Appendix D

Noise Emissions Analysis

Appendix D-1

Methodology

Contents

1.0 Introduction

This appendix summarizes the noise analysis and methodology for the Berths 191-194 (Orcem) Low-Carbon Cement Processing Facility project. Analysis included an ambient sound level survey and evaluation of potential noise and vibration impacts from on-site construction, on-site operations, and off-site traffic.

2.0 Existing Noise Environment

A noise monitoring survey was conducted by Illingworth & Rodkin, Inc. in November 2022 to quantify existing ambient sound levels in the Project vicinity. The measurements were taken using Class 1 sound level meters (Larson Davis LxT) that were field calibrated prior to the measurements. Five long-term noise measurements were taken at locations representing sensitive receptors nearest to the Orcem Project site as well as the adjacent Vopak project site. The details of the measurements, locations, and results are provided in the Illingworth & Rodkin report, found in Appendix D-2.

3.0 Environmental Noise Analysis

Potential noise emissions from on-site construction, on-site operations, and traffic were analyzed using specialized software (Computer Aided Noise Abatement [CadnaA]) model, Build 189.5221 (Datakustik 2022). CadnaA enables analysis of environmental noise emissions using sound propagation factors as adopted by International Organization for Standardization (i.e., ISO 9613, ISO 17534). CadnaA considers distance, topography, intervening structures, atmospheric attenuation, ground effects, and vegetation when estimating sound levels from specific sources at distant receptor locations. On-site and off-site truck sound levels were analyzed based on the traffic sound levels and methodologies inherent in CadnaA's FHWA TNM module. The analysis was developed using the following steps:

- Collect sound data for all noise sources to be included in the analysis. Sound data was obtained from FHWA (2006) and FTA (2018) for construction noise sources and from the Draft EIR for Orcem's Vallejo Marine Terminal Project (Dudek 2015) for operational noise sources.
- Create a 3-dimensional map of the project site and surrounding area. Elevation data is based on the National Elevation Dataset (NED).
- Build 3-dimensional models of the project structures and buildings in the surrounding area. The models of the project structures are based on the September 29, 2022 Navisworks model, while surround structures are based on data available through OpenStreetMap and Google Earth Pro.
- Build equipment noise sources in the model based on the project design and assign the appropriate sound level to each source.
- Calculate the sound levels at the noise-sensitive receptors.

Details regarding construction noise sources and operational noise sources are provided below.

3.1 Construction Noise Sources

Construction of the proposed Project would take approximately 16 months. The construction schedule is provided in Appendix D-3. Construction is assumed to take place between the hours of 7 am and 5 pm, five days a week, except for holidays.

Table D-1 includes a list of expected construction equipment and their maximum sound levels and acoustical usage factors. The acoustical usage factor is an estimate of the fraction of time a piece of construction equipment is operating at maximum power during typical construction. Typical acoustical usage factors presented in Table D-1 can be found in FHWA's Roadway Construction Noise Model (RCNM) and the RCNM User's Guide (FHWA 2006). The LAmax and the acoustical usage factor are used to calculate the LAEQ and LA10, which are commonly used when assessing potential construction noise. See the RCNM User's Guide for more information.

Table D-1. Typical Construction Mobile Equipment Sound Levels

Unique Equipment	L_{Amax} SPL @ 50ft	Acoustical Usage Factor	L_{AEQ} @ 50ft	L_{A10} @ 50ft	Source Used
Excavator	85	40	81	84	Excavator (FHWA, 2006)
Loader	80	40	76	79	Loader (FTA, 2018)
Scraper	85	40	81	84	Scraper (FTA, 2018)
Forklift	75	40	71	74	Man Lift (FHWA, 2006)
Roller Compactor	85	20	78	81	Roller (FTA, 2018)
Stone column rig	95	20	88	91	Pile-driver, sonic (FTA, 2018)
Piling Rig	101	20	94	97	Pile-driver, impact (FTA, 2018)
Air Compressor	80	40	76	79	Air Compressor (FTA, 2018)
Water truck	84	40	80	83	Truck (FTA, 2018)
Ave daily truck deliveries	84	10	74	77	Truck (FTA, 2018)
Mobile Crane	83	16	75	78	Crane, Mobile (FTA, 2018)
MEWPs	75	16	67	70	Man Lift (FHWA, 2006)
Diesel Hammer	101	20	94	97	Pile-driver, impact (FTA, 2018)
Welding Rigs	73	40	69	72	Welder / Torch (FHWA, 2006)
Concrete Pumper	82	50	79	82	Concrete Pump (FTA, 2018)

Appendix D-4 provides a summary of the CadnaA inputs and results.

3.2 Operational Noise Sources

Operations under the proposed Project would include fairly constant noise from the mill (e.g., blower fans), stockpile handling equipment, and customer trucks. Because vessels would be closest to the noise-sensitive receptors while docked at Berth 191, vessels were included in the on-site operational noise predictions. All equipment was assumed to operate 24 hours a day as a conservative assumption. Full operation is expected to be reached in 2027.

Appendix D-4 provides a summary of calculated sound levels for stationary sources on site and a summary of the CadnaA inputs and results for on-site sources. The sound data was obtained from Dudek (2015) unless otherwise noted. Typical sound levels for on-site mobile equipment and the vessels are summarized in .

Table D-2: Operations Stationary Equipment Sound Levels

Source	Sound Level
Exterior Equipment	
Aspirated Hopper Fan	88 dB at 5 ft
Conveyer Belt Motor (15HP/11KW)	59 dB at 3 ft
Conveyer Belt Motor (75HP/56KW)	71 dB at 3ft
Conveyer Belt Motor (5.5HP/4KW)	59 dB at 3 ft
Conveyer Belt Motor (20HP/15KW)	60 dB at 3ft
Bag Filter Fan	80 dB at 3ft
Air Slide Fan	80 dB at 3ft
Air Shock	89 dB at 3ft
Main Mill Fan	78 dB at 3 ft
Mill Stack	122 dB L_{WA}
Equipment Interior to Mill	
Hot Gas Burner	92 dB L_{WA}
Grinding Mill Gears	108 dB L_{WA}
Grinding Mill Drive	101 dB L_{WA}
Mill Fan	100 dB L_{WA}
Rotary Valve	105 dB L_{WA}

Source: City of Vallejo 2015. Draft Environmental Impact Report for the Vallejo Marine Terminal and Orcem Project. September 2015.

Table D-3. Typical Operations Mobile Equipment Sound Levels

Source	Sound Level
Excavator	85 dB at 50 ft[1]
Front-End Loader	80 dB at 50 ft[1]
Vessel, 20,000-60,000 tons	95 dB L_{WA}[2]

Sources:
1. Federal Transit Administration, 2018. Transit Noise and Vibration Impact Assessment, Federal Transit Administration, September 2018.
2. City of Vallejo, 2015. Draft Environmental Impact Report for the Vallejo Marine Terminal and Orcem Project. September 2015.

Because the Project will only have 20-26 employees on site, noise from site personnel vehicle traffic is assumed to be negligible.

For off-site truck noise, Appendix D-5 provides a summary of the data used to calculate 2025 and 2027 traffic counts and the CadnaA results.

4.0 Vibration Analysis

Groundborne vibration from construction was analyzed based on the FTA's Transit Noise and Vibration Impact Assessment (FTA 2018).

The vibration amplitudes used in the analysis are provided in Table D-4.

Table D-4. FTA Reference Vibration at 25 ft

Equipment	PPV at 25 ft, in/sec	FTA Source Used
Excavator	0.089	Large bulldozer
Mobile Crane	0.008	Crane*
Stone column rig	0.17	Pile driver (sonic), typical
Piling Rig	0.644	Pile driver (impact), typical
Forklift	0.076	Loaded trucks
MEWPs	0.076	Loaded trucks
Roller Compactor	0.21	Vibratory roller
Water truck	0.076	Loaded trucks
* Data obtained from Westside Purple Line Extension Project, Section 3, Advanced Preliminary Engineering, 2018		

Vibration amplitudes at each sensitive receptor were calculated for each piece of equipment using the reference vibration data and the following equation:

$$PPV_{equip} = PPV_{ref}\left(\frac{25}{D}\right)^{1.5}$$

Where PPV_{equip} is the peak particle velocity of the equipment at the receptor, in/sec, PPV_{ref} is the source reference vibration amplitude at 25 ft, and D is the distance from the equipment to the receptor in feet.

5.0 References

City of Vallejo. 2015. Draft Environmental Impact Report for the Vallejo Marine Terminal and Orcem Project. Appendix K. SCH # 2014052057. https://vallejoca.hosted.civiclive.com/our_city/departments_divisions/planning_development_services/planning_division/vallejo_marine_terminal_orcem_eir

Advanced Preliminary Engineering. 2018. Westside Purple Line Extension Project, Section 3.

Datakustik, 2022. CadnaA version 2022 (Build 189.5221) Noise Prediction Software

Dudek, 2015. Draft Environmental Impact Report for the Vallejo Marine Terminal and Orcem Project. September 2015.

Federal Highway Administration. 2006. FHWA Roadway Construction Noise Model (RCNM), U.S. Department of Transportation.

Federal Transit Administration, 2018. Transit Noise and Vibration Impact Assessment, Federal Transit Administration, September 2018.

Illingworth & Rodkin, Inc., 2022. Port of Los Angeles Vopak Terminal Long Term Noise Measurement Results, Draft Technical Memo. December 1, 2022.

Landau Associates, 2022. Los Angeles Harbor Department – Berths 121-131 Container Terminal Redevelopment Project Draft EIR/EIS. April 2022.

Appendix D-2

Illingworth & Rodkin Ambient Sound Survey

Appendix D-3

Construction Schedule

Table D-2-1. Orcem Construction Phase Summary, Received from Orcem May 2022

Orcem California Estimated Resources for Construction Phase Dated 5th May 2022 - Rev 0																		
Construction Plant/ Operatives				M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16
Operatives (Ave daily no.)				20	20	25	25	30	30	55	55	55	55	55	55	35	30	30	20
Excavators (Ave daily no)				2	2	2	2	1					1	1	1				
Mobile Crane						1	1	1	2	2	2	2	2	1	1				
Stone column rig				1	1	1	1												
Piling Rig				1	1	1	1												
Fork Lift							1	1	1	1	1	1	1	1	1	1	1		
MEWPs							4	4	4	4	4	4	4	4	2	2	2	1	1
Ave daily truck deliveries				10	20	20	20	20	25	25	20	15	15	15	15	15	10	10	10
Roller Compactor				1	1	1	1						1	1	1	1			
Air Compressor				1	1	1	1	1	1	1	1	1	1	1					
Water truck (dust control)				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Welding Rigs								2	2	2	2	2	2	2	2	2			
Materials	Order of Magnitude																		
Concrete	700 cu yd																		
Structural Steel	300T																		
Cladding	4,500m2																		
Plant equipment	950T																		
Net Fill	15,000 cu yd																		

Table D-2-2. Quay Repair Construction Phase Summary
Received from Orcem August 2022

Berth 191
Estimated Resources for Construction Phase
QUAY REPAIRS B191
Data request 8/18/22

						MARK MONTHS WHERE EQUIPMENT WILL BE USED																
Group	**Construction Plant/ Operatives**	**Number of Units**	**Engine Size in HP (equipment only, not vehicles)**	**Daily hours of operation**	**Number of Days On Site**	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14	Month 15	Month 16	Month 16
Equipment	Excavator	1	316	6	330	X	X	X	X	X	X	X	X	X	X	X						
Equipment	Loader	1	128	6	365	X	X	X	X	X	X	X	X	X	X	X	X					
Equipment	Scraper	1	330	6	180	X	X	X	X	X	X											
Equipment	Forklift	1	100	6	365	X	X	X	X	X	X	X	X	X	X	X	X					
Equipment	Concrete Pumper	1	100	6	120								X	X	X	X						
Equipment	Compartor	1	125	6	120									X	X	X	X					
Equipment	Deisel Hammer	1	70	4	60					X	X											
Equipment	Mobile Crane	1	300	6	120				X	X	X	X										
Marine support (tug/barges)	Barge Crane	1																				
Marine support (tug/barges)	Skiff Boat	2																				
No. Employees	6																					
Vehicles	Pickup																					
Vehicles	Waste Material Truck																					
Vehicles	Water Truck																					
Please add more as needed...	*Please add more as needed...*																					

* Please list any tug barge equipment individually in empty spaces above

Materials	*Example*	Quantity	Unit (cy, tons, etc.)
Waste materials	*AC, timber and concrete*	*500*	*tons*
New construction material	*AC, timber and concrete*	*500*	*tons*

Appendix D-4

Construction Noise – CadnaA Inputs and Results

Table D-3-1. CadnaA On-Site Construction Noise Point Sources

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
Excavator 1	!0100!	116	Lw	excavator		(none)	6	r	1258445.16	12259721.34	14.33
Excavator 1 4(3)_5_10(2)	!0100!	116	Lw	excavator		(none)	6	r	1258491.15	12259773.5	14.51
Excavator 1	!0101!	116	Lw	excavator		(none)	6	r	1257978.33	12258905.87	12.57
Loader	!0101!	111	Lw	loader		(none)	6	r	1258052.69	12259051.28	12.57
Scraper	!0101!	116	Lw	scraper		(none)	6	r	1258000.39	12258982.84	12.57
Forklift	!0101!	106	Lw	forklift		(none)	6	r	1258099.02	12259131.46	12.57
Forklift 4_5_10(2)	!0100!	106	Lw	forklift		(none)	6	r	1258522.45	12259814.57	15.57
Roller Compactor 4(1) 10(2)	!0100!	113	Lw	Roller_Compactor		(none)	6	r	1258566.36	12259859.19	15.85
Mobile Crane 4_5_10(2)	!0100!	110	Lw	Mobile_Crane		(none)	6	r	1258599.18	12259904.26	15.85
Mobile Crane	!0101!	110	Lw	Mobile_Crane		(none)	6	r	1257986.39	12258829.16	12.57
Stone Column Rig 4	!0100!	123	Lw	Stone_Column_Rig		(none)	6	r	1258404.51	12259672.27	13.96
Piling Rig 4	!0100!	123	Lw	Stone_Column_Rig		(none)	6	r	1258466.13	12259866.56	15.84
MEWPs	!0100!	102	Lw	MEWPs		(none)	6	r	1258454.28	12259667.69	13.63
MEWPs	!0100!	102	Lw	MEWPs		(none)	6	r	1258504.86	12259722.37	13.66
MEWPs	!0100!	102	Lw	MEWPs		(none)	6	r	1258542.95	12259765.5	13.98
MEWPs 4_5_10 (4)	!0100!	102	Lw	MEWPs		(none)	6	r	1258574.7	12259812.58	15.85
Air Compressor _4_5_10	!0100!	111	Lw	Air_Compressor		(none)	6	r	1258612.88	12259855.49	15.85
Water Truck 4_5_10	!0100!	115	Lw	Water_Truck		(none)	6	r	1258485.71	12259816.15	15.34
Water Truck 4_5_10	!0200!	118	Lw	Water_Truck		(none)	6	r	1258488.31	12259815.28	15.85
Air Compressor _4_5_10	!0200!	114	Lw	Air_Compressor		(none)	6	r	1258612.88	12259855.49	15.85
MEWPs 4_5_10 (4)	!0200!	105	Lw	MEWPs		(none)	6	r	1258574.7	12259812.58	15.85
MEWPs	!0200!	105	Lw	MEWPs		(none)	6	r	1258542.95	12259765.5	13.98
MEWPs	!0200!	105	Lw	MEWPs		(none)	6	r	1258504.86	12259722.37	13.66
MEWPs	!0200!	105	Lw	MEWPs		(none)	6	r	1258454.28	12259667.69	13.63
Mobile Crane 4_5_10(2)	!0200!	113	Lw	Mobile_Crane		(none)	6	r	1258599.18	12259904.26	15.85
Forklift 4_5_10(2)	!0200!	109	Lw	forklift		(none)	6	r	1258522.45	12259814.57	15.57
Excavator 1 4(3)_5_10(2)	!0200!	119	Lw	excavator		(none)	6	r	1258491.15	12259773.5	14.51
Mobile Crane	!0201!	113	Lw	Mobile_Crane		(none)	6	r	1257986.39	12258829.16	12.57
Forklift	!0201!	109	Lw	forklift		(none)	6	r	1258099.02	12259131.46	12.57
Scraper	!0201!	119	Lw	scraper		(none)	6	r	1258000.39	12258982.84	12.57
Loader	!0201!	114	Lw	loader		(none)	6	r	1258052.69	12259051.28	12.57
Excavator 1	!0201!	119	Lw	excavator		(none)	6	r	1257978.33	12258905.87	12.57
Welding Rigs	!0200!	107	Lw	Welding_Rigs		(none)	6	r	1258400.56	12259614.4	13.44
Welding Rigs	!0200!	107	Lw	Welding_Rigs		(none)	6	r	1258338.55	12259613.02	13.87
Deisel Hammer	!0201!	132	Lw	Piling_Rig		(none)	6	r	1258013.46	12258833.97	12.11
Water Truck 4_5_10	!0300!	115	Lw	Water_Truck		(none)	6	r	1258489.18	12259816.58	15.85
Air Compressor _4_5_10	!0300!	111	Lw	Air_Compressor		(none)	6	r	1258612.88	12259855.49	15.85

Table D-3-1. CadnaA On-Site Construction Noise Point Sources

Name	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
			Type	Value					X	Y	Z
		(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
MEWPs 4_5_10 (4)	!0300!	102	Lw	MEWPs		(none)	6	r	1258574.7	12259812.58	15.85
MEWPs	!0300!	102	Lw	MEWPs		(none)	6	r	1258542.95	12259765.5	13.98
MEWPs	!0300!	102	Lw	MEWPs		(none)	6	r	1258504.86	12259722.37	13.66
MEWPs	!0300!	102	Lw	MEWPs		(none)	6	r	1258454.28	12259667.69	13.63
Mobile Crane 4_5_10(2)	!0300!	110	Lw	Mobile_Crane		(none)	6	r	1258599.18	12259904.26	15.85
Forklift 4_5_10(2)	!0300!	106	Lw	forklift		(none)	6	r	1258522.45	12259814.57	15.57
Excavator 1 4(3)_5_10(2)	!0300!	116	Lw	excavator		(none)	6	r	1258491.15	12259773.5	14.51
Welding Rigs	!0300!	104	Lw	Welding_Rigs		(none)	6	r	1258400.56	12259614.4	13.44
Welding Rigs	!0300!	104	Lw	Welding_Rigs		(none)	6	r	1258338.55	12259613.02	13.87
Roller Compactor	!0301!	113	Lw	Roller_Compactor		(none)	6	r	1257986.39	12258829.16	12.57
Forklift	!0301!	106	Lw	forklift		(none)	6	r	1258099.02	12259131.46	12.57
Loader	!0301!	111	Lw	loader		(none)	6	r	1258052.69	12259051.28	12.57
Excavator 1	!0301!	116	Lw	excavator		(none)	6	r	1257978.33	12258905.87	12.57
Roller Compactor	!0300!	113	Lw	Roller_Compactor		(none)	6	r	1258528.33	12259868.71	15.85
Mobile Crane 4_5_10(2)	!0300!	110	Lw	Mobile_Crane		(none)	6	r	1258599.18	12259904.26	15.85
Concrete Pumper	!0301!	114	Lw	Concrete_Pumper		(none)	6	r	1258080.43	12259095.35	12.57
Excavator 1	!0001!	116	Lw	excavator		(none)	6	r	1258445.16	12259721.34	14.33
Excavator 1 4(3)_5_10(2)	!0001!	116	Lw	excavator		(none)	6	r	1258491.15	12259773.5	14.51
Forklift 4_5_10(2)	!0001!	106	Lw	forklift		(none)	6	r	1258522.45	12259814.57	15.57
Roller Compactor 4(1) 10(2)	!0001!	113	Lw	Roller_Compactor		(none)	6	r	1258566.36	12259859.19	15.85
Mobile Crane 4_5_10(2)	!0001!	110	Lw	Mobile_Crane		(none)	6	r	1258599.18	12259904.26	15.85
MEWPs	!0001!	102	Lw	MEWPs		(none)	6	r	1258542.95	12259765.5	13.98
Air Compressor _4_5_10	!0001!	111	Lw	Air_Compressor		(none)	6	r	1258347.61	12259678.41	14.36
Water Truck 4_5_10	!0001!	115	Lw	Water_Truck		(none)	6	r	1258488.31	12259814.41	15.85
Excavator 1	!0000!	116	Lw	excavator		(none)	6	r	1257978.33	12258905.87	12.57
Loader	!0000!	111	Lw	loader		(none)	6	r	1258052.69	12259051.28	12.57
Scraper	!0000!	116	Lw	scraper		(none)	6	r	1258000.39	12258982.84	12.57
Forklift	!0000!	106	Lw	forklift		(none)	6	r	1258099.02	12259131.46	12.57
Mobile Crane	!0000!	110	Lw	Mobile_Crane		(none)	6	r	1257986.39	12258829.16	12.57

Table D-3-2. CadnaA On-Site Construction Noise Line Sources

Name	Sel.	M.	ID	Result. PWL	Result. PWL'	Lw / Li		Freq.	Direct.
						Type	Value		
				(dBA)	(dBA)			(Hz)	
Truck Deliveries			!0100!	109	84.8	Lw	Truck_Deliveries		(none)
Truck Deliveries		~	!0200!	109	84.8	Lw	Truck_Deliveries		(none)
Truck Deliveries		~	!0300!	109	84.8	Lw	Truck_Deliveries		(none)

Table D-3-3. CadnaA On-Site Construction Noise Results

Name	Sel.	M.	ID	Level Lr						Height		Coordinates		
				Month 4	Month 5	Month 10	Nighttime	Auto	Noise Type			X	Y	Z
				(dBA)						(ft)		(ft)	(ft)	(ft)
Fire Station 49			!05!	68	64.8	64.8	59.3	x	Total	13.12	r	1258784.53	12260144.93	17.57
Banning's Landing Community Center			!05!	46.6	46.4	46.9	39.6	x	Total	13.12	r	1257601.5	12260421.16	22.07
Liveaboards			!05!	64.4	63.1	60.6	55.6	x	Total	13.12	r	1259857.61	12260138.45	16.4
314 N Fries Ave			!05!	39.5	38.8	38.1	32.6	x	Total	13.12	r	1255979.36	12262816.42	28.93

Appendix D-5

On-Site Operations Noise Analysis

Table D-4-1. Sound Power Levels of Sources Interior to Mill

	Sound Power Level									SWL Total		SPL @ 3 ft		Source in Vallejo Report
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Z	A	Z	A	
Elevator	96	100	104	98	93	91	92	94	82	107	99	97	89	drive reject - bucket elevator
Classifier	98	95	100	95	94	100	102	102	95	108	107	98	97	reject - drop
Rotary Valve	102	99	93	89	91	90	90	87	81	105	96	95	86	worst case of rotary valve with clinker sand and with blast furnace slag in each octave
Motor and Gearbox	115	114	104	104	110	101	90	84	74	119	109	109	98	mill gears + mill drive
Mill fan	93	96	92	86	88	86	87	81	81	100	92	90	82	mill fan
Burner	95	95	95	95	95	95	95	95	95	105	102	94	92	hot gas burner
Combustion air fan	93	96	92	86	88	86	87	81	81	100	92	90	82	estimate from mill fan and fan for dedusting filter
Dilution air fan	93	96	92	86	88	86	87	81	81	100	92	90	82	"
Hot air fan for rotary valves	93	96	92	86	88	86	87	81	81	100	92	90	82	"
Fan for dedusting filter	93	96	92	86	88	86	87	81	81	100	92	90	82	dedusting fans

Estimated

Table D-4-2. Calculation of Sound Levels Inside Mill

	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Notes
Total sound power level of all sources	116	114	109	106	111	105	104	103	99	simple sum of all the sources above
Assumed avg absorption coeff in Mill	0.3	0.2	0.15	0.1	0.1	0.1	0.1	0.1	0.1	
Sound intensity (L_i) at inside of each facade*	81	80	75	72	77	71	70	70	65	
TL of façades	4	9	14	17	23	28	33	37	37	estimated from 22ga galvanized steel
Sound intensity (L_i) at outside of each façade	77	71	61	55	54	43	37	33	28	

*Assumes the following:
omnidirectional sources
uniform sound energy at all points of all four walls
1/4 of total reverberant energy evenly distributed on each wall
no direct sound blocked or absorbed by other objects in the mill
no sound energy leaving through the roof

Table D-4-3. CadnaA On-Site Operations Noise Point Sources

Name	Sel.	M.	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
					Type	Value					X	Y	Z
				(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
conveyer belt			!00!	71.2	Lw	conveyer_belt_30HP_63dB_3ft		(none)	10	g	1258050.81	12259050.56	16.56
conveyer belt			!00!	71.2	Lw	conveyer_belt_30HP_63dB_3ft		(none)	10	g	1257977.9	12258963.77	16.56
conveyer belt			!00!	71.2	Lw	conveyer_belt_30HP_63dB_3ft		(none)	10	g	1257970.09	12258850.95	16.56
conveyer belt			!00!	71.2	Lw	conveyer_belt_30HP_63dB_3ft		(none)	10	g	1257902.25	12258763.59	16.56
conveyer belt			!00!	68.2	Lw	conveyer_belt_20HP_60dB_3ft		(none)	10	g	1257835.55	12258676.11	16.56
conveyer belt			!00!	68.2	Lw	conveyer_belt_20HP_60dB_3ft		(none)	10	g	1257771.03	12258600.11	16.56
conveyer belt			!00!	68.2	Lw	conveyer_belt_20HP_60dB_3ft		(none)	10	g	1257995.2	12258797.48	15.05
conveyer belt			!00!	68.2	Lw	conveyer_belt_20HP_60dB_3ft		(none)	10	g	1257925.76	12258713.83	15.9
conveyer belt			!00!	68.2	Lw	conveyer_belt_20HP_60dB_3ft		(none)	10	g	1257862.34	12258640.02	16.56
conveyer belt			!00!	68.2	Lw	conveyer_belt_20HP_60dB_3ft		(none)	10	g	1257808.16	12258562.43	16.56
Stack			!00!	121.7	Lw	Stack		stack_directivity	190	g	1258338.97	12259697.04	198.62
air shock			!00!	97.2	Lw	air_shock_89_at_3ft		(none)	3	g	1258496.78	12259832.1	28.22

Table D-4-3. CadnaA On-Site Operations Noise Point Sources

Name	Sel.	M.	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
					Type	Value					X	Y	Z
				(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
air shock			!00!	97.2	Lw	air_shock_89_at_3ft		(none)	3	g	1258508.53	12259824.3	28.22
air shock			!00!	97.2	Lw	air_shock_89_at_3ft		(none)	3	g	1258520.02	12259814.73	28.22
air shock			!00!	97.2	Lw	air_shock_89_at_3ft		(none)	3	g	1258492.95	12259779.19	28.22
air shock			!00!	97.2	Lw	air_shock_89_at_3ft		(none)	3	g	1258481.46	12259789.58	28.22
air shock			!00!	97.2	Lw	air_shock_89_at_3ft		(none)	3	g	1258470.25	12259798.33	28.22
conveyer belt			!00!	79.2	Lw	conveyer_belt_75HP_71dB_3ft		(none)	55	r	1258466.75	12259725.84	63.26
conveyer belt			!00!	79.2	Lw	conveyer_belt_75HP_71dB_3ft		(none)	10	g	1258380.36	12259594.07	17.45
conveyer belt			!00!	68.2	Lw	conveyer_belt_20HP_60dB_3ft		(none)	10	r	1258274.46	12259462.58	17.49
conveyer belt			!00!	85.2	Lw	conveyer_belt_200HP_77dB_3ft		(none)	10	r	1258108.96	12259146.9	16.56
elevator			!00!	71.2	Lw	elevator_591_BE1_63dB_3ft		(none)	139	r	1258384.71	12259767.7	148.22
elevator			!00!	68.2	Lw	elevator_60dB_3ft		(none)	59	r	1258460.42	12259811.96	68.31
bag filter fan 591-FN1			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	139	r	1258382.54	12259769.59	148.26
bag filter fan 591-BF2			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	3	g	1258398.01	12259810.35	117.14
bag filter fan 591-BF2			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	3	g	1258448.41	12259878	117.84
bag filter fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	10	g	1258491.17	12259824.5	68.87
bag filter fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	10	g	1258503.23	12259815.2	68.65
bag filter fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	10	g	1258514.42	12259805.56	68.42
bag filter fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	10	g	1258499.78	12259787.64	67.8
bag filter fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	10	g	1258476.53	12259806.24	68.4
bag filter fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	10	g	1258488.24	12259797.63	68.13
bag filter fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	20	r	1258390.75	12259763.18	29.13
air slide fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	59	r	1258462.94	12259812.76	68.33
air slide fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	59	r	1258460.39	12259809.67	68.27
air slide fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	59	r	1258461.91	12259808.71	68.25
air slide fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	59	r	1258463.63	12259807.16	68.21
air slide fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	59	r	1258464.58	12259811.9	68.31
air slide fan			!00!	92.6	Lw	fans_80dB_at_5ft		(none)	59	r	1258466.3	12259810.78	68.29
main filter fan			!00!	85.7	Lw	main_filter_fan_casing_78dB_3ft		(none)	11	r	1258338.9	12259697.18	19.63
front end loader			!01!	109.6	Lw	front_end_loader		(none)	6	r	1258111.9	12259646.72	15.83
excavator			!01!	114.6	Lw	excavator		(none)	6	r	1258175.7	12259669.29	15.45
conveyer belt			!00!	79.2	Lw	conveyer_belt_75HP_71dB_3ft		(none)	70	r	1258111.81	12259533.79	79.07
conveyer belt			!00!	68.2	Lw	conveyer_belt_20HP_60dB_3ft		(none)	10	r	1258232.72	12259304.35	16.8
conveyer belt			!00!	68.2	Lw	conveyer_belt_20HP_60dB_3ft		(none)	10	r	1258149.21	12259164.09	16.78
aspirated hopper fan			!00!	100.6	Lw	aspirated_hopper_fan		(none)	10	r	1258227.39	12259294.21	16.83
aspirated hopper fan			!00!	100.6	Lw	aspirated_hopper_fan		(none)	10	r	1258143.2	12259150.42	16.57
aspirated hopper fan			!00!	100.6	Lw	aspirated_hopper_fan		(none)	10	r	1258285.89	12259453.95	17.36

Table D-4-3. CadnaA On-Site Operations Noise Point Sources

Name	Sel.	M.	ID	Result. PWL	Lw / Li		Freq.	Direct.	Height		Coordinates		
					Type	Value					X	Y	Z
				(dBA)			(Hz)		(ft)		(ft)	(ft)	(ft)
aspirated hopper fan			!00!	100.6	Lw	aspirated_hopper_fan		(none)	10	r	1258323.61	12259532.13	17.5
vessel			!01!	108	Lw	bulk_vessel		(none)	10	r	1257930.13	12258654.07	13.28

Table D-4-4. CadnaA On-Site Operations Noise Point Sources

Name	Sel.	M.	ID	Result. PWL	Result. PWL"	Lw / Li		K0	Freq.	Direct.
						Type	Value			
				(dBA)	(dBA)			(dB)	(Hz)	
SW_facade				86.3	54.9	Lw"	facade	3		(none)
SW_louver				100.6	78.5	Lw"	louvers	3		(none)
SE_facade				84	54.9	Lw"	facade	3		(none)
NW_facade				85.2	54.9	Lw"	facade	3		(none)
NE_facade1				82.8	54.9	Lw"	facade	3		(none)
NE_facade2				84.4	54.9	Lw"	facade	3		(none)
SE_louver				98.2	78.5	Lw"	louvers	3		(none)

Table D-4-5. CadnaA On-Site Operations Noise Results

Name	ID	Level Lr				Height		Coordinates		
		Day	Night	Lden	Noise Type			X	Y	Z
		(dBA)	(dBA)	(dBA)		(ft)		(ft)	(ft)	(ft)
Fire Station 49	!02!	55.6	55.6	62.3	Total	13.12	r	1258784.53	12260144.93	17.57
Banning's Landing Community Center	!02!	49.7	49.7	56.3	Total	13.12	r	1257601.5	12260421.16	22.07
Liveaboards	!02!	51.4	51.4	58	Total	13.12	r	1259857.61	12260138.45	16.4
314 N Fries Ave	!02!	36.4	36.4	43.1	Total	13.12	r	1255979.36	12262816.42	28.93

Appendix D-6

Off-Site Operations Noise Analysis

Baseline current and 2027 traffic data is based on the transportation analysis performed for the Berths 121-131 Container Terminal Redevelopment project (Landau Associates, 2022). Traffic data provided in the Berth 121-131 traffic study included AM and PM vehicles per hours (vph) traffic counts, while CNEL is split into day, evening, and night. For the purposes of this analysis, it was assumed that daytime traffic was equal to 100% the average of the AM and PM traffic counts, while evening and nighttime traffic were equal to 70% and 40% of the average of the AM and PM traffic counts, respectively. As a conservative assumption, the Berth 121-131 "no build" 2027 traffic data was used for the 2027 predictions.

The sound levels were calculated using CadnaA's FHWA TNM (Traffic Noise Model) module.

Table D-5-1. Traffic Sound Level Calculations at Anaheim and Henry Ford

HENRY FORD AND ANAHEIM	SPEED LIMIT	35	mph
TRAFFIC DATA SOURCE:	Berths 121-131 Draft EIR, Draft Appendix E2		

	Existing AM vph							Existing PM vph					
	EB			WB				EB			WB		
	EBL	EBT	EBR	WBT	NBL	SBR		EBL	EBT	EBR	WBT	NBL	SBR
traffic	65	620	64	972	60	54	traffic	56	1321	390	836	140	59
future	65	620	64	972	60	54	future	56	1321	390	836	140	59
heavy %	27	22	21	9	3	10	heavy %	41	8	16	13	19	22

	2027 no build AM vph							2027 no build PM vph					
	EB			WB				EB			WB		
	EBL	EBT	EBR	WBT	NBL	SBR		EBL	EBT	EBR	WBT	NBL	SBR
traffic	45	670	514	813	318	37	traffic	67	896	481	874	472	53
heavy %	22	17	16	11	3	12	heavy %	41	16	8	21	16	22

	Existing AM				Existing PM			
	EB	WB	Total		EB	WB	Total	
traffic	749	1086	1835	traffic	1767	1035	2802	
heavy %	22%	9%	14%	heavy %	11%	14%	12%	

	2027 no build AM				2027 no build PM			
	EB	WB	Total		EB	WB	Total	
traffic	1229	1168	2397	traffic	1444	1399	2843	
heavy %	17%	9%	13%	heavy %	14%	19%	17%	

Existing Day Estimate				Existing Evening Estimate				Existing Night Estimate				
traffic	2318.5			traffic	1622.95			traffic	927.4			
heavy %	13%			heavy %	13%			heavy %	13%			
Level	66.4	dBA	from CadnaA	Level	64.9	dBA	from CadnaA	Level	62.4	dBA	from CadnaA	

2027 No Build Day Estimate				Existing Evening Estimate				2027 No Build Night Estimate				
traffic	2620			traffic	1834			traffic	1048			
heavy %	15%			heavy %	15%			heavy %	15%			
Level	67.3	dBA	from CadnaA	Level	65.7	dBA	from CadnaA	Level	63.3	dBA	from CadnaA	

Existing CNEL	70	dB
2027 CNEL	71	dB

Table D-5-2. Truck Percentages by Hour	
	% of truck OUTBOUND traffic
0:00 to 1:00	3
1:00 to 2:00	4
2:00 to 3:00	6
3:00 to 4:00	7
4:00 to 5:00	8
5:00 to 6:00	8
6:00 to 7:00	8
7:00 to 8:00	8
8:00 to 9:00	8
9:00 to 10:00	8
10:00 to 11:00	8
11:00 to 12:00	8
12:00 to 13:00	7
13:00 to14:00	3
14:00 to 15:00	3
15:00 to 16:00	
16:00 to 17:00	
17:00 to 18:00	
18:00 to 19:00	
19:00 to 20:00	
20:00 to 21:00	
21:00 to 22:00	
22:00 to 23:00	1
23:00 to 00:00	2
	100
% DAY	53
% EVENING	0
% NIGHT	47

Table D-5-3. Truck Traffic and CNEL Calculations

	Year	Total Truck RoundTrips	Gypsum Truck Trips (medium trucks)	GGBFs Truck Trips (heavy trucks)				
	2025	17,000	730	16,270				
	2027	35,000	1,500	33,500				
	2049	35,000	1,500	33,500				
	Year Total							
2025	Day	9010	387	8623				
2025	Evening	-	-	-				
2025	Night	7990	343	7647				
2027	Day	18550	795	17755				
2027	Evening	-	-	-				
2027	Night	16450	705	15745				
2049	Day	18550	795	17755				
2049	Evening	-	-	-				
2049	Night	16450	705	15745				
	Evening							
	Per hour					**Sound Level from CadnaA @ 35mph**		
2025	Day	3.02	0.13	2.89		47.7	dB	
2025	Evening	-	-	-		0	dB	
2025	Night	3.57	0.15	3.41		48.4	dB	**Resulting CNEL**
2027	Day	6.21	0.27	5.94		50.8	dB	2025 54.6
2027	Evening	-	-	-		0	dB	2027 57.7
2027	Night	7.34	0.31	7.03		51.5	dB	
2049	Day	6.21	0.27	5.94		50.8	dB	
2049	Evening	-	-	-		0	dB	
2049	Night	7.34	0.31	7.03		51.5	dB	