B2D2 Project

Neptune Berth 2 Dumper 2 Noise Threshold Analysis Report

REP-B2D2-0009

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0	July 06, 2023	For Use	Carmen Wu	Emily Adamczyk	Victoria Burdett-Coutts
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1 INTRODUCTION

1.1 Background

Neptune Bulk Terminals (Canada) Ltd. (NBT) is on the north shore of Vancouver Harbour in Burrard Inlet's Inner Harbour and is approximately 6.0 km southeast from the Lions Gate Bridge and 2.5 km northwest from the Second Narrows Bridge (49° 18.218'N, 123° 2.913'W) (see Figure 1-1). NBT, located at 1001 Low Level Road, in the City of North Vancouver, British Columbia (BC), is a bulk materials handling venture of Canpotex Ltd. and Teck Resources Ltd. (the Terminal). The Terminal consists of covered and open stockpile storage areas, a rail yard, materials handling areas, and five shiploaders at three berths. The Terminal sits entirely in the Vancouver Fraser Port Authority (the Port Authority) jurisdiction and is operated under tenancy by NBT. The Terminal is bounded on the South by the Inner Harbour of Burrard Inlet, on the North by Low Level Road and commercial land-users, and on the West and East by neighbours Cargill Grain Terminal (Cargill) and G3 Terminal (G3) (see Figure 1-1). North of Low Level Road there are residential neighbours.

NBT is undertaking the Berth 2 Shiploader Project (B2 Project) and Dumper 2 Potash Replacement Project (D2 Project), collectively referred to as the B2D2 Project, as part of NBT's maintenance works to facilitate ongoing operations and end of life replacement of their assets. The B2 (PER 21-068, Category C) and D2 (PER 21-172, Category B) Projects were permitted separately through the Port Authority Project and Environmental Review (PER) process, where the D2 Project approval was issued on October 6, 2022 (Port Authority, 2022).

The B2D2 Project will primarily be completed within the Port Authority standard working hours of Monday to Saturday, 7:00 AM to 8:00 PM. However, authorization for construction outside of standard working hours throughout the B2D2 Project will be required for critical path activities.

This extended time is required to reduce congestion on site, enhance safety conditions for construction personnel, and shorten the overall construction schedule, reducing potential impacts to other vital NBT operations. Most of the construction activities planned to be performed outside of standard working hours are expected to produce low sound. An Extended Hours Work Plan (EHWP) is in development (NBT, in progress), which is a requirement of the PER approvals (B2: Condition No. to be informed upon permit approval; D2: Condition No. 23) to outline mitigation, monitoring, and communication commitments during construction. NBT will submit the EHWP to the Port Authority within 30 business days of the start of construction activities occurring outside of standard working hours. The EHWP will be uploaded to the PER portal for the respective B2 and D2 approvals. NBT will provide a draft EHWP to the Port Authority during review of the B2D2 Project so that the strategies surrounding the NBT noise management measures can be discussed.

1.2 Report Scope

This report was prepared to support NBT's construction noise thresholds for the B2D2 Project and has the following objectives:

- To assess and analyze noise data collected at monitoring stations in proximity to the Terminal that are operated by NBT and the Port Authority. For purposes of this report, only data from 2022 was analyzed.
- To predict the noise levels generated by the B2 and D2 projects during construction through noise modelling.
- To review NBT's complaints log to analyze and determine the trend of what types of construction noises are most noticeable to the community.
- To provide a rationale for NBT's proposed noise threshold for construction activities occurring outside of the Port Authority standard working hours.

1.3 Port Authority Standard Work Hours

Projects within the Port Authority's jurisdiction are permitted to occur between Monday and Saturday from 7:00 a.m. to 8:00 p.m., with no activities permitted on Sundays and holidays. An exemption needs to be approved by the Port Authority to allow for construction outside of these time periods. The requirements for requesting approval of activities outside of standard working hours is provided in the Port Authority's 'Project and Environmental Review Guideline – Construction Outside of Regular Work Hours' (Port Authority, 2023b).

Hours outside of the Port Authority's standard working hours are defined in terms of 'Categories' and 'Bins' (see Table 1-1).

Categories are:

- Monday to Saturday.
- Sundays.
- Statutory Holidays.

Bins are:

- Day.
- Evening.
- Night.

Monday through Saturday categories are exclusive to evening and night bins, where statutory holidays and Sundays include 'day'.

Table 1-1: Port Authority Construction Hour Categories

CATEGORY	BIN		
	07:00 to 20:00 (Day)	20:01 – 22:00 (Evening)	22:01 – 06:59 (Night)
Monday to Saturday	Regular standard work hours	Outside of standard hours	Outside of standard hours
Sundays	Outside of standard hours		
Statutory Holidays			

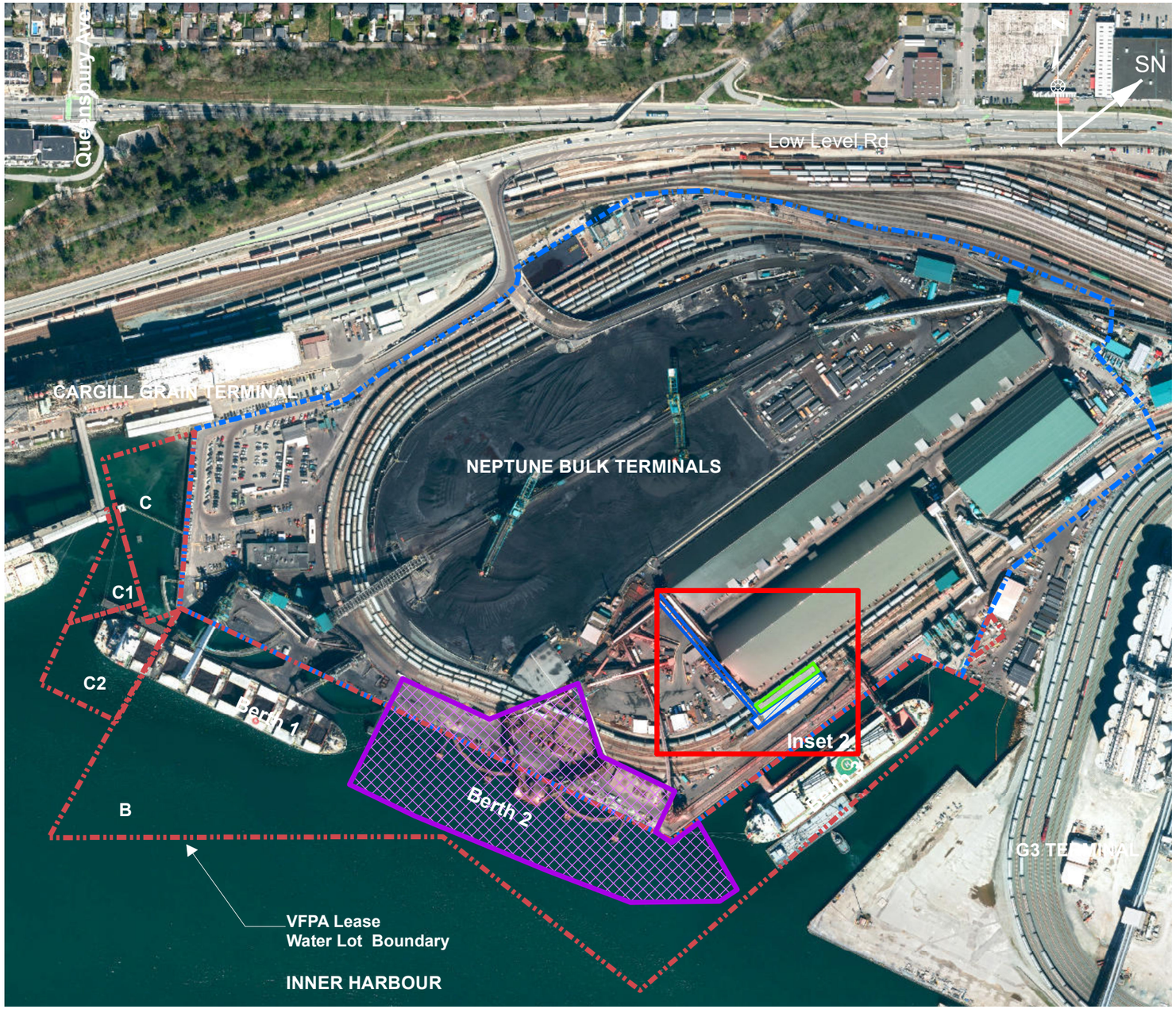
Source: Appendix I of Port Authority (2023b).

1.4 Noise Threshold

NBT is proposing thresholds as below:

- Monday to Saturday (evenings, nights): 66 decibels (dB).
- Sundays and holidays (day, evening, night): 63 dB.

These thresholds were developed by BKL Consultants Ltd. (BKL) to support the Allison Project's request for construction outside of standard working hours (Amendments: PER 12-066-2, 17-131-1) (BKL, 2019, 2021). The B2D2 Project activities and associated equipment will be similar to that of the Allison Project in terms of scale, equipment, and activity, including pile driving, welding, concrete installation, excavation, and foundation construction. BKL developed the threshold for the Allison Project using the British Standard BS 5228-1:2009 (British Standards Institute, 2009) for establishing noise criteria. Based on the British Standards, a consideration of the mean ambient noise (i.e., in absence of construction at NBT) measured over a period of time, plus five dB determined the threshold.

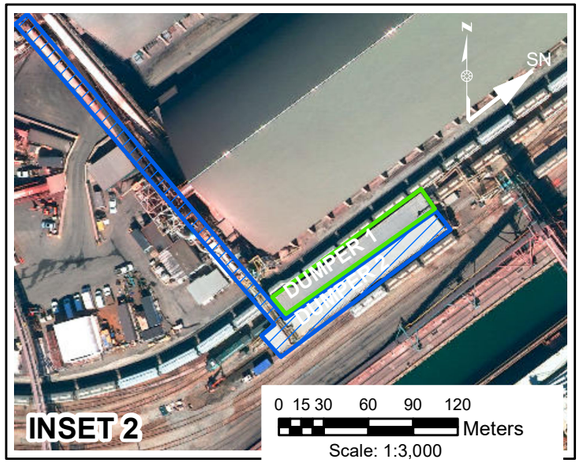


INSET 1

0 30 60 120 180 240 (m)

Scale: 1:4,000

Scale: 1:100,000



Scale: 1:3,000

LEGEND

- Berth 2 Project Area
- Dumper 2 Project Area
- Dumper 1
- Property Line
- Water Lot Boundary

SC ALE:

0 20 40 80 120 160 (m)

Scale: 1:4,000

SOURCE / NOTE:
- Aerial image is downloaded from Google EarthPro.(2021)

PROJECT:

SYSTEM:

ASSET:

DISCIPLINE

REV	YYYY-MM-DD	DESCRIPTION	DRAWN	APPROVED

ISSUES/REVISIONS

VENDOR

envirochem

ISSUED AS RECORD COPY (YES/NO) NO

Neptune TERMINALS

TITLE:

Project Site, B2D2 Footprints and Study Areas

Figure 1-1

SCALE:	SHEET	OF	DRAWING NO:
1:6000	1	1	

Document Name: Project Site, B2D2 Footprinst and Study Areas

2 NOISE MONITORING ANALYSIS

2.1 Methodology

2.1.1 Noise Monitoring Stations

A comprehensive analysis was undertaken of both NBT and Port Authority noise monitoring stations to understand noise exposure to the City of North Vancouver (CNV) community in proximity to the Terminal.

2.1.1.1 Port Authority

The Port Authority manages 11 permanent noise monitoring stations within their jurisdiction of the north and south shores of Burrard Inlet and Roberts Bank (see Figure 2-1). These 11 noise monitoring stations stream real time data to the Port Authority Noise Monitoring Web Portal with data that is publicly available. Two of these stations (No. 3 CNV Queensbury, No. 4 CNV Heywood) are the closest to the Terminal, where the Port Authority shared 2022 data (Port Authority, 2023a).

Mean hourly data are available upon request.

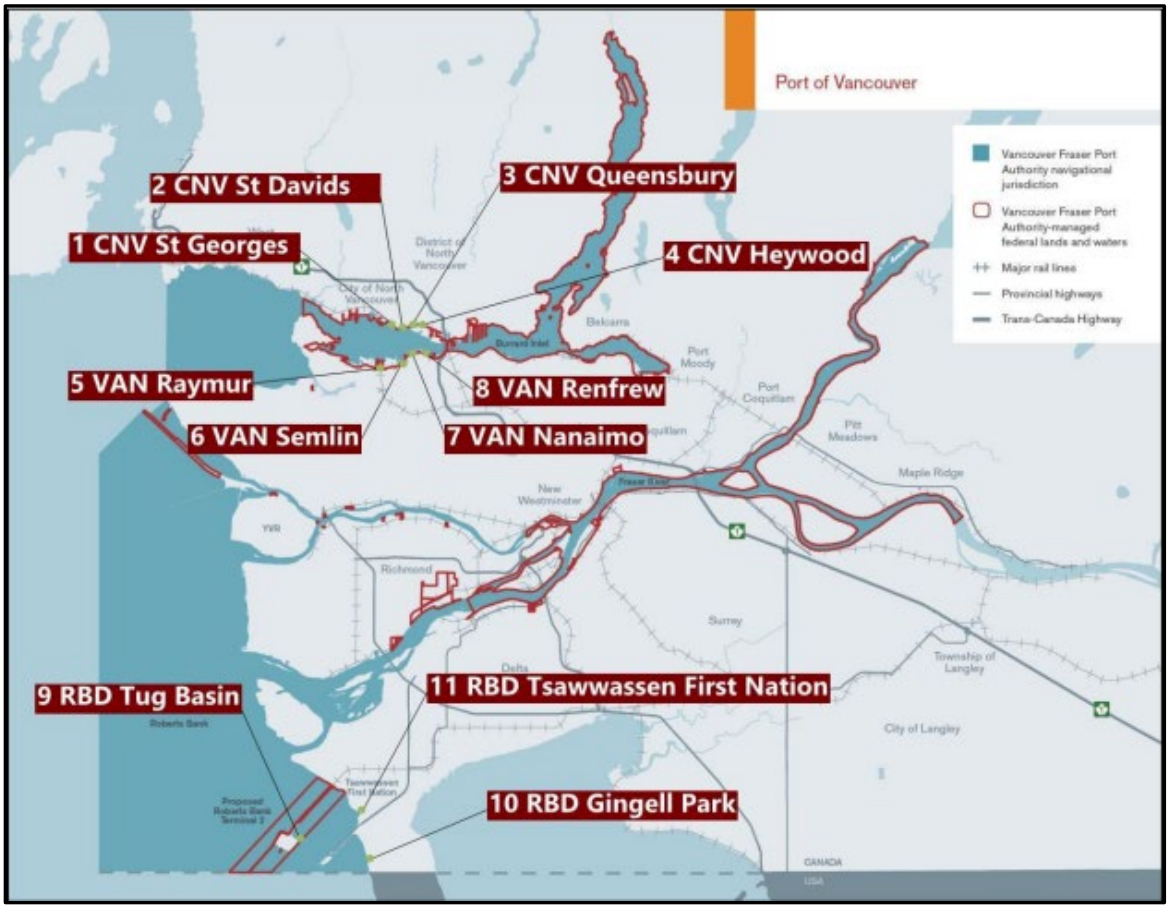


Figure 2-1: Port Authority Noise Monitoring Stations

Source: Figure 3 in Port Authority (2021).

2.1.1.2 Neptune Stations

NBT has installed two offsite noise monitoring stations in the surrounding community. BKL oversees these monitoring stations as Qualified Professionals (QPs). The stations are referred to as the residential address at which they are located at, as below (see Figure 2-2):

- 817 4th Street East Monitor Station (NBT Fourth Street).
- 926 Cloverley Street Monitor Station (NBT Cloverley Street).

BKL provided the NBT B2D2 Project team with hourly means of the noise data collected from both stations; however, only Fourth Street was used in the analysis since the Cloverley Station was not established until October 2022.

Mean hourly data are available upon request.

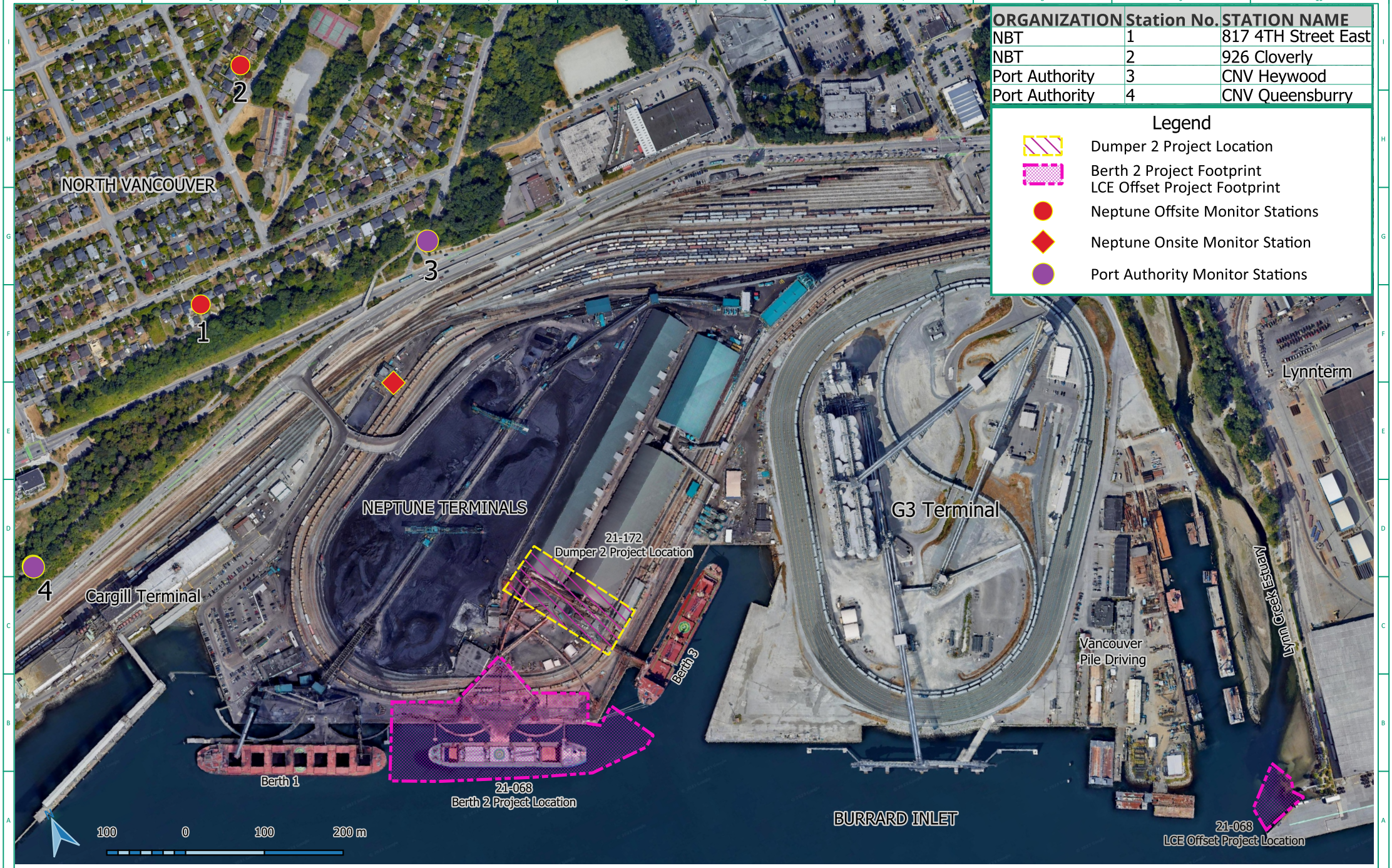
Table 2-1: Port Authority and Neptune Noise Monitoring Locations

ORGANIZATION	STATION NO.	STATION NAME	RELATIVE TO NBT ONSITE NOISE MONITORING STATION	
			Distance (m)	Direction
NBT	1	817 Fourth Street East Monitor Station	270	NW
	2	926 Cloverley Street Monitor Station	450	N
Port Authority	3	CNV Heywood Monitor Station	185	NE
	4	CNV Queensbury Monitor Station	500	W

Note: The NBT onsite noise monitoring station is located approximately 470 m N and 365 m N to centre of the B2 and D2 Projects respectively (see Figure 2-2).

2.1.2 Data Acquisition

Measurements were recorded in dB as an A-weighted equivalent continuous sound level (L_{Aeq}) and averaged over 60-minute periods. A-weighting is a standard weighting of the audible frequencies designed to reflect the response of the human ear to noise (Cirrus Research plc, 2015).



ORGANIZATION	Station No.	STATION NAME
NBT	1	817 4TH Street East
NBT	2	926 Cloverly
Port Authority	3	CNV Heywood
Port Authority	4	CNV Queensburry

Legend

- Dumper 2 Project Location
- Berth 2 Project Footprint
  LCE Offset Project Footprint
- Neptune Offsite Monitor Stations
- Neptune Onsite Monitor Station
- Port Authority Monitor Stations

LEGEND:

SOURCES / NOTE:
NAD1983 CORS96 UTM 10N
Scale 1:5000
Units: meters
Static (relies on a datum which is plate-fixed)
Celestial body: Earth
Method: Universal Transverse Mercator (UTM)

PROJECT: Neptune Terminals B2D2
SYSTEM:
ASSET:
DISCIPLINE: Regulatory

REV	YYYY-MM-DD	DESCRIPTION	DRAWN	APPROVED
A	2023-02-03	Neptune Terminals Noise Monitor	C. Knight	
	2023-03-28	Neptune Terminals Noise Monitor	C. Knight	

ISSUES / REVISIONS

VENDOR: Dynamic Ocean Consulting Ltd.

Neptune TERMINALS

TITLE:
Neptune and Port Authority Noise Monitoring Locations
Figure 2-2

SCALE: As Shown
SHEET 1 OF 1
DRAWING NO. 2023-03-28-004
REV: A

2.1.3 Statistical Analysis

The data from the three stations were processed to calculate the mean, standard deviation, and median noise levels within the Port Authority's out of hours categories (see Table 1-1). This report is exclusive to out of hours analysis. Additionally, data were grouped by day and month to investigate seasonal variance between bin and category means, medians, and outliers.

Comparative plots for the three stations were produced to visualize daily and seasonal trends. The results are described in Section 2.2.1 and the data tables are provided in Appendix A.

2.1.4 Threshold Exceedance Analysis

Based on the noise monitoring station data, a table of dates and times of all noise levels over the recommended thresholds (Section 1.4) was developed to confirm the number of events and time off occurrence across stations.

2.2 Results

2.2.1 Statistical Analyses Results

Results from noise analyses varied between the monitoring stations, where CNV Heywood was the loudest station and NBT Fourth Street was the quietist station (Figure 2-3; Table 2-2 to Table 2-4). During all hours of the day from Monday to Saturday, NBT Fourth Street was generally below the 63 dB threshold while CNV Heywood was above the 63 dB threshold, except for midnight to 5 am (Appendix A, Figure A-1). CNV Queensbury was quieter than CNV Heywood, and in general, night hours were below 63 dB (Appendix A, Figure A-1).

When considering mean noise for all days of the week, NBT Fourth Street has the least variability across bins while CNV Heywood has the most variability (Appendix A, Figure A-2). Additionally, during days and evenings at CNV Heywood, mean noise levels were consistently above 63 dB, whereas at CNV Queensbury, day and evening noise levels hovered around 63 dB (Appendix A, Figure A-2).

When investigating noise variability across months, NBT Fourth Street was consistent for most of the year except for December, when noise levels were more variable throughout the day (Appendix A, Figure A-3). This December trend was present for CNV Heywood as well (Appendix A, Figure A-4), but CNV Queensbury had the most noise variability in June (Appendix A, Figure A-5).

In general, July was the quietest month for NBT Fourth Street (57.5 dB), and March was the loudest (59.6 dB). At CNV Heywood, July was also the quietest month (63.9 dB), and February was the loudest (65.2 dB). Lastly, at CNV Queensbury, June was the quietest month (60.1 dB), and similar to CNV Heywood, February was the loudest (64.2 dB).

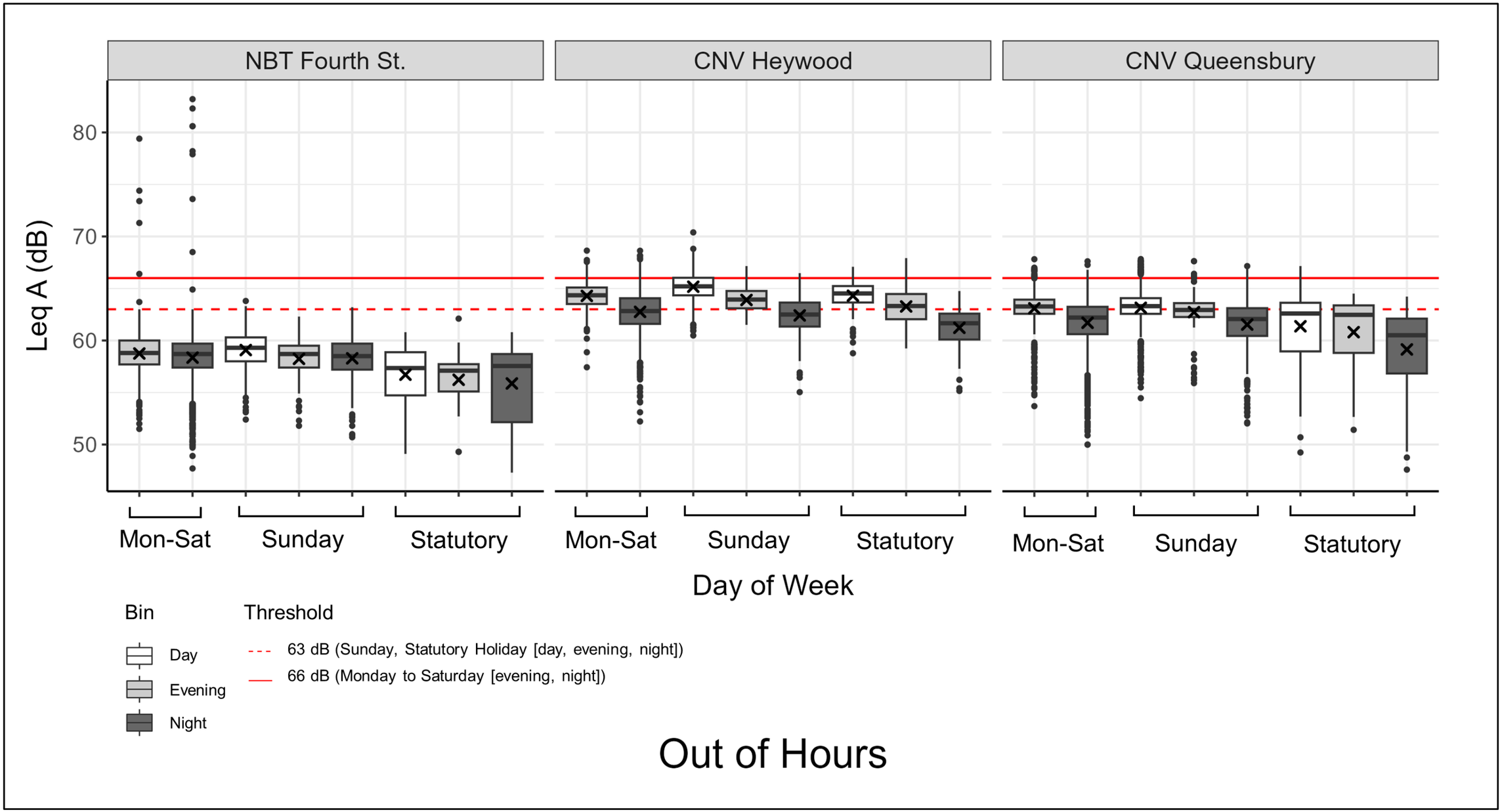


Figure 2-3: Out of Hours

Table 2-2: Monday to Saturday Out of Hours

ANALYSIS TYPE	STATION		
	NBT	PORT AUTHORITY	
	FOURTH STREET	CNV HEYWOOD	CNV QUEENSBURY
Evening			
Mean	58.44	64.26	63.04
SD	2.498	1.327	1.920
Median	58.70	64.33	63.25
Min	51.50	57.43	53.69
Max	79.40	68.64	67.81
Night			
Mean	58.32	62.71	61.65
SD	2.387	1.985	2.494
Median	58.70	62.79	63.14
Min	47.70	52.22	49.99
Max	83.20	68.63	67.61

Note: Raw data are available upon request.

Table 2-3: Sunday Out of Hours

ANALYSIS TYPE	STATION		
	NBT	PORT AUTHORITY	
	FOURTH STREET	CNV HEYWOOD	CNV QUEENSBURY
Evening			
Mean	58.01	63.89	62.60
SD	2.001	1.191	2.318
Median	58.30	63.92	62.91
Min	51.80	61.50	55.90
Max	62.30	67.15	67.63
Night			
Mean	58.25	62.35	61.37
SD	2.326	1.753	2.774
Median	58.50	62.47	62.87
Min	50.70	55.04	52.02
Max	63.20	66.47	67.15
Day			
Mean	58.98	65.13	63.04
SD	1.826	1.387	2.214
Median	59.20	65.17	63.27
Min	52.40	60.48	54.46
Max	63.80	70.39	67.83

Note: Raw data are available upon request.

Table 2-4: Statutory Holidays Out of Hours

ANALYSIS TYPE	STATION		
	NBT	PORT AUTHORITY	
	FOURTH STREET	CNV HEYWOOD	CNV QUEENSBURY
Evening			
Mean	56.30	63.27	60.80
SD	3.012	2.114	3.883
Median	57.25	63.31	62.47
Min	49.30	59.24	51.41
Max	62.10	67.92	64.51
Night			
Mean	55.70	61.22	59.14
SD	3.012	1.950	4.042
Median	57.25	61.66	60.50
Min	47.30	55.15	47.59
Max	60.80	64.83	64.22
Day			
Mean	56.71	64.30	61.37
SD	2.719	1.398	3.707
Median	57.35	64.52	62.59
Min	49.10	58.77	49.24
Max	61.30	67.49	67.25

Note: Raw data are available upon request.

Table 2-5: Monthly Mean Noise Levels for Monday to Saturday (Evening, Night)

MONTH	STATION		
	NBT	PORT AUTHORITY	
	FOURTH STREET	CNV HEYWOOD	CNV QUEENSBURY
Evening			
Jan	59.29 ± 2.75	64.58 ± 1.78	63.61 ± 2.68
Feb	59.63 ± 1.51	65.02 ± 0.98	64.41 ± 1.36
Mar	59.37 ± 2.02	64.62 ± 1.26	62.97 ± 2.17
Apr	59.04 ± 2.76	64.43 ± 1.18	63.35 ± 0.73
May	58.74 ± 1.3	64.13 ± 1.13	63.45 ± 0.68
Jun	58.34 ± 1.87	64.03 ± 1.28	60.76 ± 2.89
Jul	57.12 ± 1.5	63.86 ± 1.37	62.65 ± 0.75
Aug	57.79 ± 1.55	64.05 ± 1.03	62.54 ± 0.91
Sep	58.03 ± 1.69	63.85 ± 1.04	62.59 ± 1.22
Oct	59.43 ± 2.21	64.38 ± 1.05	63.42 ± 0.7
Nov	58.73 ± 1.73	64.35 ± 1.24	64.13 ± 0.9

MONTH	STATION		
	NBT	PORT AUTHORITY	
	FOURTH STREET	CNV HEYWOOD	CNV QUEENSBURY
Dec	58.61 ± 4.7	63.84 ± 1.81	62.75 ± 2.8
Night			
Jan	58.83 ± 2.47	62.9 ± 2	62.94 ± 2.05
Feb	58.97 ± 1.69	63.44 ± 1.75	63.06 ± 1.78
Mar	58.92 ± 2.11	62.94 ± 2.11	61.78 ± 2.71
Apr	59.12 ± 4.19	63.13 ± 1.98	61.11 ± 1.68
May	58.65 ± 1.55	62.32 ± 2	60.88 ± 1.85
Jun	57.71 ± 2.35	62.29 ± 2.17	58.38 ± 3.16
Jul	56.85 ± 1.87	62.18 ± 2.19	60.47 ± 2.05
Aug	57.56 ± 1.87	62.52 ± 1.83	60.33 ± 1.78
Sep	57.95 ± 2.26	62.59 ± 1.85	61.94 ± 1.83
Oct	58.68 ± 1.72	62.83 ± 1.66	63.07 ± 0.69
Nov	58.3 ± 2.28	62.78 ± 2	63.44 ± 0.95
Dec	58.03 ± 2.71	62.69 ± 1.89	62.53 ± 2.69
Day			
Jan	60.03 ± 2.29	66.43 ± 1.33	64.87 ± 2.46
Feb	59.88 ± 1.52	66.52 ± 1.1	65.04 ± 1.22
Mar	60.15 ± 1.62	66.53 ± 1.08	63.68 ± 2.1
Apr	59.54 ± 1.54	66.3 ± 1.08	63.55 ± 0.88
May	59.51 ± 1.66	65.7 ± 1.14	63.89 ± 1.12
Jun	59.11 ± 1.37	65.47 ± 1.06	61.41 ± 2.44
Jul	57.88 ± 1.56	65.18 ± 1.1	62.93 ± 1.04
Aug	58.19 ± 1.52	65.23 ± 1.18	62.63 ± 1
Sep	58.61 ± 2.21	65.42 ± 0.99	62.69 ± 1.73
Oct	59.25 ± 1.8	66.03 ± 1.29	63.95 ± 1.03
Nov	59.52 ± 1.83	66.16 ± 1.08	64.45 ± 0.93
Dec	58.8 ± 3.58	65.76 ± 2.04	63.45 ± 2.4

Note: Means ± standard deviation.

Table 2-6: Sunday Quarterly Means

QUARTER	TIME OF DAY	STATION		
		NBT	PORT AUTHORITY	
		NBT FOURTH STREET	CNV HEYWOOD	CNV QUEENSBURY
(Jan-Mar)	Day	60.14 ± 1.42	65.96 ± 1.26	64.17 ± 2.39
(Jan-Mar)	Evening	59.43 ± 1.5	64.47 ± 1.21	63.75 ± 2.64
(Jan-Mar)	Night	59.12 ± 2.18	62.83 ± 1.82	62.39 ± 2.56
(Apr-Jun)	Day	59.02 ± 1.66	64.95 ± 1.34	61.96 ± 2.4
(Apr-Jun)	Evening	57.83 ± 2.19	63.61 ± 1.23	61.42 ± 2.56
(Apr-Jun)	Night	58.53 ± 1.72	62.38 ± 1.61	59.74 ± 2.89
(Jul-Sep)	Day	58.39 ± 1.41	64.64 ± 1.08	62.67 ± 1.28
(Jul-Sep)	Evening	57.74 ± 1.92	63.82 ± 1.1	62.26 ± 0.88
(Jul-Sep)	Night	57.51 ± 1.9	62.08 ± 1.7	60.93 ± 1.69
(Oct-Dec)	Day	58.4 ± 2.14	64.97 ± 1.48	63.35 ± 1.96
(Oct-Dec)	Evening	57.76 ± 1.92	63.67 ± 1.08	62.97 ± 2.17
(Oct-Dec)	Night	57.46 ± 2.7	62.13 ± 1.8	62.42 ± 2.86

Note: Means ± standard deviation.

2.2.2 Threshold Analysis

The number of occurrences for noise recordings over the B2D2 Project thresholds are summarized in Table 2-7. Hour by hour documented exceedances for each monitoring station are available upon request.

Fewer exceedances were identified for the proposed Monday to Saturday thresholds (66 dB) compared to the lower threshold proposed for Sundays and statutory holidays (63 dB). When analyzing specifically the Monday to Saturday category, exceedances were identified most frequently at the CNV Heywood (180) noise monitoring station, followed by CNV Queensbury (43) and the fewest occurrences at NBT Fourth Street (13). Across all three noise monitoring stations, threshold exceedances occurred more frequently for the night bin (22:01-06:59) than the evening bin (20:01-22:00). However, once the number of hours within each bin were corrected (evening bin: two; night bin: nine), exceedances occurred more frequently per hour across the year for the evening bin (CNV Heywood: evening = 30, night = 13.3; CNV Queensbury: evening = 8.5, night = 2.9; NBT Fourth Street: evening = 2.5, night = 0.9).

CNV Heywood also had the highest occurrence of exceedances on Sunday (876) and statutory holidays (170) category, followed by CNV Queensbury (Sunday = 569, statutory holidays = 73), and NBT Fourth Street, which only had five exceedances on Sunday and none on statutory holidays. Most exceedances identified during Sunday and statutory holidays category occurred during the day, and similarly, higher occurrence of threshold exceedances was identified during the night bin compared to the evening bin.

Table 2-7: 2022 Noise Occurrences – Noise Events Over Proposed Thresholds

MONITOR SITE	NBT FOURTH STREET			CNV HEYWOOD			CNV QUEENSBURY		
DAY	Monday – Saturday	Sunday	Statutory Holiday	Monday – Saturday	Sunday	Statutory Holiday	Monday – Saturday	Sunday	Statutory Holiday
THRESHOLD LEVEL (DB)	**66**	**63**		**66**	**63**		**66**	**63**	
EVENING	5	0	0	60	78	15	17	43	8
NIGHT	8	1	0	120	176	18	26	123	6
DAY	-	4	0	-	622	137	-	403	59
TOTAL	**13**	**5**	**0**	**180**	**876**	**170**	**43**	**569**	**73**

3 CONSTRUCTION NOISE MODELLING

Construction noise modelling was carried out by BKL for the B2 and D2 Projects to predict the noise levels that will be generated during construction (BKL, 2022a, 2022b). BKL was provided with a list of equipment expected to be required for both projects.

Based on the construction schedule and equipment data, BKL modelled the loudest construction activity outside of regular work hours for the B2 (PER 21-068) and D2 (PER 21-172) Projects (Table 3-1).

Cadna/A noise mapping software was used to model the construction activities listed above and predict the resulting noise levels in the community. Cadna/A incorporates the internationally recommended International Organization for Standardization (ISO) Standard 9613-2:1996 (ISO, 1996) for calculating the attenuation of sound propagation outdoors. It predicts the A-weighted sound pressure level under meteorological conditions favourable for sound propagation.

The loudest construction activity, both during Sunday out of hours periods as listed in Table 3-1 above, is vibratory hammer pile installation. Table 3-2 provides the prediction for noise levels at the NBT Fourth Street Station.

Table 3-1: BKL Berth 2 Dumper 2 Equipment for Noise Modelling

PROJECT	PER ID	CONSTRUCTION ACTIVITY	CONSTRUCTION EQUIPMENT
B2	21-068	Vibratory Hammer Pile Installation	Liebherr 885HD crawler crane 400 kW
			APE200-6 Vibratory Hammer 563 kW
			400 Amp Welder 15 kW
			Telehandler 55.4 kW
			18 m Manlift 18 kW
			Delivery trucks
			Dewatering pumps
D2	21-172	Demolition	Long Reach Excavator with hammer attachment 200kW (CAT336D)
			Excavator 129.4kW (CAT325)

PROJECT	PER ID	CONSTRUCTION ACTIVITY	CONSTRUCTION EQUIPMENT
			Skid Steer Loader 66.6kW
			18M Manlift 18kW
			Dump Trucks
			Demo Trucks
		Screw Piles	Excavator CAT330F 205 kW
			Telehandler 55.4 Kw
			400 Amp Welder
		Temporary Bridges	Liebherr 885HD Crawler Crane 400kW
			APE200-6 Vibratory Hammer 563 kW
			400 Amp Welder 15 kW
			Telehandler 55.4 kW
			18 m Manlift 18kW
			Long Reach Excavator with hammer attachment 200kW
			Excavator 129.4kW (CAT325)
			Skid Steer Loader 66.6kW
			Dump Trucks

Table 3-2: Berth 2 Dumper 2 Project - Loudest Noise Prediction Results at Community Measurement Location

PREDICTED NOISE LEVEL (*LEQ*, DBA)	
Berth 2 (PER 21-068)	**Dumper 2 (PER 21-172)**
58	61

Source: NBT Fourth Street Station.

4 COMPLAINTS PROCEDURE

NBT's Environmental Complaint Procedure (NBT, 2022) will be followed in the event of any questions, concerns, and complaints received from the community either forwarded through the Port Authority's Community Feedback line or directly via NBT's Community Inquiries line.

Investigations of noise concerns will involve reviewing the timing of the event in correlation to the noise monitoring stations. The data will be reviewed in part with the operations taking place onsite. If further analysis of the noise data is required, the QP will be brought in to further the investigation process. NBT's procedure for responding to community noise concerns is as follows:

- Complaint is received by NBT from either a resident, business, or from a regulatory authority.
- Complaint is referred to Director of People & Community and Vice President of Health, Safety and Environment.

- The complaint is investigated thoroughly to determine whether the noise is attributable to NBT. Noise monitors are checked with every complaint to attempt to determine noise source and to confirm noise has not exceeded allowable thresholds.
- Should investigation results indicate that the noise is not from NBT, the complainant will be provided with a response indicating the potential noise source and referred to the appropriate regulatory authority or company.
- Should investigation results indicate that the noise is from NBT, an internal investigation will be conducted to assess which aspect of the Terminal the noise originated from and to determine whether additional mitigation measures are applicable to reduce noise. The complainant will be provided with a response indicating the noise source and provided with the additional steps NBT will implement to reduce noise.
- All complaints will be recorded within NBT's internal database.
- NBT will notify the Port Authority of any questions, concerns, or complaints received within two business days of being received and will also provide the Port Authority with a copy of NBT's response to the community concern.

The dates and times that exceedances of the proposed noise threshold occurred in 2022 were cross referenced with the NBT and Port Authority noise complaints logs. Sections 4.1 and 4.2 compare noise exceedance timing with the respective complaints' logs.

4.1 Neptune Complaints Log

Through 2022, 15 complaints were logged to NBT by the community; however, none of the complaints were related to noise, and none were determined to be attributed to be NBT-related noise following investigation.

4.2 Port Authority Complaints Log

A record of noise complaints were requested from the Port Authority corresponding to instances where exceedances of the propose noise threshold occurred (Port Authority, 2023c). Throughout 2022, there were six noise complaints in the vicinity of the Port Authority noise stations, where just one on 14-Dec-22 was pertinent to construction related noise. Maximum and mean noise recorded at all three stations on this date is reported in Table 4-1.

Table 4-1: Maximum and Mean Noise for Each Station on December 14, 2022

STATION	MAXIMUM LEQ A (DB)	MEAN LEQ A (DB ± SD)
NBT Fourth Street	61.40	59.43 ± 1.33
CNV Heywood	67.74	65.21 ± 2.20
CNV Queensbury	65.67	64.34 ± 0.71

5 DISCUSSION

NBT has developed this report to support our proposed noise thresholds of 66 dB (Monday to Sat – evening and night) and 63 dB (Sunday/Statutory holiday – all hours). This threshold has been justified based on an analysis of 2022 data at NBT's Fourth Street Station and at two of the Port Authority Noise Stations (CNV Heywood, CNV Queensbury).

Mean noise levels throughout the year at the three stations ranged from 59 dB to 65 dB, with the NBT Fourth Street Station consistently being the quietest of the three stations. This is a predictable outcome, as the Port Authority's noise monitoring stations are closer to industrial and commercial activity. In consideration of the NBT traditional approach for noise thresholds, a threshold of 64 dB would be considered (mean plus 5 dB). However, throughout 2022, there were numerous instances where sound levels were recorded above 66 dB.

Of all complaints received, one received by the Port Authority was determined to be a result of construction noise (see Section 4.2). When the date of this complaint was cross-checked with the sound levels at each noise monitoring station, data indicated that the mean noise recorded at the three stations were below 66 dB but was over 63 dB at both CNV stations and was not dissimilar with the overall noise trend observed throughout 2022. Further analysis of complaints received by NBT and the Port Authority for 2022 reveal that the majority of noise complaints received were not concerning construction.

Application of the proposed thresholds for the B2D2 Project is expected to be appropriate given that the history of complaints was primarily concerning noise outside of construction and unrelated to NBT, and as based on the noise trends observed at the CNV and NBT noise monitoring stations. NBT will continue to monitor complaints received concerning noise and implement adaptive management measures should monitoring indicate construction activities generating noise in excess of the proposed thresholds or due to community concerns. Adaptive management measures may include lowering the noise threshold should noise levels generated by B2D2 Project construction activity be determined to be responsible for neighbour complaints.

NBT has developed an EHWP (NBT, in progress) to outline NBT's commitments during B2D2 Project construction activity occurring outside of the Port Authority's standard working hours and details procedures for responding to noise exceedances recorded at NBT monitoring stations. This includes the ability for NBT noise stations to send notifications to onsite NBT personnel when exceedances are recorded, allowing for the B2D2 Project to quickly determine whether noise is attributable to NBT operations and/or the B2D2 Project and implement appropriate adaptive and corrective actions.

6 CLOSURE

Regulatory professionals from BKL and NBT (through Dynamic Ocean Consulting Ltd [Dynamic Ocean]) have contributed to developing supporting documents specific Port Authority noise compliance.

ORGANIZATION	NAME
NBT	Victoria Burdett-Coutts, MSc. RPBio
Dynamic Ocean	Peter Snow, PEng
	Dr. Emily Adamczyk, PhD
	Carmen Wu, BSc., BIT
	Dr. William Halliday, PhD

If you have any further questions, please contact:

Victoria Burdett-Coutts
Senior Regulatory Professional
Neptune Bulk Terminals (CANADA) Ltd.
778-839-2372 (mobile)
vburdett-coutts@neptuneterminals.com.

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APPENDIX A: NOISE MONITORING STATION 2022 ANALYSIS 24 HOUR & MONDAY TO SUNDAY SERIES FIGURES

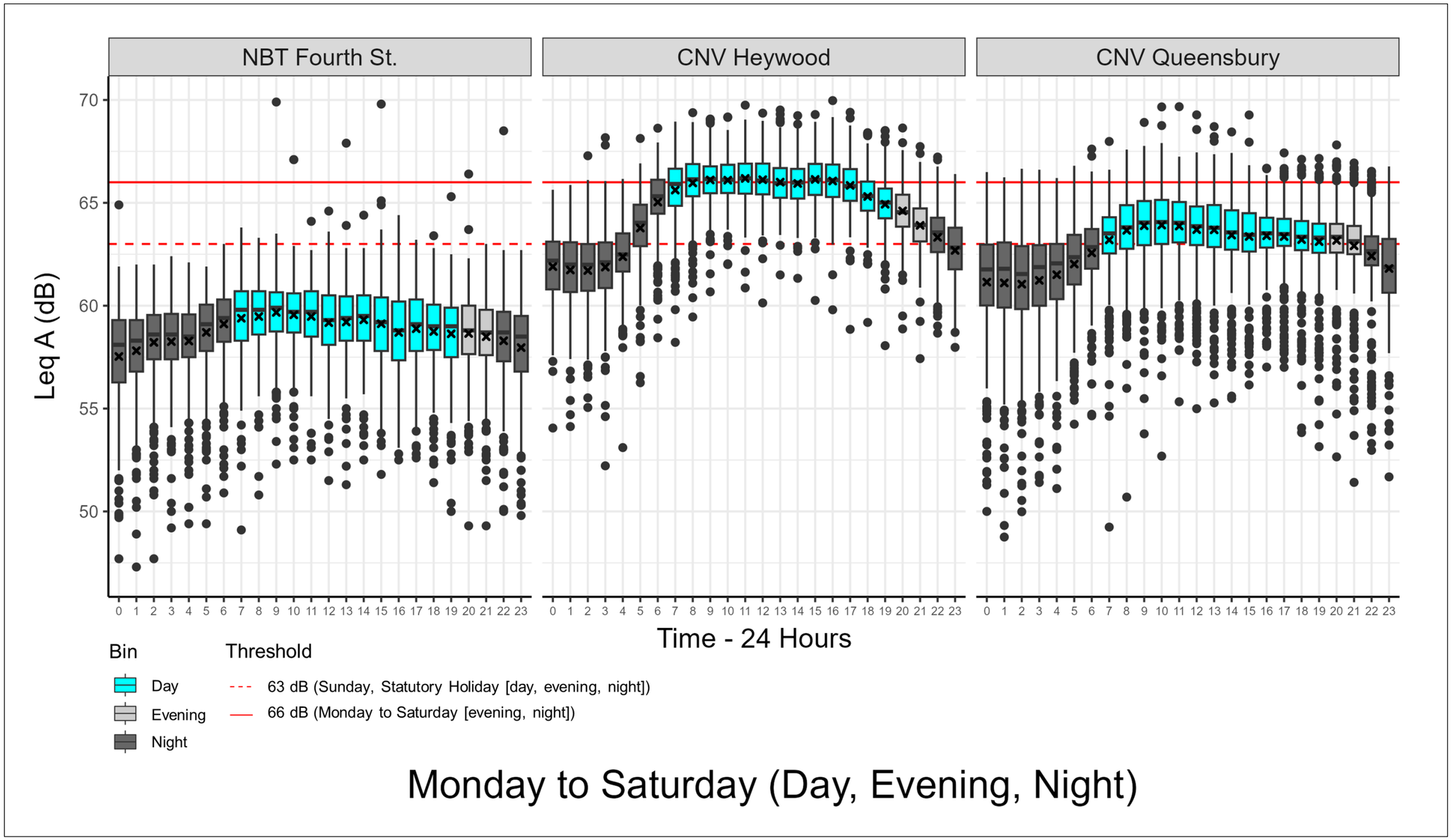

Figure A-1: Monday to Saturday (Day [In Hours], Evening, Night) – Annual Summary

Note: for values over 70 dB see Appendix B – Table B-1.

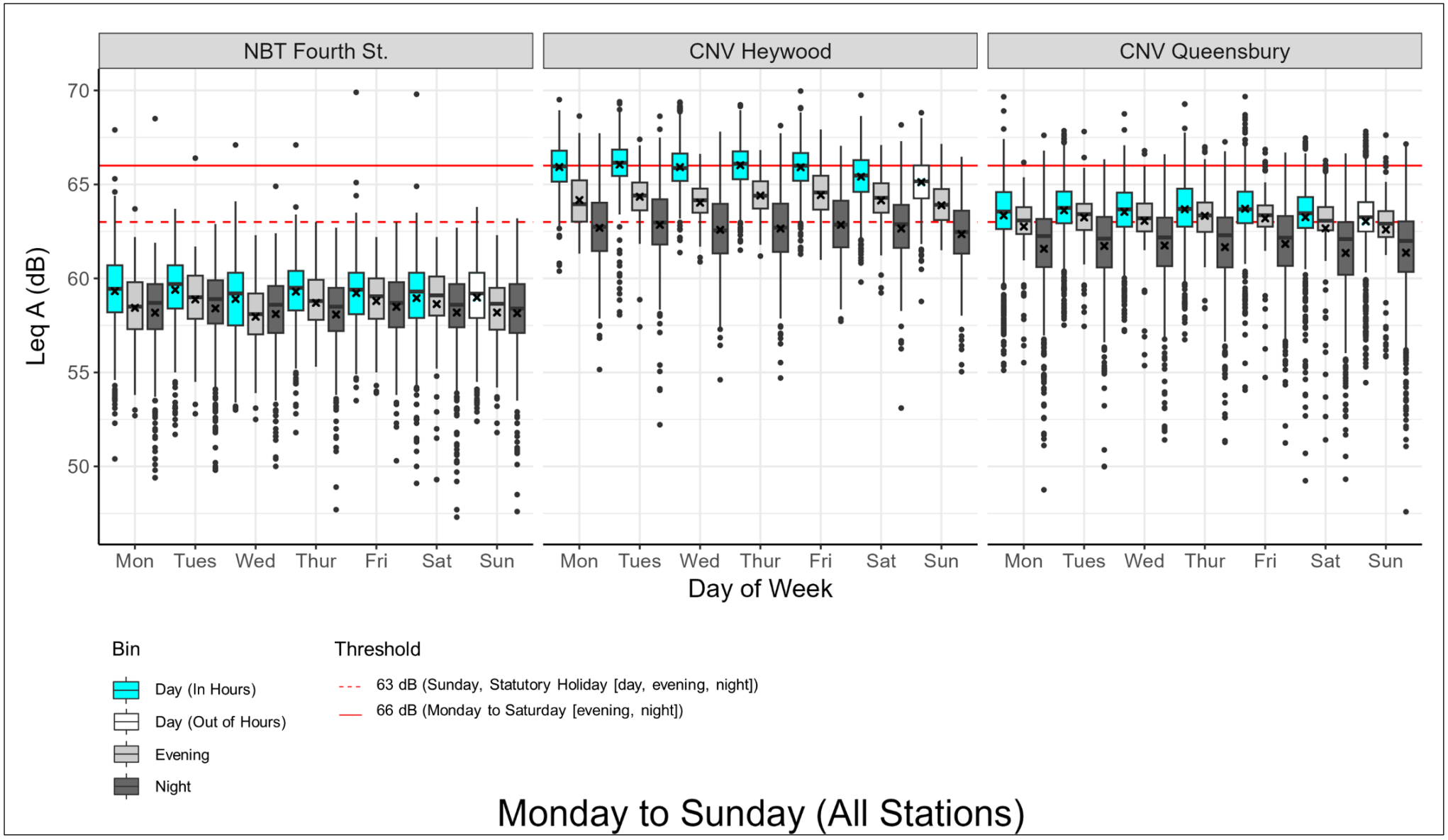

Figure A-2: Monday to Sunday – All Stations - (Day, Evening Night – Annual Summaries by Day of Week)

Note: for values over 70 dB see Appendix B – Table B-2.

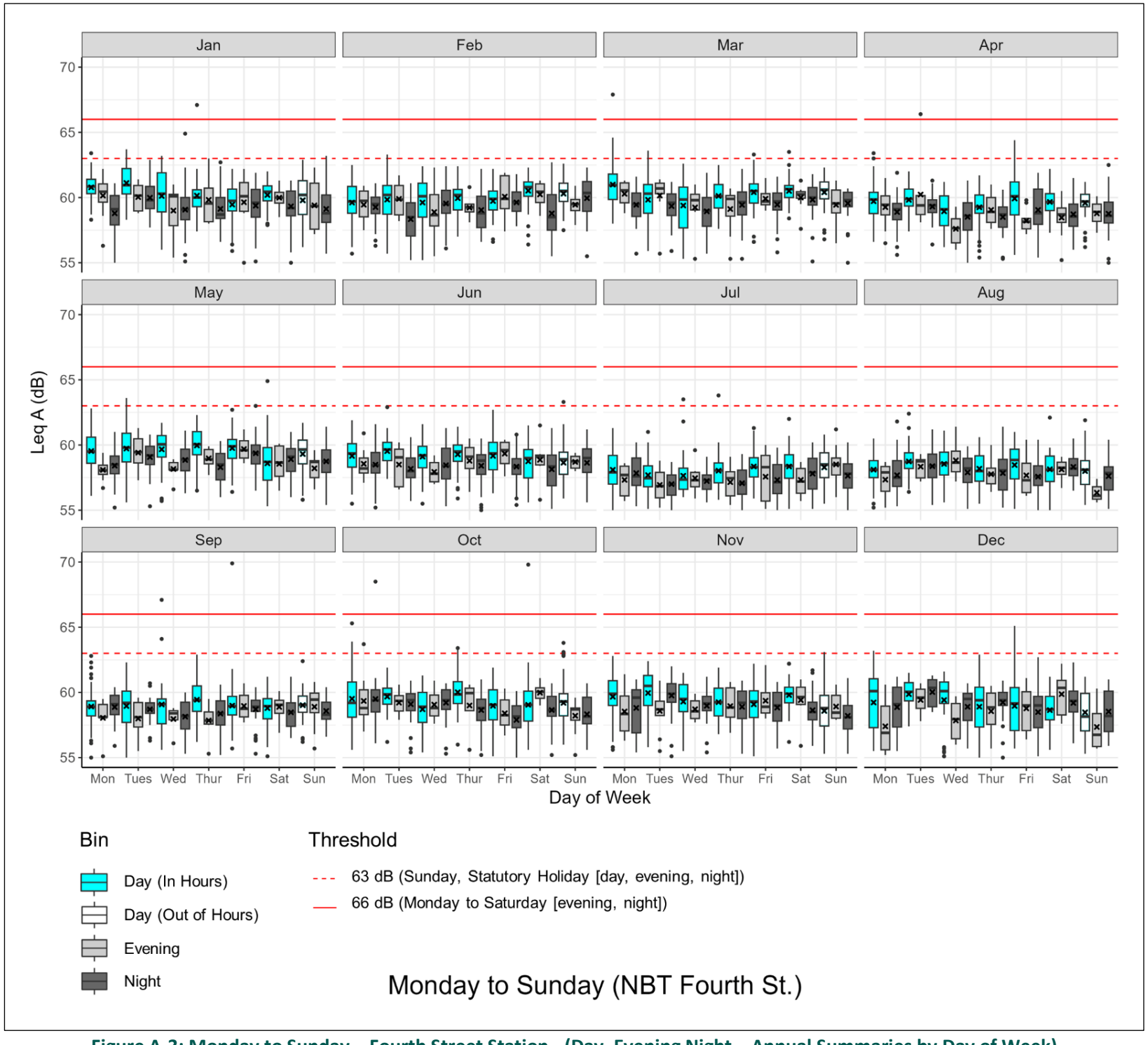

Figure A-3: Monday to Sunday – Fourth Street Station - (Day, Evening Night – Annual Summaries by Day of Week)

Note: for values over 70 dB see Appendix B –Table B-2.

Figure A-4: Monday to Sunday – Heywood Street Station - (Day, Evening Night – Annual Summaries by Day of Week)

Note: for values over 70 dB see Appendix B – Table B-2.

Figure A-5: Monday to Sunday – Queensbury Street Station - (Day, Evening Night – Annual Summaries by Day of Week)

Note: for values over 70 dB see Appendix B – Table B-2.

APPENDIX B: NOISE MONITORING STATION 2022 ANALYSIS DATES OVER 70 DB FOR APPENDIX A FIGURES

Table B-1: Values over 70 dB for Monday to Saturday – All Stations (Day [In Hours], Evening, Night) – Monthly Means – Figure A-1

STATION	DATE	TIME	LEQ A (DB)	DAY OF WEEK	TIME OF DAY
CNV Heywood	2022-02-15	13:00:00	70.5	Tuesday	Day
CNV Heywood	2022-04-12	11:00:00	71.5	Tuesday	Day
CNV Heywood	2022-05-04	15:00:00	70.2	Wednesday	Day
CNV Heywood	2022-05-31	11:00:00	71.0	Tuesday	Day
CNV Heywood	2022-06-13	16:00:00	73.1	Monday	Day
CNV Heywood	2022-06-14	13:00:00	70.1	Tuesday	Day
CNV Heywood	2022-07-05	14:00:00	72.1	Tuesday	Day
CNV Heywood	2022-08-05	12:00:00	71.0	Friday	Day
CNV Heywood	2022-08-12	14:00:00	73.7	Friday	Day
CNV Heywood	2022-09-29	11:00:00	70.0	Thursday	Day
CNV Heywood	2022-10-01	8:00:00	75.5	Saturday	Day
CNV Heywood	2022-10-24	13:00:00	73.1	Monday	Day
CNV Heywood	2022-11-07	11:00:00	71.7	Monday	Day
CNV Heywood	2022-12-07	8:00:00	71.2	Wednesday	Day
CNV Queensbury	2022-02-18	13:00:00	72.5	Friday	Day
CNV Queensbury	2022-05-13	15:00:00	70.2	Friday	Day
CNV Queensbury	2022-06-30	10:00:00	70.4	Thursday	Day
CNV Queensbury	2022-06-30	11:00:00	73.1	Thursday	Day
CNV Queensbury	2022-09-01	11:00:00	70.1	Thursday	Day
NBT Fourth St.	2022-01-17	10:00:00	71.3	Monday	Day
NBT Fourth St.	2022-04-05	21:00:00	74.4	Tuesday	Evening
NBT Fourth St.	2022-04-05	22:00:00	77.9	Tuesday	Night
NBT Fourth St.	2022-04-05	23:00:00	80.6	Tuesday	Night
NBT Fourth St.	2022-04-06	0:00:00	83.2	Wednesday	Night
NBT Fourth St.	2022-04-06	1:00:00	82.3	Wednesday	Night
NBT Fourth St.	2022-04-06	2:00:00	80.6	Wednesday	Night
NBT Fourth St.	2022-04-06	3:00:00	78.2	Wednesday	Night
NBT Fourth St.	2022-04-06	4:00:00	73.6	Wednesday	Night
NBT Fourth St.	2022-10-31	21:00:00	71.3	Monday	Evening
NBT Fourth St.	2022-11-23	15:00:00	75.8	Wednesday	Day
NBT Fourth St.	2022-12-30	16:00:00	78.4	Friday	Day
NBT Fourth St.	2022-12-30	17:00:00	81.3	Friday	Day
NBT Fourth St.	2022-12-30	18:00:00	82.2	Friday	Day
NBT Fourth St.	2022-12-30	19:00:00	82.1	Friday	Day
NBT Fourth St.	2022-12-30	20:00:00	79.4	Friday	Evening
NBT Fourth St.	2022-12-30	21:00:00	73.4	Friday	Evening

Note: See Appendix A: Figure A-1 for graphical depiction of figures for values below 70 dB.

Table B-2: Values over 70 dB for Monday to Sunday – All Stations (Day, Evening, Night) – Annual Means by Day of Week

STATION	DATE	TIME	LEQ A (DB)	DAY OF WEEK	TIME OF DAY
CNV Heywood	2022-01-02	15:00:00	70.4	Sunday	Day
CNV Heywood	2022-02-15	13:00:00	70.5	Tuesday	Day
CNV Heywood	2022-04-12	11:00:00	71.5	Tuesday	Day
CNV Heywood	2022-05-04	15:00:00	70.2	Wednesday	Day
CNV Heywood	2022-05-31	11:00:00	71.0	Tuesday	Day
CNV Heywood	2022-06-13	16:00:00	73.1	Monday	Day
CNV Heywood	2022-06-14	13:00:00	70.1	Tuesday	Day
CNV Heywood	2022-07-05	14:00:00	72.1	Tuesday	Day
CNV Heywood	2022-08-05	12:00:00	71.0	Friday	Day
CNV Heywood	2022-08-12	14:00:00	73.7	Friday	Day
CNV Heywood	2022-09-29	11:00:00	70.0	Thursday	Day
CNV Heywood	2022-10-01	8:00:00	75.5	Saturday	Day
CNV Heywood	2022-10-24	13:00:00	73.1	Monday	Day
CNV Heywood	2022-11-07	11:00:00	71.7	Monday	Day
CNV Heywood	2022-12-07	8:00:00	71.2	Wednesday	Day
CNV Queensbury	2022-02-18	13:00:00	72.5	Friday	Day
CNV Queensbury	2022-05-13	15:00:00	70.2	Friday	Day
CNV Queensbury	2022-06-30	10:00:00	70.4	Thursday	Day
CNV Queensbury	2022-06-30	11:00:00	73.1	Thursday	Day
CNV Queensbury	2022-09-01	11:00:00	70.1	Thursday	Day
NBT Fourth St.	2022-01-17	10:00:00	71.3	Monday	Day
NBT Fourth St.	2022-04-05	21:00:00	74.4	Tuesday	Evening
NBT Fourth St.	2022-04-05	22:00:00	77.9	Tuesday	Night
NBT Fourth St.	2022-04-05	23:00:00	80.6	Tuesday	Night
NBT Fourth St.	2022-04-06	0:00:00	83.2	Wednesday	Night
NBT Fourth St.	2022-04-06	1:00:00	82.3	Wednesday	Night
NBT Fourth St.	2022-04-06	2:00:00	80.6	Wednesday	Night
NBT Fourth St.	2022-04-06	3:00:00	78.2	Wednesday	Night
NBT Fourth St.	2022-04-06	4:00:00	73.6	Wednesday	Night
NBT Fourth St.	2022-10-31	21:00:00	71.3	Monday	Evening
NBT Fourth St.	2022-11-23	15:00:00	75.8	Wednesday	Day
NBT Fourth St.	2022-12-30	16:00:00	78.4	Friday	Day
NBT Fourth St.	2022-12-30	17:00:00	81.3	Friday	Day
NBT Fourth St.	2022-12-30	18:00:00	82.2	Friday	Day
NBT Fourth St.	2022-12-30	19:00:00	82.1	Friday	Day
NBT Fourth St.	2022-12-30	20:00:00	79.4	Friday	Evening

STATION	DATE	TIME	LEQ A (DB)	DAY OF WEEK	TIME OF DAY
NBT Fourth St.	2022-12-30	21:00:00	73.4	Friday	Evening

Note: See Appendix A: Figures A-2 through A-5 for graphical depiction of figures for values below 70 dB.