On the basis of the EPA Guidelines, the proposed agricultural fertiliser facility construction phase would have slight to moderate short-term negative construction traffic effects.

13.3.4 Operational Phase Impacts

A detailed description of the proposed agricultural fertiliser facility and additional use of the existing jetty operational phase is provided in **Chapter 2 Description of the Proposed Development**. Subject to planning permission, the proposed agricultural fertiliser facility will be operational from 2023.

13.3.4.1 Agricultural Fertiliser Facility

Raw material will be shipped into the existing jetty at the Belvelly Port Facility, at an average of one ship per week. It is expected that operations will require approximately 50 ships per annum. Following an on-site blending process, the product is packaged into bags and stored on site. The bags will be collected by trucks as required and distributed nationwide by road. Due to the nature of the agricultural fertiliser business, the proposed agricultural fertiliser facility operates with seasonal peaks. Normal peak traffic volumes occur during February, March, and April. During the three months peak period, it is envisaged there will be typically 47 heavy goods vehicle (HGV) trips per day, both to and from the proposed agricultural fertiliser facility. During the off-peak nine months period, there will be typically 20 HGV movements per day, both to and from the proposed facility. These traffic volumes have been determined by a review of the existing agricultural fertiliser facility operations in Cork city. This includes hourly, daily and monthly empirical data recorded on a multi annual basis.

The facility will operate all year-round, with working times varying depending on market demand. Normal hours of operation are 7.00 a.m. to 5.00 p.m. Monday to Friday. During peak demand, which is typically between February and April, fertiliser blending and bagging operations will occur between 7.00 a.m. and 12.00 midnight, and HGV distribution of finished fertiliser product from the facility by road will occur between 7.00 a.m. to 7.00 p.m. Monday to Saturday.

The facility will have an average of 17 operational employees on site at any one time, with a maximum of 30 employees during the peak period. The peak period staff numbers would generate approximately 24 car and van trips, both to and from the proposed agricultural fertiliser facility each working date, based on an average vehicle occupancy rate of 1.25 personnel per vehicle. Canteen facilities for personnel will be provided on site.

13.3.4.2 Additional Port Operational Uses of the Jetty

The proposed additional port operational use of the jetty will consist of servicing other cargo vessels, which will include the relocation of vessels displaced from the Cork City Quays. The additional cargo types proposed will include woodchip, machinery parts, deep sea maintenance and exploratory vessel engineering cargo, and other miscellaneous dry cargo.

Approximately 40 additional port related cargo ships will berth at the jetty each year. The size and frequency of cargo vessels will be variable and subject to the various customers' needs. On average, ships will be berthed for 1 to 2 days to offload / load cargo but may be longer depending on cargo size and weather conditions.

During February, March and April, it is expected there will be 10 HGVs per day, both to and from the site in order to facilitate the distribution of goods nationwide by road. It is expected that there will be up to 30 HGVs per day, both to and from the site to facilitate distribution of goods, during the nine months period from May to January. Accordingly, peak daily HGV trips generated by the additional Port operational uses of the jetty will be managed so as not coincide with peak daily HGV trips generated by the proposed agricultural fertiliser facility.

It is proposed that all exportation and importation vehicle loads would travel via the R624 north of the existing site access junction.

The proposed additional operational uses of the jetty would have up to eight operational employees on site, which would generate approximately six car and van trips, both to and from the site each working day. Canteen facilities for personnel will be provided on site.

For the assessment, two periods have been defined. The peak period for the proposed agricultural fertiliser facility refers to the months of February, March and April. The off-peak period for the proposed agricultural fertiliser facility refers to the months of January, May, June, July, August, September, October, November and December.

13.3.4.3 Proposed Agricultural Fertiliser Facility Operational Traffic Volumes (Peak Period)

The peak period months for the proposed agricultural fertiliser facility are February, March and April. During these months, production may occur between 7.00 a.m. and 12.00 midnight, and out loading may occur between 7.00 a.m. to 7.00 p.m. Monday to Saturday. There are no operations on Sundays, or Bank Holidays. Operational employees would travel to site prior to 7.00 a.m. and depart from site after 7.00 p.m., outside the peak traffic periods. Shift changes during the day would occur during off-peak traffic hours. **Table 13.37** summarises the proposed operational phase daily traffic volumes during the three months peak period.

Table 13.37 Proposed Operational Phase Daily Traffic Volumes for the Proposed Agricultural Fertiliser Facility (Peak Period)

Traffic Direction	Peak Period (Feb/Mar/Apr) Daily Traffic Volumes
	Agricultural Fertiliser Facility
Inbound	24 cars/vans + 47 trucks
Outbound	24 cars/vans + 47 trucks
Daily Total	48 cars/vans + 94 trucks

The proposed operational phase traffic volumes associated with the proposed agricultural facility would generate a total of up to eight HGV movements per hour, two-way. This would occur during the proposed peak period operational hours of 7.00 a.m. to 7.00 p.m., Monday to Saturday.

13.3.4.4 Proposed Additional Port Operational Uses of the Jetty Traffic Volumes

The proposed operational phase daily traffic volumes for the additional Port uses of the jetty are provided in **Table 13.38.** Port related HGV traffic will generally operate 8.00 a.m. to 6.00 p.m., Monday to Saturday. There will be no operations on Sundays, or Bank Holidays.

Operational employees would travel to site prior to 8.00 a.m. and depart from site after 6.00 p.m.

Figure 13.38 Proposed Operational Phase Traffic Volumes for the Additional Port Uses of the Jetty

Traffic Direction	February/March/April Daily Traffic Volumes	May to January Daily Traffic Volumes
	Jetty Cargo Operations	Jetty Cargo Operations
Inbound	6 cars/vans + 10 trucks	6 cars/vans + 30 trucks
Outbound	6 cars/vans + 10 trucks	6 cars/vans + 30 trucks
Daily Total	12 cars/vans + 20 trucks	12 cars/vans + 60 trucks

The proposed operational phase traffic volumes generated by the additional Port uses of the existing jetty, would be two HGVs per hour two-way during February/March/April, and six HGVs per hour, two-way during May to January.

13.3.4.5 Predicted Traffic Volumes on the R624 with Operational Phase (Peak Period)

The predicted 2023, 2028 and 2038 morning and evening peak hour traffic volumes on the R624, during the three months peak period operation of the proposed agricultural fertiliser facility and the additional Port operational uses of the jetty, are provided in **Table 13.39, Table 13.40** and **Table 13.41**.

Table 13.39 Predicted 2023 R624 Traffic Volumes with Proposed Operational Phase Peak Period

R624 Location	Peak Hour	Total Vehicles (HGVs)	Change with Agricultural Fertiliser Facility	Change with Additional Port Jetty Use	Total Change	% Change
South of Belvelly Bridge & L2989 Junction	AM	766 (30)	+8 (8)	+2 (2)	+10 (10)	+1.32% (50%)
	PM	637 (16)	+8 (8)	+2 (2)	+10 (10)	+1.59% (167%)
Belvelly Bridge	AM	1,431 (43)	+8 (8)	+2 (2)	+10 (10)	+0.70% (30%)
	PM	1,434 (20)	+8 (8)	+2 (2)	+10 (10)	+0.70% (100%)
Cobh Cross	AM	1,640 (51)	+8 (8)	+2 (2)	+10 (10)	+0.61% (24%)
	PM	1,908 (59)	+8 (8)	+2 (2)	+10 (10)	+0.53% (20%)

Table 13.40 Predicted 2028 R624 Traffic Volumes with Proposed Operational Phase Peak Period

R624 Location	Peak Hour	Total Vehicles (HGVs)	Change with Agricultural Fertiliser Facility	Change with Additional Port Jetty Use	Total Change	% Change
South of Belvelly Bridge & L2989 Junction	AM	812 (32)	+8 (8)	+2 (2)	+10 (10)	+1.25% (45%)
	PM	672 (17)	+8 (8)	+2 (2)	+10 (10)	+1.51% (143%)
Belvelly Bridge	AM	1,518 (48)	+8 (8)	+2 (2)	+10 (10)	+0.66% (26%)
	PM	1,517 (22)	+8 (8)	+2 (2)	+10 (10)	+0.66% (83%)
Cobh Cross	AM	1,738 (56)	+8 (8)	+2 (2)	+10 (10)	+0.58% (22%)
	PM	2,022 (66)	+8 (8)	+2 (2)	+10 (10)	+0.50% (18%)

Table 13.41 Predicted 2038 R624 Traffic Volumes with Proposed Operational Phase Peak Period

R624 Location	Peak Hour	Total Vehicles (HGVs)	Change with Agricultural Fertiliser Facility	Change with Additional Port Jetty Use	Total Change	% Change
South of Belvelly Bridge & L2989 Junction	AM	856 (38)	+8 (8)	+2 (2)	+10 (10)	+1.18% (36%)
	PM	707 (20)	+8 (8)	+2 (2)	+10 (10)	+1.43% (100%)
Belvelly Bridge	AM	1,596 (57)	+8 (8)	+2 (2)	+10 (10)	+0.63% (21%)
	PM	1,591 (25)	+8 (8)	+2 (2)	+10 (10)	+0.64% (67%)
Cobh Cross	AM	1,828 (66)	+8 (8)	+2 (2)	+10 (10)	+0.55% (18%)
	PM	2,129 (78)	+8 (8)	+2 (2)	+10 (10)	+0.47% (15%)

The peak period operation of the proposed agricultural fertiliser facility and the additional Port uses of the jetty would increase morning and evening peak hour traffic volumes on the R624 by up to 10 vehicles, including 10 heavy goods vehicles. This would equate to an increase of up to 0.71% on Belvelly Bridge and 1.61% south of Belvelly Bridge and the L2989 junction. The increase on the R624 at Cobh Cross would be up to 0.62%.

The peak period operation of the proposed agricultural fertiliser facility and the additional Port uses of the jetty would increase morning and evening peak hour traffic volumes at the at the R624/L2989 junction by up to 0.7% and 0.8%, respectively, as detailed in **Table 13.42**.

Table 13.42 Predicted R624/L2989 Traffic Volumes with Proposed Operational Phase Peak Period

Location	Year	Peak Hour	Total Vehicles (HGVs)	Change	% Change
R624/L2989 Junction (Total junction volumes)	2023	AM	1,436 (45)	+10 (10)	+0.7% (29%)
		PM	1,336 (21)	+10 (10)	+0.8% (91%)
	2028	AM	1,512 (49)	+10 (10)	+0.7% (26%)
		PM	1,414 (23)	+10 (10)	+0.7% (77%)
	2038	AM	1,600 (58)	+10 (10)	+0.6% (21%)
		PM	1,484 (26)	+10 (10)	+0.7% (63%)

The peak period operation of the proposed agricultural fertiliser facility and the additional Port uses of the jetty would increase morning and evening peak hour traffic volumes, on the N25 Cobh Cross Interchange Eastbound Off Slip Road, by approximately three vehicles. The equivalent peak period increase on the N25 Cobh Cross Interchange Westbound Off Slip Road is approximately one vehicle. The predicted Cobh Cross Interchange additional peak hour vehicles, with the operational phase peak period, are provided in **Table 13.43**.

Table 13.43 Predicted Cobh Cross Interchange Additional Peak Hour Vehicles with Operational Phase Peak Period

N25/R624 Cobh Cross Junction	Junction Approach	Additional Vehicles (HGVs)	
		AM Peak	PM Peak
Cobh Cross Northern Roundabout	N25 Eastbound Off Slip	+3 (3)	+3 (3)
	R624 Northbound	+1 (1)	+1 (1)
Cobh Cross Southern Roundabout	N25 Westbound Off Slip	+1 (1)	+1 (1)
	R624 Southbound	+3 (3)	+3 (3)

The predicted 2023, 2028 and 2038 daily traffic volumes on the R624, during the peak period operation of the proposed agricultural fertiliser facility and the additional Port o uses of the jetty, are provided in **Table 13.44, Table 13.45** and **Table 13.46**.

Table 13.44 Predicted R624 2023 Daily Traffic Volumes with Operational Phase Peak Period

R624 Location	Total Daily Vehicles (HGVs)	Change with Agricultural Fertiliser Facility	Change with Additional Port Jetty Use	Total Change	% Change
South of Belvelly Bridge & L2989 Junction	7,046 (358)	+142 (94)	+32 (20)	+174 (114)	2.53%
Belvelly Bridge	14,574 (495)	+142 (94)	+32 (20)	+174 (114)	1.21%
Cobh Cross	20,851 (663)	+142 (94)	+32 (20)	+174 (114)	0.84%

Table 13.45 Predicted R624 2028 Daily Traffic Volumes with Operational Phase Peak Period

R624 Location	Total Daily Vehicles (HGVs)	Change with Agricultural Fertiliser Facility	Change with Additional Port Jetty Use	Total Change	% Change
South of Belvelly Bridge & L2989 Junction	7,426 (385)	+142 (94)	+32 (20)	+174 (114)	2.40%
Belvelly Bridge	15,414 (533)	+142 (94)	+32 (20)	+174 (114)	1.14%
Cobh Cross	22,072 (732)	+142 (94)	+32 (20)	+174 (114)	0.79%

Table 13.46 Predicted R624 2038 Daily Traffic Volumes with Operational Phase Peak Period

R624 Location	Total Daily Vehicles (HGVs)	Change with Agricultural Fertiliser Facility	Change with Additional Port Jetty Use	Total Change	% Change
South of Belvelly Bridge & L2989 Junction	7,853 (446)	+142 (94)	+32 (20)	+174 (114)	2.27%
Belvelly Bridge	16,232 (626)	+142 (94)	+32 (20)	+174 (114)	1.08%
Cobh Cross	23,235 (870)	+142 (94)	+32 (20)	+174 (114)	0.75%

The peak period operation of the proposed agricultural fertiliser facility and the additional Port uses of the jetty would increase daily traffic volumes on the R624 by up to 174 vehicles, including 114 heavy goods vehicles. This would equate to an increase of up to 1.21% on Belvelly Bridge and 2.53% south of Belvelly Bridge and the L2989 junction. The increase on the R624 at Cobh Cross would be up to 0.84%.

As detailed in **Section 13.3.1.2**, the R624 at Belvelly Bridge would operate in excess of its calculated suburban road link capacity northbound during the predicted 2023, 2028 and 2038 morning peak hour and southbound during the predicted 2023, 2028 and 2038 evening peak hour, with the TII predicted high growth sensitivity scenario. The peak period for the proposed agricultural fertiliser facility and the additional Port uses of the jetty would increase the suburban road link peak volume/capacity ratios for the R624 within its 60 km/hour suburban speed limit zone at Belvelly Bridge, during the predicted 2023, 2028 and 2038 morning and evening peak hours, by up to 625 percentage basis points (five additional vehicles per direction) (0.625%).

The R624 at Belvelly Bridge would continue to operate within its calculated suburban road link capacity southbound during the predicted 2023, 2028 and 2038 morning peak hour and northbound during the predicted 2023, 2028 and 2038 evening peak hour, with the peak period for the proposed agricultural fertiliser facility and the additional Port uses of the jetty. During off-peak hours, the R624 would continue to operate within its calculated capacity with the peak period for the proposed agricultural fertiliser facility and the additional Port uses of the jetty.

13.3.4.6 Predicted Traffic Volumes on National Roads with Operational Phase (Peak Period)

The existing distribution of heavy vehicle traffic volumes generated by the existing agricultural fertiliser facility operations in Cork city on national roads is approximately one third via the N25, and two thirds via the M8 and N40. The existing distribution and volumes of heavy vehicles generated on national roads by the proposed agricultural fertiliser facility would be unchanged. The distribution and volumes of heavy vehicles generated on national roads by the proposed additional Port operational uses of the jetty would also be similar to the Port's equivalent existing operations at Cork city.

Accordingly, the proposed peak season agricultural fertiliser facility and the additional Port uses of the jetty would only increase heavy vehicle traffic volumes on national roads locally, on the N25, between Cobh Cross Interchange and Dunkettle Interchange. This peak period daily increase would be up to approximately 38 HGVs, two-way.

The proposed peak season agricultural fertiliser facility and the additional Port uses of the jetty would reduce heavy vehicle traffic volumes on the N8, west of Dunkettle Interchange, by up to approximately 114 HGVs, two-way.

Similarly, the proposed peak period agricultural fertiliser facility and the additional Port uses of the jetty would only increase employee generated vehicle traffic volumes on national roads locally, on the N25, between Cobh Cross Interchange and Dunkettle Interchange. On the basis that approximately 20% of existing operational employee vehicle trips are via the N25, this peak season daily increase would be approximately 36 cars/vans, two-way.

The total peak period increase in daily traffic volumes on national roads would be up to approximately 74 vehicles, including 38 HGVs, on the N25 between Cobh Cross Interchange and Dunkettle Interchange. This would equate to an increase of up to 0.14%. There would be no increases on other national roads.

The predicted changes in daily traffic volumes on national roads, with the proposed peak season agricultural fertiliser facility and the additional Port uses of the jetty, are summarised in **Table 13.47**.

Table 13.47 Predicted Changes in National Road Daily Traffic Volumes with Operational Phase Peak Period

National Road	Location	Change (+/-) in Daily Vehicles (HGVs)
N25	Between Little Island and Carrigtohill	+74 (38)
N25	Carrigtohill Bypass	0
N25	Between Dunkettle and Little Island	+74 (38)
N40	Between Tunnel and Mahon	0
M8	Between Dunkettle and Glanmire	0
N8	Between Dunkettle and Glanmire Roundabout	-114 (114)
N8	Tivoli	-114 (114)

The predicted highest increases in peak hours and daily traffic volumes for the three months peak period of February, March and April, on the existing local road network, are significantly less than the volumetric threshold (5%) identified by TII in their TTA Assessment Guidelines for consideration of sensitive locations.

13.3.4.7 Proposed Agricultural Fertiliser Facility Off-Peak Period

During the nine months off peak period, there will be up to 17 operational employees on site at any one time, which will be less than during the three months peak season. Staff would arrive on site prior to 7.00 a.m. and depart after 5.00 p.m. This would generate approximately 14 car and van trips, both to and from the proposed agricultural fertiliser facility each working date, based on an average vehicle occupancy rate of 1.25 personnel per vehicle. Canteen facilities for personnel will be provided on site.

Table 13.48 summarises the proposed agricultural fertiliser facility operational phase daily traffic volumes during the nine months off peak period.

Table 13.48 Proposed Operational Phase Daily Traffic Volumes for the Proposed Agricultural Fertiliser Facility (Off Peak Period)

Traffic Direction	Off Peak Period (Jan/May/Jun/Jul/Aug/Sept/Oct/Nov/Dec) Daily Traffic Volumes
	Agricultural Fertiliser Facility
Inbound	14 cars/vans + 20 trucks
Outbound	14 cars/vans + 20 trucks
Daily Total	28 cars/vans + 40 trucks

The proposed off peak operational phase traffic volumes associated with the proposed agricultural facility would generate a total of up to five HGVs per hour, two-way. This would occur during the proposed operational hours of 7.00 a.m. to 5.00 p.m., Monday to Saturday.

13.3.4.8 Predicted Traffic Volumes on the R624 with Operational Phase (Off Peak Period)

The predicted 2022, 2027 and 2037 morning and evening peak hour traffic volumes on the R624, during the nine months off peak period operation of the proposed agricultural fertiliser facility and the additional Port uses of the jetty, are provided in **Table 13.49, Table 13.50** and **Table 13.51**.

Table 13.49 Predicted 2023 R624 Traffic Volumes with Proposed Operational Phase Off Peak Period

R624 Location	Peak Hour	Total Vehicles (HGVs)	Change with Agricultural Fertiliser Facility	Change with Additional Port Jetty Use	Total Change	% Change
South of Belvelly Bridge & L2989 Junction	AM	767 (31)	+5 (5)	+6 (6)	+11 (11)	+1.46% (55%)
	PM	647 (12)	+14 (0)	+6 (6)	+20 (6)	+3.19% (100%)
Belvelly Bridge	AM	1,432 (44)	+5 (5)	+6 (6)	+11 (11)	+0.77% (33%)
	PM	1,444 (16)	+14 (0)	+6 (6)	+20 (6)	+1.40% (60%)
Cobh Cross	AM	1,641 (52)	+5 (5)	+6 (6)	+11 (11)	+0.67% (27%)
	PM	1,918 (55)	+14 (0)	+6 (6)	+20 (6)	+1.05% (12%)

Table 13.50 Predicted 2028 R624 Traffic Volumes with Proposed Operational Phase Off Peak Period

R624 Location	Peak Hour	Total Vehicles (HGVs)	Change with Agricultural Fertiliser Facility	Change with Additional Port Jetty Use	Total Change	% Change
South of Belvelly Bridge & L2989 Junction	AM	813 (33)	+5 (5)	+6 (6)	+11 (11)	+1.37% (50%)
	PM	682 (13)	+14 (0)	+6 (6)	+20 (6)	+3.02% (86%)
Belvelly Bridge	AM	1,519 (49)	+5 (5)	+6 (6)	+11 (11)	+0.73% (29%)
	PM	1,527 (18)	+14 (0)	+6 (6)	+20 (6)	+1.33% (50%)
Cobh Cross	AM	1,739 (57)	+5 (5)	+6 (6)	+11 (11)	+0.64% (24%)
	PM	2,032 (62)	+14 (0)	+6 (6)	+20 (6)	+0.99% (11%)

Table 13.51 Predicted 2038 R624 Traffic Volumes with Proposed Operational Phase Off Peak Period

R624 Location	Peak Hour	Total Vehicles (HGVs)	Change with Agricultural Fertiliser Facility	Change with Additional Port Jetty Use	Total Change	% Change
South of Belvelly Bridge & L2989 Junction	AM	857 (39)	+5 (5)	+6 (6)	+11 (11)	+1.30% (39%)
	PM	717 (16)	+14 (0)	+6 (6)	+20 (6)	+2.87% (60%)
Belvelly Bridge	AM	1,597 (58)	+5 (5)	+6 (6)	+11 (11)	+0.69% (23%)
	PM	1,601 (21)	+14 (0)	+6 (6)	+20 (6)	+1.27% (40%)
Cobh Cross	AM	1,829 (67)	+5 (5)	+6 (6)	+11 (11)	+0.61% (20%)
	PM	2,139 (72)	+14 (0)	+6 (6)	+20 (6)	+0.94% (9%)

The off-peak period operation of the proposed agricultural fertiliser facility and the additional Port uses of the jetty would increase morning peak hour traffic volumes on the R624 by up to 11 vehicles, including 11 heavy goods vehicles. This would equate to an increase of up to 0.77% on Belvelly Bridge and 1.46% south of Belvelly Bridge and the L2989 junction. The increase on the R624 at Cobh Cross would be up to 0.67%.

The increase during the evening peak hour would be up to 20 vehicles, including six heavy goods vehicles. This would equate to an increase of up to 1.40% on Belvelly Bridge and 3.19% south of Belvelly Bridge and the L2989 junction. The increase on the R624 at Cobh Cross would be up to 1.05%. The majority of the increase during the evening peak hour would be staff cars/vans.

The off peak period operation of the proposed agricultural fertiliser facility and the additional Port uses of the jetty would increase morning and evening peak hour traffic volumes at the at the R624/L2989 junction by up to 0.8% and 1.5%, respectively, as detailed in **Table 13.52**.

Table 13.52 Predicted R624/L2989 Traffic Volumes with Proposed Operational Phase Off Peak Period

Location	Year	Peak Hour	Total Vehicles (HGVs)	Change	% Change
R624/L2989 Junction (Total junction volumes)	2023	AM	1,437 (46)	+11 (11)	+0.8% (31%)
		PM	1,346 (17)	+20 (6)	+1.5% (55%)
	2028	AM	1,513 (50)	+11 (11)	+0.7% (28%)
		PM	1,424 (19)	+20 (6)	+1.4% (46%)
	2038	AM	1,601 (59)	+11 (11)	+0.7% (23%)
		PM	1,494 (22)	+20 (6)	+1.4% (38%)

The off-peak period operation of the proposed agricultural fertiliser facility and the additional Port operational uses of the jetty works would increase peak hour traffic volumes, on the N25 Cobh Cross Interchange Eastbound Off Slip Road, by approximately three vehicles. The equivalent off peak period increase on the N25 Cobh Cross Interchange Westbound Off Slip Road is approximately two vehicles. The predicted Cobh Cross Interchange additional peak hour vehicles, with the operational phase off peak period are provided in **Table 13.53**.

Table 13.53 Predicted Cobh Cross Additional Peak Hour Vehicles with Operational Phase Off Peak

N25/R624 Cobh Cross Junction	Junction Approach	Additional Vehicles (HGVs)	
		AM Peak	PM Peak
Cobh Cross Northern Roundabout	N25 Eastbound Off Slip	+3 (3)	+2 (2)
	R624 Northbound	+1 (1)	+4 (1)
Cobh Cross Southern Roundabout	N25 Westbound Off Slip	+2 (2)	1 (1)
	R624 Southbound	+5 (3)	+2 (2)

The predicted 2023, 2028 and 2038 daily traffic volumes on the R624, during the off peak period operation of the proposed agricultural fertiliser facility and the additional Port uses of the jetty, are provided in **Table 13.54, Table 13.55** and **Table 13.56**.

Table 13.54 Predicted R624 2023 Daily Traffic Volumes with Operational Phase Off Peak Period

R624 Location	Total Daily Vehicles (HGVs)	Change with Agricultural Fertiliser Facility	Change with Additional Port Jetty Use	Change	% Change
South of Belvelly Bridge & L2989 Junction	7,012 (344)	+68 (40)	+72 (60)	+140 (100)	2.04%
Belvelly Bridge	14,540 (481)	+68 (40)	+72 (60)	+140 (100)	0.97%
Cobh Cross	20,817 (649)	+68 (40)	+72 (60)	+140 (100)	0.68%

Table 13.55 Predicted R624 2028 Daily Traffic Volumes with Operational Phase Off Peak Period

R624 Location	Total Daily Vehicles (HGVs)	Change with Agricultural Fertiliser Facility	Change with Additional Port Jetty Use	Change	% Change
South of Belvelly Bridge & L2989 Junction	7,392 (371)	+68 (40)	+72 (60)	+140 (100)	1.93%
Belvelly Bridge	15,380 (519)	+68 (40)	+72 (60)	+140 (100)	0.92%
Cobh Cross	22,038 (718)	+68 (40)	+72 (60)	+140 (100)	0.64%

Table 13.56 Predicted R624 2037 Daily Traffic Volumes with Operational Phase Off Peak Period

R624 Location	Total Daily Vehicles (HGVs)	Change with Agricultural Fertiliser Facility	Change with Additional Port Jetty Use	Change	% Change
South of Belvelly Bridge & L2989 Junction	7,819 (432)	+68 (40)	+72 (60)	+140 (100)	1.82%
Belvelly Bridge	16,198 (612)	+68 (40)	+72 (60)	+140 (100)	0.87%
Cobh Cross	23,201 (856)	+68 (40)	+72 (60)	+140 (100)	0.61%

The off-peak period operation of the proposed agricultural fertiliser facility and the additional Port uses of the jetty would increase daily traffic volumes on the R624 by up to 140 vehicles, including 100 heavy goods vehicles. This would equate to an increase of up to 0.97% on Belvelly Bridge and 2.04% south of Belvelly Bridge and the L2989 junction. The increase on the R624 at Cobh Cross would be up to 0.68%.

As detailed in **Section 13.3.1.2**, the R624 at Belvelly Bridge would operate in excess of its Calculated suburban road link capacity northbound during the predicted 2023, 2028 and 2038 morning peak hour and southbound during the predicted 2023, 2028 and 2038 evening peak hour, with the TII predicted high growth sensitivity scenario. The off peak period for the proposed agricultural fertiliser facility and the additional Port uses of the jetty would increase these critical suburban road link peak volume/capacity ratios for the R624 within its 60 km/hour suburban speed limit zone at Belvelly Bridge, during the predicted 2023, 2028 and 2038 morning and evening peak hours, by up to 750 percentage basis points (0.750%) and 375 percentage basis points (0.375%), respectively.

The R624 at Belvelly Bridge would continue to operate within its calculated suburban road link capacity southbound during the predicted 2023, 2028 and 2038 morning peak hour and northbound during the predicted 2023, 2028 and 2038 evening peak hour, with the off peak period for the proposed agricultural fertiliser facility and the additional Port uses of the jetty. During off-peak hours, the R624 would continue to operate within its calculated capacity with the off-peak period for the proposed agricultural fertiliser facility and the additional Port uses of the jetty.

13.3.4.9 Predicted Traffic Volumes on National Roads with Operational Phase (Off Peak Period)

As detailed previously in **Section 13.3.5.6**, the existing distribution of heavy traffic volumes generated by the existing agricultural fertiliser facility operations in Cork city on national roads is approximately one third via the N25, and two thirds via the M8 and N40. The existing distribution and volumes of heavy vehicles generated on national roads by the proposed agricultural fertiliser facility would be unchanged. The distribution and volumes of heavy vehicles generated on national roads by the proposed additional Port operational uses of the jetty would also be similar to the Port's equivalent existing operations at Cork city.

Accordingly, the proposed off peak season agricultural fertiliser facility and the additional Port operational uses of the jetty would only increase heavy vehicle traffic volumes on national roads locally, on the N25, between Cobh Cross Interchange and Dunkettle Interchange. This off-peak period daily increase would be up to approximately 20 HGVs, two-way.

The proposed off peak period agricultural fertiliser facility and the additional Port operational uses of the jetty would reduce heavy vehicle traffic volumes on the N8, east of Dunkettle Interchange, by up to approximately 60 HGVs, two-way.

Similarly, the proposed off peak period agricultural fertiliser facility and the additional Port operational uses of the jetty would only increase employee generated vehicle traffic volumes on national roads locally, on the N25, between Cobh Cross Interchange and Dunkettle Interchange. On the basis that approximately 20% of existing operational employee vehicle trips are via the N25, this peak period daily increase would be approximately 24 cars/vans, two-way.

The total off peak season increase in daily traffic volumes on national roads would be up to approximately 44 vehicles, including 20 HGVs, on the N25 between Cobh Cross Interchange and Dunkettle Interchange. This would equate to an increase of up to 0.09%. There would be no increases on other national roads.

The predicted changes in daily traffic volumes on national roads, with the proposed off peak period agricultural fertiliser facility and the additional Port operational uses of the jetty, are summarised in **Table 13.57**.

Table 13.57 Predicted Changes in National Road Daily Traffic Volumes with Operational Phase Off Peak Period

National Road	Location	Change (+/-) in Daily Vehicles (HGVs)
N25	Between Little Island and Carrigtohill	+44 (20)
N25	Carrigtohill Bypass	0
N25	Between Dunkettle and Little Island	+44 (20)
N40	Between Tunnel and Mahon	0
M8	Between Dunkettle and Glanmire	0
N8	Between Dunkettle and Glanmire Roundabout	-60 (60)
N8	Tivoli	-60 (60)

The predicted highest increases in peak hours and daily traffic volumes for the nine months off peak period of February, March and April, on the existing local road network, are significantly less than the volumetric threshold (5%) identified by TII in their TTA Assessment Guidelines for consideration of sensitive locations.

13.3.4.10 Proposed Facility Access/Routes

The R624/Marino Point main access junction includes a dedicated right-turn lane on the R624, with a right-turn lane length of circa 65 metres. The Belvelly Port Facility site main access junction is located within the 60km/hr suburban speed limit zone on the R624.

The proposed agricultural fertiliser facility and additional port operational uses highest weekday daily traffic generation of up to 168 vehicles, would be significantly less than the traffic volumes' warrant identified by the TII Geometric Design of Junctions for the provision of a dedicated ghost island right-turn lane, detailed in **Section 13.3.3.1**. Accordingly, the highest traffic volumes generated by the Belvelly Port Facility site main access at its R624 junction would be relatively low and would be facilitated by the existing ghost island right-turn lane junction, without any significant traffic queuing and delays.

The additional traffic volumes generated by the proposed works on the R624, at the horizontal bend on the south side of Belvelly Bridge and on Belvelly Bridge, would increase instances of informal vehicle stopping and yielding at these locations, to facilitate large and heavy vehicle movements. Heavy vehicle trucks generated by the proposed peak period agricultural fertiliser facility and additional port operational uses would be at a rate of one truck every six minutes.

On the basis of the EPA Guidelines, the proposed agricultural fertiliser facility and additional port operational phase would have slight to moderate negative effects.

13.3.4.11 CMATS Cycle Network

The proposed development will facilitate the relocation of existing development from the City Docks, and reduce HGVs in the vicinity of the CMATS Cycle Network linking the City with urban centres and employment areas in Cork County, located east of the Cork City. Section 13.3.1 of this chapter refers.

13.3.5 Cumulative Effects

The predicted 2023, 2028 and 2038 baseline traffic volumes are on the basis of TII's predicted high sensitively growth scenario. This high sensitivity growth scenario includes for other proposed development generated traffic volumes on the surrounding local road network.

The TII predicted high sensitivity growth scenario results in an increase in baseline heavy vehicle traffic volumes on the R624 of 53.5% up to 2037, from the 2018 baseline data. The equivalent increase in baseline light vehicle traffic volumes is 16.9%.

The following are known housing developments in Cobh which are proceeding, or considered likely to proceed in the short term, and as such, will generate traffic volumes on the R624:

- Inis Alainn, Carrignafoy, Cobh, Co. Cork;
- Martello Estate, Ringacoltig, Cobh, Co. Cork; and
- Cluain Ard Strategic Housing Development, Cobh, Co. Cork.

The Government's Economic and Social Research Institute (ESRI) envisage that the current Coronavirus (Covid-19) restrictions and measures will result in an economic recession. During the last economic recession, traffic volumes reduced year-on-year on National and Regional Roads. Accordingly, it is envisaged that the TII predicted high sensitivity growth scenario used in this assessment may not occur, and future baseline traffic volumes will be lower than predicted.

13.4 Mitigation

13.4.1 Construction Phase

The proposed hours for the exportation and importation of vehicle loads are 9.00 a.m. to 4.00 p.m., Monday to Friday, and 8.00 a.m. to 5.00 p.m. on Saturdays. These hours are proposed to avoid coinciding with the existing weekday morning and evening peak traffic periods on the R624 and surrounding road network, of 7.00 a.m. to 9.00 a.m. and 4.00 p.m. to 6.00 p.m.

In response to Cork County Council's request, the layout of Belvelly Bridge and the horizontal geometry of the R624/L2989 junction was reviewed in consultation with Cork County Council's Traffic and Transport Section, as part of the separate planning application by the Belvelly Marino Development Co. DAC (BMDC) for the proposed demolition and site infrastructure works at the subject site (Cork County Council planning reference: 19/06783). The proposals for improvement for road users submitted for consideration by Cork County Council have been conditioned by the Council as part of their planning permission notification for the proposed demolition and site infrastructure works.

A detailed Construction Traffic Management Plan will be prepared by the main contractor prior to works commencing. This Plan will comprise the construction traffic mitigation measures which are set out in this EIAR and any additional measures which are required by the conditions attached to the Planning Authority's decision. The Construction Traffic Management Plan will also include any specific requirements of Cork County Council during the construction phase including any monitoring and reporting requirements. This Plan will be submitted to and agreed with Cork County Council prior to construction commencement.

13.4.2 Operational Phase

As noted above, the layout of Belvelly Bridge and the horizontal geometry of the R624/L2989 junction was reviewed in consultation with Cork County Council's Traffic and Transport Section, as part of the separate planning application by the Belvelly Marino Development Co. DAC (BMDC) for the proposed demolition and site infrastructure works at the subject site (Cork County Council planning reference: 19/06783). The proposals for improvement for road users submitted for consideration by Cork County Council have been conditioned by the Council as part of their planning permission notification for the proposed demolition and site infrastructure works.

In response to Cork County Council's request, a proposed reservation for the provision of a four metres wide route for pedestrians and cyclists connecting to the R624 to the north and south of the proposed development, was submitted to Cork County Council, as part of the separate planning application by the Belvelly Marino Development Co. DAC (BMDC) (Cork County Council planning reference: 19/06783), and has been conditioned by the Council as part of their planning permission notification.

The foregoing proposals would support the plans of Cork County Council to enhance sustainable travel between Cobh, Marino Point and Cobh Cross. The proposals and those of Cork County Council would also support a link for public transport users, between Marino Point and the existing public transport services at Cobh.

13.5 Residual Impacts

13.5.1 Construction Phase

On the basis of the EPA Guidelines, the proposed agricultural fertiliser facility construction phase will have slight to moderate short-term negative effects. These would relate to heavy vehicle traffic movements during daily off-peak traffic periods.

13.5.2 Operational Phase

On the basis of the EPA Guidelines, the proposed agricultural fertiliser facility and additional port operational phase will have slight to moderate negative effects. These would relate to heavy vehicle traffic movements.

13.6 References

Cork County Council's Cork County Development Plan 2014

Cork County Council's Cobh Municipal District Local Area Plan 21st August 2017

National Transport Authority (NTA) Cork Metropolitan Area Transport Strategy 2040 (CMATS)

Transport Infrastructure Ireland (TII) Traffic and Transport Assessment (TTA) Guidelines PE-PDV-02045 May 2014

TII's Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections PE-PAG-02017 October 2016

TII's Geometric Design of Junctions DN-GEO-03060 June 2017

Environmental Protection Agency (EPA) Guidelines on The Information to be Contained in Environmental Impact Assessment Reports Draft August 2017 (EPA EIAR Guidelines)

Stryker Anngrove Phase II Traffic and Transport Assessment

14. NOISE AND VIBRATION

14.1 INTRODUCTION

This chapter of the EIAR assesses potential impacts associated with noise emissions at identified receptors, identifies mitigation measures required to minimise such impacts, and describes any predicted residual impacts.

14.1.1 Scope of Assessment

The proposed development will involve two main elements:

- The development of a new agricultural fertiliser facility by Goulding Chemicals Limited which will include blending, bagging, and storage operations.
- Additional port operational use to facilitate general cargo vessels at the Belvelly Port Facility.

Full details of the proposed works are provided in **Chapter 2 Description of the Proposed Development.** Noise emissions will arise during construction works associated with the proposed agricultural fertiliser facility, and from subsequent operation of the commissioned facility. Noise emissions will also arise from port operational use of the existing jetty. Such emissions may result in potential impacts at offsite receptors.

There are no onsite noise sensitive receptors. Offsite receptors include residential dwellings along the R624 road (Cobh Road), and dwellings across the harbour at Passage West. A golf course to the immediate east of the site may also be considered a sensitive receptor. To the immediate north of the site, Great Island Channel Special Area of Conservation (SAC) and Cork Harbour Special Protection Area (SPA) are also sensitive receptors.

The proposed development is not expected to give rise to groundborne vibration once commissioned, and operational phase vibration has therefore been scoped out of the assessment.

14.1.2 Methodology

Noise criteria relevant to the proposed development are identified. Potential impacts are assessed by reference to these criteria. In certain cases, criteria are informed by existing noise levels measured during baseline noise surveys. Predictive modelling of noise emissions is used to calculate noise levels received at receptors. Where required, mitigation measures are recommended in order to reduce received levels. The assessment contains the following elements:

- Identification of noise criteria relevant to the proposed development.
- Assessment of potential impacts by reference to baseline noise information.
- Identification of existing and proposed onsite noise sources of potential significance.
- Prediction of noise levels received at receptors.
- Rating of the predicted impact and comparison against relevant assessment criteria.
- Recommendation of mitigation measures, if required.

- Description of predicted residual impacts.

The assessment was undertaken by reference to the following documents:

- *Report RI 8507: Structural response and damage produced by ground vibration from surface mines blasting* (US Bureau Of Mines, 1980).
- *British Standard BS 7385-02: 1993 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground borne vibration* (1993).
- *Guidelines on community noise* (World Health Organisation, 1999).
- Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise (2002).
- *Draft guidelines for noise impact assessment* (Institute of Environmental Management and Assessment, and Institute of Acoustics, 2002).
- *Night noise guidelines for Europe* (World Health Organisation, 2009).
- *British Standard BS 4142:2014 Methods for rating and assessing industrial and commercial sound* (2014).
- *British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise* (2014).
- *British Standard BS 5228-2:2009 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration* (2014).
- *Good practice guidance for the treatment of noise during the planning of national road schemes* (National Roads Authority, 2014).
- *Draft advice notes on current practice in the preparation of environmental impact statements* (Environmental Protection Agency, 2015).
- *NG4 Guidance note for noise: Licence applications, surveys and assessments in relation to scheduled activities* (Environmental Protection Agency, 2016).
- *Draft guidelines on the information to be contained in environmental impact assessment reports* (Environmental Protection Agency, 2017).
- *Noise Action Plan 2018-2023: Cork agglomeration area noise project* (Cork City Council & Cork County Council, 2019).

Baseline noise surveys were undertaken in accordance with *International Standard ISO 1996-2:2017 Acoustics: Description, Measurement and Assessment of Environmental Noise – Part 2: Determination of environmental noise levels* (2017). Predictive modelling was carried out using *International Standard ISO 9613-2:1996 Acoustics: Attenuation of sound during propagation outdoors – Part 2 General method of calculation* (1996).

14.1.3 Assessment Criteria

Construction Phase Noise

No national noise guidance documents have been issued specifically with respect to construction projects in Ireland. Noise emissions arising from such projects are typically assessed by reference to *British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on*

construction and open sites – Part 1: Noise (2014). This standard is considered the most relevant standard available with respect to the proposed development.

BS 5228-1:2009+A1:2014 sets out a number of methods to determine appropriate noise criteria. The method applied in this assessment is the 'ABC' method, which recommends criteria based on existing ambient levels. On the basis of ambient levels measured across the study site (presented below), **Table 14.1** lists criteria considered appropriate to the proposed development. Little or no construction activities are expected to occur during evening or night-time hours.

Table 14.1 Noise criteria applied, taken from BS 5228-1:2009+A1:2014.

Day	Period	Hours	$L_{Aeq\ 1\ h}$ free field[1]	$L_{Aeq\ 1\ h}$ façade[2]
Monday-Friday	Daytime	0700-1900	65 dB	68 dB
	Evening	1900-2300	55 dB	58 dB
	Night-time	2300-0700	45 dB	48 dB
Saturday	Daytime	0700-1300	65 dB	68 dB
	Evening	1300-2300	55 dB	58 dB
	Night-time	2300-0700	45 dB	48 dB
Sunday & public holiday	Daytime	0700-1900	55 dB	58 dB
	Evening	1900-2300	55 dB	58 dB
	Night-time	2300-0700	45 dB	48 dB

[1]Applicable in external areas such as gardens, >3.5 m from facades.

[2]Applicable on balconies at Passage West.

Criteria presented in **Table 14.1** relate to the $L_{Aeq\ T}$ parameter, which is the A-weighted sound pressure level specifically attributable to site operations, averaged over time interval T. The interval typically applied to construction projects is one hour, and thus the parameter applied in this assessment is the $L_{Aeq\ 1\ h}$.

$L_{Aeq\ 1\ h}$ criteria listed in **Table 14.1** are considered applicable to all noise sensitive locations, defined by the Environmental Protection Agency as:

Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.

Identified $L_{Aeq\ 1\ h}$ criteria are thus considered applicable to all dwellings across the study site. The criteria are external free-field values (i.e. not immediately adjacent to facades), and thus apply to external areas in the curtilage of dwellings such as garden and patio areas. With respect to receptors with balconies, such as several receptors at Passage West, $L_{Aeq\ 1\ h}$ criteria may be corrected for façade reflection, and these are included in **Table 14.1**.

No construction phase noise limits have been identified with respect to the designated SAC and SPA areas to the north of the site, which are particularly important for birds. It is widely accepted that wildlife, including birds quickly become accustomed to steady or intermittent sources such as industrial emissions and traffic, and indeed the SAC and SPA areas are currently subject to elevated R624 traffic noise levels, shipping traffic, Marino Point jetty activity, MarinoChem emissions, and intermittent rail movements. Given that the construction phase is expected to be complete within 18 months, it is not considered necessary to ascribe specific construction phase noise criteria with respect to birds.

Construction Phase Vibration

As with noise, there are no national limits relating to groundborne vibration, and reference is usually made to guidance set out in *British Standard BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration* (2014). **Table 14.2** presents guidance included in the document with respect to human perception of peak particle velocity (PPV), the most commonly applied descriptor of groundborne vibration.

Table 14.2 Human perception of vibration, from BS 5228-2:2009+A1:2014.

PPV	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10.0 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

During construction projects, reference is usually made to criteria relevant to buildings, in order to avoid potential cosmetic or structural damage. Guidance presented in the then National Roads Authority document *Good practice guidance for the treatment of noise during the planning of national road schemes* (2014) with respect to construction vibration has seen increasing application to non-road projects due to the absence of any other Irish guidance. NRA criteria, listed in **Table 14.3**, are informed by documents such as *British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration* (1993). The criteria apply to the closest part of any relevant building or structure.

Table 14.3 Building vibration criteria, from NRA (2014).

Frequency	<10 Hz	10-50 Hz	>50 Hz
PPV	8 mm/s	12.5 mm/s	20 mm/s

NRA limits set out above are considerably lower than criteria recommended by two respected international authorities, as presented in **Table 14.4**. The criteria presented are those below which cosmetic damage (hairline cracking, etc.) to buildings is unlikely to occur. Limits relating to structural damage are significantly higher.

Table 14.4 Recommended vibration limits.

Structure	Lower frequencies	Higher frequencies	Source
Modern dwellings	<40 Hz: 19 mm/s	>40 Hz: 51 mm/s	1
Older dwellings	<40 Hz: 12.7 mm/s	>40 Hz: 51 mm/s	1
Industrial & heavy commercial	4-15 Hz: 50 mm/s	>15 Hz: 50 mm/s	2&3
Residential & light commercial	4-15 Hz: 15-20 mm/s	>15 Hz: 20-50 mm/s	2&3

Sources:
1 US Bureau Of Mines report RI 8507: Structural response and damage produced by ground vibration from surface mines blasting (1980).
2 BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration (2014).
3 BS 7385-02: 1993 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground borne vibration (1993).

Operational Phase Noise

There are no national noise limits or guidelines available in Ireland with respect to industrial or port facilities. In the absence of any guidance, the most appropriate document is the World Health Organisation (WHO) report *Guidelines on community noise* (1999) which sets out guideline values considered necessary to protect communities. Most environmental noise guidance documents issued across Europe ultimately derive limits on the basis of guidance presented in the WHO report.

With respect to residential settings, the document notes that an outdoor $L_{Aeq\ 16\ h}$ level of 55 dB is an indicator of serious annoyance during daytime and evening hours, with 50 dB being an indicator of moderate annoyance. The 55 dB criterion was first suggested by the WHO in their 1980 document *Environmental Health Criteria 12*.

Since 1980, the 55 dB criterion has become the de facto daytime limit applied by most Irish regulatory authorities to commercial and industrial operators. Although the WHO criterion applies to daytime periods of 16 hours, authorities typically specify shorter periods, and thus limits as $L_{Aeq\ 15\ min}$, $L_{Aeq\ 30\ min}$ and $L_{Aeq\ 1\ h}$ are variously applied. Compliance with a 15-60 minute criterion, timed to coincide with the loudest onsite activity, will generally guarantee compliance with an $L_{Aeq\ 16\ h}$ criterion.

In issuing licences to industrial facilities, the EPA typically specifies a daytime $L_{Aeq\ T}$ limit of 55 dB at receptors. The EPA considers daytime to refer to 0700-1900 h. A similar daytime limit is usually included in noise conditions attached to planning permission issued by local authorities.

The WHO's 1999 guidance document recommends an external night-time criterion of 45 dB to prevent sleep disturbance. Although the WHO document *Night noise guidelines for Europe* (2009) makes reference to a 40 dB night-time criterion, this relates to the $L_{night,outside}$ parameter, which is the long term average measured throughout a whole year. The 45 dB criterion is considered more appropriate to short term measurement intervals. As before, $L_{Aeq\ 15\ min}$, $L_{Aeq\ 30\ min}$ and $L_{Aeq\ 1\ h}$ intervals are variously

applied by regulatory authorities, rather than the 8 hour period to which the WHO's 45 dB criterion applies. The EPA considers that night-time refers to 2300-0700 h.

Neither of the WHO documents identified above makes reference to evening periods, and indeed their 1999 document assumes that daytime extends to 2300 h. However, a trend towards the separate assessment of evening impacts is currently evident, partly driven by EPA document *NG4 Guidance note for noise: Licence applications, surveys and assessments in relation to scheduled activities* (2016). The original 2012 version of the document introduced the evening period 1900-2300 h. The NG4 document recommends an evening criterion of 50 dB, applicable externally at receptors.

Many authorities require that a penalty be added to measured noise levels where emissions are tonal and/or impulsive. NG4 specifies the addition of a 5 dB penalty to site specific $L_{Aeq\,T}$ levels measured during daytime or evening hours. During night-time hours, the EPA prohibits tones and impulses entirely, stating that such characteristics should not be 'clearly audible or measurable'. With respect to short term impulsive sources, the WHO recommends a night-time L_{Amax} limit of 60 dB outside bedroom windows during night-time hours. No L_{Amax} limit is recommended for daytime periods.

The above criteria, summarised in **Table 14.5**, are considered relevant to operational emissions at the proposed development. An assessment interval of 1 h is applied in this assessment, as is typically used in assessments relating to external plant. Rather than allowing daytime and evening levels to be rated for tonal or impulsive features, the table assumes that such features are avoided at all times. Criteria apply externally at receptors. Where façade levels are being assessed, such as on balconies, criteria may be increased by 3 dB.

Table 14.5 Noise criteria appropriate to operational emissions

Period	Parameter	Limit
0700-1900 h	$L_{Aeq\,1\,h}$	55 dB
1900-2300 h	$L_{Aeq\,1\,h}$	50 dB
2300-0700 h	$L_{Aeq\,1\,h}$	45 dB
2300-0700	L_{AFmax}	60 dB

In addition to the absolute criteria above, the impact of noise emissions from commercial sources may be assessed by reference to relative criteria. The most commonly applied standard here is *British Standard BS 4142:2014 Methods for rating and assessing industrial and commercial sound* (2014) which provides for the comparison of specific $L_{Aeq\,T}$ levels (i.e. noise levels attributable to the source in question) with background levels, and provides an indication of impact depending on the difference. Specific levels may be rated to take tonal, impulsive and other characteristics into account. The standard notes that the background noise environment may include existing industrial emissions unrelated to the specific source.

BS 4142:2014 states that a difference between specific and background levels of 10 dB or more is indicative of a significant adverse impact. A difference of 5 dB suggests an adverse impact, with lower differences suggesting reduced impacts. The standard adds that the perception of impact will be

increased or reduced depending on local context, and context is seeing an increasingly important role in assessment of noise impact.

The degree of noise impact may also be assessed by reference to the magnitude of increase. **Table 14.6** sets out the scale applied in this report, drawn from guidance given in *Draft guidelines on the information to be contained in environmental impact assessment reports* (Environmental Protection Agency, 2017) and *Draft guidelines for noise impact assessment* (Institute of Environmental Management and Assessment, and Institute of Acoustics, 2002).

Table 14.6 Assessment of impact by reference to increase over existing noise levels.

Increase	Impact	Impact
<2 dB	Imperceptible	Capable of measurement, but without significant consequences
2-4 dB	Not significant	Causes noticeable changes to soundscape, but without significant consequences
4-6 dB	Slight	Causes noticeable changes to soundscape without affecting its sensitivities
6-10 dB	Moderate	Alters soundscape in manner consistent with existing and emerging baseline trends
10-15 dB	Significant	Alters soundscape due to source character, magnitude, duration or intensity
15-20 dB	Very significant	Significantly alters soundscape due to source character, magnitude, duration or intensity
>20 dB	Profound	Obliterates soundscape.

For the purposes of this assessment, criteria set out in **Table 14.6** are considered relevant to $L_{Aeq\,T}$ levels. Thus post-commissioning $L_{Aeq\,T}$ levels (total ambient) may be compared to existing $L_{Aeq\,T}$ levels. This is considered more appropriate that the comparison of post-commissioning $L_{Aeq\,T}$ levels with residual $L_{AF90\,T}$ levels, which forms the basis of the assessment method set out in BS 4142:2014.

The foregoing criteria are considered relevant to noise sensitive receptors in the surrounding area, as defined by the EPA above. Such receptors include dwellings and care facilities. Although the EPA's definition does not specifically refer to golf courses, it is considered prudent to apply sensitive receptor status to the club house, fairways and greens of Cobh Golf Course which lies to the east of the site.

Local Authority Noise Action Plan

The *Cork City Council and Cork County Council Cork Agglomeration Noise Action Plan 2018-2023* (2019) describes a strategic plan based on noise mapping undertaken in 2017 ('round 3' mapping). Preparation of the plan is a requirement of Directive 2002/49/EC of the European Parliament and of the Council relating to the assessment and management of environmental noise (2002), transposed into Irish law by the European Communities (Environmental Noise) Regulations 2018 (SI No. 549/2018). The Directive requires preparation of noise plans for agglomerations with more than

100,000 inhabitants, and for roads with annual traffic volumes over 3 million vehicles. Regional route R624 which is adjacent to the proposed development site, and regional route R610 through Passage West, are not subject to noise mapping.

The Noise Action Plan does not specify noise criteria with respect to commercial or industrial projects, and instead focusses on road traffic noise from major roads. In the absence of any plan criteria, limits set out in **Table 14.5** above are considered relevant.

14.1.4 Statement on Limitations and Difficulties Encountered

No difficulties were encountered during the preparation of this chapter.

14.1.5 Competency of Assessor

This chapter was prepared by Damian Brosnan, Principal Consultant with Damian Brosnan Acoustics. Damian has 24 years' experience and has worked on several hundred noise impact assessment projects to date. Damian's full qualifications and details of experience are provided in **Chapter 1 Introduction**.

14.2 EXISTING ENVIRONMENT

14.2.1 Overview of the Existing Environment in the Context of Noise and Vibration

The site is shown in **Figure 14.1**. The proposed development site lies in a rural area between Cork City and Cobh, and is thus subject to daily patterns associated with urban activity. This is chiefly evident in traffic noise arising on the R624 which runs outside the eastern boundary of the site. This route sees intermittent traffic throughout the daytime and evening, reducing to occasional movements during the night. During busy periods, traffic noise becomes almost continuous.

The diurnal urban character of the soundscape is additionally reflected in railway noise, due to the routing of the Cobh railway line alongside the site, as well as low altitude aircraft noise associated with Cork Airport. The study site is also influenced by traffic noise on the R610 which serves Passage West across the river. At intervals, noise from vessels on the river may be clearly audible at receptors on both sides.

A commercial ship dock facility located at a quay at Passage West is used for feed/grain import and scrap metal export on small bulk carriers. Noise emissions here arise at intervals from grabs and loaders used to load/unload material.

The Belvelly Port Facility site includes several existing onsite noise sources. The first of these is an existing chemical facility (MarinoChem) located within the overall Belvelly Port Facility site, at the northwest corner. Noise emissions from here arise 24/7, and are continuous and steady in nature. An electrical substation and Gas Networks Ireland compound located near the eastern boundary of the site give rise to locally audible emissions within 50 m. Occasional vehicle emissions arise at a

temporary contractor's compound at the southern end of the site. Emissions also arise at the existing jetty at the Belvelly Port Facility site, which is currently used to export dry cargo (wooden logs), the importation of Methanol for MarinoChem, as a stand-by berth for Port work vessels, and to moor occasional vessels for lay-by or minor maintenance work. Methanol unloading at the jetty occurs 1-2 times per month, requiring continuous pumping emissions overnight.

Outside of the above, the only other noise sources of significance are bird calls. Wildlife calls may be audible at intervals at the Fota wildlife park to the northeast. At night-time, reduced local noise intrusion allows distant traffic on the N25 to the north, and sporadic traffic noise at Courtstown Industrial Estate to the northwest, to become audible. Commercial plant at the latter, such as air handling units may also become audible during the night, although such emissions were not detected during site surveys.

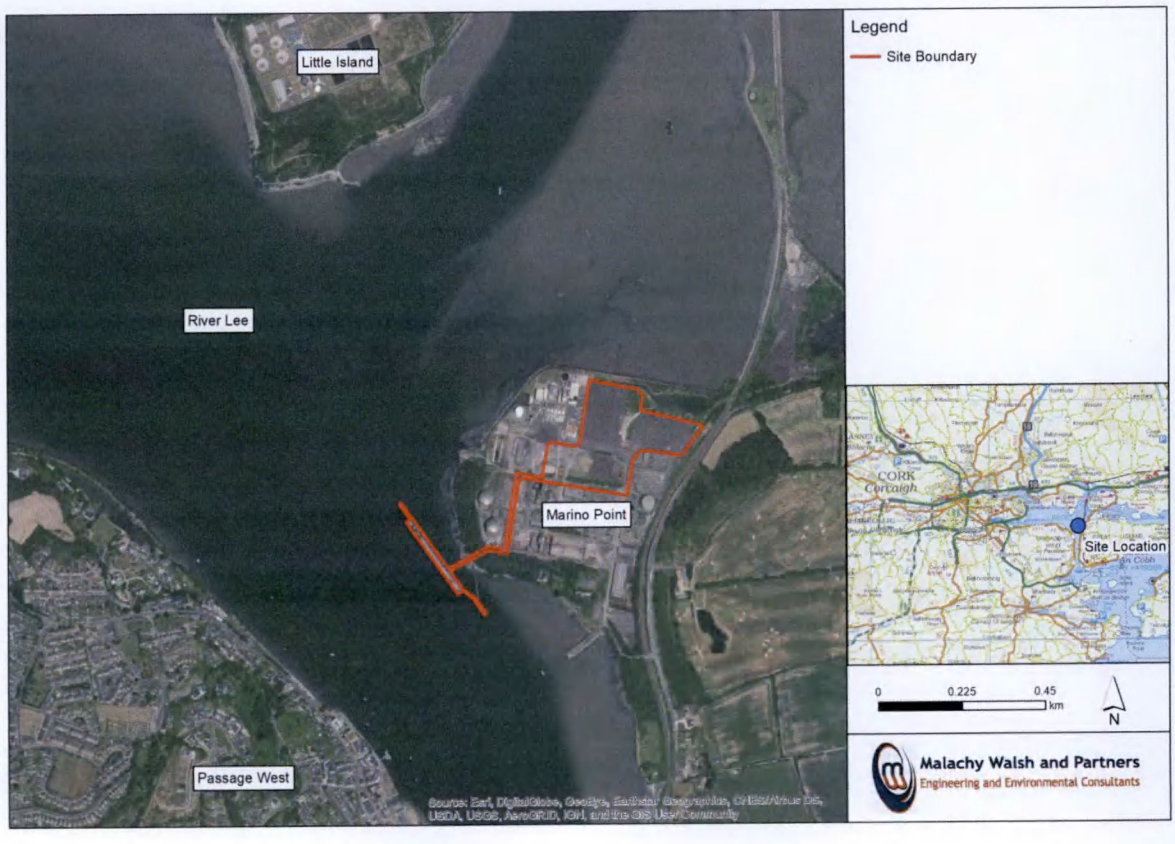


Figure 14.1 Study site. N

14.2.2 Sources of Baseline Information

Noise mapping

Directive 2002/49/EC requires that nominated authorities undertake strategic mapping of noise levels along transport corridors where specified thresholds are exceeded. Traffic volumes on the R624 and R610 are below noise mapping thresholds. Rail traffic on the Cobh line is similarly insufficient to trigger noise mapping. Consequently, strategic noise maps have not been prepared by any authority in respect of the study site, and thus there are no noise maps available to provide baseline data.

MarinoChem

The onsite MarinoChem facility is regulated by the EPA under Industrial Emissions licence Reg No. P0034-03. The facility is required to undertake an annual noise survey at two stations shown in **Figure 14.2**. Noise data measured during the surveys of 2016-2018 are summarised in **Table 14.7**. Insufficient information is presented in the annual environmental reports to assess the validity (calibration, methodology, weather conditions, etc.) of the data.

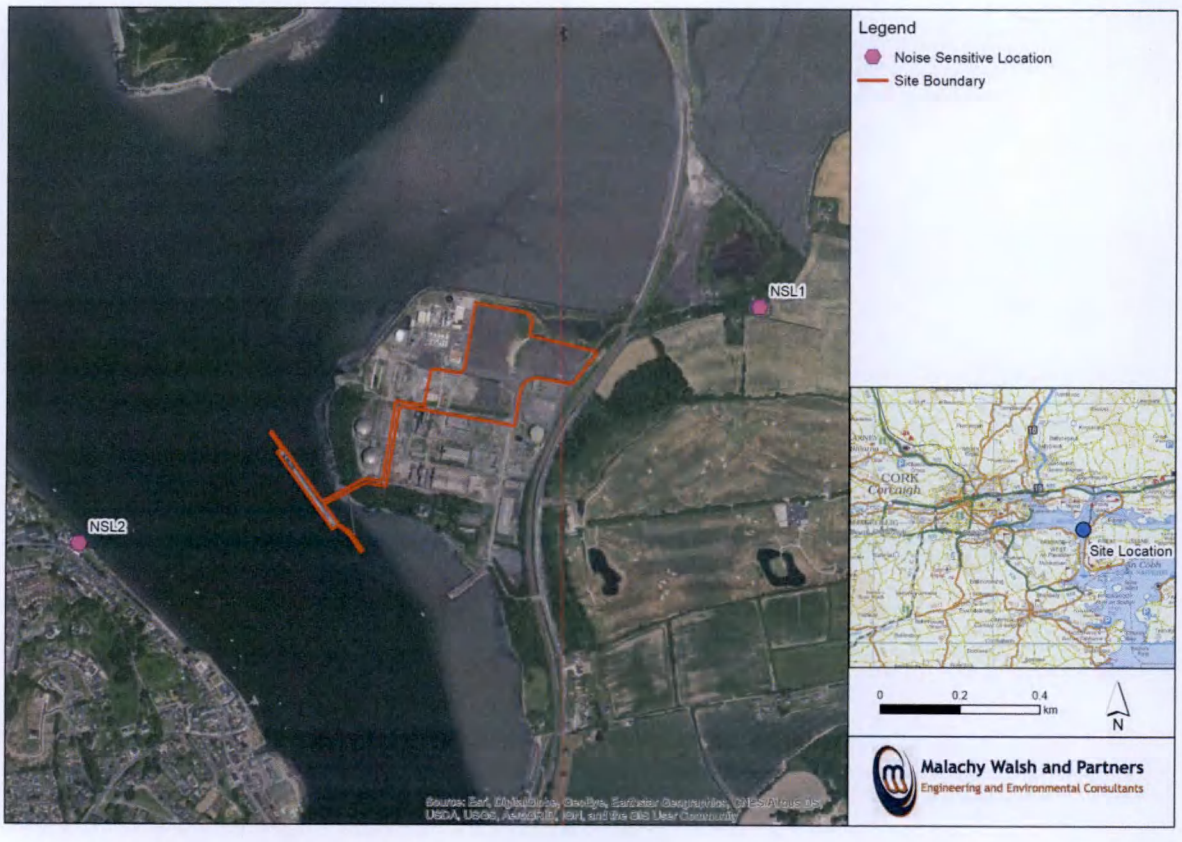


Figure 14.2 Noise stations used during routine MarinoChem surveys. N

Notes provided with **Table 14.7** data state that noise sources audible at NSL1 across the three surveys were road traffic and birdsong during the daytime, and road traffic at night. At NSL2, sources audible were road traffic, pedestrians and birdsong during the daytime, and traffic and water flow during the night. There is no indication that MarinoChem emissions were audible during any of the surveys at NSL1 or NSL2. Recorded $L_{AF90\ 30\ min}$ levels are thus considered reasonably representative of existing background noise levels at these positions.

Table 14.7 MarinoChem noise data 2016-2018 as submitted to EPA. Periods are defined by the EPA as daytime (0700-1900), evening (1900-2300) and night-time (2300-0700).

Station	Date	Period	$L_{Aeq\ 30\ min}$	$L_{AF10\ 30\ min}$	$L_{AF90\ 30\ min}$
NSL1	Dec 2016	Daytime	67-68 dB	72-73 dB	38-45 dB
		Evening	-	-	-
		Night-time	42 dB	43-44 dB	40 dB
	Nov 2017	Daytime	68 dB	71 dB	52 dB
		Evening	67-71 dB	70-73 dB	51 dB
		Night-time	38-39 dB	39-40 dB	36 dB
	Dec 2018	Daytime	62-64 dB	52-70 dB	46-48 dB
		Evening	-	-	-
		Night-time	40-50 dB	39-41 dB	38-39 dB
NSL2	Dec 2016	Daytime	52-58 dB	55-59 dB	49-52 dB
		Evening	-	-	-
		Night-time	38-46 dB	37-50 dB	30-31 dB
	Nov 2017	Daytime	51-52 dB	54-59 dB	44-49 dB
		Evening	41-56 dB	42-56 dB	36-49 dB
		Night-time	-	-	-
	Dec 2018	Daytime	58 dB	60-61 dB	52-53 dB
		Evening	42-60 dB	42-62 dB	39-53 dB
		Night-time	43 dB	43 dB	41 dB

Baseline survey 2019

In order to obtain additional baseline noise information to inform the assessment, a noise survey was undertaken by Damian Brosnan Acoustics across the study area over various dates in June and July 2019. Monitoring was undertaken at locations described in **Section 14.2.5**. Equipment specifications, survey methodology and weather conditions are listed in **Appendix 14.1**.

The soundscape prevailing at each station is described in **Table 14.8**. Measured data are listed in **Appendix 14.2**. Daytime data are summarised in **Table 14.9**. Profiles are shown in **Appendix 14.3**. The interval T applied is 15 minutes, as recommended by BS 4142:2014 with respect to residual/background noise measurements.

Table 14.8 Noise sources audible at baseline stations.

Station	Sources audible
N1	Continuous buzz emissions faintly audible from onsite substation, and onsite MarinoChem facility. R624 traffic audible at low level. Train passes and low altitude aircraft. On 28th of June 2019 distant rock breaker audible at low level at SE corner of Marino Point site. Bird song/calls, and lightly rustling vegetation at times. The rock breaker was breaking a small pit at the corner of the carpark.
N2	R624 traffic dominant, locally and in distance. Bird song/calls significant at times. Low altitude aircraft and train passes in distance. Lightly rustling vegetation at times. Slightly audible truck

Station	Sources audible
	movements at onsite Sorensen compound, although rare. MarinoChem emissions audible during night-time traffic lulls.
N3	R624 traffic regular and dominant. No other noise audible apart from local bird calls and several train passes.
N4	Regular R624 traffic dominant. During lulls, distant traffic in several directions, and birdcalls. Several train passes, and low altitude aircraft.
N5	Regular R624 traffic dominant. During lulls, distant traffic in several directions, and birdcalls. Several train passes, and low altitude aircraft. On 28.06.19, loader operating at intervals at Passage West quay quite audible. Several small vessel passes on river. From 1345 on 01.07.19, mobile grab almost continuously quite audible at quay across river, to 1500.
N6	Local car movements below, distant traffic across river, trains and vessels, bird song/calls, aircraft. Apartment/balcony noise.
N7	Frequent traffic on R610 dominant. Sporadic forklift truck activity at boatyard, too sporadic to affect L90. Bird song/calls and low altitude aircraft. Lightly rustling trees nearby. Rock breaker audible at intervals in distance (traced to Marino Point site, where a small pit was being broken out at the corner of the carpark).
N8	Distant traffic continuously slightly audible in several directions. Bird song/calls and low altitude aircraft. Sporadic local car movements. Sporadic voices on nearby walkway.
N9	Sporadic local car movements in estate. R610 traffic inaudible. However, distant noise audible to East, including train horns and slightly audible traffic. Sporadic hammering in distance, most likely domestic construction project. Bird song/calls, low altitude aircraft, distant dog barking, and lightly rustling trees nearby. Rock breaker slightly audible in distance to East at intervals (later traced to Belvelly Port Facility site). Children kickabout activity at 30 m 1135-1150.

Table 14.9 Daytime noise data summary.

Station	$L_{Aeq\ 15\ min}$	$L_{AF90\ 15\ min}$
N1	43-54 dB	40-47 dB
N2	45-55 dB	35-48 dB
N3	63-65 dB	39-43 dB
N4	59-60 dB	39-44 dB
N5	50-58 dB	41-45 dB
N6*	42-56 dB	37-45 dB
N7	53-57 dB	47-53 dB
N8	37-45 dB	35-39 dB
N9	45-51 dB	40-42 dB

*Façade level

The highest $L_{Aeq\ 15\ min}$ ranges were seen at N3 and N4, where traffic levels on the adjacent R624 were elevated throughout the day. While traffic noise also dominated at N5 and N7, levels were lower due to slower traffic speed. Due to continuous traffic activity at N7, the highest $L_{AF90\ 15\ min}$ levels were recorded here. Outside of N7, measured $L_{AF90\ 15\ min}$ levels were relatively similar across the stations, showing a floor of 35-41 dB. Distant traffic noise was the chief contributor at most stations, including at the two onsite stations N1 and N2 located near the SPA/SAC areas to the north.

$L_{Aeq\ 15\ min}$ and $L_{AF90\ 15\ min}$ levels at N3 and N7 are reasonably similar to $L_{Aeq\ 30\ min}$ and $L_{AF90\ 30\ min}$ levels recorded during the 2016-2018 MarinoChem surveys at NSL1 and NSL2 respectively.

Evening and night-time noise levels were measured at N1, N2 and N6 during the baseline survey. Noise data are presented in **Appendix 14.2**. Data are summarised in **Table 14.10**.

Table 14.10 Evening and night-time noise data summary at N1, N2, N6.

Station	Evening	Evening	Night-time	Night-time
	$L_{Aeq\ 15\ min}$	$L_{AF90\ 15\ min}$	$L_{Aeq\ 15\ min}$	$L_{AF90\ 15\ min}$
N1	42-55 dB	40-45 dB	39-60 dB	38-44 dB
N2	43-51 dB	31-44 dB	34-53 dB	24-43 dB
N6*	41-54 dB	37-42 dB	31-46 dB	27-42 dB

*Façade level

At the three unattended stations N1, N2 and N6, representative $L_{AF90\ 15\ min}$ levels were determined using the statistical method described in BS 4142:2014. **Table 14.11** presents the determined modal levels. The calculation has been extended to include $L_{Aeq\ 15\ min}$ levels. In contrast with BS 4142:2014 methodology, separate evening and night-time periods are assessed, as this is considered a more rigorous approach.

Table 14.11 Representative noise levels at N1, N2, N6.

Station	Daytime	Daytime	Evening	Evening	Night-time	Night-time
	$L_{Aeq\ 15\ min}$	$L_{AF90\ 15\ min}$	$L_{Aeq\ 15\ min}$	$L_{AF90\ 15\ min}$	$L_{Aeq\ 15\ min}$	$L_{AF90\ 15\ min}$
N1	47 dB	43 dB	47 dB	43 dB	44 dB	43 dB
N2	49 dB	45 dB	48 dB	41 dB	43 dB	33 dB
N6*	46 dB	40 dB	47 dB	39 dB	38 dB	33 dB

*Façade level

Baseline survey 2020

The baseline survey of 2019 included measurement of evening and night-time levels at N1, N2 and N6. In order to provide an indication of evening and night-time levels at other positions, evening monitoring was undertaken at stations N4, N7 and N9 on 30.01.20, with night-time monitoring also undertaken at N4 and N7. Survey details, measured data and $L_{Aeq\ 1\ s}$ profiles are presented in **Appendices 14.4, 14.5** and **14.6** respectively. Noise data are summarised in **Table 14.12**.

Table 14.12 Evening and night-time noise data summary at N4, N7, N9.

Station	Evening	Evening	Night-time	Night-time
	$L_{Aeq\ 15\ min}$	$L_{AF90\ 15\ min}$	$L_{Aeq\ 15\ min}$	$L_{AF90\ 15\ min}$
N4	53-64 dB	36-47 dB	40-58 dB	37-46 dB
N7	57-58 dB	41-49 dB	36-50 dB	32-37 dB
N9	38-46 dB	34-50 dB	-	-

The evening and night-time soundscape at these stations was dominated by road traffic, particularly at N4 and N7. During lulls in local traffic, distant traffic remained continuously audible.

14.2.3 Sensitive Aspects of Noise, Study Area and Timeframe

The local soundscape is not considered particularly sensitive. Ambient noise levels are elevated across the entire area due to road traffic noise on both sides of the river. Traffic noise is audible locally and in the distance throughout the daytime, evening and night-time.

The wider study site is urban in character, with an industrial history. This history particularly relates to marine industry and commerce. A number of marine based facilities are located around the greater harbour area, including an active jetty within the Marino Point site (used through the night at intervals), and an active commercial quay on the opposite side of the river. The Marino Point site was used intensively by NET and IFI during the period 1976-2002.

Being subject to tides, such marine activity has traditionally occurred at various times of the day, evening and night. In this context, the study site is considered reasonably robust with respect to noise, and is not considered overly sensitive to ongoing changes and developments in the soundscape.

14.2.4 Environmental Characteristics

Environmental characteristics are discussed in **Section 14.2.1**.

14.2.5 Selected Noise Sensitive Receptors

There are no residential receptors directly bordering the Belvelly Port Facility site, and the site is surrounded on three sides by water. The eastern side is bounded by the R624 and the Cobh railway line. The closest receptors are situated along the R624. One of these receptors is station NSL1 shown in **Figure 14.2**. Further south, ribbon development has proliferated along the R624 route, and the nearest receptors along the R624 are located close to stations N4 and N5 as shown in **Figure 14.3,** below. To the east of these dwellings lies Cobh Golf Course.

Across the river, a large number of dwellings lie along the R610 in Passage West, and further up the hillside above the village. The village has extended north to Lee Carrow and Horsehead. Receptors at Passage West consist of a mixture of detached dwellings and period terraced houses, in addition to a four story apartment complex (Steampacket House) which includes balconies facing Marino Point.

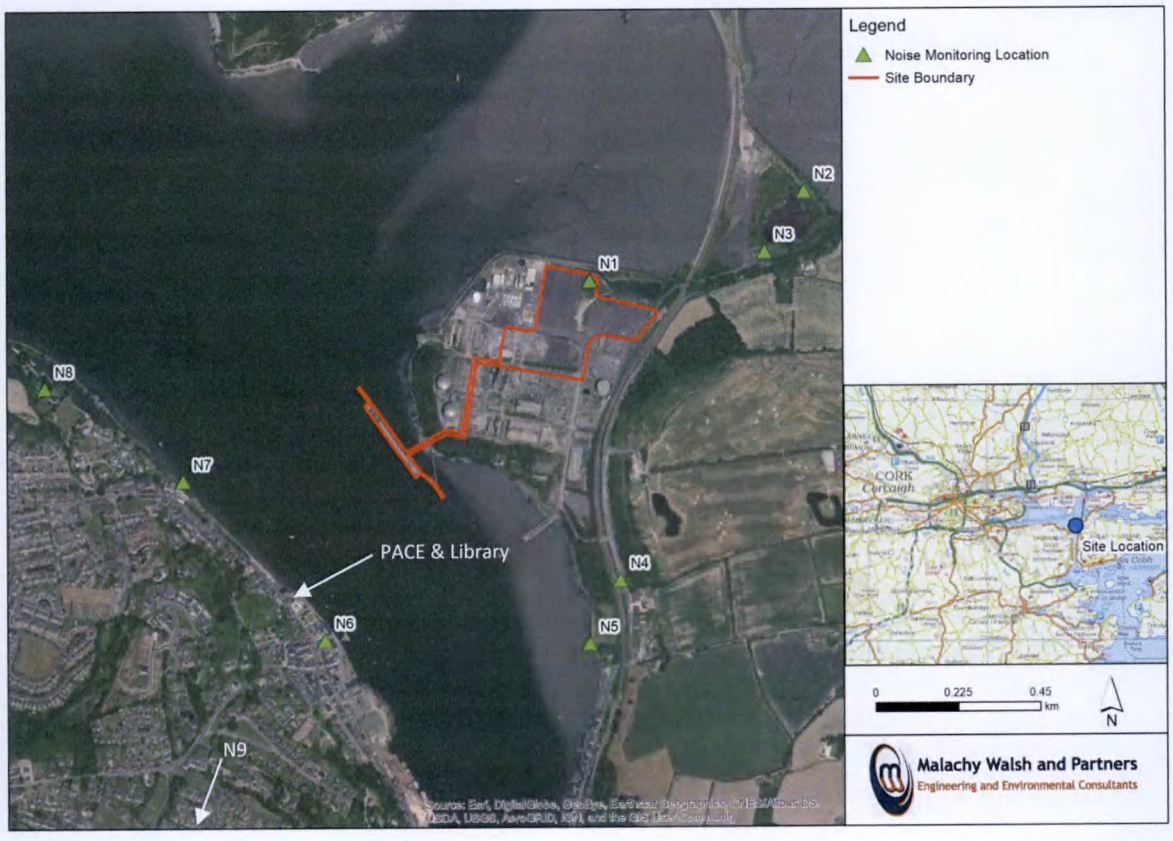


Figure 14.3 Baseline noise stations

One vulnerable receptor has been identified in the study area: The Passage West Association of Care for the Elderly (PACE), located adjacent to Passage West Library (**Figure 14.3**), 465 m from the Marino Point jetty.

Non-residential receptors in the local area consist of Cobh Golf Course, and the designated SPA and SAC areas adjacent to Martino Point. A public walk alongside the R610 in Passage West is not considered sensitive, as users are transient and quickly pass through the area.

Noise monitoring locations used to represent surrounding receptors are described in **Table 14.13** and shown in **Figure 14.3** and **Photographs 14.1** to **14.9**.

Table 14.13 Baseline noise survey locations.

Station	ITM NGR	Location	Reason for selection
N1	577685 569790	Northern end of main Marino Point site, 25 m from SW corner of onsite lagoon, 90 m from shore	To measure baseline in vicinity of local open water areas
N2	578271 570035	Northern annexe of site, at SE end of disused rail siding, 15 m from NW corner of lagoon, 25 m from mudflats	To measure baseline at SPA/SAC

Station	ITM NGR	Location	Reason for selection
N3	578150 569876	Northern access to Marino Point site, 10 m from R624 (= NSL1 position used by MarinoChem)	To represent dwelling cluster on opposite side of R624
N4	577759 569028	Overgrown area on the east side of R624, 130 m SSE of Marino Point entrance	To represent ribbon development extending further South along R624
N5	577695 568815	Overgrown lawn on South side of derelict dwelling adjacent to R624 railway bridge	To represent dwellings close to bridge, and shoreline dwellings further South
N6	576951 568835	Balcony of floor 3 apartment at Steampacket House apartment complex, 500 m SW of Marino Point jetty (1 m from façade)	To represent apartments in Passage West facing Marino Point
N7	576545 569255	North end of grassed area adjacent to R610, 540 m SW of Marino Point jetty	To represent front gardens of nearby dwellings along West side of R610
N8	576209 569505	Overgrown lawn on East side of period dwelling at Lee Carrow, 810 m W of Marino Point jetty	To represent several dwellings at Lee Carrow and Horsehead
N9	576485 568871	Grassed area at Ard Chuain residential area, on hillside overlooking Passage West, 800 m SW of Marino Point jetty	To represent elevated dwellings in this area with clear views to site

Photograph 14.1
N1, looking SW towards onsite structures.

Photograph 14.2
N2, looking SE, with onsite lagoon located behind vegetation.

Photograph 14.3
N3, looking East towards northern gate to site. Nearest dwelling is located beyond trees.

Photograph 14.4
N4, looking NW towards site, with R624 visible.

Photograph 14.5
N5, looking East to railway bridge over R624.

Photograph 14.6
N6, looking NE towards site.

Photograph 14.6
N6, looking NE towards site.

Photograph 14.8
N8, looking East, with onsite structures visible on skyline.

Photograph 14.9
N9, looking NE, with onsite structures visible beyond dwelling in centre

14.2.6 Do-Nothing Scenario

Across the study site, the soundscape is expected to gradually evolve in accordance with the ongoing growth and development of the Belvelly, Cobh and Passage West areas. Likely changes include increasing traffic volumes associated with population growth, and increasing rail and air travel movements. Some changes will result in reduced noise emissions, such as the termination of large vessel passage to/from Cork following cessation of container operations at Tivoli terminal. Development pressure may see port activities at Passage West quay replaced with residential accommodation. While the gradual replacement of the national car fleet with electric vehicles will

result in a reduction in engine noise emissions, traffic noise across the study area is unlikely to reduce appreciably due to the greater contribution from tyre noise.

At the Belvelly Port Facility site itself, the do-nothing scenario will see a continuation of the current soundscape, dominated onsite by MarinoChem emissions, and locally by an electrical substation. The Belvelly Port Facility jetty on the western side of the site would continue to see occasional use associated with the MarinoChem facility, including overnight pumping of methanol from vessels at intervals. The jetty would also continue to be used intermittently by the Port of Cork Company, chiefly as a lay-over berth and for the exportation and importation of timber logs. MarinoChem emissions may change over time, depending on facility activity and noise management. Given the strategic location of the Marino Point site, and particularly its road, rail and sea connections, it is highly unlikely that the site will remain undeveloped in the long term.

14.3 LIKELY SIGNIFICANT IMPACTS

14.3.1 Construction Phase

14.3.1.1 Agricultural Fertiliser Facility

Construction noise sources

With respect to the proposed development, construction works required at the site relate solely to the proposed Gouldings agricultural fertiliser facility. The main work elements will consist of the following:

- Piling works (CFA piles i.e. continuous flight auger).
- Groundworks for foundations and installation of services.
- Excavation works in relation to provision of underground services.
- Potential rock breaking in limited areas.
- Steel frame erection.
- Building cladding installation.
- Installation of hardstanding areas and carparking.
- Site landscaping.

Noise emissions associated with the foregoing are listed in **Table 14.14**, taken from BS 5228-1:2009+A1:2014.

Table 14.14 Typical noise levels (dB) at 10 m from construction plant.

Plant	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Total L_{Aeq}
Crawler mounted CFA piling rig	79	79	78	78	75	71	66	56	80
Attendant tracked excavator	79	75	73	69	69	67	60	52	74
Concrete pump	84	76	70	71	73	73	66	58	78
Crane	81	77	69	67	62	60	61	51	70

Plant	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Total L_{Aeq}
Rock breaker	91	89	85	89	87	87	84	80	93
Discharging concrete mixer truck	80	69	66	70	71	69	64	58	75
Tracked excavator (16 t)	78	70	72	68	67	66	73	65	76
Consaw	73	67	70	68	73	78	78	77	84
Mobile generator	78	71	66	62	59	55	56	49	65
Dumper	84	81	74	73	72	68	61	53	76
Vibro-roller	88	83	69	68	67	65	62	59	74
Telescopic handler	85	79	69	67	64	62	56	47	71
Truck (driving)	73	78	78	78	74	73	68	66	80

None of the above sources is expected to be audibly tonal. While vibro-rollers measured by Damian Brosnan Acoustics have emitted an acoustic signal in the 31.5 Hz band, the signal has not been audibly tonal when assessed using annex K of *International Standard ISO 1996-2:2017 Acoustics : Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels*.

It is highly unlikely that all of the foregoing will be in use simultaneously during the 15 month construction phase. However, modelling undertaken below assumes simultaneous use as a worst case scenario. Construction hours are likely to be 0800-1800 h Monday-Friday and 0800-1700 Saturday.

Noise emissions associated with construction phase personnel will be negligible in the context of R624 traffic. However, HGV movements may be elevated at times. The agricultural fertiliser facility construction will involve the exportation off site of up to 250 vehicle loads over a two to three months period, associated with foundation excavation and installation of utilities. This equates to an average of six trucks per day to and from the site. Importation of stone, concrete, steel and building materials is expected to require up to 12 truck deliveries per day to and from the site. This equates a total of 18 truck movements per day to and from the site, associated with the construction of the agricultural fertiliser facility.

Predictive modelling

Predictive modelling of construction activity was undertaken using DGMR iNoise v2020 software, using model input parameters as described above. Plant on-times applied were 80 % with respect to all plant, excluding the generator (100 %). The model output is shown in **Figure 14.4**, predicted as $L_{Aeq\ 1\,h}$ levels.

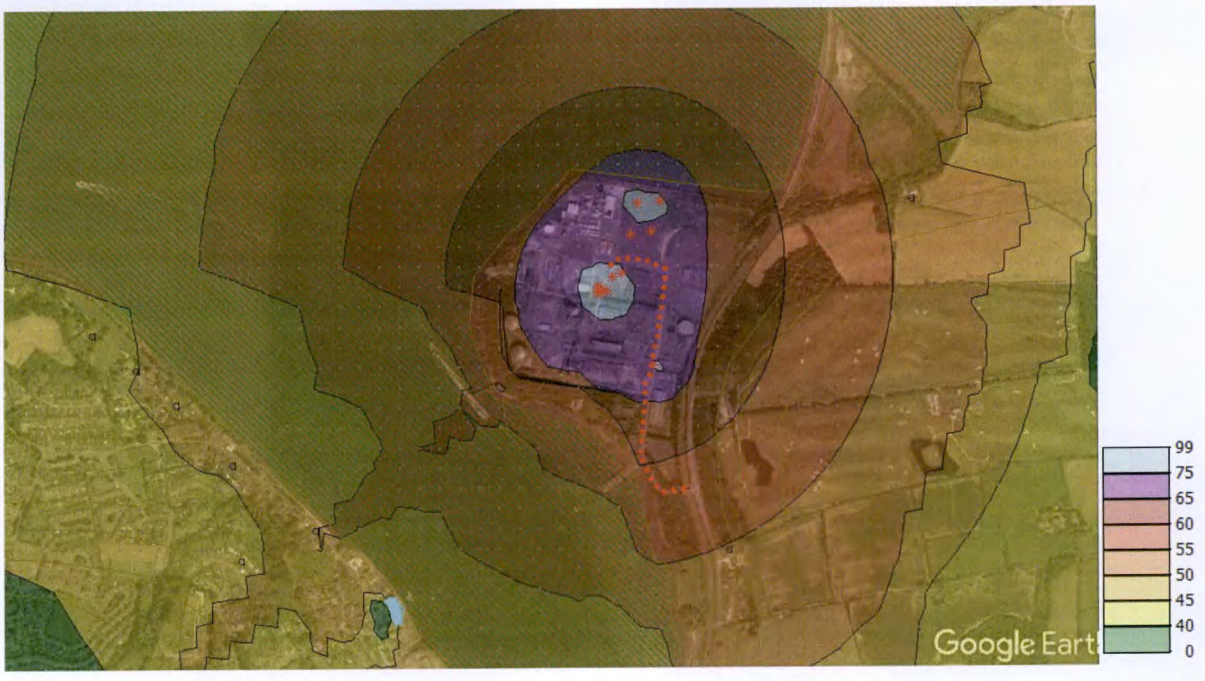


Figure 14.4 Construction phase $L_{Aeq\ 1\ h}$ levels associated with Gouldings facility. The cluster of sources near the site centre represents the proposed Gouldings piling operation, which is modelled at the southwest corner of the Gouldings site in order to apply a worst case scenario with respect to offsite receptors. The line source represents construction truck movements.

Predicted $L_{Aeq\ 1\ h}$ levels at all receptors, on both sides of the river, will be considerably lower than the 65 dB construction phase criterion. The highest level predicted is 55 dB at the dwellings south of the Belvelly Port Facility main entrance. It is reiterated that this prediction relates to a worst case scenario.

Construction phase vibration

Three potential sources of ground borne vibration may arise during the project. The first of these is the use of vibro-rollers to create internal roadways and hardstanding areas. Vibratory compaction of hardcore may be required prior to the laying of finished surfaces. Although relying on the actual application of vibration, this activity is not recognised as being a significant offsite source of groundborne vibration, due to the fluidic nature of vibrated hardcore and fill which tends to attenuate vibration transmission – most of the vibration energy is lost through stone and fill settlement before reaching underlying strata. Low peak particle velocity (PPV) levels in the order of 1.5 mm/s have been reported at a distance of 25 m at some sites. PPV levels measured by Damian Brosnan Acoustics at approximately 300 m have been below 0.1 mm/s.

The second source is asphalt breaking using hydraulic breakers mounted on tracked excavators, and manual pneumatic breakers/hammers. Although this activity may give rise to relatively high levels of ground vibration in proximity to the breaking area, the vibration tends to contain relatively little energy in the lower frequencies at which buildings and occupants are most vulnerable. In addition, higher frequencies attenuate more rapidly than low frequencies, thus minimising the impact zone. For this reason, most vibration guidance documents such as *BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration* (2014) ignore breaking

vibration. **Table 14.15** lists various PPV levels reported in literature at sites where hydraulic breaking (of rock) has been undertaken. The range in levels noted reflects variations in equipment power and rock type.

Table 14.15 Reported rock breaking vibration levels.

Distance	5 m	10 m	20 m	50 m
PPV	0.2-4.5 mm/s	0.06-3.0 mm/s	0.02-1.5 mm/s	0.1-0.3 mm/s

With respect to occupants of buildings, groundborne vibration generally becomes noticeable around 1 mm/s PPV (see **Table 14.2**). With separation distances of several hundred metres to the nearest residential receptors, groundborne vibration from the proposed development is not expected to be discernible at receptors. Similarly, groundborne vibration is highly unlikely to arise at the Martello Tower several hundred metres to the north, and will certainly be less than vibration caused by regular rail traffic which passes within 65 m of the tower.

The third potential source of groundborne vibration is piling. It is proposed to install piles during the construction of the agricultural fertiliser facility using a continuous flight auger. Information presented in BS 5228-2:2009 indicates that vibration emissions from this form of piling are minimal, tending toward 0 mm/s at 50 m.

On the basis of the foregoing, it is concluded that construction activities are highly unlikely to give rise to PPV levels at offsite receptors or structures which exceed or approach criteria set out in **Tables 14.3** and **14.4** above. It is therefore concluded that no construction vibration impacts will arise.

14.3.1.2 Additional Port Operational Use

The proposed additional operational port use of the jetty to facilitate general cargo vessels will not require construction works as part of the current planning application.

14.3.2 Operational Phase

14.3.2.1 Proposal Overview

At present, much of the Belvelly Port Facility consists of open ground with scattered redundant structures. A separate planning application (Planning Ref. 19/06783) has been made to Cork County Council for permission to demolish these structures and undertake certain site infrastructure and utility upgrade works to facilitate future development of the wider site. There is one active industrial facility at the site (MarinoChem Ltd.), located at the northwest corner of the main site block. The Belvelly Port Facility jetty on the western side of the site sees occasional use associated with the MarinoChem facility, including night-time vessel activity at intervals. The jetty is also used sporadically by the Port of Cork Company, chiefly as a lay-over berth. Outside of the jetty and the MarinoChem facility, there is little activity at the site.

Agricultural Fertiliser Facility

Goulding Chemicals Ltd. propose to construct a new agricultural fertiliser facility at the northern end of the main Belvelly Port Facility site, to the immediate east of the MarinoChem facility. This proposal will require the construction of a new building to house blending and bagging plant, and a dry materials storage building (**Figure 14.5**). Ancillary infrastructure will include a new administration building, carparking, and external storage yards. Other activity will relate to the use of the jetty for the importing of bulk granular fertiliser by bulk carrier vessels. The bulk fertiliser will be transported from the jetty through the site to the Gouldings facility by truck.

Additional Port Operational Use at the Jetty

The proposed additional port operational use of the jetty will consist of servicing other cargo vessels, which will include the relocation of vessels displaced from the Cork City Quays. The additional cargo types proposed will include woodchip, machinery parts, deep sea maintenance and exploratory vessel engineering cargo, and other miscellaneous dry cargo.

Approximately 40 additional port related cargo ships will berth at the jetty each year. The size and frequency of cargo vessels will be variable and subject to the various customers' needs. On average, ships will be berthed for 1 to 2 days to offload / load cargo but may be longer depending on cargo size and weather conditions.

Loading and unloading will be carried out during between 7.00 to 19.00, Monday to Saturday, although there may be the rare occasions where such operations may need to take place outside these times for operational and safety reasons. Port related HGV traffic will operate 8.00 a.m. to 6.00 p.m., Monday to Saturday. There will be no operations on Sundays, or Bank Holidays.

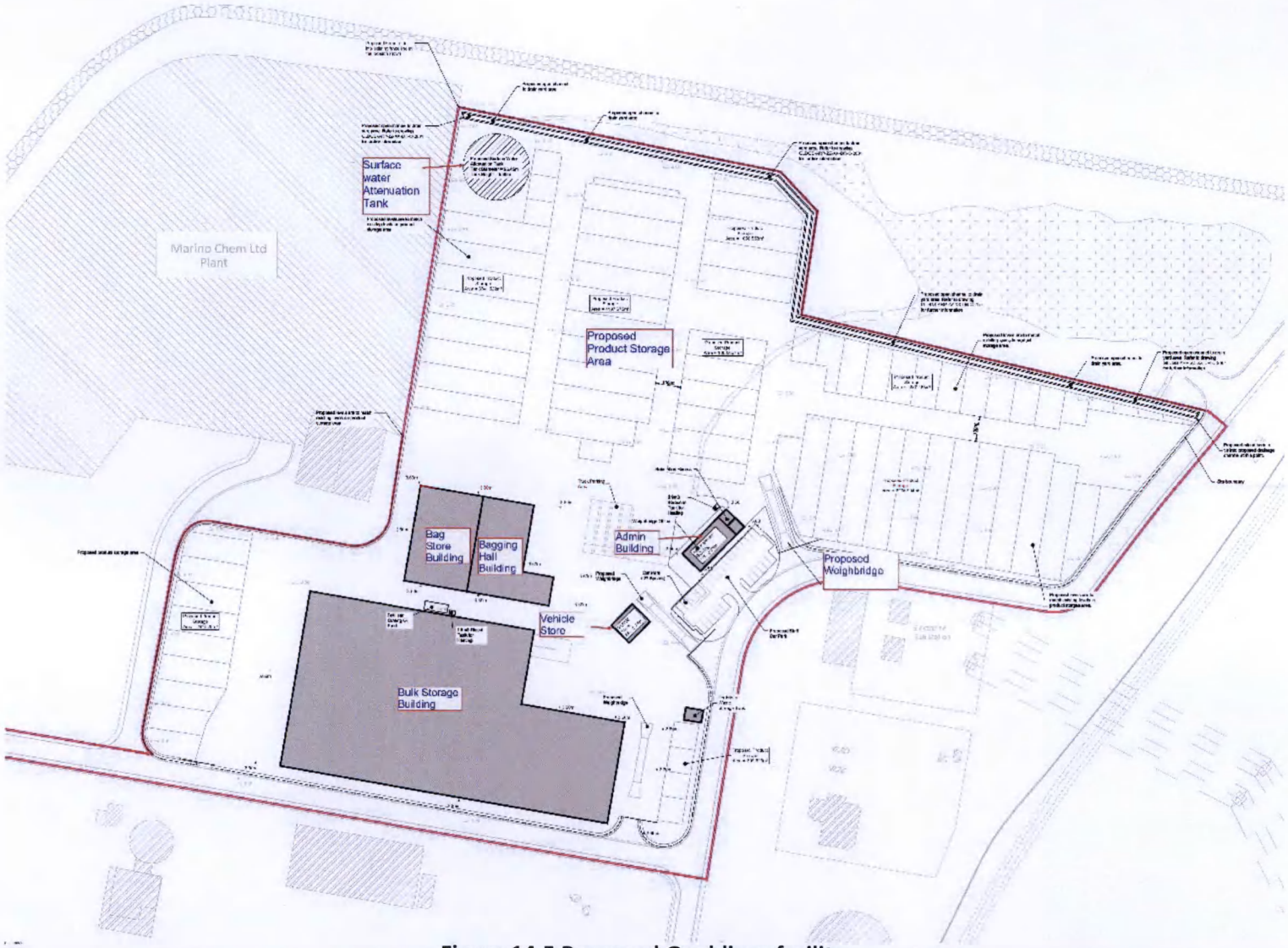


Figure 14.5 Proposed Gouldings facility

14.3.2.2 Noise emissions – Agricultural fertiliser facility

Noise emissions at the proposed Gouldings facility will arise from the following activities:

- At the facility, tractors and trailers coming from the jetty will tip their loads into storage bays in the blending building.
- As required, ingredients stored in the various bays will be transferred by front end loader to the blending plant located within the same building. A second front end loader will also be used internally to manage stockpiles.
- The output from the blending plant will be bagged in the adjacent bagging plant.
- Bags will be forwarded to the adjacent packaging plant where they will be laid on pallets and wrapped.
- Loaded pallets will be transported by forklift truck to internal and external storage areas. Up to four forklift trucks will be used.
- Trucks will be loaded by forklift truck as required, for delivery to customers.

On the basis of the foregoing, Gouldings noise sources will consist of the following:

- Trucks and tractors on external areas, associated with inward and outward deliveries. The likely worst case scenario will see up to two truck movements simultaneously on yard areas.
- Up to four forklift truck movements on external yards simultaneously. These will consist of Yale Veracitor models, as currently used at the existing Gouldings facility in Cork City.
- Two front end loaders operating in the blending and bagging building. The Komatsu WA380 and Volvo L90G models currently used at the city site will most likely be relocated to the new site.
- Blending, bagging and packaging plant located in the building.

Noise levels associated with external plant (trucks, tractors and forklift trucks) are listed in **Table 14.16**. Truck and tractor data are taken from BS 5228-1:2009+A1:2014. Forklift data were measured directly by Damian Brosnan Acoustics at the existing Gouldings facility in Cork City on 30.01.20.

Table 14.16 Noise sources at proposed Gouldings Fertilisers facility. Octave band levels as $L_{Zeq\ 5\ min}$.

Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	$L_{Aeq\ T}$
Truck (articulated) at 10 m	-	87 dB	76 dB	73 dB	81 dB	79 dB	75 dB	68 dB	62 dB	83 dB
Tractor and trailer at 10 m	-	93	86	76	76	73	72	64	59	79 dB
Yale Veracitor 30VX forklift at 2 m	80 dB	74 dB	73 dB	72 dB	75 dB	70 dB	72 dB	62 dB	53 dB	77 dB
Yale Veracitor 50VX forklift at 5 m	70 dB	69 dB	72 dB	67 dB	66 dB	63 dB	66 dB	62 dB	56 dB	71 dB

During the 30.01.20 survey at the existing Gouldings facility, reverberant noise levels were measured separately in the blending and bagging zones. Reverberant $L_{Aeq\,T}$ levels describe the average noise level within the building, resulting from steady plant noise emitted in the building reflected off internal surfaces, with noise decay through absorption and outward propagation balanced by continuous plant emissions. Measured reverberant levels are presented in **Table 14.17**.

Table 14.17 Reverberant noise levels at existing Gouldings Fertilisers facility. Octave band levels as $L_{Zeq\ 5\ min}$.

Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	$L_{Aeq\,T}$
Blending area, with 2 loaders	71 dB	71 dB	74 dB	74 dB	74 dB	71 dB	72 dB	65 dB	57 dB	77 dB
Bagging/wrapping area, with one forklift truck	74 dB	75 dB	76 dB	75 dB	75 dB	75 dB	75 dB	74 dB	71 dB	82 dB

Noise emissions from the above will arise throughout operating hours at the Gouldings facility. The facility will operate all year-round, with working times varying depending on market demand. Normal hours of operation are 7.00 a.m. to 5.00 p.m. Monday to Friday. During peak demand, which is typically between February and April, production may occur between 7.00 a.m. and 12.00 midnight, and out loading may occur between 7.00 a.m. to 7.00 p.m. Monday to Saturday.

14.3.2.3 Noise emissions - jetty

Fertiliser operations

Bulk granular fertiliser ingredients will be transported to the jetty by vessels carrying approximately 1,000-5,000 tonnes, and transferred to trucks using two Liebherr LH60 material handling cranes with semi-closed clamshell grabs. Both cranes will discharge to trucks using adjacent mobile hoppers. Trucks will park underneath the hoppers during loading.

Noise emissions from a mobile hopper are listed in **Table 14.18**, as measured on 6th February 2020 by Damian Brosnan Acoustics at the Port of Cork deep water terminal at Ringaskiddy, where similar hoppers are currently used.

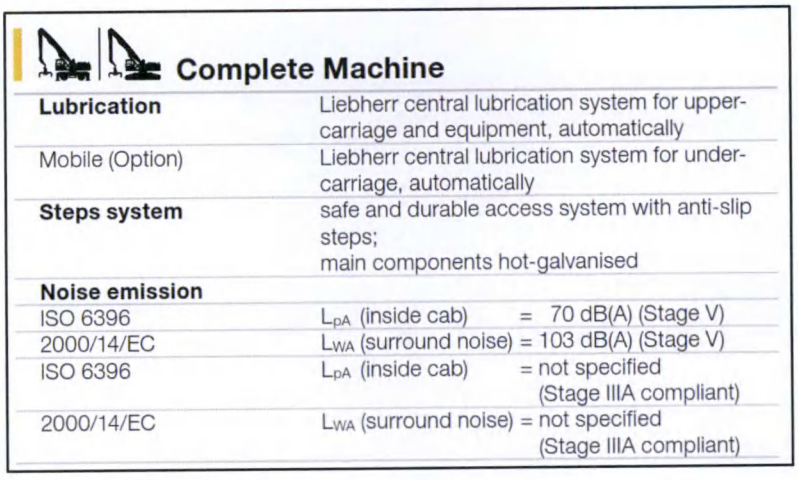
Table 14.18 Mobile hopper noise data. Octave band levels as $L_{Zeq\ 5\ min}$.

Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	$L_{Aeq\,T}$ at 10 m*
Mobile hopper	72 dB	82 dB	74 dB	70 dB	66 dB	64 dB	61 dB	59 dB	56 dB	70 dB

*Horizontal distance: 10 m. Noise source height = 10 m, thus actual straight line distance = 14 m.

There are no material handling cranes at Ringaskiddy at present. Noise emissions data for a Liebherr LH60 were thus obtained directly from Liebherr (**Figure 14.6**). Spectral data are unavailable. **Table**

14.19 presents assumed spectral data, based on a Liebherr 550 mobile harbour crane spectrum measured at Ringaskiddy during the survey of 6th February 2020, and assuming a pro rata distribution.



Complete Machine	
Lubrication	Liebherr central lubrication system for upper-carriage and equipment, automatically
Mobile (Option)	Liebherr central lubrication system for under-carriage, automatically
Steps system	safe and durable access system with anti-slip steps; main components hot-galvanised
Noise emission	
ISO 6396	L_{pA} (inside cab) = 70 dB(A) (Stage V)
2000/14/EC	L_{WA} (surround noise) = 103 dB(A) (Stage V)
ISO 6396	L_{pA} (inside cab) = not specified (Stage IIIA compliant)
2000/14/EC	L_{WA} (surround noise) = not specified (Stage IIIA compliant)

Figure 14.6: Liebherr LH60 specifications data.

Table 14.19 Assumed Liebherr LH60 sound power data. Octave band levels as L_{WZ}.

Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	L_{WA}
Liebherr LH60 crane	101 dB	107 dB	103 dB	102 dB	99 dB	97 dB	97 dB	93 dB	85 dB	103 dB

It is proposed to carry out bulk granular fertiliser unloading operations at the jetty during the period 0700-1900 h Monday-Saturday, although there may be rare occasions where loading/unloading may need to take place outside these times for operational and safety reasons. There will be no operations on Sundays or Bank Holidays. Each unloading event is likely to take approximately 12 hours.

Additional port operation use at the jetty

It is proposed to undertake other operations at the jetty, over and above existing jetty use. The cargo types proposed will include woodchip, machinery parts, deep sea maintenance and exploratory vessel engineering cargo, and other miscellaneous dry cargo. Such materials may be imported by vessels, such as the fertiliser vessels discussed above. Unloading of such materials will require use of the jetty cranes described above. No other unloading plant will be required.

It is proposed to carry out loading and unloading operations at the jetty during the period 0700-1900 h Monday-Saturday, although there may be limited occasions where it may be necessary to work outside these times for operational and safety reasons. Generally loading or unloading will not be undertaken on Sundays or public holidays.

No other jetty noise sources of significance are proposed, apart from a road sweeper used on the jetty and internal roads. The sweeper will operate on the jetty and jetty access road. Noise levels measured

on 6th February 2020 by Damian Brosnan Acoustics in proximity to the Port of Cork sweeper truck used at Ringaskiddy are listed in **Table 14.20**.

Table 14.20 Typical road sweeper truck noise levels. Octave band levels as $L_{Zeq\ 5\ min}$.

Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	$L_{Aeq\ T}$ at 2 m
Volvo 240 (drive by)	82 dB	82 dB	81 dB	84 dB	80 dB	76 dB	75 dB	73 dB	72 dB	83 dB

14.3.2.4 Noise emissions - Vessels

Fertiliser vessels

Bulk carriers will be used to import granular fertiliser. These vessels will typically be 3000-6000 t capacity. Fertiliser vessel activity will vary throughout the year. Typically, up to two vessels are expected to dock each month, increasing to four during peak periods. Such vessels typically shut down their engines while docked, and no emissions of significance arise outside arrival and departure events. Such events usually last 20-30 minutes. Sound power levels associated with a typical 2000-5000 t general cargo vessel are listed in **Table 14.21**, taken from the DGMR iNoise database.

Table 14.21 Typical general cargo vessel (2,000-5,000 t) sound power levels while manoeuvring. Octave band levels as L_{WA}.

Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	L_{WA}
Cargo vessel 2000-5000 t	-	80 dB	89 dB	90 dB	91 dB	92 dB	90 dB	83 dB	74 dB	98 dB

Other vessels at the jetty

The jetty is currently used by vessels associated with MarinoChem, and sporadically by other vessels on lay-over such as tugs. The current proposal will see additional vessel activity by small-medium bulk carriers (including the fertiliser vessels discussed above), other sporadic carriers and scientific vessels. Bulk carriers using the jetty will be used to import loose dry bulk woodchip, and break bulk such as machinery parts. These vessels will typically be 1,000-15000 t capacity. Typical sound power levels associated with such vessels are listed in **Table 14.22**, again taken from the DGMR iNoise database. From time to time, other cargo types may be imported, although this will not extend to container traffic. The jetty may sporadically be used by scientific/exploratory/engineering vessels, and deep sea maintenance vessels.

Table 14.22 Typical general cargo vessel (10000-15000 t) sound power levels while manoeuvring. Octave band levels as L_{WA}.

Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	L_{WA}
Cargo vessel 10000-15000 t	-	82 dB	91 dB	98 dB	99 dB	102 dB	97 dB	90 dB	81 dB	106 dB

14.3.2.5 Noise emissions – Onsite traffic

Fertiliser facility traffic

Traffic movements in the Belvelly Port Facility associated with the proposed fertiliser development may be summarised as follows:

- Unloading of bulk carriers associated with the Gouldings facility will require a continuous stream of articulated trucks or tractors between the jetty and the facility. It is expected that up to 4 trucks or tractors will be involved in this process, moving back and forth between the jetty and facility repeatedly along a defined haulage route through the Belvelly Port Facility site. Approximately four unloading events per month are expected on average, with each unloading event lasting approximately 1.5 days. Thus truck transfer operations are likely to occur for approximately 6 days each month, confined to the period 0700-1900 h Monday-Saturday.
- Bagged fertiliser products will be delivered offsite by trucks. Up to 20 truck-loads per day are expected on average, increasing to 45-50 during peak periods. A typical worst case scenario will see 8 truck movements per hour, two way associated with offsite delivery.
- Goulding employees and drivers are expected to travel to/from the site by car. The facility will have an average of 17 employees on site at any one time, with a maximum of 30 at peak times. Car and van movements will also arise due to site visitors. Thus the number of car and van movements associated with the facility is likely to be 50-60 per day during peak periods. These are highly unlikely to be audible offsite, and will be inconsequential in the context of existing offsite road traffic on the R610 and R624.

Car/van movements associated with the above will give rise to negligible noise levels offsite. Truck movements associated with fertiliser unloading are of potentially greater consequence

Other BMDC traffic

Onsite traffic movements unrelated to the fertiliser facility may be summarised as follows:

- Personnel operating at the jetty are likely to travel to and from the site by car. Such personnel will operate the cranes, hopper and road sweeper truck, and will assist during mooring operations. The number of personnel required will vary from two to five. Traffic movements associated with same will be minimal, and will not be audible offsite.
- From time to time, unloading of other non-fertiliser cargo vessels will require truck activity, such as trucks with log trailers and low-loader trailers. A likely worst case scenario will see up to six truck movements per hour, with one of these idling on the jetty.

Car/van movements associated with the above will give rise to negligible noise levels offsite in the context of existing R624 traffic. One scenario is of potentially greater consequence: occasions when trucks arrive at the jetty to load items unloaded earlier such as woodchip or machinery.

14.3.2.6 Noise emissions – Offsite traffic

Fertiliser traffic

All Gouldings vehicles accessing the site will use the R624. Vehicles will consist of Gouldings trucks and Gouldings employees. It is expected that during peak periods, the number of car movements per hour will be approximately 50, due chiefly to arrival and departure of Gouldings employees. Peak Gouldings delivery will involve approximately 6 truck movements per hour.

A road traffic assessment has been undertaken as part of the EIAR process. The assessment indicates that the increase in R624 traffic due to Gouldings traffic will be negligible. It follows that no increase in R624 traffic noise will arise.

Other site traffic

Non-Gouldings traffic will access the site via the R624. Vehicles will consist of jetty employees, trucks associated with non-Gouldings imports, and trucks delivering goods to the facility. The number of such movements will be minimal.

A road traffic assessment has been undertaken as part of the EIAR process. The assessment indicates that the increase in R624 traffic due to Belvelly Port facility traffic will be slight to moderate long term impact. The corresponding increase in noise levels will be negligible.

14.3.2.7 Predictive modelling

On the basis of the foregoing, predictive modelling was undertaken with respect to 7 scenarios:

- Scenario 1: Gouldings facility operations (production and delivery offsite).
- Scenario 2: Scenario 1 plus: Bulk carrier docked and shut down. Two material handling cranes and mobile hoppers in use, plus truck transfer to Gouldings.
- Scenario 3: Scenario 2 (including scenario 1), plus road sweeper truck in use on jetty and haul route to Gouldings.
- Scenario 4: Bulk carrier arriving or departing.
- Scenario 5: Scenario 1 plus scenario 4.
- Scenario 6: No vessels docked. Truck activity at jetty and on access route.
- Scenario 7: Scenario 1 plus scenario 6.

Modelling was carried out using DGMR iNoise v2020 software. With respect to scenarios 4 and 5, a cargo vessel capacity of 15,000 t is assumed, in order to apply a worst case scenario. The following input parameters were applied:

- Algorithm: *International Standard ISO 9613-2:1996 Acoustics: Attenuation of sound during propagation outdoors – Part 2 General method of calculation* (1996).
- Input data taken from **Tables 14.16-14.22**. Where 31.5 Hz data unavailable (BS 5228), 63 Hz data applied.
- Truck data taken from CNOSSUS-EU database, with onsite speed of 50 km/h.
- G = 0 (hard surfaces onsite and at Passage West, with intervening river).

- Receiver heights: 4 m (10 m at Steampacket House).
- Screening: None. Bulk carrier height insufficient to screen jetty from Passage West. Berm east of jetty does not provide screening of note with respect to any receptor.

The model output with respect to all 7 scenarios is shown in **Figures 14.7 to 14.13**. Predicted $L_{Aeq\ 1\ h}$ levels with respect to surrounding receptors are presented in **Table 14.23**.

Figure 14.7 Predicted $L_{Aeq\ 1\ h}$ levels re scenario 1.

Figure 14.8 Predicted $L_{Aeq\ 1\ h}$ levels re scenario 2.

Figure 14.9 Predicted $L_{Aeq\ 1\ h}$ levels re scenario 3.

Figure 14.10 Predicted $L_{Aeq\ 1\ h}$ levels re scenario 4.

Figure 14.11 Predicted $L_{Aeq\,1\,h}$ levels re scenario 5.

Figure 14.12 Predicted $L_{Aeq\,1\,h}$ levels re scenario 6.

Figure 14.13 Predicted $L_{Aeq\ 1\ h}$ levels re scenario 7.

Table 14.23 Predicted $L_{Aeq\ 1\ h}$ levels at selected representative receptors (from Table 14.13).

Scenario	Activity	$L_{Aeq\ 1\ h}$ levels W of river	$L_{Aeq\ 1\ h}$ levels E of river
1	Gouldings operations	18-22	31-38
2	Sc. 1 + unloading (material handling cranes & hoppers)	38-44	40-41
3	Sc. 2 + sweeper truck	38-44	40-41
4	Carrier arrival/departure	31-38	25-33
5	Sc. 1 + Sc. 4	31-38	35-38
6	Limited jetty activity	24-29	26-37
7	Sc. 1 + Sc. 6	24-29	36-38

14.3.2.8 Assessment in context of noise criteria

Gouldings activity

Noise levels attributable to fertiliser operations will be lower than identified noise criteria. Predicted $L_{Aeq\ 1\ h}$ levels will range from 31 to 41 dB on the eastern side of the river, and 18 to 44 dB across the river. At all receptors, unloading operations will give rise to noise levels which are considerably lower than the 55 dB daytime criterion considered relevant. As berthed vessels will be shut down during night-time hours, there will be no night-time emissions.

Other jetty uses

Noise criteria considered appropriate to operational phase emissions are set out in **Table 14.5,** above. Impacts associated with non-Gouldings activity are assessed in **Table 14.24** in light of these criteria. As noted previously, criteria may be increased by 3 dB with respect to façade levels such as on balconies.

Table 14.24 Noise criteria appropriate to operational emissions

Criterion	Assessment
0700-1900 h $L_{Aeq\ 1\ h}$ 55 dB	Criterion will not be exceeded
1900-2300 h $L_{Aeq\ 1\ h}$ 50 dB	Criterion will not be exceeded
2300-0700 h $L_{Aeq\ 1\ h}$ 45 dB	Criterion will not be exceeded

From the table, it is apparent that operations will comply with identified criteria.

Noise criteria listed in **Table 14.5** include a L_{AFmax} limit of 60 dB during night-time hours. Routine night-time operations are not proposed, with potential night-time sources consisting chiefly of arriving/departing vessels, and overnight berthing. Such sources are unlikely to give rise to impulsive emissions, and therefore highly unlikely to result in exceedances of the identified L_{AFmax} criterion at any receptor. It is noted that night-time offloading of methanol vessels is currently undertaken at the jetty at intervals.

14.3.2.9 Direct & indirect impacts

Gouldings operations

Daytime background $L_{AF90\ 15\ min}$ levels measured across the study site ranged from 35 dB at Horsehead, to 53 dB at receptors along the waterfront at Passage West. Evening $L_{AF90\ 15\ min}$ levels fell to 37-50 dB, being lowest on the hillside above Passage West. Night-time levels fell to 27-46 dB, with the lowest levels measured at Steampacket House, and the highest adjacent to the R624. Predicted levels presented in **Table 14.23** with respect to Gouldings operations may be assessed in light of these values, by reference to (a) BS 4142 and (b) existing ambient levels in light of **Table 14.6** criteria. It is evident that impacts will be negligible at receptors.

Other jetty uses

A BS 4142 comparison between predicted levels and background levels indicates that proposed operations will not give rise to adverse impacts at receptors.

BS 4142 notes that impacts should in all cases be assessed by reference to context. In this regard, it is noted that the study site is defined by its industrial waterfront heritage and by a strong maritime tradition. The proposed Belvelly Port Facility jetty operation is consistent with this tradition, and predicted impacts may thus be tempered in light of the historic industrial maritime soundscape. In this context, daytime, evening and night-time impacts will not be adverse.

Direct impacts may also be assessed in light of existing ambient $L_{Aeq\ T}$ levels. Existing ambient levels (**Tables 14.9** to **14.12**) range from 37 dB at Horsehead to 65 dB along the R624. A comparison between these levels, and predicted noise levels from all 7 scenarios, indicates that, as before, no increases of significance will arise, and noise impacts will be imperceptible or slight.

With respect to SAC/SPA areas north of Marino Point, proposed operations will not result in increases in noise levels, as the soundscape here is currently dominated by R624 traffic. Traffic levels remain elevated during the evening and night-time

No tonal or impulsive noise emissions are expected.

All impacts discussed above refer to direct impacts. No indirect impacts other than changes in offsite traffic volumes have been identified. A review of the traffic impact assessment associated with the project indicates that changes in road traffic volumes will be minimal. Given that a doubling of road traffic is required to alter $L_{Aeq\,T}$ levels by 3 dB, road traffic noise impacts are not expected at receptors or at the SPA/SAC. No indirect impacts are expected.

14.3.3 Cumulative effects

14.3.3.1 Construction phase

Agricultural Fertiliser Facility

It is possible that the construction of the Gouldings agricultural fertiliser facility may be commenced prior to completion of the Belvelly Port Facility demolition, site infrastructure and utility upgrade works project which has been assessed in a previous planning application (Planning Ref. 19/06783). The overlap period may extend up to four months. It is therefore possible that construction noise emissions will arise from both projects simultaneously.

The demolition, site infrastructure and utility upgrade works across the wider Belvelly Port site and jetty will require a broad range of construction and demolition plant, scattered across the site, with concentrated activity near the centre of the main site area. Plant required here will include:

- Tracked excavators to excavate trenches and load dumpers/trucks.
- Tracked excavators fitted with hydraulic concrete breakers to break up concrete and hardstanding areas.
- Tracked excavators fitted with munching/shears attachments.
- Small pneumatic breakers/hammers to break concrete and aprons.
- Equipment to blast the Prill tower, including breakers, hydraulic busters and chemical splitting operations.
- Small dumpers and larger 6x6 dump trucks to move material.
- Mobile grabs to manipulate metal, wood and other waste items.
- Mobile grabs and/or excavators fitted with shears or similar devices to demolish metal structures.
- A tracked mobile crusher and screener to render concrete and asphalt suitable for onsite infill.
- Front end loaders to manage crushed material stockpiles and load dump trucks.
- Vibro-rollers to level infilled areas, hardstanding areas, new roadways, and rail siding bases.
- Pumps to pump out the onsite lagoon during filling.
- Small power tools at localised works areas.
- Pneumatic compressors and generator trailers for tools, power and lighting.
- Telescopic handlers.
- Gas torches to cut steel girders.
- Trucks to import and export materials.
- Crew and employee vehicles.

Several of the above sources will give rise to noise emissions which will be negligible at or outside the site boundary. These include pumps, small power tools, gas torches, and crew/employee vehicles. Emissions from the latter will be particularly negligible in the context of existing traffic noise on the R624, and across the river on the R610. This is based on experience with other construction and demolition projects, where such sources give rise to low emissions, and their frequency of occurrence is such that $L_{Aeq\ 1\ h}$ levels are not affected.

The construction phase predictive model used in **Section 14.3.2** and the predictive model used for the demolition, site infrastructure and utility upgrade works project (Planning Ref. 19/06783) were combined to produce an overall model relevant to the potential cumulative construction phases of both projects. The cumulative model output is shown in **Figure 14.14.**

Figure 14.14 Predicted cumulative contours from likely worst case noise scenario during enabling works construction/demolition and Gouldings construction. N

Cumulative noise levels associated with the worst case scenario will marginally exceed 65 dB alongside the site boundary and at the onsite lagoon. Levels will be lower further north. Cumulative levels will be lower than 65 dB at all receptors. The assessment indicates that the bulk of the emissions will arise from the Belvelly Port Facility site demolition, infrastructure and utility upgrade works, with limited contribution from the proposed agricultural fertiliser facility construction works.

No construction works will be required at the jetty as part of the current proposal, and all such works will be undertaken through application Planning Ref. 19/06783. These works are included in the cumulative assessment above.

14.3.3.2 Operational phase

Agricultural Fertiliser Facility

Other noise sources which will be installed at the Belvelly Port site as part of the separate site demolition, infrastructure and utility upgrade works project include the following:

- A new WWTP will be installed near the southern end of the site. The only noise source of significance at the plant (air blowers) will be housed in a steel kiosk designed to achieve an $L_{Aeq\ T}$ level of 43 dB at a distance of 3 m from the kiosk. These emissions will not be audible beyond the Belvelly Port site boundary.
- Three foul water pumping stations installed at the Belvelly Port site will include submerged pumps located in sumps approximately 3 m below ground level. Emissions from these are unlikely to be audible 5 m from the sump manholes.
- A new electrical substation will be constructed near the southern end of the Belvelly Port site. Noise emissions from same are highly unlikely to be audible beyond 50 m.

Noise emissions from the above will not contribute to cumulative impacts. In addition, noise emissions from the existing onsite MarinoChem facility are currently satisfactory and considerably lower than identified criteria at offsite locations. Cumulative impacts between MarinoChem emissions and those from the Gouldings facility will also be negligible. While the jetty is currently used at intervals to offload methanol from vessels, noise emissions from associated pumping equipment are negligible.

With respect to unloading of granular fertiliser at the jetty, the chief source of potential cumulative noise impacts relates to the existing quay at Passage West, used to import/export materials such as grain and woodchip. Observations made during the preparation of this chapter indicate that a typical worst case scenario at this site involves simultaneous operation of two material handling cranes and regular truck movements. This activity is confined to daytime hours.

Potential cumulative impacts between Gouldings jetty activity and the Passage West quay were assessed through predictive modelling. Scenario 3 identified in **Table 14.23** was rerun with Passage West quay plant identified in the previous paragraph. The model output is shown in **Figure 14.15**.

A comparison between **Figures 14.9** and **14.15** indicates an increase of 1 dB in the vicinity of the PACE centre, and an increase of 2 dB at Steampacket House, over noise levels predicted in the absence of Passage West quay operations. Cumulative daytime $L_{Aeq\ 1\ h}$ levels at these locations will be 45 dB near the PACE centre, and 45 dB at Steampacket House. These levels will remain considerably below the daytime 55 dB criterion.