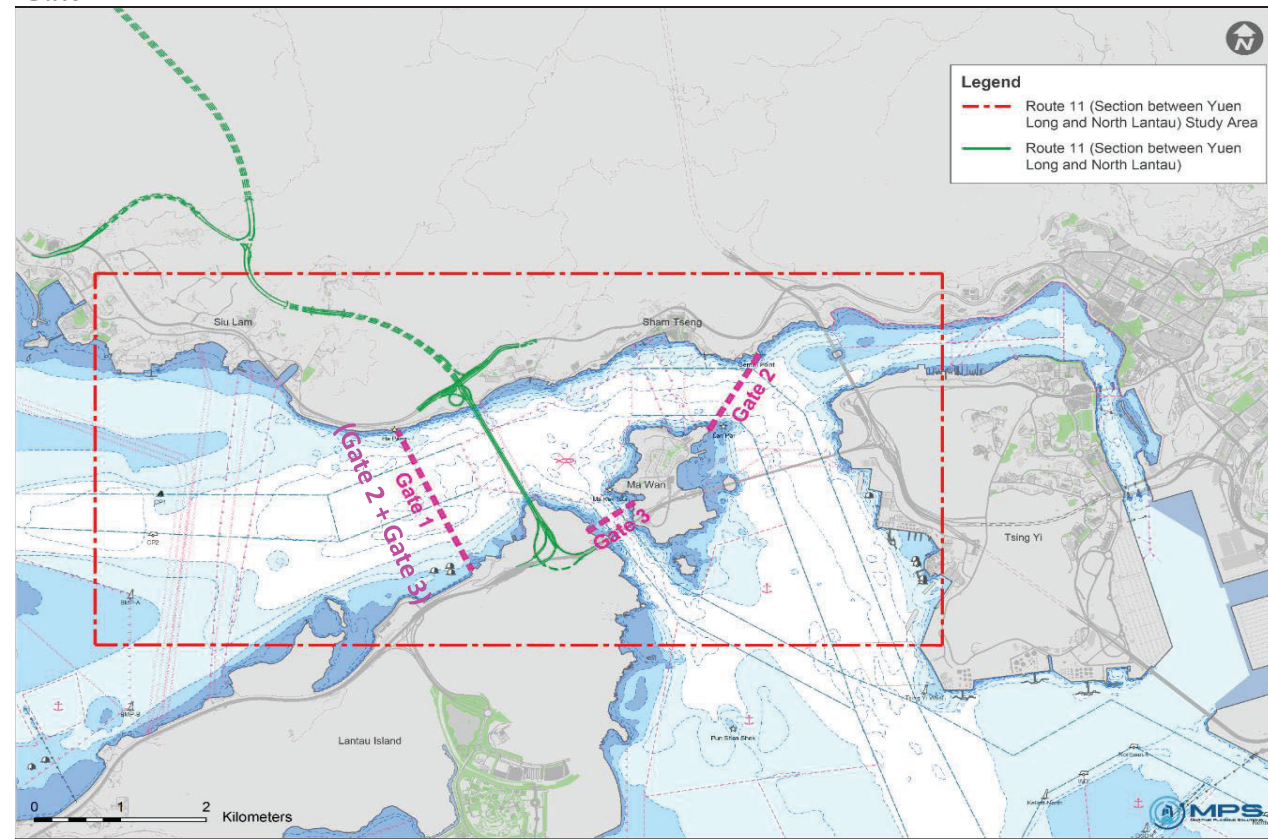


**Annex I**

Marine Emission Rate for Tsing Lung Tau Fairway in Year 2048  
Cross Boundary Ferries\_Gate 2

**Marine Traffic Information**

Assessment Year 2048  
 Assessed Vessel Type Cross Boundary Ferries  
 Gate 2



**Marine Traffic Information from Marine Traffic Consultants**

Location	Monthly Vessel Count in Dec <sup>[1]</sup>	Travelling Speed (knots) <sup>[2]</sup>	Length of Sailing Route (m) <sup>[3]</sup>
Gate 2	1,040	34	2,500

**Notes**

- [1] Monthly Vessel Count is advised by Marine Traffic Consultant and accepted by Marine Department.
- [2] Average speed of 34 knot is provided by Marine Traffic Consultant and assumed to be constant throughout the channel (i.e. Gate 1 to Gate 2).
- [3] Possible maximum length of sailing route is estimated for conservative assessment.

**Marine Emission Inventory****Total Emission Rate**

Group <sup>[1]</sup>	Vessel Type	Emission Rate per Trip (g/s) <sup>[2]</sup>			Annual No. of Vessel Arrivals in Year 2019 <sup>[3]</sup>	Composite Emission Rate per Trip (g/s) <sup>[4]</sup>		
		NO <sub>x</sub>	RSP	FSP		NO <sub>x</sub>	RSP	FSP
1	PRD Ferry - Shekou	0.361	0.009	0.008	20	0.467	0.011	0.010
	PRD Ferry - Zhuhai	0.569	0.013	0.013	28			
	PRD Ferry - Shunde	0.427	0.010	0.009	8			
	PRD Ferry - Zhongshan	0.472	0.011	0.010	14			
	PRD Ferry - Jiangmen	0.324	0.008	0.007	2			
	PRD Ferry - Nansha	0.459	0.011	0.010	12			
	PRD Ferry - Heshan	0.417	0.010	0.009	2			

**Engine in Operation**

Engine	On (1) or Off (0) <sup>[2]</sup>
ME	1
AE	1

**Notes:**

[1] The vessel type is grouped according to the modelling parameter (i.e. stack height, exit temperature, exit velocity etc). Vessel types with the identical modelling parameters will be grouped.

[2] Main and auxiliary engine are assumed in operation during maneuvering for conservative assessment with reference to Table 3-25 of Study on Marine Vessels Emission Inventory Final Report (HKUST, February 2012). The emission rate per trip considers the emission from the engine in operation as indicated in the table "Engine in Operation", and the calculation is documented in the "Technical Notes on Marine Emission for So Kwun Wat and Tsing Lung Tau Areas" submitted to EPD.

[3] Marine Traffic Consultant has provided the total number of CBFs but without breakdown into different vessel types. Hence, reference has been made to Operator's Schedule for the different vessel types. ([http://barcaferry.com/timetable/route\\_hkchina\\_c.htm](http://barcaferry.com/timetable/route_hkchina_c.htm))

[4] The emission rate per trip is calculated based on the following equation. Breakdown is provided and documented in "Technical Notes on Marine Emission for So Kwun Wat and Tsing Lung Tau Areas" submitted to EPD and emission rates are evenly apportioned into point sources in the model as shown in subsequent pages of this Appendix.

*Engine Emission Rate per Trip = (i)Time-in-mode x (ii)Engine Load Factors x (iii) Engine Power x (iv) Emission Factor, where*

(i) Time-in-mode is calculated from the average speed and possible maximum length of sailing route within assessment area provided by Marine Traffic Consultant.

(ii) Engine Load Factors are calculated from actual speed provided by the Marine Traffic Consultant divided by the maximum speed based on desktop review, or made reference to Table 4-10 of Study on Marine Vessels Emission Inventory Final Report (HKUST, February 2012).

(iii) The average engine powers are based on desktop review.

(iv) The emission factor is made reference to Study on Marine Vessels Emission Inventory Final Report (HKUST, February 2012) Table 4-17. Under the Air Pollution Control (Fuel for Vessels) Regulation, all vessels assumed to use MGO due to requirement to fuel switch to compliant fuel (sulphur content <=0.5%) within Hong Kong waters.

**Modelling Parameters**

Gate	Group	Source ID	Type	X	Y	Base Elevation	Release Height [1]	Exit Temperature [1]	Exit velocity [1]	Internal diameter [1]	Emission Rate per Trip		
				(m)	(m)						(mpd)	(m)	(K)
				(g/s)	(g/s)	(g/s)							
2	1	G2_C1_001	POINTHOR	822960.9	824410.3	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_002	POINTHOR	822912.7	824395.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_003	POINTHOR	822864.5	824381.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_004	POINTHOR	822816.3	824366.5	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_005	POINTHOR	822768.1	824351.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_006	POINTHOR	822719.9	824337.3	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_007	POINTHOR	822671.7	824322.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_008	POINTHOR	822623.5	824308	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_009	POINTHOR	822575.3	824293.4	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_010	POINTHOR	822527.1	824278.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_011	POINTHOR	822478.9	824264.2	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_012	POINTHOR	822430.7	824249.6	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_013	POINTHOR	822382.5	824235	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_014	POINTHOR	822334.3	824220.4	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_015	POINTHOR	822286.1	824205.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_016	POINTHOR	822237.9	824191.2	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_017	POINTHOR	822189.7	824176.5	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_018	POINTHOR	822141.5	824161.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_019	POINTHOR	822093.3	824147.3	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_020	POINTHOR	822045.1	824133	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_021	POINTHOR	821996.1	824121.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_022	POINTHOR	821947.1	824110.4	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_023	POINTHOR	821898.2	824099.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_024	POINTHOR	821849.2	824087.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_025	POINTHOR	821800.2	824076.5	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_026	POINTHOR	821751.2	824065.2	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_027	POINTHOR	821702.3	824053.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_028	POINTHOR	821653.3	824042.6	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_029	POINTHOR	821604.3	824031.3	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_030	POINTHOR	821555.4	824020.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_031	POINTHOR	821506.4	824008.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_032	POINTHOR	821457.4	823997.5	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_033	POINTHOR	821408.5	823986.2	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_034	POINTHOR	821359.5	823974.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_035	POINTHOR	821310.5	823963.6	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_036	POINTHOR	821261.6	823952.3	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_037	POINTHOR	821212.6	823941	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_038	POINTHOR	821163.6	823929.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_039	POINTHOR	821114.7	823918.5	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_040	POINTHOR	821065.7	823907.2	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_041	POINTHOR	823109	824188.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_042	POINTHOR	823060.9	824173.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_043	POINTHOR	823012.8	824158.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_044	POINTHOR	822964.7	824143.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05



Modelling Parameters

Gate	Group	Source ID	Type	X	Y	Base Elevation	Release Height <sup>[1]</sup>	Exit Temperature <sup>[1]</sup>	Exit velocity <sup>[1]</sup>	Internal diameter <sup>[1]</sup>	Emission Rate per Trip			
				(m)	(m)		(mpd)	(m)	(K)	(m/s)	(m)	NOx	RSP	FSP
				(g/s)	(g/s)		(g/s)							
2	1	G2_C1_045	POINTHOR	822916.6	824128.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_046	POINTHOR	822868.5	824113.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_047	POINTHOR	822820.4	824098.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_048	POINTHOR	822772.3	824083.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_049	POINTHOR	822724.2	824068.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_050	POINTHOR	822676.1	824053.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_051	POINTHOR	822628	824038.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_052	POINTHOR	822579.9	824023.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_053	POINTHOR	822531.8	824008.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_054	POINTHOR	822483.7	823993.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_055	POINTHOR	822435.6	823978.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_056	POINTHOR	822387.5	823963.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_057	POINTHOR	822339.4	823948.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_058	POINTHOR	822291.3	823933.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_059	POINTHOR	822243.2	823918.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_060	POINTHOR	822195.1	823903.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_061	POINTHOR	822147	823888.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_062	POINTHOR	822098.9	823873.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_063	POINTHOR	822050.8	823858.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_064	POINTHOR	822002.7	823843.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_065	POINTHOR	821954.6	823828.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_066	POINTHOR	821906.5	823813.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_067	POINTHOR	821858.4	823799	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_068	POINTHOR	821810.3	823784	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_069	POINTHOR	821762.2	823769	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_070	POINTHOR	821714.1	823754	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_071	POINTHOR	821666	823739	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_072	POINTHOR	821617.9	823724	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_073	POINTHOR	821569.8	823709	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_074	POINTHOR	821521.7	823694	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_075	POINTHOR	821473.6	823679.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_076	POINTHOR	821425.5	823664.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_077	POINTHOR	821377.3	823649.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_078	POINTHOR	821329.2	823634.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_079	POINTHOR	821281.1	823619.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_080	POINTHOR	821233	823604.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_081	POINTHOR	821184.9	823589.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_082	POINTHOR	821136.8	823574.2	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_083	POINTHOR	823130.7	823910.2	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_084	POINTHOR	823082.7	823894.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_085	POINTHOR	823034.7	823879.5	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_086	POINTHOR	822986.7	823864.2	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_087	POINTHOR	822938.7	823848.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	
2	1	G2_C1_088	POINTHOR	822890.7	823833.5	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05	

**Modelling Parameters**

Gate	Group	Source ID	Type	X	Y	Base Elevation	Release Height [1]	Exit Temperature [1]	Exit velocity [1]	Internal diameter [1]	Emission Rate per Trip		
				(m)	(m)						(mpd)	(m)	(K)
											(g/s)	(g/s)	(g/s)
2	1	G2_C1_089	POINTHOR	822842.7	823818.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_090	POINTHOR	822794.7	823802.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_091	POINTHOR	822746.7	823787.4	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_092	POINTHOR	822698.7	823772	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_093	POINTHOR	822650.7	823756.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_094	POINTHOR	822602.7	823741.3	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_095	POINTHOR	822554.7	823725.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_096	POINTHOR	822506.7	823710.6	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_097	POINTHOR	822458.7	823695.2	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_098	POINTHOR	822410.7	823679.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_099	POINTHOR	822362.7	823664.5	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_100	POINTHOR	822314.7	823649.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_101	POINTHOR	822266.7	823633.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_102	POINTHOR	822218.7	823618.4	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_103	POINTHOR	822170.7	823603.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_104	POINTHOR	822122.7	823587.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_105	POINTHOR	822074.7	823572.4	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_106	POINTHOR	822026.7	823557	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_107	POINTHOR	821978.7	823541.6	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_108	POINTHOR	821930.7	823526.3	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_109	POINTHOR	821882.7	823510.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_110	POINTHOR	821834.7	823495.6	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_111	POINTHOR	821786.7	823480.2	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_112	POINTHOR	821738.7	823464.9	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_113	POINTHOR	821690.7	823449.5	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_114	POINTHOR	821642.6	823434.2	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_115	POINTHOR	821594.6	823418.8	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_116	POINTHOR	821546.6	823403.4	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_117	POINTHOR	821498.6	823388.1	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_118	POINTHOR	821450.6	823372.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_119	POINTHOR	821402.6	823357.4	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_120	POINTHOR	821354.6	823342	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_121	POINTHOR	821306.6	823326.7	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_122	POINTHOR	821258.6	823311.3	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_123	POINTHOR	821210.6	823296	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_124	POINTHOR	821162.6	823280.6	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05
2	1	G2_C1_125	POINTHOR	821114.6	823265.3	0	1.3	773	8	0.7	3.74E-03	8.83E-05	8.26E-05

**Notes:**

[1] Modelling parameters are referred to Approved EIA of Proposed Road Improvement Works in West Kowloon Reclamation Development – Phase 1 – Investigation, Design and Construction (AEIAR-179/2013) and Expansion of Hong Kong Airport into a Three-Runway System (AEIAR-185/2014).

**Calculation of Multiplying Factor for Total Vessel Count****Monthly Vessel Count for Year 2048**

Marine Gate	Monthly Vessel Count in Dec <sup>[1]</sup>
Gate 2	1,040

**Notes:**

[1] The marine traffic data for December is provided by Marine Traffic Consultant.

**Monthly Profile of Marine Traffic for Year 2019**

Month	Monthly Multiplying Factor
Jan-19	1.00
Feb-19	0.90
Mar-19	1.00
Apr-19	0.97
May-19	1.00
Jun-19	0.97
Jul-19	1.00
Aug-19	1.00
Sep-19	0.97
Oct-19	1.00
Nov-19	0.97
<b>Dec-19</b>	<b>1.00</b>

**Notes:**

[1] No monthly profile is available from Marine Traffic Consultant and port statistics. Same number of vessel count each day is assumed.

**Hourly Multiplying Factor derived from Marine Traffic in December 2048**

Hour		Gate 2	
Start	End	No. of Marine Vessels <sup>[1]</sup>	Hourly Multiplying Factor
0	1	0	0.0%
1	2	0	0.0%
2	3	0	0.0%
3	4	0	0.0%
4	5	1	0.1%
5	6	0	0.0%
6	7	0	0.0%
7	8	40	3.8%
8	9	112	10.8%
9	10	42	4.0%
10	11	65	6.3%
11	12	98	9.4%
12	13	88	8.5%
13	14	50	4.8%
14	15	80	7.7%
15	16	72	6.9%
16	17	83	8.0%
17	18	60	5.8%
18	19	129	12.4%
19	20	22	2.1%
20	21	78	7.5%
21	22	17	1.6%
22	23	3	0.3%
23	24	0	0.0%

**Notes:**

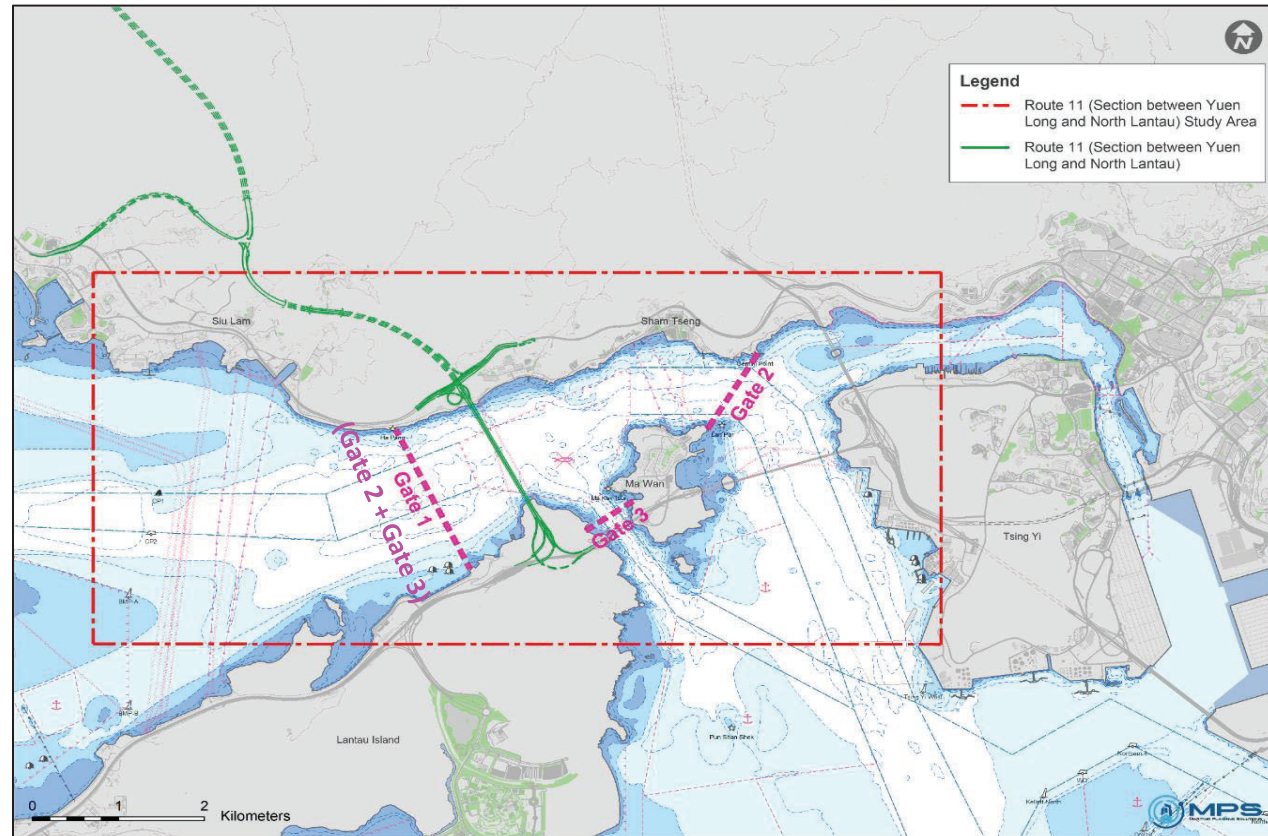
[1] The number of hourly marine vessels for Dec 2048 is provided by Marine Traffic Consultant. It contains the total number of marine vessels for the 31 days in December in Year 2048 for each hour. For example, from Hour 0 to Hour 1 (i.e. first hour of 1 Dec + first hour of 2 Dec, .... 1st hour of 31 Dec), there are total 0 marine vessels for the first hour during the whole December.

**Annex II**

Marine Emission Rate for Tsing Lung Tau Fairway in Year 2048  
Cross Boundary Ferries\_Gate 3

**Marine Traffic Information**

Assessment Year 2048  
 Assessed Vessel Type Cross Boundary Ferries  
 Gate 3



**Marine Traffic Information from Marine Traffic Consultants**

Location	Monthly Vessel Count in Dec <sup>[1]</sup>	Travelling Speed (knots) <sup>[2]</sup>	Length of Sailing Route (m) <sup>[3]</sup>
Gate 3	1,230	33	4,300

**Notes:**

- [1] Monthly Vessel Count is advised by Marine Traffic Consultant and accepted by Marine Department.
- [2] Average speed of 34 knot is provided by Marine Traffic Consultant and assumed to be constant throughout the channel (i.e. Gate 1 to Gate 3).
- [3] Possible maximum length of sailing route is estimated for conservative assessment.



**Marine Emission Inventory****Total Emission Rate**

Group <sup>[1]</sup>	Vessel Type	Emission Rate per Trip (g/s) <sup>[2]</sup>			Annual No. of Vessel Arrivals in Year 2019 <sup>[3]</sup>	Composite Emission Rate per Trip (g/s) <sup>[4]</sup>		
		NO <sub>x</sub>	RSP	FSP		NO <sub>x</sub>	RSP	FSP
1	PRD Ferry - Shekou	0.630	0.015	0.014	20	0.808	0.019	0.018
	PRD Ferry - Zhuhai	0.986	0.023	0.022	28			
	PRD Ferry - Shunde	0.735	0.017	0.016	8			
	PRD Ferry - Zhongshan	0.813	0.019	0.018	14			
	PRD Ferry - Jiangmen	0.574	0.014	0.013	2			
	PRD Ferry - Nansha	0.790	0.019	0.017	12			
	PRD Ferry - Heshan	0.717	0.017	0.016	2			

**Engine in Operation**

Engine	On (1) or Off (0) <sup>[2]</sup>
ME	1
AE	1

**Notes:**

[1] The vessel type is grouped according to the modelling parameter (i.e. stack height, exit temperature, exit velocity etc). Vessel types with the identical modelling parameters will be grouped.

[2] Main and auxiliary engine are assumed in operation during maneuvering for conservative assessment with reference to Table 3-25 of Study on Marine Vessels Emission Inventory Final Report (HKUST, February 2012). The emission rate per trip considers the emission from the engine in operation as indicated in the table "Engine in Operation", and the calculation is documented in the "Technical Notes on Marine Emission for So Kwun Wat and Tsing Lung Tau Areas" submitted to EPD.

[3] Marine Traffic Consultant has provided the total number of CBFs but without breakdown into different vessel types. Hence, reference has been made to Operator's Schedule for the different vessel types. ([http://barcaferry.com/timetable/route\\_hkchina\\_c.htm](http://barcaferry.com/timetable/route_hkchina_c.htm))

[4] The emission rate per trip is calculated based on the following equation. Breakdown is provided and documented in "Technical Notes on Marine Emission for So Kwun Wat and Tsing Lung Tau Areas" submitted to EPD and emission rates are evenly apportioned into point sources in the model as shown in subsequent pages of this Appendix.

*Engine Emission Rate per Trip = (i)Time-in-mode x (ii)Engine Load Factors x (iii) Engine Power x (iv) Emission Factor, where*

(i) Time-in-mode is calculated from the average speed and possible maximum length of sailing route within assessment area provided by Marine Traffic Consultant.

(ii) Engine Load Factors are calculated from actual speed provided by the Marine Traffic Consultant divided by the maximum speed based on desktop review, or made reference to Table 4-10 of Study on Marine Vessels Emission Inventory Final Report (HKUST, February 2012).

(iii) The average engine powers are based on desktop review.

(iv) The emission factor is made reference to Study on Marine Vessels Emission Inventory Final Report (HKUST, February 2012) Table 4-17. Under the Air Pollution Control (Fuel for Vessels) Regulation, all vessels assumed to use MGO due to requirement to fuel switch to compliant fuel (sulphur content <=0.5%) within Hong Kong waters.

**Modelling Parameters**

Gate	Group	Source ID	Type	X	Y	Base Elevation	Release Height [1]	Exit Temperature [1]	Exit velocity [1]	Internal diameter [1]	Emission Rate per Trip		
				(m)	(m)		(mpd)	(m)	(K)	(m/s)	(m)	NOx (g/s)	RSP (g/s)
3	1	G3_C1_001	POINTHOR	824160.2	822449.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_002	POINTHOR	824127.4	822490.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_003	POINTHOR	824094.6	822530.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_004	POINTHOR	824061.7	822571.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_005	POINTHOR	824028.9	822612.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_006	POINTHOR	823996.1	822652.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_007	POINTHOR	823963.2	822693.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_008	POINTHOR	823930.4	822734.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_009	POINTHOR	823897.6	822774.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_010	POINTHOR	823864.7	822815.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_011	POINTHOR	823831.9	822856.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_012	POINTHOR	823799.1	822896.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_013	POINTHOR	823766.2	822937.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_014	POINTHOR	823732.5	822977.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_015	POINTHOR	823696.9	823015	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_016	POINTHOR	823661.3	823052.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_017	POINTHOR	823625.6	823090.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_018	POINTHOR	823590	823128.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_019	POINTHOR	823554.4	823166.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_020	POINTHOR	823518.8	823204.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_021	POINTHOR	823483.2	823242	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_022	POINTHOR	823447.5	823279.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_023	POINTHOR	823411.9	823317.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_024	POINTHOR	823376.3	823355.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_025	POINTHOR	823340.7	823393.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_026	POINTHOR	823305.1	823431.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_027	POINTHOR	823269.5	823469.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_028	POINTHOR	823233.8	823506.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_029	POINTHOR	823198.2	823544.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_030	POINTHOR	823162.6	823582.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_031	POINTHOR	823122.4	823613.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_032	POINTHOR	823077.4	823637.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_033	POINTHOR	823032.5	823661	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_034	POINTHOR	822987.6	823684.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_035	POINTHOR	822942.6	823708.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_036	POINTHOR	822897.7	823732.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_037	POINTHOR	822852.7	823756	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_038	POINTHOR	822807.8	823779.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_039	POINTHOR	822759.3	823789.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_040	POINTHOR	822709.4	823793	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_041	POINTHOR	822659.4	823796.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_042	POINTHOR	822609.4	823800.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_043	POINTHOR	822559.5	823803.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_044	POINTHOR	822509.5	823807.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05

**Modelling Parameters**

Gate	Group	Source ID	Type	X	Y	Base Elevation	Release Height [1]	Exit Temperature [1]	Exit velocity [1]	Internal diameter [1]	Emission Rate per Trip		
				(m)	(m)		(m)	(K)	(m/s)	(m)	NOx (g/s)	RSP (g/s)	FSP (g/s)
3	1	G3_C1_045	POINTHOR	822459.5	823810.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_046	POINTHOR	822409.6	823814.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_047	POINTHOR	822359.5	823816	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_048	POINTHOR	822309.5	823815.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_049	POINTHOR	822259.4	823814.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_050	POINTHOR	822209.3	823813.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_051	POINTHOR	822159.2	823812.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_052	POINTHOR	822109.2	823811.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_053	POINTHOR	822059.1	823811	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_054	POINTHOR	822009	823810.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_055	POINTHOR	821958.9	823809.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_056	POINTHOR	821909.1	823805.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_057	POINTHOR	821859.5	823797.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_058	POINTHOR	821810	823789.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_059	POINTHOR	821760.4	823782.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_060	POINTHOR	821710.8	823774.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_061	POINTHOR	821661.3	823766.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_062	POINTHOR	821611.7	823759	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_063	POINTHOR	821562.1	823751.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_064	POINTHOR	821512.6	823743.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_065	POINTHOR	821463	823735.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_066	POINTHOR	821413.4	823728.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_067	POINTHOR	821363.9	823720.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_068	POINTHOR	821314.3	823712.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_069	POINTHOR	821264.7	823705	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_070	POINTHOR	821215.2	823697.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_071	POINTHOR	821165.6	823689.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_072	POINTHOR	821116	823681.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_073	POINTHOR	824038.7	822435.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_074	POINTHOR	824005.3	822475.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_075	POINTHOR	823972	822515.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_076	POINTHOR	823938.7	822555.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_077	POINTHOR	823905.4	822595.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_078	POINTHOR	823872	822636.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_079	POINTHOR	823838.7	822676.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_080	POINTHOR	823805.4	822716.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_081	POINTHOR	823772.1	822756.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_082	POINTHOR	823738.7	822796.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_083	POINTHOR	823705.4	822837	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_084	POINTHOR	823672.1	822877.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_085	POINTHOR	823633.7	822911.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_086	POINTHOR	823594.1	822944.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_087	POINTHOR	823554.4	822977.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_088	POINTHOR	823514.8	823010.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_089	POINTHOR	823475.1	823043.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05

Modelling Parameters

Gate	Group	Source ID	Type	X	Y	Base Elevation	Release Height [1]	Exit Temperature [1]	Exit velocity [1]	Internal diameter [1]	Emission Rate per Trip		
				(m)	(m)						(mpd)	(m)	(K)
3	1	G3_C1_090	POINTHOR	823435.5	823076.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_091	POINTHOR	823395.9	823109	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_092	POINTHOR	823356.2	823141.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_093	POINTHOR	823316.6	823174.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_094	POINTHOR	823276.9	823207.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_095	POINTHOR	823237.3	823240.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_096	POINTHOR	823197.7	823273.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_097	POINTHOR	823158	823306.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_098	POINTHOR	823114.6	823332.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_099	POINTHOR	823069	823354.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_100	POINTHOR	823023.5	823377.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_101	POINTHOR	822977.9	823399.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_102	POINTHOR	822932.4	823422.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_103	POINTHOR	822886.9	823444.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_104	POINTHOR	822841.3	823466.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_105	POINTHOR	822795.8	823489.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_106	POINTHOR	822747.3	823497.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_107	POINTHOR	822697.2	823498.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_108	POINTHOR	822647.1	823499.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_109	POINTHOR	822597	823500.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_110	POINTHOR	822547	823501.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_111	POINTHOR	822496.9	823502.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_112	POINTHOR	822446.8	823503.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_113	POINTHOR	822396.8	823500.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_114	POINTHOR	822346.9	823496.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_115	POINTHOR	822296.9	823493.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_116	POINTHOR	822246.9	823489.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_117	POINTHOR	822196.9	823486.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_118	POINTHOR	822147	823482.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_119	POINTHOR	822097.2	823477.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_120	POINTHOR	822048.3	823465.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_121	POINTHOR	821999.4	823453.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_122	POINTHOR	821950.5	823442.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_123	POINTHOR	821901.6	823430.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_124	POINTHOR	821852.7	823419.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_125	POINTHOR	821803.8	823407.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_126	POINTHOR	821754.9	823395.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_127	POINTHOR	821706	823384.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_128	POINTHOR	821657.1	823372.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_129	POINTHOR	821608.2	823361.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_130	POINTHOR	821559.3	823349.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_131	POINTHOR	821510.4	823337.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_132	POINTHOR	821461.4	823326.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_133	POINTHOR	821412.5	823314.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_134	POINTHOR	821363.6	823303.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05



**Modelling Parameters**

Gate	Group	Source ID	Type	X	Y	Base Elevation	Release Height [1]	Exit Temperature [1]	Exit velocity [1]	Internal diameter [1]	Emission Rate per Trip		
				(m)	(m)						(mpd)	(m)	(K)
3	1	G3_C1_135	POINTHOR	821314.7	823291.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_136	POINTHOR	821265.8	823280	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_137	POINTHOR	821216.9	823268.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_138	POINTHOR	821168	823256.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_139	POINTHOR	821119.1	823245.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_140	POINTHOR	823882.7	822443.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_141	POINTHOR	823848.5	822482.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_142	POINTHOR	823814.2	822521.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_143	POINTHOR	823779.9	822561	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_144	POINTHOR	823745.6	822600.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_145	POINTHOR	823711.4	822639.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_146	POINTHOR	823677.1	822678.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_147	POINTHOR	823642.8	822718.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_148	POINTHOR	823608.6	822757.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_149	POINTHOR	823574.3	822796.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_150	POINTHOR	823538.2	822833.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_151	POINTHOR	823498.7	822866.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_152	POINTHOR	823459.3	822900	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_153	POINTHOR	823419.9	822933.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_154	POINTHOR	823380.4	822966.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_155	POINTHOR	823341	822999.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05



**Modelling Parameters**

Gate	Group	Source ID	Type	X	Y	Base Elevation	Release Height [1]	Exit Temperature [1]	Exit velocity [1]	Internal diameter [1]	Emission Rate per Trip		
				(m)	(m)						(mpd)	(m)	(K)
3	1	G3_C1_156	POINTHOR	823301.6	823032.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_157	POINTHOR	823262.1	823066	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_158	POINTHOR	823222.6	823098.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_159	POINTHOR	823175.1	823116.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_160	POINTHOR	823127.8	823133.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_161	POINTHOR	823080.5	823151.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_162	POINTHOR	823033.2	823169.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_163	POINTHOR	822985.9	823186.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_164	POINTHOR	822938.7	823204.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_165	POINTHOR	822891.4	823222.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_166	POINTHOR	822844.1	823240.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_167	POINTHOR	822796.9	823258	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_168	POINTHOR	822746.9	823258.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_169	POINTHOR	822696.8	823258.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_170	POINTHOR	822646.7	823258.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_171	POINTHOR	822596.6	823258	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_172	POINTHOR	822546.5	823257.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_173	POINTHOR	822496.4	823257.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_174	POINTHOR	822446.4	823257.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_175	POINTHOR	822399.5	823238.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_176	POINTHOR	822352.8	823219.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_177	POINTHOR	822306.1	823199.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_178	POINTHOR	822259.4	823180.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_179	POINTHOR	822212.7	823161.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_180	POINTHOR	822166	823141.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_181	POINTHOR	822119.3	823122.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_182	POINTHOR	822072.6	823102.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_183	POINTHOR	822025.8	823083.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_184	POINTHOR	821979	823064.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_185	POINTHOR	821932.1	823045.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_186	POINTHOR	821885.2	823026.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05

**Modelling Parameters**

Gate	Group	Source ID	Type	X	Y	Base Elevation	Release Height [1]	Exit Temperature [1]	Exit velocity [1]	Internal diameter [1]	Emission Rate per Trip		
				(m)	(m)						(mpd)	(m)	(K)
3	1	G3_C1_187	POINTHOR	821838.3	823007.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_188	POINTHOR	821791.3	822988.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_189	POINTHOR	821744.4	822970.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_190	POINTHOR	821697.5	822951.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_191	POINTHOR	821650.6	822932.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_192	POINTHOR	821603.6	822913.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_193	POINTHOR	821556.7	822894.8	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_194	POINTHOR	821509.8	822876	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_195	POINTHOR	821462.8	822857.2	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_196	POINTHOR	821415.9	822838.4	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_197	POINTHOR	821369	822819.6	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_198	POINTHOR	821322.1	822800.7	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_199	POINTHOR	821275.1	822781.9	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_200	POINTHOR	821228.2	822763.1	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_201	POINTHOR	821181.3	822744.3	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05
3	1	G3_C1_202	POINTHOR	821134.3	822725.5	0	1.3	773	8	0.7	4.00E-03	9.46E-05	8.85E-05

**Notes:**

[1] Modelling parameters are referred to Approved EIA of Proposed Road Improvement Works in West Kowloon Reclamation Development – Phase 1 – Investigation, Design and Construction (AEIAR-179/2013) and Expansion of Hong Kong Airport into a Three-Runway System (AEIAR-185/2014).

**Calculation of Multiplying Factor for Total Vessel Count****Calculation of Monthly Vessel Count for Year 2048**

Marine Gate	Monthly Vessel Count in Dec <sup>[1]</sup>
Gate 3	1,230

**Notes:**

[1] The marine traffic data for December is provided by Marine Traffic Consultant.

**Monthly Profile of Marine Traffic for Year 2019**

Month	Monthly Multiplying Factor
Jan-19	1.00
Feb-19	0.90
Mar-19	1.00
Apr-19	0.97
May-19	1.00
Jun-19	0.97
Jul-19	1.00
Aug-19	1.00
Sep-19	0.97
Oct-19	1.00
Nov-19	0.97
<b>Dec-19</b>	<b>1.00</b>

**Notes:**

[1] No monthly profile is available from Marine Traffic Consultant and port statistics. Same number of vessel count each day is assumed.

**Monthly-Hourly Profile of Marine Traffic for Year 2048**

Hour		Gate 3	
Start	End	No. of Marine Vessels <sup>[1]</sup>	Hourly Multiplying Factor
0	1	3	0.2%
1	2	0	0.0%
2	3	4	0.3%
3	4	0	0.0%
4	5	0	0.0%
5	6	0	0.0%
6	7	0	0.0%
7	8	2	0.2%
8	9	53	4.3%
9	10	63	5.1%
10	11	155	12.6%
11	12	92	7.5%
12	13	68	5.5%
13	14	93	7.6%
14	15	85	6.9%
15	16	52	4.2%
16	17	120	9.8%
17	18	124	10.1%
18	19	64	5.2%
19	20	130	10.6%
20	21	12	1.0%
21	22	92	7.5%
22	23	18	1.5%
23	24	0	0.0%

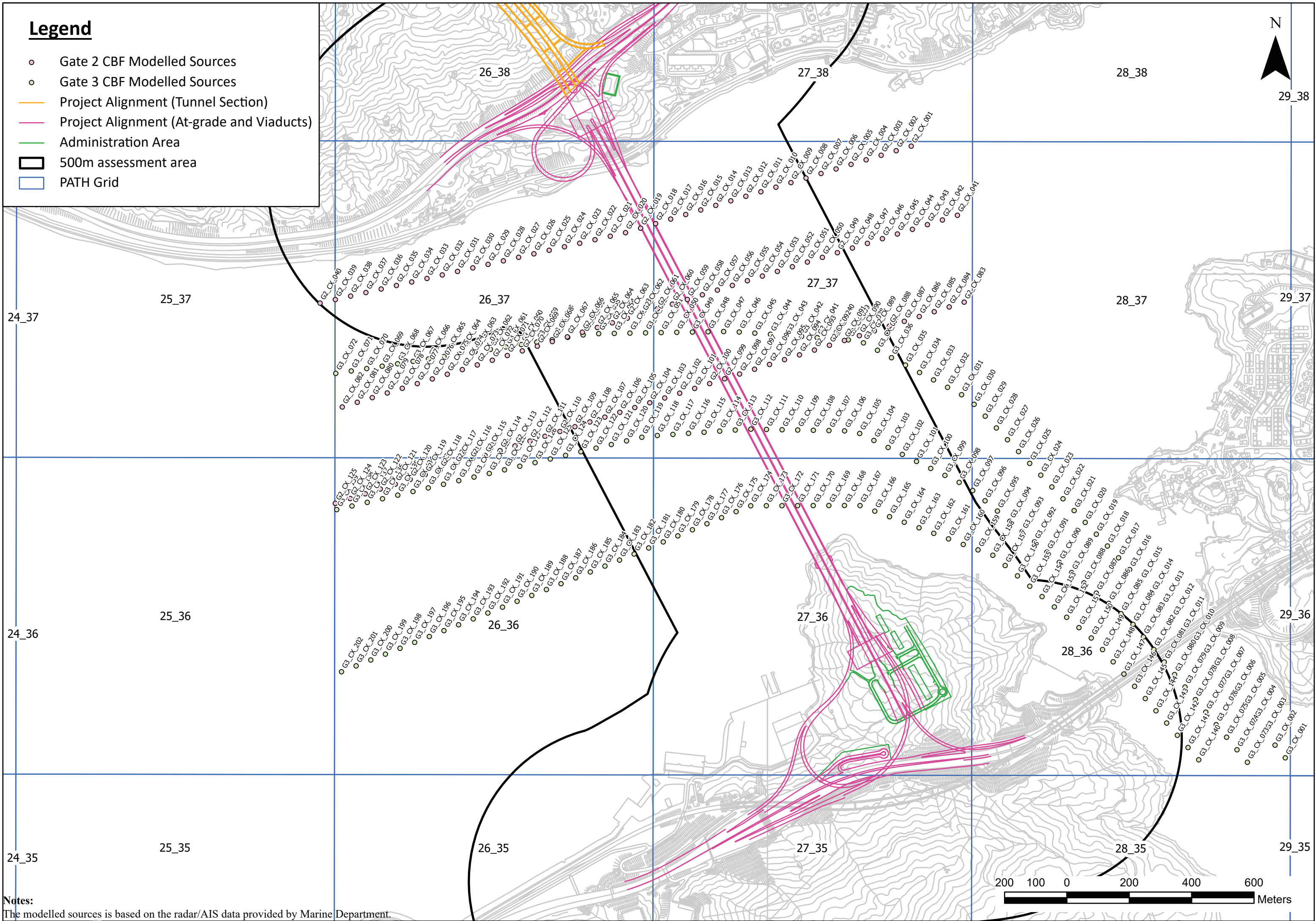
**Notes:**

[1] The number of hourly marine vessels for Dec 2048 is provided by Marine Traffic Consultant. It contains the total number of marine vessels for the 31 days in December in Year 2048 for each hour. For example, from Hour 0 to Hour 1 (i.e. first hour of 1 Dec + first hour of 2 Dec, .... 1st hour of 31 Dec), there are total 3 marine vessels for the first hour during the whole December.

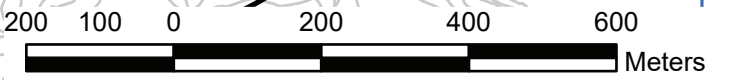


# Legend

- Gate 2 CBF Modelled Sources
- Gate 3 CBF Modelled Sources
- Project Alignment (Tunnel Section)
- Project Alignment (At-grade and Viaducts)
- Administration Area
- ▭ 500m assessment area
- ▭ PATH Grid



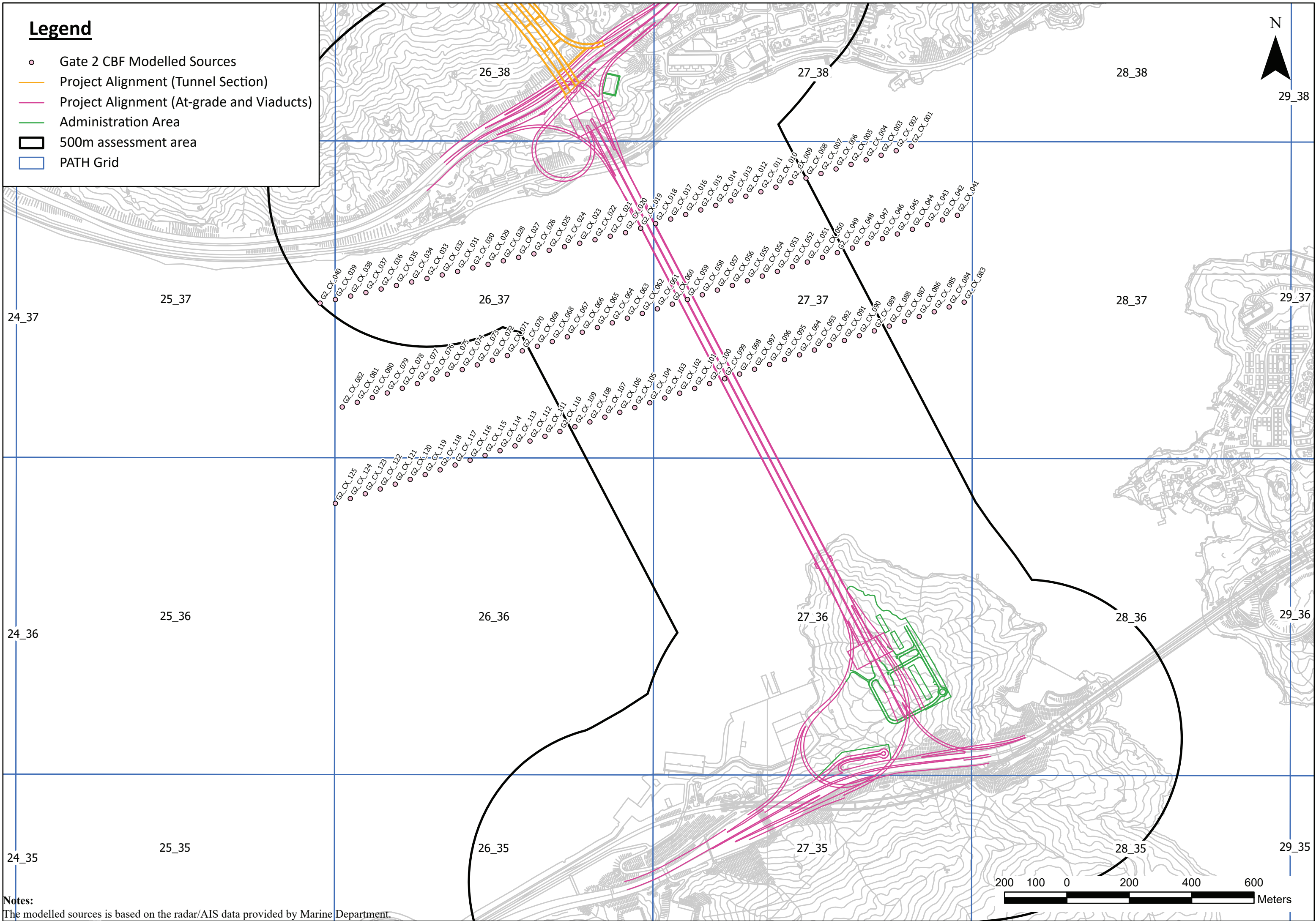
**Notes:**  
The modelled sources is based on the radar/AIS data provided by Marine Department.



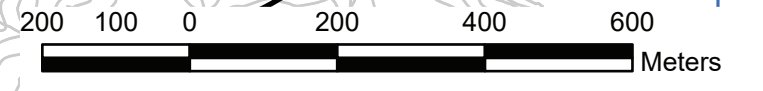


# Legend

- Gate 2 CBF Modelled Sources
- Project Alignment (Tunnel Section)
- Project Alignment (At-grade and Viaducts)
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- ▭ 500m assessment area
- ▭ PATH Grid



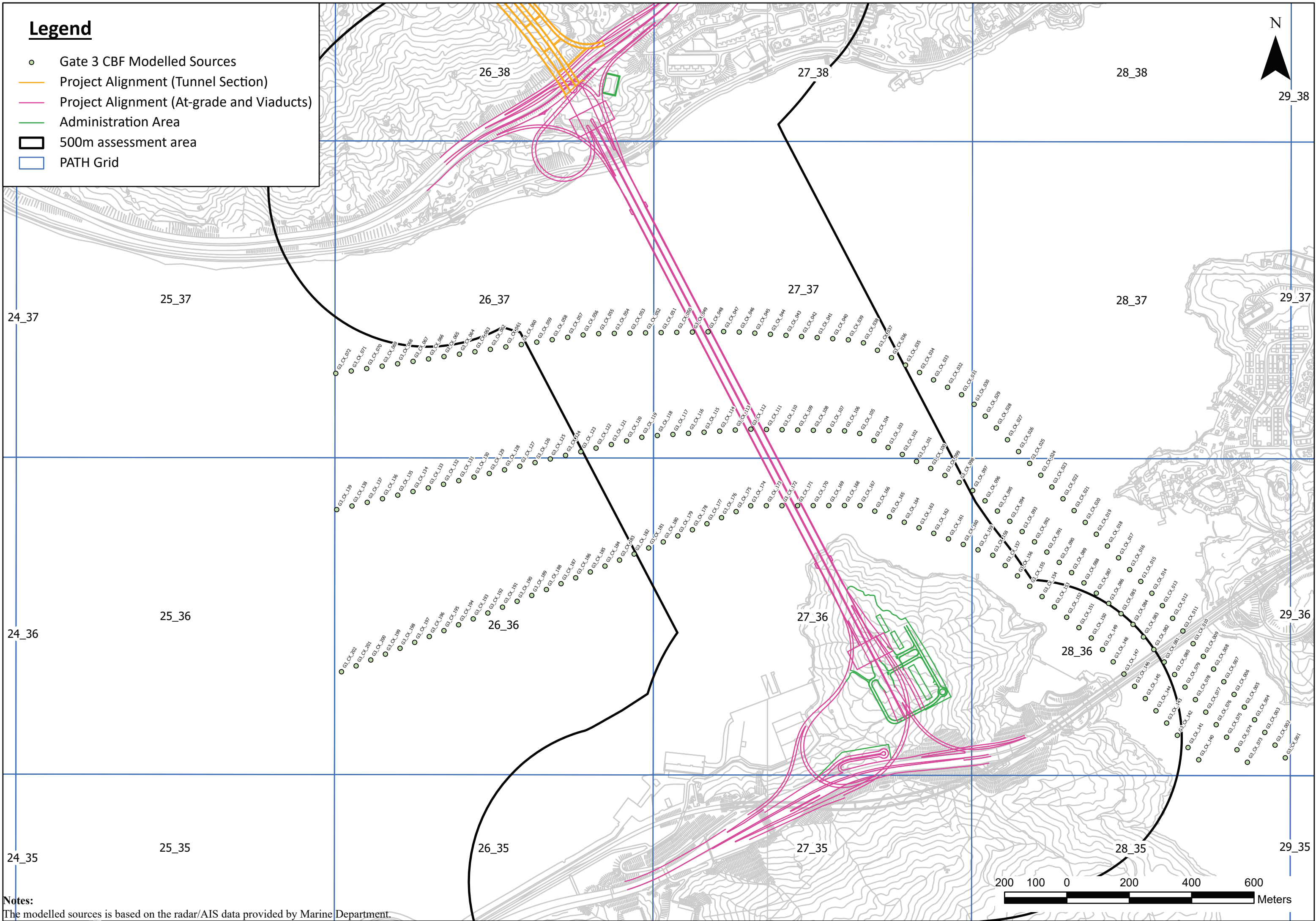
**Notes:**  
The modelled sources is based on the radar/AIS data provided by Marine Department.





# Legend

- Gate 3 CBF Modelled Sources
- Project Alignment (Tunnel Section)
- Project Alignment (At-grade and Viaducts)
- Administration Area
- ▭ 500m assessment area
- ▭ PATH Grid



**Notes:**  
The modelled sources is based on the radar/AIS data provided by Marine Department.

