM	69.9	78.1	72.6	66.6	64.1	61.2	92.1	68.5	60.3	4/3/2008
		Midday	67.8	78.1	70.6	64.1	61.6	59.1	83.0			4/2/2008
		Pre-PM	67.7	77.0	69.7	65.3	62.8	60.7	82.9			3/4/2010
6	West 34th Street between 7th and 8th Avenues	AM	75.2	84.5	78.5	72.0	68.8	63.6	88.0	73.8	65.0	5/17/2007
		Midday	73.5	80.1	75.8	71.5	68.7	65.7	92.7			5/17/2007
		Pre-PM	72.8	80.8	75.2	71.3	68.3	65.6	85.4			3/11/2010
7	West 35th Street between Broadway and 7th Avenue	AM	70.0	78.0	72.6	68.0	65.4	63.6	82.8	71.0	64.6	3/4/2010
		Midday	71.5	79.0	75.3	68.9	66.1	64.1	84.6			3/4/2010
		Pre-PM	71.4	79.7	73.0	69.3	67.3	66.0	89.0			3/11/2010
8	West 31st Street between 7th and 8th Avenues	AM	68.2	78.0	70.8	65.3	62.0	59.5	83.6	67.8	60.2	3/4/2010
		Midday	67.6	77.4	70.0	65.0	62.2	60.1	82.4			3/4/2010
		Pre-PM	67.6	76.0	69.7	65.2	63.0	61.1	86.3			3/4/2010
9	Pedestrian Area on West 34th Street between Broadway and 6th Avenue	AM	75.5	81.9	77.9	74.5	71.4	66.5	85.7	73.2	66.2	1/10/2008
		Midday	72.7	78.5	75.2	71.8	68.5	66.2	85.7			1/10/2008
		Pre-PM	71.5	78.3	74.0	70.0	67.7	65.9	82.5			3/23/2010
10	Pedestrian Area on West 33rd Street between Broadway and 6th Avenue	AM	73.6	79.5	75.7	72.4	69.3	66.1	90.1	73.0	64.9	1/9/2008
		Midday	72.9	82.3	75.9	69.4	65.1	62.9	87.8			1/9/2008
		Pre-PM	72.5	78.8	75.3	71.1	67.9	65.6	84.1			4/20/2010
11	6th Avenue between West 33rd and West 34th Streets	AM	74.2	81.6	77.1	72.6	68.6	64.7	90.4	73.2	64.5	4/9/2008
		Midday	72.9	81.1	75.6	70.9	67.9	64.6	86.2			3/23/2010
		Pre-PM	72.4	79.0	75.5	71.1	67.8	64.1	85.2			3/23/2010
12	6th Avenue between West 31st and West 32nd Streets	AM	75.8	83.6	78.1	72.6	67.6	64.5	97.6	74.5	64.2	4/9/2008
		Midday	73.8	82.7	76.6	71.7	67.5	64.7	86.1			3/23/2010
		Pre-PM	74.0	83.8	76.8	71.7	66.5	63.4	88.0			4/20/2010

APPENDIX G.4
Predicted Existing Noise Levels

15 Penn Plaza Construction

at-grade level

* The background noise level was obtained based on the average Lmin value at Site 8.

Noise Receptor Sites	Elevation (floor)	Governed Receptor			Predicted Existing Leq					
		Noise Monitoring Site	Measured Average Leq	TNM	TNM	Calibrate Factor	Adjust dBA at-grade Level	Background dBA at-grade Level*	Adjust Factor on floors	Actual Ave. Leq
1	at-grade	1	71.4	74.5	74.5	0.0	71.4	60.2	0	71.4
2	at-grade	2	71.7	65.3	65.3	0.0	71.7	60.2	0	71.7
3	at-grade	3	71.2	64.4	64.4	0.0	71.2	60.2	0	71.2
4	at-grade	4	68.5	65.5	65.5	0.0	68.5	60.2	0	68.5
5	at-grade	5	68.5	71.0	71.0	0.0	68.5	60.2	0	68.5
6	at-grade	6	73.8	72.9	72.9	0.0	73.8	60.2	0	73.8
7	at-grade	7	71.0	70.5	70.5	0.0	71.0	60.2	0	71.0
8	at-grade	8	67.8	69.9	69.9	0.0	67.8	60.2	0	67.8
9	at-grade	9	73.2	76.3	76.3	0.0	73.2	60.2	0	73.2
10	at-grade	10	73.0	75.5	75.5	0.0	73.0	60.2	0	73.0
11	at-grade	11	73.2	72.6	72.6	0.0	73.2	60.2	0	73.2
12	at-grade	12	74.5	74.2	74.2	0.0	74.5	60.2	0	74.5
A1	at-grade	2	71.7	65.3	62.2	3.1	68.6	60.2	0	68.6
A2	at-grade	2	71.7	65.3	47.9	17.4	54.3	60.2	0	60.2
A2	TOP	2					54.3	60.2	1.6	61.8
B	at-grade	2	71.7	65.3	62.2	3.1	68.6	60.2	0	68.6
B	3	2					68.6	60.2	-1.2	67.4
B	5	2					68.6	60.2	-3	65.6
B	10	2					68.6	60.2	-5.1	63.5
B	15	2					68.6	60.2	-18.3	50.3
B	20	2					68.6	60.2	-16	52.6
B	25	2					68.6	60.2	-14.8	53.8
B	30	2					68.6	60.2	-15.6	53.0
B	35	2					68.6	60.2	-15	53.6
B	40	2					68.6	60.2	-15.3	53.3
B	45	2					68.6	60.2	-15.7	52.9
B	50	2					68.6	60.2	-15.8	52.8
B	55	2					68.6	60.2	-15.3	53.3
B	TOP	2					68.6	60.2	-14	54.6
C	at-grade	12	74.5	74.2	70.1	4.1	70.4	60.2	0	70.4
C	3	12					70.4	60.2	-0.2	70.2
C	5	12					70.4	60.2	-1.4	69.0
C	10	12					70.4	60.2	-3.8	66.6
C	15	12					70.4	60.2	-6.7	63.7
C	20	12					70.4	60.2	-8.2	62.2
C	25	12					70.4	60.2	-10.4	60.0
C	30	12					70.4	60.2	-11.9	58.5
C	35	12					70.4	60.2	-12.6	57.8
C	40	12					70.4	60.2	-13	57.4
C	TOP	12					70.4	60.2	-13.3	57.1
D	at-grade	8	67.8	69.9	67.9	2.0	65.8	60.2	0	65.8
D	TOP	8					65.8	60.2	-0.1	65.7
E	at-grade	4	68.5	65.5	66.1	-0.6	69.1	60.2	0	69.1
E	3	4					69.1	60.2	-0.4	68.7
E	5	4					69.1	60.2	-1.6	67.5
E	10	4					69.1	60.2	-5	64.1
E	15	4					69.1	60.2	-6.7	62.4
E	20	4					69.1	60.2	-8.1	61.0
E	25	4					69.1	60.2	-10.3	58.8
E	30	4					69.1	60.2	-11.3	57.8
E	TOP	4					69.1	60.2	-13.1	56.0

15 Penn Plaza Construction

at-grade level

* The background noise level was obtained based on the average Lmin value at Site 8.

Noise Receptor Sites	Elevation (floor)	Governed Receptor			Predicted Existing Leq					
		Noise Monitoring Site	Measured Average Leq	TNM	TNM	Calibrate Factor	Adjust dBA at-grade Level	Background dBA at-grade Level*	Adjust Factor on floors	Actual Ave. Leq
F	at-grade	12	74.5	74.2	71.7	2.5	72.0	60.2	0	72.0
F	3	12					72.0	60.2	-0.8	71.2
F	5	12					72.0	60.2	-2.3	69.7
F	10	12					72.0	60.2	-5.2	66.8
F	15	12					72.0	60.2	-8.3	63.7
F	20	12					72.0	60.2	-11	61.0
F	25	12					72.0	60.2	-12.3	59.7
F	30	12					72.0	60.2	-14.2	57.8
F	TOP	12					72.0	60.2	-15.1	56.9
G	at-grade	11	73.2	72.6	72.7	-0.1	73.3	60.2	0	73.3
G	3	11					73.3	60.2	-1.9	71.4
G	5	11					73.3	60.2	-3.3	70.0
G	10	11					73.3	60.2	-5.6	67.7
G	15	11					73.3	60.2	-7.9	65.4
G	TOP	11					73.3	60.2	-9.2	64.1
H	at-grade	11	73.2	72.6	72.2	0.4	72.8	60.2	0	72.8
H	3	11					72.8	60.2	0.4	73.2
H	5	11					72.8	60.2	-0.4	72.4
H	10	11					72.8	60.2	-2.5	70.3
H	15	11					72.8	60.2	-5	67.8
H	20	11					72.8	60.2	-6.4	66.4
H	25	11					72.8	60.2	-8.2	64.6
H	TOP	11					72.8	60.2	-9.2	63.6
I	at-grade	3	71.2	64.4	64.9	-0.5	71.7	60.2	0	71.7
I	3	3					71.7	60.2	-1	70.7
I	5	3					71.7	60.2	-2.5	69.2
I	10	3					71.7	60.2	-5.1	66.6
I	15	3					71.7	60.2	-6.8	64.9
I	20	3					71.7	60.2	-8.2	63.5
I	25	3					71.7	60.2	-9.2	62.5
I	30	3					71.7	60.2	-10.1	61.6
I	TOP	3					71.7	60.2	-10.7	61.0
J	at-grade	4	68.5	65.5	67.1	-1.6	70.1	60.2	0	70.1
J	3	4					70.1	60.2	-1.2	68.9
J	TOP	4					70.1	60.2	-2.8	67.3
K	at-grade	11	73.2	72.6	70.6	2.0	71.2	60.2	0	71.2
K	3	11					71.2	60.2	-1.3	69.9
K	5	11					71.2	60.2	-2.7	68.5
K	10	11					71.2	60.2	-5.1	66.1
K	TOP	11					71.2	60.2	-7.5	63.7
L	at-grade	12	74.5	74.2	70.7	3.5	71.0	60.2	0	71.0
L	3	12					71.0	60.2	-0.5	70.5
L	5	12					71.0	60.2	-2.4	68.6
L	10	12					71.0	60.2	-5	66.0
L	15	12					71.0	60.2	-7.8	63.2
L	20	12					71.0	60.2	-10.3	60.7
L	25	12					71.0	60.2	-11.6	59.4
L	30	12					71.0	60.2	-13.5	57.5
L	35	12					71.0	60.2	-14.2	56.8
L	40	12					71.0	60.2	-14.9	56.1
L	45	12					71.0	60.2	-15.5	55.5
L	TOP	12					71.0	60.2	-16	55.0

15 Penn Plaza Construction

at-grade level

* The background noise level was obtained based on the average Lmin value at Site 8.

Noise Receptor Sites	Elevation (floor)	Governed Receptor			Predicted Existing Leq					
		Noise Monitoring Site	Measured Average Leq	TNM	TNM	Calibrate Factor	Adjust dBA at-grade Level	Background dBA at-grade Level*	Adjust Factor on floors	Actual Ave. Leq
M	at-grade	5	68.5	71.0	69.2	1.8	66.7	60.2	0	66.7
M	3	5					66.7	60.2	-1	65.7
M	TOP	5					66.7	60.2	-2.5	64.2
N	at-grade	5	68.5	71.0	64.5	6.5	62.0	60.2	0	62.0
N	3	5					62.0	60.2	-1	61.0
N	5	5					62.0	60.2	-2.5	59.5
N	10	5					62.0	60.2	-6.2	55.8
N	TOP	5					62.0	60.2	-8	54.0
O	at-grade	5	68.5	71.0	63.6	7.4	61.1	60.2	0	61.1
O	3	5					61.1	60.2	-1	60.1
O	5	5					61.1	60.2	-2.5	58.6
O	10	5					61.1	60.2	-5.2	55.9
O	TOP	5					61.1	60.2	-7.1	54.0
P	at-grade	12	74.5	74.2	70.1	4.1	70.4	60.2	0	70.4
P	3	12					70.4	60.2	-0.9	69.5
P	TOP	12					70.4	60.2	-2.4	68.0
Q	at-grade	7	71.0	70.5	63.5	7.0	64.0	60.2	0	64.0
Q	3	7					64.0	60.2	-0.3	63.7
Q	5	7					64.0	60.2	-1.8	62.2
Q	10	7					64.0	60.2	-5.5	58.5
Q	TOP	7					64.0	60.2	-8.5	55.5
R	at-grade	1	71.4	74.5	72.6	1.9	69.5	60.2	0	69.5
R	3	1					69.5	60.2	-0.6	68.9
R	5	1					69.5	60.2	-1.9	67.6
R	10	1					69.5	60.2	-4.4	65.1
R	TOP	1					69.5	60.2	-7	62.5
S	at-grade	11	73.2	72.6	72	0.6	72.6	60.2	0	72.6
S	3	11					72.6	60.2	-0.6	72.0
S	5	11					72.6	60.2	-2	70.6
S	10	11					72.6	60.2	-5.5	67.1
S	15	11					72.6	60.2	-7.5	65.1
S	20	11					72.6	60.2	-9.1	63.5
S	TOP	11					72.6	60.2	-11.1	61.5
T	at-grade	4	68.5	65.5	64.9	0.6	67.9	60.2	0	67.9
T	3	4					67.9	60.2	-1.3	66.6
T	5	4					67.9	60.2	-2.9	65.0
T	10	4					67.9	60.2	-5.7	62.2
T	TOP	4					67.9	60.2	-7.6	60.3
U	at-grade	4	68.5	65.5	68	-2.5	71.0	60.2	0	71.0
U	3	4					71.0	60.2	0.1	71.1
U	5	4					71.0	60.2	-1	70.0
U	10	4					71.0	60.2	-3.2	67.8
U	TOP	4					71.0	60.2	-5	66.0
V	at-grade	4	68.5	65.5	63.8	1.7	66.8	60.2	0	66.8
V	3	4					66.8	60.2	-1.2	65.6
V	5	4					66.8	60.2	-2.8	64.0
V	10	4					66.8	60.2	-5.6	61.2
V	TOP	4					66.8	60.2	-7.5	59.3
W	at-grade	12	74.5	74.2	69.3	4.9	69.6	60.2	0	69.6
W	3	12					69.6	60.2	-0.8	68.8
W	5	12					69.6	60.2	-2.1	67.5
W	10	12					69.6	60.2	-4.6	65.0
W	TOP	12					69.6	60.2	-6	63.6
X	at-grade	12	74.5	74.2	74.2	0.0	74.5	60.2	0	74.5
X	3	12					74.5	60.2	-0.8	73.7
X	5	12					74.5	60.2	-2.3	72.2
X	Top	12					74.5	60.2	-5.7	68.8

APPENDIX G.5
Noise Analysis Results

Construction Noise Results

Exceed the CEQR noise criterion

CadnaA Receptor Sites	Elevation (floor)	Existing	2010 Q4		2011 Q3		2011 Q4		2012 Q1		2012 Q3		2013 Q2		2013 Q4		2014 Q1		2014 Q4	
		Leq(1)	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change
1	at-grade	71.4	72.1	0.7	72.6	1.2	73.3	1.9	73.6	2.2	74.0	2.6	72.6	1.1	72.9	1.5	74.3	2.9	72.8	1.4
2	at-grade	71.7	75.9	4.2	74.3	2.6	77.4	5.8	77.0	5.3	76.4	4.7	79.6	7.9	79.6	7.9	85.7	14.1	81.4	9.8
3	at-grade	71.2	75.8	4.6	74.8	3.6	86.7	15.5	85.5	14.3	84.3	13.1	86.4	15.2	86.3	15.1	88.8	17.6	83.4	12.2
4	at-grade	68.5	68.6	0.0	68.7	0.2	68.7	0.2	68.9	0.3	68.9	0.4	69.0	0.5	69.0	0.5	69.2	0.7	69.2	0.6
5	at-grade	68.5	68.5	0.1	68.7	0.2	68.7	0.3	68.9	0.4	68.9	0.4	69.1	0.6	69.1	0.6	69.3	0.8	69.2	0.8
6	at-grade	73.8	73.9	0.0	73.9	0.1	73.9	0.1	74.0	0.1	74.0	0.2	74.0	0.2	74.0	0.2	74.1	0.3	74.1	0.2
7	at-grade	71.0	71.0	0.0	71.3	0.3	71.3	0.3	71.6	0.7	71.6	0.7	72.0	1.0	72.0	1.0	72.3	1.3	72.3	1.3
8	at-grade	67.8	67.9	0.1	68.2	0.4	68.2	0.4	68.4	0.6	68.6	0.8	68.7	0.9	68.7	0.9	68.9	1.1	68.9	1.1
9	at-grade	73.2	73.2	0.0	73.4	0.2	73.4	0.2	73.5	0.3	73.6	0.4	73.6	0.4	73.6	0.4	73.7	0.5	73.7	0.5
10	at-grade	73.0	73.2	0.2	73.1	0.1	73.2	0.2	73.3	0.3	73.5	0.5	73.1	0.1	72.7	-0.3	72.7	-0.3	72.5	-0.5
11	at-grade	73.2	73.2	0.1	73.3	0.2	73.4	0.2	73.6	0.4	73.6	0.5	73.5	0.3	73.5	0.3	73.6	0.4	73.6	0.4
12	at-grade	74.5	74.6	0.1	74.8	0.3	74.8	0.3	75.0	0.5	75.1	0.6	75.1	0.6	75.1	0.6	75.3	0.7	75.3	0.7
A1	at-grade	68.6	68.8	0.3	69.4	0.8	69.9	1.3	70.0	1.4	71.1	2.6	70.2	1.6	70.1	1.6	70.8	2.2	70.4	1.8
A2	at-grade	60.2	60.6	0.4	61.3	1.1	62.1	1.8	61.4	1.2	64.7	4.5	61.9	1.7	61.9	1.7	62.7	2.4	62.1	1.9
A2	TOP	61.8	62.3	0.5	67.9	6.1	69.0	7.2	64.8	3.0	73.3	11.4	64.4	2.5	63.9	2.0	65.8	4.0	63.9	2.0
B	at-grade	68.6	68.7	0.1	69.4	0.9	69.9	1.4	70.0	1.4	70.7	2.1	69.9	1.4	69.9	1.3	70.4	1.8	70.2	1.6
B	3	67.4	67.7	0.3	69.7	2.3	71.5	4.2	71.1	3.8	72.0	4.6	69.6	2.3	69.5	2.2	70.5	3.1	69.8	2.4
B	5	65.6	66.5	0.9	70.4	4.8	72.4	6.8	70.9	5.3	72.2	6.7	68.8	3.2	68.7	3.1	70.5	5.0	68.7	3.2
B	10	63.5	65.4	1.9	70.5	7.1	72.5	9.1	70.6	7.1	72.1	8.7	67.8	4.4	67.6	4.1	69.6	6.2	67.8	4.3
B	15	50.3	59.2	8.9	65.8	15.6	69.4	19.1	67.7	17.4	71.1	20.9	63.5	13.2	62.7	12.5	64.9	14.6	62.7	12.4
B	20	52.6	60.1	7.6	67.4	14.8	70.0	17.4	67.5	14.9	70.9	18.3	63.9	11.4	62.7	10.1	65.2	12.7	62.6	10.1
B	25	53.8	60.1	6.4	66.6	12.9	69.4	15.7	67.3	13.6	70.5	16.7	64.1	10.4	62.9	9.2	65.0	11.2	62.8	9.0
B	30	53.0	59.8	6.8	65.8	12.9	68.8	15.9	67.1	14.1	70.1	17.1	66.5	13.5	65.2	12.3	66.3	13.3	65.3	12.3
B	35	53.6	59.9	6.4	65.4	11.9	68.4	14.8	67.0	13.5	70.0	16.4	67.7	14.1	66.4	12.8	67.0	13.4	66.2	12.7
B	40	53.3	60.2	6.9	65.3	12.0	68.3	15.1	67.3	14.0	69.9	16.6	68.6	15.3	66.9	13.7	67.2	14.0	66.7	13.4
B	45	52.9	60.2	7.3	65.2	12.3	68.0	15.2	67.1	14.2	69.5	16.6	69.3	16.5	66.7	13.9	66.8	14.0	66.4	13.5
B	50	52.8	59.9	7.2	64.8	12.0	67.7	14.9	66.8	14.0	69.1	16.4	70.3	17.5	66.4	13.7	66.8	14.1	66.5	13.7
B	55	53.3	60.2	6.9	64.5	11.2	67.2	13.9	66.4	13.2	68.7	15.5	69.9	16.7	66.5	13.2	66.5	13.2	66.1	12.8
B	TOP	54.6	60.5	5.9	64.0	9.4	66.7	12.1	66.1	11.5	68.2	13.7	69.7	15.1	66.9	12.4	66.4	11.8	66.1	11.6
C	at-grade	70.4	70.8	0.4	71.2	0.7	71.7	1.2	72.1	1.7	72.1	1.6	71.1	0.7	71.1	0.6	71.3	0.9	71.2	0.8
C	3	70.2	71.3	1.1	71.9	1.7	73.4	3.1	74.1	3.9	73.8	3.5	71.0	0.8	71.0	0.7	71.2	1.0	71.1	0.9
C	5	69.0	72.8	3.8	73.8	4.8	76.9	7.9	77.1	8.1	77.4	8.4	69.9	0.9	69.9	0.8	70.1	1.1	70.0	1.0
C	10	66.6	71.3	4.7	72.6	6.0	75.4	8.7	76.4	9.8	76.5	9.9	68.0	1.4	67.9	1.2	68.3	1.6	68.0	1.4
C	15	63.7	68.3	4.5	69.6	5.8	72.5	8.8	73.4	9.7	73.7	10.0	65.9	2.1	65.6	1.9	66.2	2.4	65.7	1.9
C	20	62.2	66.3	4.0	67.5	5.3	70.4	8.2	71.2	9.0	71.8	9.5	65.1	2.9	64.6	2.3	65.2	3.0	64.6	2.4
C	25	60.0	64.1	4.1	65.4	5.3	68.4	8.4	69.4	9.4	70.0	10.0	64.1	4.0	63.2	3.2	64.0	3.9	63.3	3.2
C	30	58.5	61.9	3.4	63.9	5.3	66.3	7.8	67.6	9.1	68.4	9.9	64.8	6.3	63.7	5.1	64.0	5.4	63.5	4.9
C	35	57.8	61.0	3.2	63.4	5.6	66.0	8.1	67.3	9.4	67.8	10.0	65.5	7.7	64.0	6.2	64.3	6.4	63.8	5.9
C	40	57.4	60.4	3.0	63.0	5.6	65.6	8.2	66.8	9.4	67.3	9.9	66.5	9.0	64.0	6.5	64.3	6.9	63.9	6.4
C	TOP	57.1	59.9	2.8	62.8	5.7	65.4	8.3	66.3	9.2	67.0	9.9	66.2	9.1	64.0	6.9	64.2	7.0	63.8	6.6
D	at-grade	65.8	66.0	0.2	66.1	0.3	66.5	0.7	66.5	0.7	66.9	1.1	66.7	0.9	66.7	0.9	66.9	1.1	66.8	1.0
D	TOP	65.7	65.9	0.2	66.1	0.4	66.6	0.9	66.6	0.9	67.2	1.5	66.8	1.1	66.7	1.0	66.9	1.2	66.9	1.2

Construction Noise Results

Exceed the CEQR noise criterion

CadnaA Receptor Sites	Elevation (floor)	Existing	2010 Q4		2011 Q3		2011 Q4		2012 Q1		2012 Q3		2013 Q2		2013 Q4		2014 Q1		2014 Q4	
		Leq(1)	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change
E	at-grade	69.1	69.2	0.0	69.3	0.2	69.3	0.2	69.5	0.3	69.5	0.4	69.6	0.5	69.6	0.5	69.8	0.7	69.8	0.6
E	3	68.7	68.8	0.0	68.9	0.2	69.0	0.2	69.1	0.4	69.1	0.4	69.3	0.5	69.3	0.5	69.4	0.7	69.4	0.7
E	5	67.5	67.6	0.0	67.7	0.2	67.8	0.2	67.9	0.4	68.0	0.4	68.1	0.6	68.1	0.6	68.2	0.7	68.2	0.7
E	10	64.1	64.2	0.1	64.4	0.2	64.4	0.3	64.6	0.5	64.7	0.5	64.8	0.7	64.8	0.7	65.0	0.8	64.9	0.8
E	15	62.4	62.5	0.1	62.7	0.3	62.8	0.4	63.0	0.5	63.1	0.6	63.1	0.7	63.1	0.7	63.3	0.8	63.2	0.8
E	20	61.0	61.2	0.1	61.3	0.3	61.5	0.4	61.6	0.6	61.8	0.7	61.8	0.8	61.8	0.7	61.9	0.9	61.9	0.8
E	25	58.8	59.0	0.2	59.2	0.4	59.4	0.6	59.5	0.7	59.8	0.9	59.8	0.9	59.8	0.9	60.4	1.6	60.3	1.5
E	30	57.8	58.0	0.2	58.2	0.4	58.5	0.6	58.6	0.8	58.9	1.1	59.2	1.4	59.4	1.6	59.8	2.0	59.7	1.8
E	TOP	56.0	56.6	0.5	56.6	0.6	57.3	1.3	57.5	1.5	57.9	1.9	61.6	5.6	59.3	3.3	58.9	2.8	58.7	2.6
F	at-grade	72.0	72.0	0.0	72.2	0.2	72.2	0.2	72.4	0.3	72.4	0.3	72.5	0.5	72.5	0.5	72.7	0.6	72.6	0.6
F	3	71.2	71.3	0.0	71.4	0.2	71.4	0.2	71.6	0.3	71.6	0.3	71.7	0.5	71.7	0.5	71.9	0.6	71.9	0.6
F	5	69.7	69.8	0.0	69.9	0.2	69.9	0.2	70.1	0.3	70.1	0.4	70.2	0.5	70.2	0.5	70.4	0.7	70.4	0.6
F	10	66.8	66.9	0.0	67.0	0.2	67.0	0.2	67.2	0.4	67.3	0.4	67.3	0.5	67.4	0.5	67.5	0.7	67.5	0.7
F	15	63.7	63.8	0.0	64.0	0.2	64.0	0.3	64.2	0.4	64.3	0.5	64.4	0.7	64.4	0.6	64.5	0.8	64.5	0.8
F	20	61.0	61.1	0.1	61.3	0.3	61.4	0.4	61.6	0.5	61.7	0.7	61.9	0.9	61.9	0.8	62.1	1.0	62.0	1.0
F	25	59.7	59.9	0.2	60.1	0.4	60.3	0.6	60.5	0.8	60.8	1.1	60.8	1.0	60.8	1.1	61.0	1.2	60.9	1.2
F	30	57.8	58.0	0.1	58.2	0.4	58.6	0.8	58.8	0.9	59.3	1.5	59.7	1.9	59.6	1.7	59.8	1.9	59.7	1.9
F	TOP	56.9	57.1	0.1	57.4	0.5	58.1	1.2	58.2	1.2	58.9	2.0	59.7	2.7	59.4	2.5	59.6	2.7	59.5	2.6
G	at-grade	73.3	73.3	0.0	72.7	-0.5	72.78	-0.5	72.2	-1.0	72.3	-1.0	71.4	-1.8	71.4	-1.8	70.8	-2.5	70.8	-2.5
G	3	71.4	71.5	0.1	70.9	-0.4	71.1	-0.3	70.7	-0.7	70.8	-0.6	69.6	-1.8	69.6	-1.8	69.0	-2.4	68.9	-2.4
G	5	70.0	70.2	0.2	69.8	-0.2	70.0	0.1	69.9	-0.1	70.0	0.0	68.2	-1.8	68.2	-1.8	67.6	-2.4	67.6	-2.4
G	10	67.7	68.5	0.8	68.2	0.5	69.2	1.5	69.6	1.9	69.7	2.0	66.2	-1.5	66.0	-1.7	65.5	-2.2	65.4	-2.3
G	15	65.4	66.8	1.5	66.5	1.1	68.1	2.7	68.8	3.4	69.4	4.1	64.5	-0.9	63.9	-1.4	63.5	-1.9	63.3	-2.1
G	TOP	64.1	65.7	1.7	65.7	1.6	67.9	3.8	68.6	4.6	69.5	5.5	63.7	-0.4	62.9	-1.2	62.5	-1.6	62.2	-1.9
H	at-grade	72.8	72.8	0.1	72.8	0.1	72.9	0.2	73.1	0.4	73.1	0.3	72.8	0.1	72.8	0.0	72.8	0.1	72.8	0.0
H	3	73.2	73.3	0.1	73.3	0.1	73.4	0.3	73.8	0.6	73.7	0.5	73.2	0.1	73.2	0.0	73.3	0.1	73.2	0.0
H	5	72.4	72.5	0.2	72.5	0.2	72.9	0.5	73.3	0.9	73.3	0.9	72.5	0.1	72.4	0.0	72.5	0.2	72.4	0.0
H	10	70.3	71.0	0.7	71.0	0.7	71.8	1.5	73.0	2.7	73.4	3.2	70.7	0.4	70.3	0.1	70.8	0.5	70.3	0.1
H	15	67.8	69.0	1.2	69.3	1.6	70.4	2.6	71.8	4.0	72.6	4.8	68.9	1.1	67.9	0.2	68.8	1.0	67.9	0.1
H	20	66.4	67.7	1.4	68.4	2.1	69.5	3.1	70.6	4.3	71.8	5.5	68.0	1.6	66.6	0.3	67.7	1.3	66.6	0.2
H	25	64.6	66.1	1.5	67.2	2.6	68.2	3.7	69.4	4.8	70.7	6.1	66.7	2.1	65.1	0.5	66.1	1.5	64.9	0.3
H	TOP	63.6	65.1	1.5	66.2	2.6	67.3	3.7	68.4	4.9	69.9	6.4	66.3	2.7	64.4	0.8	65.4	1.8	64.1	0.5
I	at-grade	71.7	71.7	0.0	71.8	0.1	71.9	0.2	72.06	0.4	72.06	0.4	72.1	0.4	72.0	0.3	72.1	0.4	72.0	0.3
I	3	70.7	70.7	0.0	70.9	0.2	71.0	0.3	71.4	0.7	71.3	0.6	71.4	0.7	71.2	0.5	71.3	0.6	71.1	0.4
I	5	69.2	69.3	0.1	69.4	0.2	69.6	0.4	70.1	0.9	70.1	0.9	70.3	1.1	69.9	0.7	70.0	0.8	69.7	0.5
I	10	66.6	66.7	0.1	66.9	0.3	67.3	0.7	68.2	1.6	68.1	1.5	68.5	1.9	67.7	1.1	67.9	1.3	67.3	0.7
I	15	64.9	65.2	0.3	65.4	0.5	66.1	1.2	67.4	2.5	67.3	2.4	67.7	2.8	66.6	1.7	66.8	1.9	65.8	0.9
I	20	63.5	63.9	0.4	64.1	0.6	65.0	1.5	66.6	3.1	66.7	3.2	67.0	3.5	65.7	2.2	66.0	2.5	64.7	1.2
I	25	62.5	63.0	0.5	63.3	0.8	64.3	1.8	66.1	3.6	66.3	3.8	66.7	4.2	65.2	2.7	65.4	2.9	63.9	1.4
I	30	61.6	62.2	0.6	62.5	0.9	63.7	2.1	65.6	4.0	66.0	4.4	66.2	4.6	64.7	3.1	64.9	3.3	63.3	1.7
I	TOP	61.0	61.8	0.8	62.1	1.1	63.8	2.8	65.7	4.7	66.1	5.1	66.0	5.0	64.4	3.4	64.5	3.5	62.9	1.9
J	at-grade	70.1	70.2	0.0	70.5	0.4	70.6	0.4	70.9	0.8	70.9	0.8	71.2	1.0	71.2	1.0	71.5	1.4	71.5	1.4
J	3	68.9	69.0	0.1	69.4	0.4	69.5	0.6	69.9	0.9	70.0	1.1	70.1	1.2	70.1	1.2	70.5	1.5	70.4	1.5
J	TOP	67.3	67.5	0.1	67.8	0.5	68.0	0.7	68.4	1.1	68.7	1.3	68.6	1.3	68.6	1.3	69.0	1.6	68.9	1.5

Construction Noise Results

Exceed the CEQR noise criterion

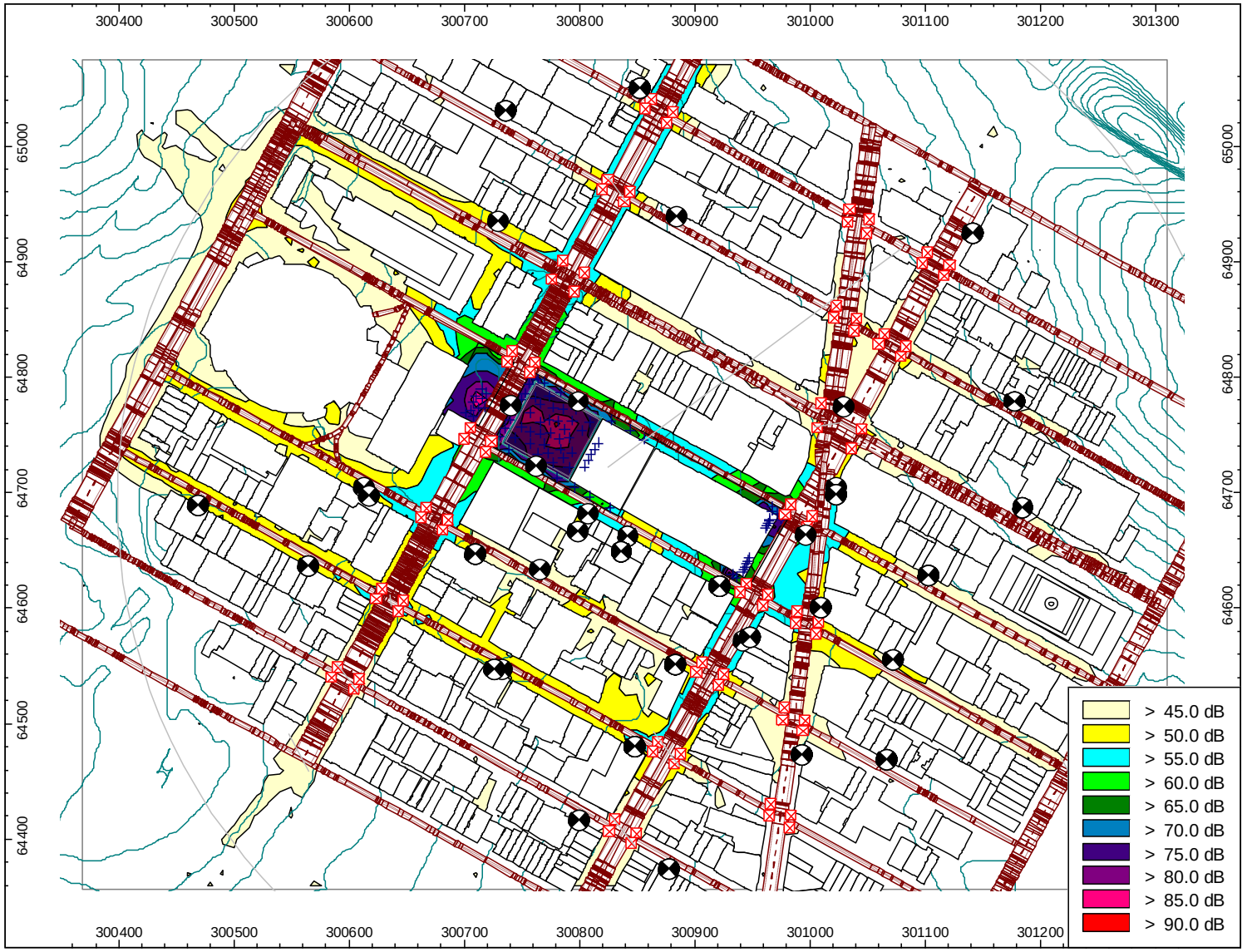
CadnaA Receptor Sites	Elevation (floor)	Existing	2010 Q4		2011 Q3		2011 Q4		2012 Q1		2012 Q3		2013 Q2		2013 Q4		2014 Q1		2014 Q4	
		Leq(1)	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change
K	at-grade	71.2	71.2	0.0	70.2	-0.9	70.2	-0.9	69.3	-1.9	69.3	-1.8	68.4	-2.8	68.4	-2.8	67.4	-3.7	67.4	-3.8
K	3	69.9	69.9	0.0	69.0	-0.9	69.0	-0.8	68.1	-1.8	68.2	-1.6	67.3	-2.6	67.2	-2.7	66.3	-3.6	66.2	-3.7
K	5	68.5	68.5	0.0	67.6	-0.9	67.6	-0.8	66.7	-1.7	66.9	-1.5	65.9	-2.5	65.8	-2.7	65.0	-3.5	64.9	-3.6
K	10	66.1	66.1	0.0	65.2	-0.8	65.3	-0.8	64.5	-1.6	64.7	-1.4	63.7	-2.4	63.6	-2.5	62.8	-3.3	62.6	-3.5
K	TOP	63.7	63.7	0.0	62.8	-0.9	62.8	-0.8	62.0	-1.6	62.3	-1.4	61.3	-2.4	61.3	-2.3	60.6	-3.1	60.5	-3.2
L	at-grade	71.0	71.1	0.1	71.3	0.3	71.3	0.3	71.5	0.5	71.5	0.5	71.7	0.7	71.7	0.7	71.9	0.9	71.9	0.9
L	3	70.5	70.6	0.1	70.8	0.3	70.8	0.3	71.1	0.5	71.1	0.6	71.3	0.7	71.3	0.8	71.5	0.9	71.4	0.9
L	5	68.6	68.7	0.1	68.9	0.3	69.0	0.3	69.2	0.6	69.3	0.7	69.4	0.8	69.4	0.8	69.6	1.0	69.5	0.9
L	10	66.0	66.2	0.1	66.4	0.3	66.4	0.4	66.6	0.5	66.7	0.6	66.9	0.9	66.8	0.8	67.0	1.0	67.0	0.9
L	15	63.2	63.3	0.1	63.6	0.3	63.7	0.5	63.9	0.7	64.3	1.1	64.3	1.1	64.1	0.9	64.3	1.1	64.2	1.0
L	20	60.7	60.9	0.2	61.1	0.4	61.6	0.9	61.8	1.0	62.5	1.8	62.3	1.5	61.7	1.0	61.9	1.2	61.9	1.1
L	25	59.4	59.8	0.4	59.9	0.4	60.6	1.2	60.8	1.3	61.7	2.3	61.5	2.1	60.8	1.3	60.9	1.5	60.8	1.4
L	30	57.5	58.1	0.6	58.1	0.6	59.2	1.6	59.3	1.7	60.5	2.9	60.6	3.1	59.4	1.8	59.5	2.0	59.3	1.8
L	35	56.8	57.4	0.6	57.5	0.7	58.8	2.0	59.0	2.2	60.1	3.3	60.7	3.9	59.1	2.3	59.3	2.4	59.1	2.3
L	40	56.1	56.7	0.6	56.8	0.7	58.1	2.0	58.4	2.2	59.5	3.4	61.8	5.7	59.0	2.9	59.1	3.0	59.0	2.9
L	45	55.5	55.8	0.3	56.2	0.7	57.7	2.1	57.9	2.4	59.3	3.8	61.6	6.1	59.4	3.8	59.2	3.7	59.1	3.6
L	TOP	55.0	55.3	0.3	55.9	0.8	57.4	2.4	57.7	2.7	59.2	4.1	61.4	6.4	59.9	4.9	59.4	4.4	59.3	4.3
M	at-grade	66.7	66.8	0.1	67.0	0.3	67.0	0.3	67.2	0.5	67.2	0.5	67.4	0.7	67.4	0.7	67.6	0.9	67.6	0.9
M	3	65.7	65.8	0.1	66.0	0.3	66.0	0.3	66.2	0.5	66.5	0.9	66.5	0.8	66.5	0.8	66.7	1.0	66.7	1.0
M	TOP	64.2	64.4	0.3	64.5	0.4	64.8	0.6	65.0	0.8	65.6	1.5	65.4	1.3	65.5	1.3	65.9	1.7	65.4	1.3
N	at-grade	62.0	62.3	0.3	62.5	0.5	62.5	0.5	62.7	0.7	62.7	0.8	62.9	0.9	62.9	1.0	63.1	1.1	63.0	1.1
N	3	61.0	61.4	0.4	61.6	0.6	61.7	0.7	61.9	1.0	62.0	1.1	62.5	1.5	62.1	1.1	62.3	1.3	62.2	1.2
N	5	59.5	59.9	0.4	60.1	0.6	60.2	0.8	60.6	1.1	60.7	1.2	60.9	1.4	60.7	1.2	61.0	1.5	60.8	1.4
N	10	55.8	56.4	0.6	57.2	1.4	57.7	1.9	57.5	1.8	57.7	1.9	57.6	1.9	57.9	2.1	58.4	2.6	57.9	2.2
N	TOP	54.0	54.9	1.0	56.1	2.2	56.4	2.5	57.7	3.8	58.4	4.4	58.0	4.0	58.8	4.8	58.9	4.9	57.6	3.6
O	at-grade	61.1	61.3	0.2	61.5	0.4	61.5	0.4	61.7	0.6	61.7	0.6	61.8	0.8	61.8	0.8	62.0	0.9	62.0	0.9
O	3	60.1	60.3	0.3	60.5	0.4	60.5	0.5	60.7	0.6	60.8	0.7	60.9	0.8	60.9	0.9	61.1	1.0	61.1	1.0
O	5	58.6	58.8	0.3	59.0	0.4	59.1	0.5	59.2	0.7	59.3	0.7	59.5	0.9	59.5	0.9	59.6	1.1	59.6	1.0
O	10	55.9	56.2	0.3	56.3	0.5	56.4	0.6	56.6	0.7	56.9	1.0	57.2	1.4	57.2	1.3	57.4	1.5	57.3	1.4
O	TOP	54.0	54.6	0.6	54.8	0.9	55.2	1.2	55.6	1.7	56.2	2.2	56.8	2.9	56.6	2.6	56.9	3.0	56.5	2.6
P	at-grade	70.4	70.4	0.0	70.6	0.2	70.6	0.2	70.8	0.4	70.8	0.4	71.0	0.5	71.0	0.5	71.1	0.7	71.1	0.7
P	3	69.5	69.5	0.0	69.7	0.2	69.7	0.2	69.9	0.4	69.9	0.4	70.1	0.6	70.1	0.6	70.3	0.8	70.3	0.8
P	TOP	68.0	68.1	0.0	68.2	0.2	68.3	0.2	68.4	0.4	68.5	0.5	68.7	0.7	68.7	0.7	68.9	0.8	68.9	0.8
Q	at-grade	64.0	64.0	0.0	64.3	0.3	64.3	0.3	64.5	0.6	64.6	0.6	64.8	0.9	64.8	0.9	65.1	1.1	65.1	1.1
Q	3	63.7	63.7	0.0	64.0	0.3	64.0	0.3	64.2	0.6	64.3	0.6	64.5	0.9	64.5	0.9	64.8	1.1	64.8	1.1
Q	5	62.2	62.2	0.0	62.5	0.3	62.5	0.3	62.8	0.6	62.8	0.6	63.0	0.9	63.0	0.9	63.3	1.1	63.3	1.1
Q	10	58.5	58.5	0.0	58.8	0.3	58.8	0.4	59.1	0.6	59.2	0.7	59.4	0.9	59.4	0.9	59.7	1.2	59.6	1.2
Q	TOP	55.5	55.5	0.1	55.8	0.4	55.9	0.5	56.2	0.7	56.3	0.8	56.5	1.0	56.5	1.1	57.0	1.5	56.9	1.4
R	at-grade	69.5	69.6	0.0	69.9	0.3	69.9	0.3	70.2	0.6	70.2	0.6	70.5	0.9	70.5	0.9	70.8	1.2	70.8	1.2
R	3	68.9	69.0	0.0	69.3	0.3	69.3	0.4	69.6	0.7	69.6	0.7	69.9	1.0	69.9	1.0	70.2	1.3	70.2	1.3
R	5	67.6	67.7	0.1	68.0	0.4	68.0	0.4	68.3	0.7	68.3	0.7	68.7	1.0	68.6	1.0	68.9	1.3	68.9	1.3
R	10	65.1	65.3	0.1	65.6	0.4	65.7	0.6	66.1	0.9	66.2	1.1	66.4	1.3	66.5	1.3	66.8	1.7	66.6	1.5
R	TOP	62.5	62.7	0.2	63.0	0.5	63.3	0.8	63.7	1.2	64.0	1.4	64.1	1.5	64.1	1.6	64.5	2.0	64.2	1.7

Construction Noise Results

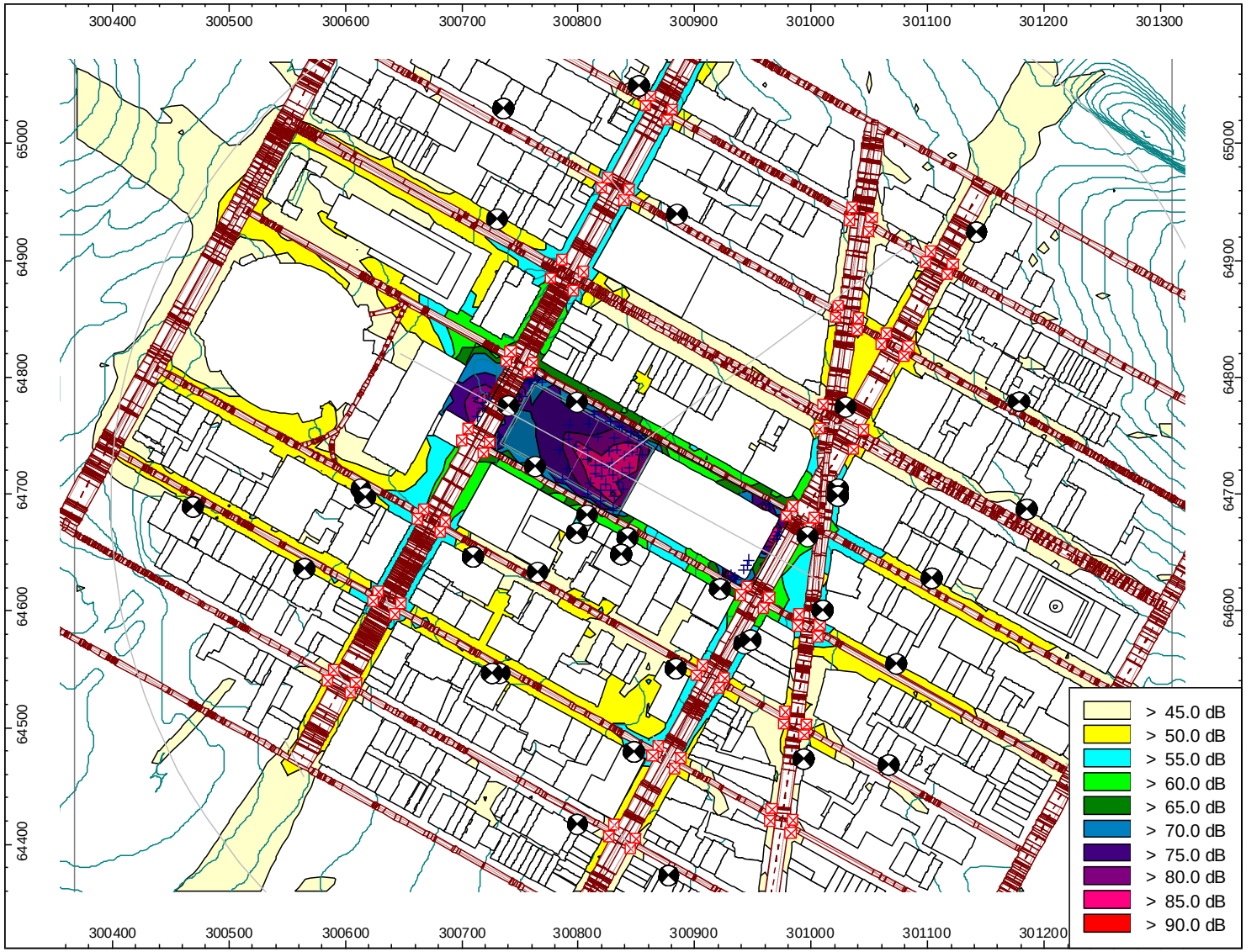
Exceed the CEQR noise criterion

CadnaA Receptor Sites	Elevation (floor)	Existing	2010 Q4		2011 Q3		2011 Q4		2012 Q1		2012 Q3		2013 Q2		2013 Q4		2014 Q1		2014 Q4	
		Leq(1)	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change
S	at-grade	72.6	72.6	0.0	72.8	0.2	72.8	0.2	72.9	0.4	73.0	0.4	73.1	0.5	73.1	0.5	73.3	0.7	73.3	0.7
S	3	72.0	72.0	0.0	72.2	0.2	72.2	0.2	72.3	0.4	72.4	0.4	72.5	0.5	72.5	0.5	72.7	0.7	72.7	0.7
S	5	70.6	70.6	0.0	70.8	0.2	70.8	0.2	71.0	0.4	71.0	0.5	71.1	0.5	71.1	0.5	71.3	0.7	71.3	0.7
S	10	67.1	67.1	0.0	67.3	0.2	67.4	0.3	67.5	0.5	67.7	0.7	67.6	0.6	67.6	0.6	67.8	0.7	67.8	0.7
S	15	65.1	65.1	0.0	65.3	0.3	65.5	0.4	65.6	0.6	65.9	0.9	65.7	0.6	65.7	0.6	65.8	0.8	65.8	0.7
S	20	63.5	63.5	0.1	63.8	0.4	64.0	0.5	64.1	0.7	64.6	1.1	64.1	0.6	64.1	0.6	64.2	0.8	64.2	0.7
S	TOP	61.5	61.6	0.1	62.0	0.5	62.2	0.7	62.2	0.8	63.0	1.5	62.1	0.6	62.2	0.7	62.4	1.0	62.4	0.9
T	at-grade	67.9	67.9	0.0	68.1	0.2	68.1	0.2	68.3	0.4	68.4	0.4	68.5	0.6	68.5	0.6	68.7	0.8	68.7	0.8
T	3	66.6	66.6	0.0	66.8	0.2	66.9	0.2	67.1	0.4	67.1	0.4	67.3	0.6	67.3	0.6	67.5	0.8	67.5	0.8
T	5	65.0	65.0	0.0	65.3	0.2	65.3	0.2	65.5	0.4	65.5	0.4	65.7	0.6	65.7	0.6	65.9	0.8	65.9	0.8
T	10	62.2	62.3	0.0	62.5	0.2	62.5	0.2	62.7	0.5	62.7	0.5	62.9	0.7	63.1	0.9	63.3	1.0	63.2	1.0
T	TOP	60.3	60.4	0.0	60.6	0.2	60.6	0.3	60.8	0.5	60.9	0.5	61.2	0.9	61.4	1.0	61.5	1.2	61.5	1.2
U	at-grade	71.0	71.0	0.0	71.1	0.1	71.1	0.1	71.2	0.1	71.2	0.1	71.2	0.2	71.2	0.2	71.2	0.2	71.2	0.2
U	3	71.1	71.1	0.0	71.2	0.1	71.2	0.1	71.3	0.1	71.3	0.1	71.3	0.2	71.3	0.2	71.3	0.2	71.3	0.2
U	5	70.0	70.0	0.0	70.1	0.1	70.1	0.1	70.1	0.1	70.1	0.1	70.2	0.2	70.2	0.2	70.2	0.2	70.2	0.2
U	10	67.8	67.8	0.0	67.9	0.1	67.9	0.1	68.0	0.1	68.0	0.1	68.0	0.2	68.0	0.2	68.1	0.2	68.1	0.2
U	TOP	66.0	66.1	0.0	66.1	0.1	66.2	0.1	66.3	0.2	66.3	0.3	66.2	0.2	66.3	0.2	66.3	0.3	66.3	0.3
V	at-grade	66.8	66.8	0.0	66.9	0.0	66.9	0.0	66.9	0.1	66.9	0.1	66.9	0.1	66.9	0.1	67.0	0.1	66.9	0.1
V	3	65.6	65.7	0.0	65.7	0.0	65.7	0.1	65.7	0.1	65.8	0.1	65.8	0.1	65.8	0.1	65.8	0.2	65.8	0.1
V	5	64.0	64.1	0.0	64.1	0.1	64.1	0.1	64.2	0.1	64.2	0.2	64.2	0.2	64.2	0.2	64.2	0.2	64.2	0.2
V	10	61.2	61.3	0.0	61.3	0.1	61.3	0.1	61.4	0.1	61.4	0.2	61.4	0.2	61.4	0.2	61.4	0.2	61.4	0.2
V	TOP	59.3	59.4	0.0	59.4	0.1	59.5	0.1	59.5	0.2	59.6	0.2	59.5	0.2	59.5	0.2	59.5	0.2	59.5	0.2
W	at-grade	69.6	69.6	0.0	69.8	0.2	69.8	0.2	70.0	0.4	70.0	0.4	70.2	0.5	70.2	0.5	70.3	0.7	70.3	0.7
W	3	68.8	68.8	0.0	69.0	0.2	69.0	0.2	69.2	0.4	69.2	0.4	69.4	0.5	69.4	0.6	69.6	0.7	69.6	0.7
W	5	67.5	67.5	0.0	67.7	0.2	67.7	0.2	67.9	0.4	67.9	0.4	68.1	0.6	68.1	0.6	68.3	0.7	68.3	0.7
W	10	65.0	65.0	0.0	65.2	0.2	65.2	0.2	65.5	0.4	65.6	0.5	65.9	0.8	65.7	0.7	65.9	0.9	65.9	0.8
W	TOP	63.6	63.7	0.0	63.9	0.3	64.0	0.3	64.2	0.6	64.4	0.8	64.6	0.9	64.4	0.8	64.7	1.1	64.6	0.9
X	at-grade	74.5	74.6	0.1	74.8	0.2	74.8	0.3	75.0	0.5	75.1	0.6	75.1	0.6	75.1	0.6	75.3	0.7	75.3	0.7
X	3	73.7	73.8	0.1	74.0	0.3	74.2	0.5	74.4	0.7	74.5	0.8	74.3	0.6	74.3	0.6	74.5	0.7	74.5	0.7
X	5	72.2	72.4	0.2	72.6	0.4	73.1	0.8	73.4	1.1	73.6	1.4	72.8	0.6	72.8	0.6	73.0	0.8	73.0	0.7
X	Top	68.8	69.7	0.8	70.3	1.4	71.7	2.9	71.9	3.1	73.3	4.4	69.4	0.6	69.4	0.6	69.6	0.8	69.6	0.7

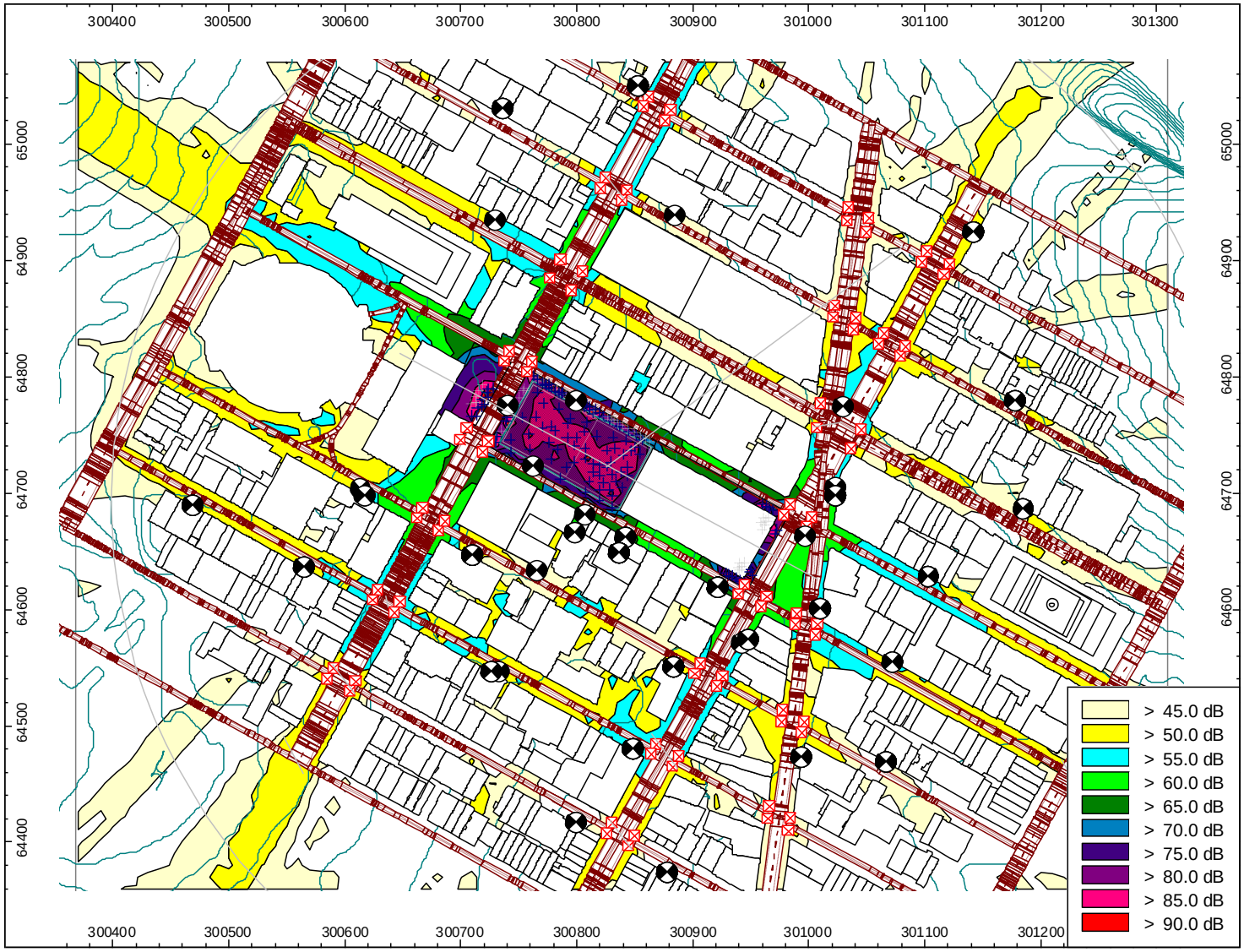
APPENDIX G.6
Noise Contour Maps



15 Penn Plaza – 2010 (Q4)



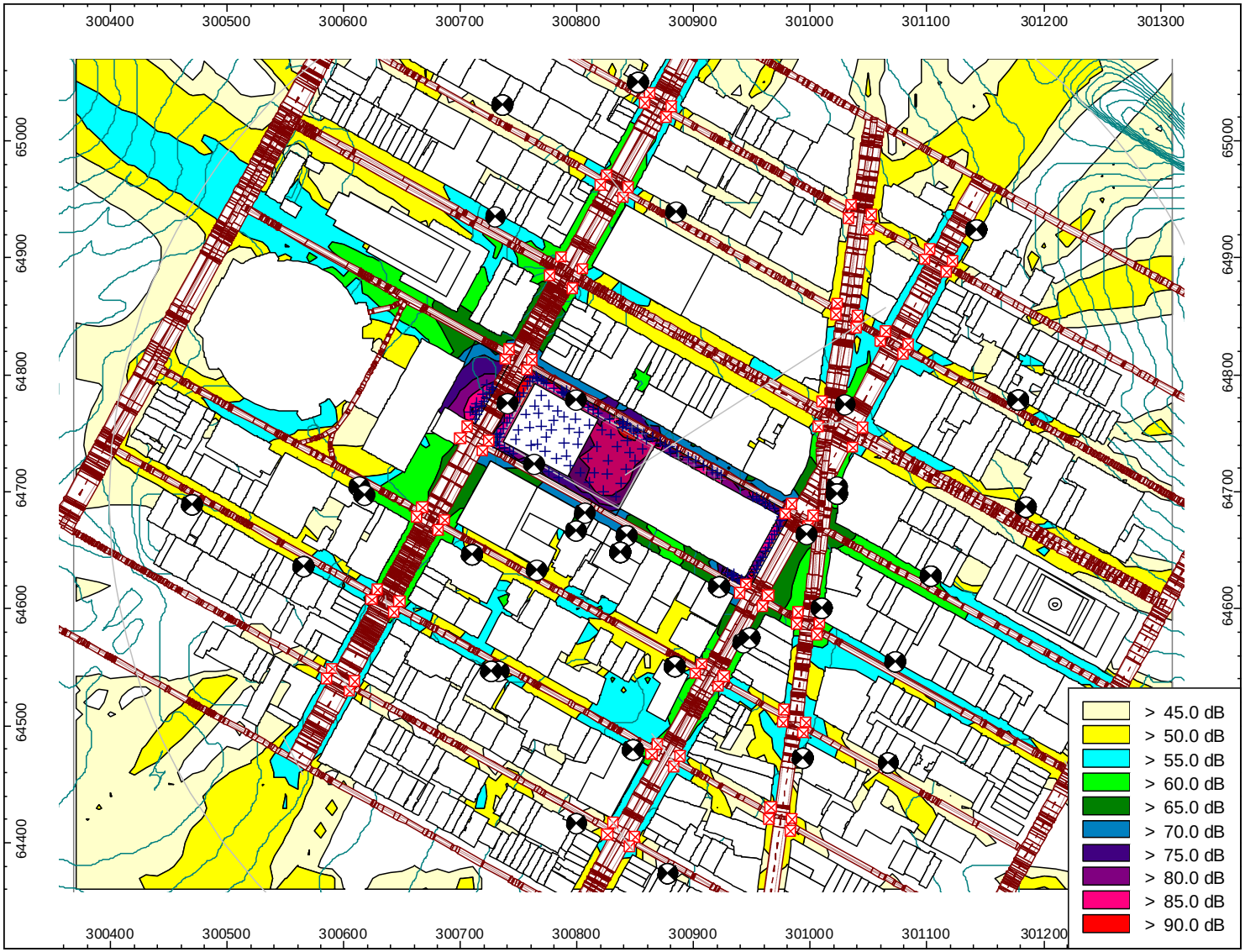
15 Penn Plaza – 2011 (Q3)



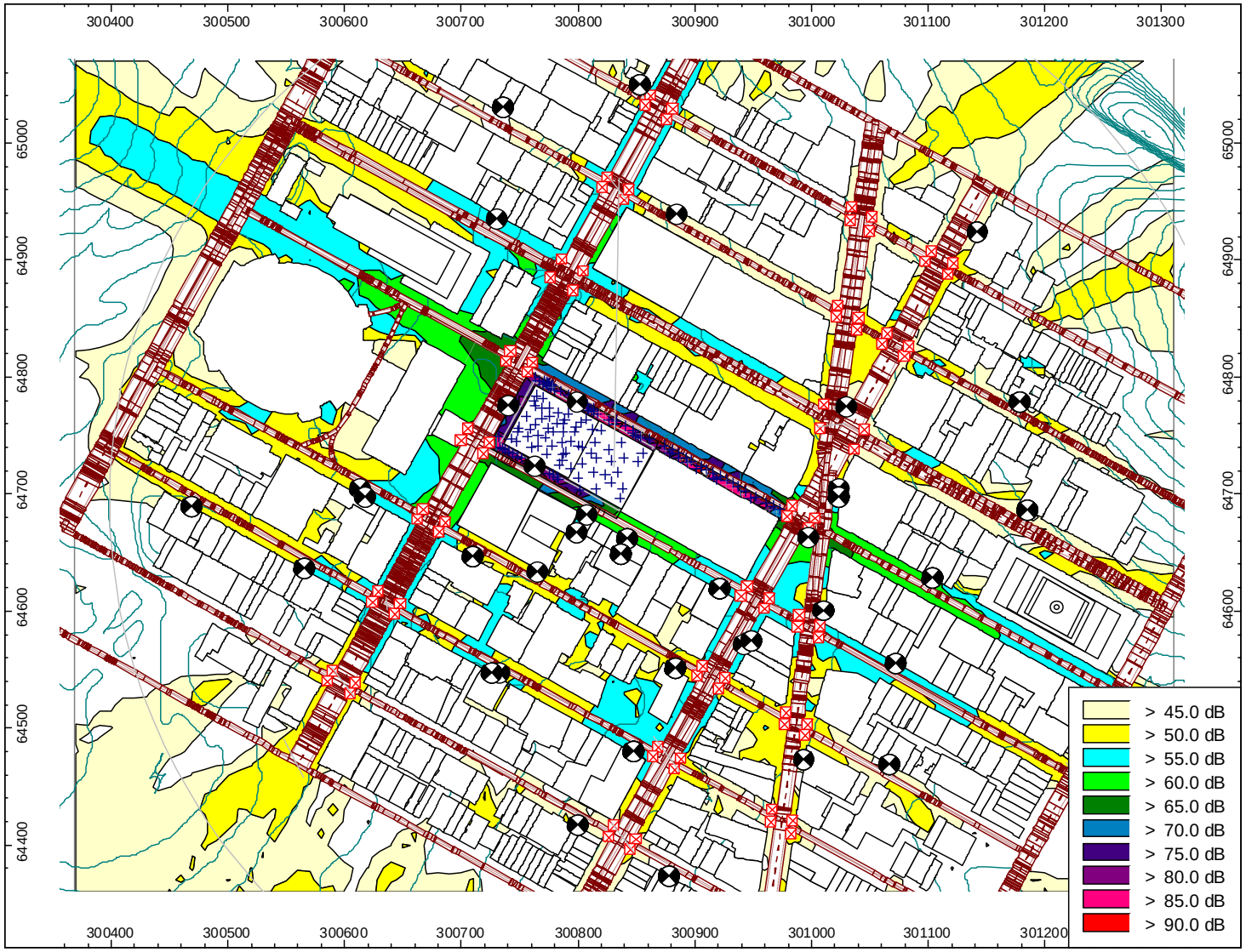
15 Penn Plaza – 2011 (Q4)



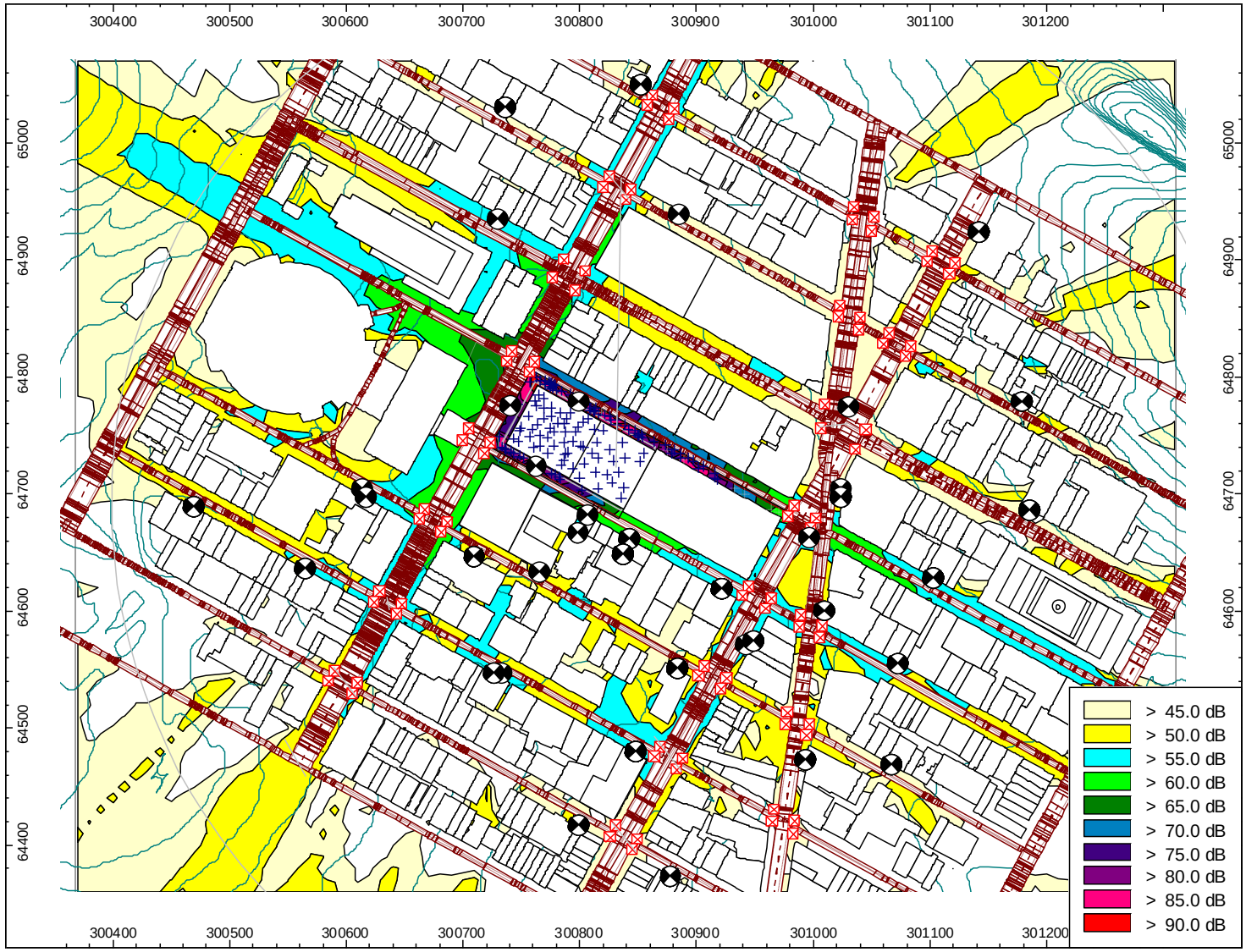
15 Penn Plaza – 2012 (Q1)



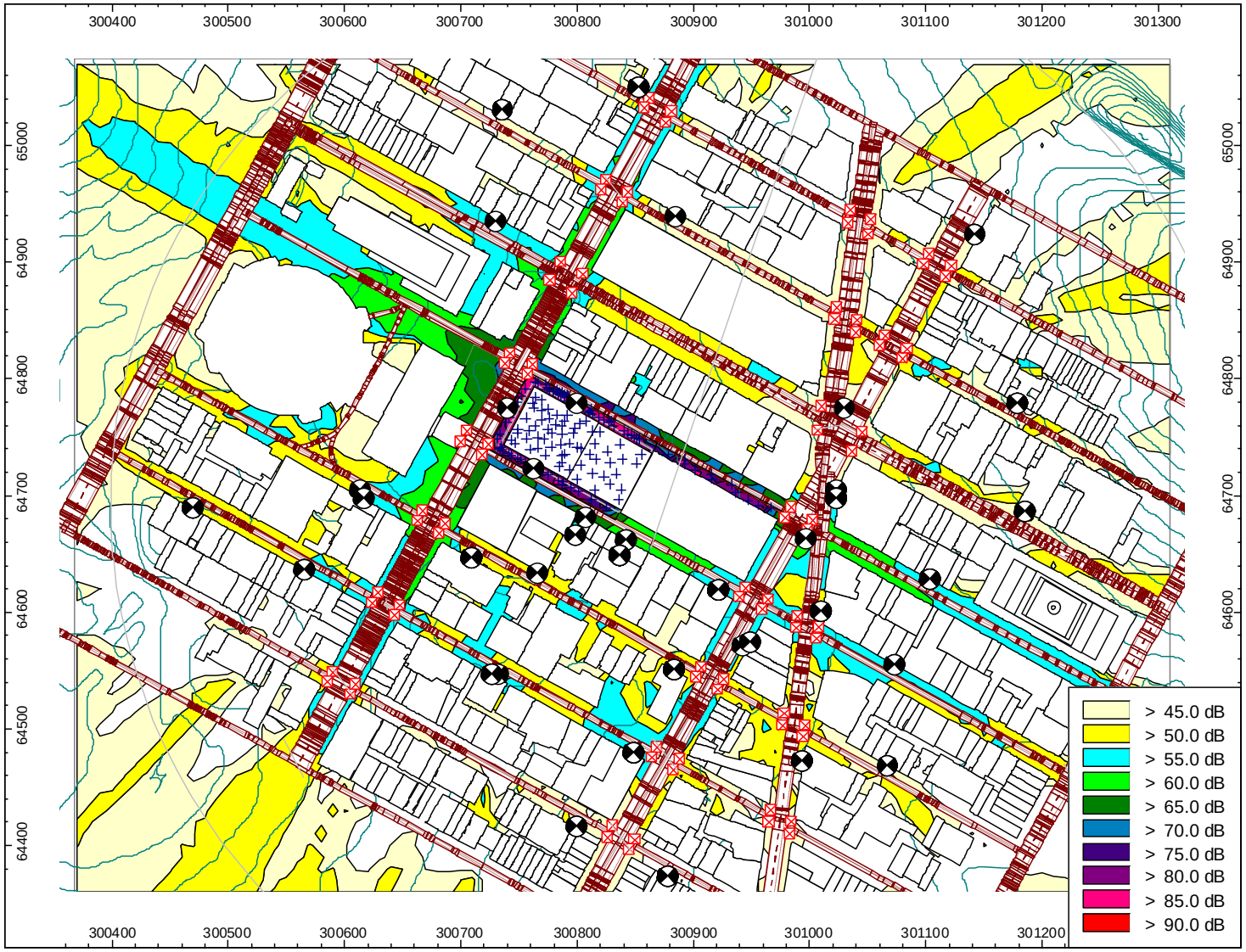
15 Penn Plaza – 2012 (Q3)



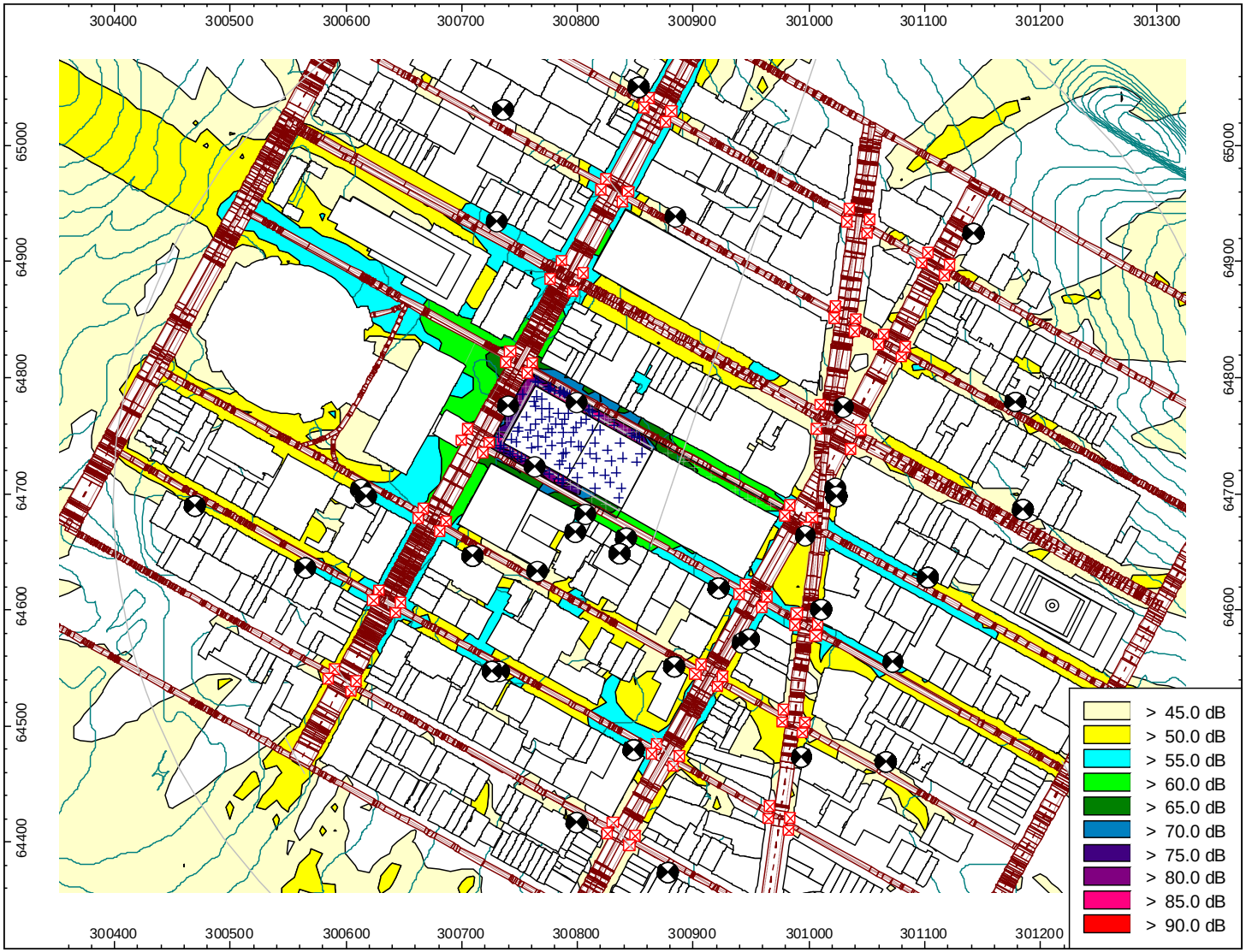
15 Penn Plaza – 2013 (Q2)



15 Penn Plaza – 2013 (Q4)



15 Penn Plaza – 2014 (Q1)



15 Penn Plaza – 2014 (Q4)

Appendix G.7
Vibration Calculations

Calculations for Construction Vibration

$PPV_{equipment} = PPV_{ref} * (25/D)^{1.5}$

where:
PPV_{equip} is the peak particle velocity in in/sec of the equipment at the receiver location
PPV_{ref} is the reference vibration level in in/sec at 25 feet
D is the distance from the equipment to the received location in feet

Equipment		PPVr	Criterion PPV	Impact Distance (ft)	PPVe
Clam shovel drop (slurry wall)		0.202	0.5	14	0.5
Vibratory Roller		0.210	0.5	15	0.5
Hoe Ram		0.089	0.5	8	0.5

Calculations for Construction Ground-Borne Vibration

Lv(D) = Lv(25ft) - 30 log(D/25)

where:
L_v(D) is the vibration level in VdB of the equipment at the receiver location
L_v(ref) is the reference vibration level in VdB at 25 feet
D is the distance from the equipment to the receiver location in feet

Equipment		Lv(25ft)	Criterion VdB	Impact Distance (ft)	Lv(D)
Clam shovel drop (slurry wall)		94	65	232	65
Vibratory Roller		94	65	232	65
Hoe Ram		87	65	135	65