

PROVISIONAL LOCAL VESSELS ADVISORY COMMITTEE

Summary Findings of the 2004 Assessment of Typhoon Shelter Space Requirements

Purpose

1. The purpose of this paper is to report on the summary findings of the 2004 round of assessment on typhoon shelter space requirements.

Background

2. The Marine Department (MD) has been conducting assessment of the typhoon shelter (TS) space requirements on a regular basis to ensure provision of sufficient typhoon shelter space based on data going back as far as some 30 years ago. The findings are used as a planning guide for the development of TSs. The regression model devised in the study has been observed as an accurate and effective tool for forecasting the future demand for TS space.
3. At the 27th meeting of the Port Progress Committee (chaired by the then Secretary for Planning, Environment and Lands) held on 15 February 1996, it was decided that new typhoon shelter space would not be provided for pleasure vessels, and the space requirements of pleasure vessels should be separated from the other categories of vessels.

Forecasting Equations

4. The regression equations adopted for forecasting in the 2004 round of assessment are provided at Appendix 1. For each round of assessment, the regression equations are reviewed and updated based on the latest time series data available. The forecasting equation for Mainland vessels (item 5 of Appendix I) has been modified this year to include the container throughput handled at locations other than container terminals as an additional parameter of the equation. The explanatory power of the revised equation is significantly improved from 0.75 to 0.93.

Parameters

5. The parameters incorporated in this assessment (Appendix 2) include:
 - (a) Hong Kong's medium-term economic forecasts released in the *Financial Secretary's Budget Speech* in March 2004 and economic estimates released in the *Half-yearly*

Economic Report 2004 in August 2004;

- (b) *Hong Kong Population Projections 2004-2033* released by the Census and Statistics Department (C&SD) in August 2004; and
- (c) Forecasts of container throughput handled at locations other than Container Terminals released in the *Consultancy Study on Hong Kong Port - Master Plan 2020* commissioned by the Economic Development and Labour Bureau.

Assumptions

- 6. In the current assessment, we continue to adopt the following key assumptions as we did in the past :
 - (a) The occupancy factor of 8/3 for estimating the TS space requirements for each vessel (including provision of fairways and fire-lanes)
i.e. area required = vessel length x breadth x 8/3; and
 - (b) 100% provision of TS space for locally licensed vessels (including those with licences expired for less than 12 months but excluding Government vessels).

Demand

Current situation

- 7. The demand of typhoon shelter/sheltered anchorage space for locally licensed (excluding Government vessels) cargo vessels, fishing vessels, Mainland river trade/coastal vessels and miscellaneous commercial vessels visiting Hong Kong as at the end of 2003 is estimated to be **391.2** hectares (Appendix 3), representing a small increase of 13.5 hectares or 3.6% over the level of end 2002 (377.7 hectares).
- 8. Increases are mainly recorded for Mainland vessels (+11.0 hectares) and fishing vessels (+5.7 hectares). On the other hand, decrease is mainly recorded for barges and lighters (-5.0 hectares) as the number of locally licensed barges and lighters has decreased by 2.3% to 1243 in 2003.
- 9. The current demand for pleasure vessels is estimated to be 138.0 hectares, i.e. 8.2 hectares or 6.4% more than the demand of last year.

Forecast

- 10. The demand of TS space for cargo vessels and other non-pleasure vessels is forecast to increase from 391.2 hectares in 2003 to 433.1 hectares in 2021 (Appendix 4), at a growth rate of about 0.6% per year (compound rate basis) or 2.3 hectares per year (simple average

basis). For pleasure vessels, the demand is forecast to increase from 138.0 hectares to 162.8 hectares by the end of 2021, at a growth rate of 0.92% or 1.3 hectares per year.

Table 1
Forecast of TS/sheltered anchorage space requirements (hectares)

	2003 (Actual)	2006	2011	2016	2021
Cargo, fishing, Mainland vessels and miscellaneous commercial vessels	391	426 (423)	430 (431)	436 (439)	433 (446)
Pleasure vessels	138	146 (149)	152 (154)	157 (160)	163 (165)

Notes: (1) Figures refer to year-end positions.

(2) Figures in brackets denote the forecasts made in 2002 assessment

Supply

Current situation

- The current supply covering the gazetted TSs and the natural sheltered anchorages that are relatively safe for cargo vessels and other non-pleasure vessels to take shelter during typhoon passage is **401.5** hectares (Appendix 5). The 8 hectares of TS space in Government Dockyard and the 4.2 hectares of area occupied by Government buoys in typhoon shelters have been excluded, in line with the exclusion of Government vessels in the demand side.

Forecast

- With the completion of the Tai O Sheltered Boat Anchorage (4 hectares) in mid-2005, the total supply of TS space during the period of 2006-2021 will level at 405.5 hectares. However, the future supply of TS space may be affected by some development projects, such as the Wan Chai Development Phase II project (WDII) and South East Kowloon Development (SEKD) project. As the above two projects are currently under review and the outcomes are uncertain at this moment, their impacts on the future supply of TS space would not be considered in this assessment.

Matching of Demand and Supply

- As at end 2003, the current total supply of TS/sheltered anchorage space is 401.5 hectares for

cargo vessels and other non-pleasure vessels while the corresponding demand is 391.2 hectares, thus there is a surplus of 10.3 hectares (2.6% of total demand) of TS space as at end 2003. However, according to the forecasting model, there would be shortfalls in TS space throughout the entire forecasting period. Nevertheless, all the shortfalls would not exceed the trigger point (i.e. 10% of the total demand for TS space) for planning the provision of a new TS ([Appendix 6](#)).

Table 2

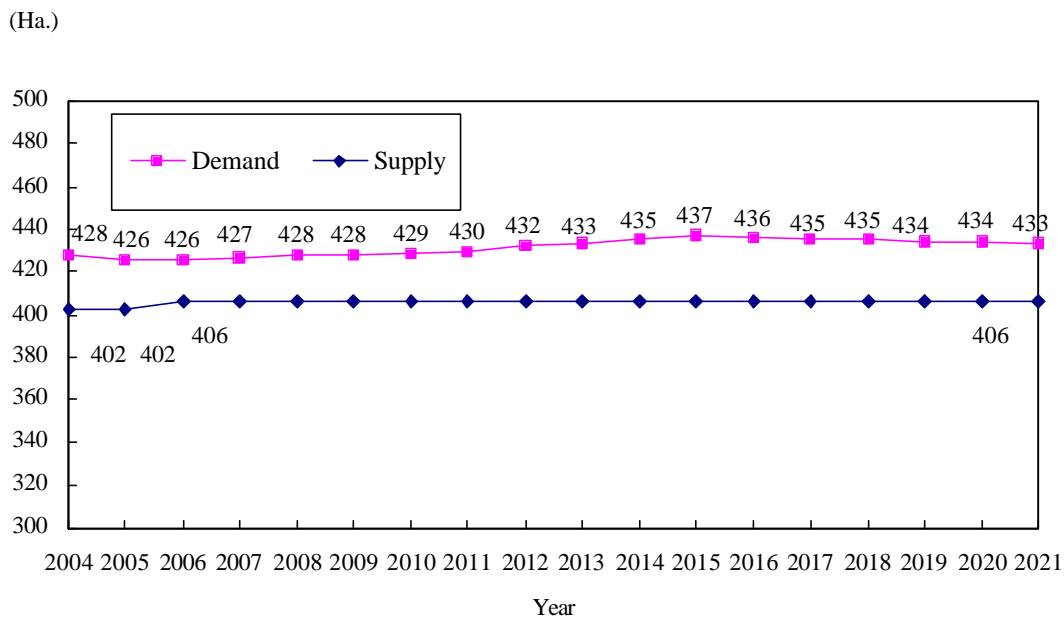
Matching of demand and supply of TS/sheltered anchorage space for non-pleasure vessels

	2006	2011	2016	2021
Surplus(+)/Shortfall(-)				
(hectares)	-20.6	-24.8	-30.5	-27.6
(as % of demand)	(-4.8%)	(-5.8%)	(-7.0%)	(-6.4%)

Note: Figures refer to year-end positions

Chart 1

**Demand and Supply of TS/sheltered anchorage space for non-pleasure vessels
2004-2021**



- For pleasure vessels, same as the conclusion of the last assessment, there will be a surplus in sheltered space over the entire forecasting horizon. The existing surplus is about 51 hectares or 37% of demand and it would be reduced gradually to about 27 hectares or 16% of demand by 2021 (see Table 3).

Table 3
Forecast of surplus/shortfall for TS/sheltered anchorage space for pleasure vessels

	2003 (Actual)	2006	2011	2016	2021
Surplus (hectares)	+51	+43	+37	+32	+27
(As % of demand)	(+37%)	(+29%)	(+24%)	(+20%)	(+16%)

Conclusion

15. During the period of 2006-2021, the forecast demand for TS/sheltered anchorage space slightly exceeds the existing supply. However, given that (a) the River Trade Terminal basin in Tuen Mun (5.8% of total demand) could serve as a buffer to meet part of the demand for TS/sheltered anchorage space and (b) according to the surveys conducted in 2002 to 2004, about 5% to 10% of the locally licensed vessels would absent from Hong Kong during typhoon passage, the *current supply of TS/sheltered anchorage space (405.5 hectares) has the scope to meet the future demand during the forecasting horizon*. The key factor for determining the timing for providing a new TS depends very much on the reviews of the WDII and SEKD development projects. The Marine Department will closely monitor the progress of these projects and revise the assessment results as necessary.
16. The assessment of typhoon shelter requirements would be regularly reviewed by the Marine Department by incorporating the latest available information into the forecasting model. Marine Department would actively liaise with the concerned parties and Government departments if the revised forecasting results indicate that planning of a new typhoon shelter would be required.

Advice sought

17. Members' views are sought on the summary findings of the 2004 round of assessment of TS space requirements.

Statistics Section

Planning, Development & Port Security Branch

Marine Department

December 2004

Appendix 1

Forecasting Equations for Various Classes of Vessels

<u>Category of vessel</u>	<u>Regression equation</u>	<u>Explanatory power (as measured by coefficient of determination R²)</u>
1. Ferries and Launches	Space = 0.000154 x (lagged 1 year GDP per capita) (Space = 10.162 + 0.0000207 x GDP)	0.970 (0.897)
2. Passenger and Trading Vessels	Space = e ^[(2.739 - 0.00000169 x (lagged 1 year GDP)] (Space = e ^(2.736 - 0.00000230 x GDP))	0.961 (0.953)
3. Lighters and Barges	Space = 25.332 x ln(non-CT ocean TEU) (Space = 25.875 x ln(non-CT ocean TEU))	0.990 (0.992)
4. Fishing Vessels	Space = e ^[(5.399 - 0.0000006359 x (lagged 1 year GDP)] (Space = 228.330 - 0.000950 x GDP per capita)	0.895 (0.784)
5. Mainland Vessels Seeking Shelter in HK Waters during Typhoon Passage	Space = 0.00616 x (non-CT TEU) + 0.60095 x ln(GDP) (Space = -18.420 + 0.0000728 x GDP)	0.933 (0.747)
6. Miscellaneous Vessels	Space = 18.262 x ln(GDP) - 20.418 x ln(population) (Space = [3.466 + 0.00000240 x GDP] ²)	0.996 (0.878)
7. Pleasure Vessels	Space = 37.986 x ln(lagged 1 year GDP) - 35.406 x ln(population) (Space = -358.381 + 36.619 x ln{GDP})	0.993 (0.747)

Note: The regression equations used in 2002 Assessment and their explanatory powers are shown in brackets.

Appendix 2

Comparison of the Parameters Used in the 2002 Assessment and 2004 Assessment of Typhoon Shelter Space Requirements

	<u>2002 Assessment</u>	<u>2004 Assessment</u>
1. GDP forecasts (HK\$ million)		
2004	972 794*	1 463 304 [#]
2006	1 042 206*	1 576 628 [#]
2011	1 208 202*	1 899 836 [#]
2016	1 400 637*	2 289 300 [#]
2021	1 623 722*	2 758 605 [#]
	$\left[\begin{array}{l} 02 : +1.5\% \text{ p.a.} \\ 03 - 06 : +3.5\% \text{ p.a.} \\ 07 - 21 : +3.0\% \text{ p.a.} \end{array} \right]$	$\left[\begin{array}{l} 04 : +7.5\% \text{ p.a.} \\ 05 - 08 : +3.8\% \text{ p.a.} \\ 09 - 21 : +3.8\% \text{ p.a.} \end{array} \right]$
2. Population forecasts (mid-year) ('000)		
2004	6 957.7	6 842.5
2006	7 121.8	6 939.7
2011	7 527.7	7 255.4
2016	7 896.5	7 572.6
2021	8 228.3	7 862.8
3. GDP per capita forecasts ('000)		
2004	139 815*	213 855 [#]
2006	146 340*	227 190 [#]
2011	160 501*	261 851 [#]
2016	177 374*	302 314 [#]
2021	197 334*	350 843 [#]
4. Ocean TEU forecasts (Other than Container Terminals) ('000 TEUs)		
2004	3 032	3 881
2006	3 001	3 974
2011	3 218	4 641
2016	3 273	5 441
2021	3 047	5 835
5. Overall TEU forecasts (Other than Container Terminals) ('000 TEUs)		
2004	N.A.	8 578
2006	N.A.	9 009
2011	N.A.	10 253
2016	N.A.	11 556
2021	N.A.	11 419

Notes :

- * at constant (1990) market prices
- # at constant (2000) market prices
- N.A. not applicable

Appendix 3

Time Series on the Number of Vessels of Different Classes and their Typhoon Shelter/Sheltered Anchorage Space Requirements

Year	Ferries and Launches						Passenger and Trading Vessels (Class 1 and Class 5)						Lighters and Barges * (Class 2)		Fishing Vessels (Class 4 and Class 6)					
	Ferries		Launches		Sub-total		Passenger sampans (Class 1)		Trading vessels (Class 5)		Sub-total				Fishing vessels (Class 4)		Fishing vessels (Class 6)		Sub-total	
	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)
1989	87	7.60	594	14.28	681	21.88	324	1.71	96	2.58	420	4.29	2,026	193.01	2,689	12.63	4,076	134.52	6,765	147.15
1990	87	7.51	584	14.76	671	22.27	271	1.35	90	2.60	361	3.95	1,953	186.73	2,357	9.46	3,993	133.88	6,350	143.34
1991	88	7.33	590	14.81	678	22.14	199	1.06	83	2.26	282	3.32	1,943	183.90	1,611	6.53	3,826	123.02	5,437	129.55
1992	90	7.27	665	17.36	755	24.63	241	1.11	75	2.14	316	3.25	1,981	201.36	1,564	6.34	3,861	125.69	5,425	132.03
1993	87	7.29	775	21.52	862	28.81	256	0.93	75	2.13	331	3.06	2,011	223.28	1,760	6.71	3,732	122.37	5,492	129.08
1994	87	8.07	846	23.78	933	31.85	251	1.00	70	1.97	321	2.97	1,938	237.01	1,657	5.96	3,491	115.92	5,148	121.88
1995	91	8.48	893	24.89	984	33.37	246	0.98	67	1.83	313	2.81	1,793	230.28	1,568	5.51	3,193	106.97	4,761	112.48
1996	90	7.70	872	23.46	962	31.16	212	0.92	66	1.81	278	2.73	1,676	214.53	1,526	5.32	3,022	103.61	4,548	108.93
1997	92	7.84	852	22.97	944	30.81	232	0.98	64	1.72	296	2.70	1,561	203.34	1,403	4.85	2,778	96.12	4,181	100.97
1998	80	7.21	792	22.49	872	29.70	183	0.84	60	1.59	243	2.43	1,454	191.23	1,268	5.08	2,630	92.46	3,898	97.54
1999	65	5.24	736	21.69	801	26.93	175	0.80	58	1.46	233	2.26	1,364	181.12	1,243	5.20	2,648	95.45	3,891	100.65
2000	67	5.50	738	22.37	805	27.87	168	0.79	51	1.24	219	2.03	1,352	184.95	1,258	5.24	2,651	95.59	3,909	100.83
2001	66	5.20	687	20.47	753	25.67	143	0.68	44	0.94	187	1.62	1,324	191.20	1,262	5.79	2,545	90.47	3,807	96.26
2002	47	4.84	659	19.13	706	23.97	134	0.65	43	0.88	177	1.53	1,272	181.10	1,285	6.76	2,587	91.61	3,872	98.37
2003	55	5.27	657	19.28	712	24.55	129	0.64	44	0.88	173	1.52	1,243	176.08	1,362	8.03	2,704	96.07	4,066	104.10

Note: * Excluding the 60 dangerous goods barges generally staying in TW Bay Dangerous Goods Anchorage

Appendix 3 (Cont'd)

Time Series on the Number of Vessels of Different Classes and their Typhoon Shelter/Sheltered Anchorage Space Requirements

Year	Mainland Vessels Seeking Shelter in HK Waters during Typhoon Passage		Miscellaneous Vessels @ (Class 3 & Class 4 (Misc.))								Total for Vessels Other than Pleasure Vessels		Pleasure Vessels	
			Stationary vessels (Class 3)		Outboard open sampans (Class 4)		Miscellaneous (Class 4)		Sub-total					
	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)	No. of vessels	Area (ha.)
1989	177	16.86	297	7.97	2,033	4.07	2,408	9.19	4,738	21.23	14,807	404.42	5,254	128.01
1990	100	9.56	295	7.84	2,238	4.48	1,968	9.84	4,501	22.16	13,936	388.01	5,759	140.32
1991	300	28.39	278	10.49	2,087	7.80	1,264	8.20	3,629	26.49	12,269	393.79	5,613	136.76
1992	132	13.42	261	10.07	2,056	7.74	1,219	10.75	3,536	28.56	12,145	403.25	5,461	133.06
1993	242	26.87	259	4.84	2,552	6.78	1,842	17.71	4,653	29.33	13,591	440.43	5,650	137.66
1994	183	22.38	255	10.20	2,938	6.65	1,707	10.29	4,900	27.14	13,423	443.23	5,934	144.58
1995	287	36.86	244	7.63	2,853	6.90	737	10.00	3,834	24.53	11,972	440.33	5,860	142.78
1996	287	36.74	241	7.87	2,926	6.64	666	7.81	3,833	22.32	11,584	416.41	5,650	137.66
1997	284	36.99	236	8.25	2,962	7.91	644	7.94	3,842	24.10	11,108	398.91	5,729	139.58
1998	385	50.64	256	7.96	2,706	7.20	587	13.60	3,549	28.76	10,401	400.30	5,343	130.18
1999	560	74.36	251	7.23	2,844	7.53	583	12.72	3,678	27.48	10,527	412.80	5,171	125.99
2000	331	45.28	254	6.80	2,954	7.86	590	14.27	3,798	28.93	10,414	389.89	5,437	132.47
2001	351	50.69	245	6.53	2,940	7.83	610	17.56	3,795	31.92	10,217	397.36	5,138	125.19
2002	294	41.86	244	6.48	2,956	7.92	605	16.44	3,805	30.84	10,126	377.67	5,325	129.75
2003	373	52.84	239	6.61	3,100	8.36	631	17.11	3,970	32.08	10,537	391.17	5,663	137.99

Note: @ Including floating restaurants

Appendix 4

Forecasts of Demand for Typhoon Shelter/Sheltered Anchorage Space

<u>Category of Vessel</u>	<u>Actual</u>	<u>Forecast at Year End</u>			
	<u>End 2003</u>	<u>2006</u>	<u>2011</u>	<u>2016</u>	<u>2021</u>
1. Ferries and Launches	24.6	34.1 (31.6)	39.3 (35.1)	45.3 (39.0)	52.6 (43.6)
2. Passenger and Trading Vessels	1.5	1.2 (1.4)	0.7 (1.0)	0.4 (0.6)	0.2 (0.4)
3. Lighters and Barges	176.1	209.9 (207.2)	213.9 (209.0)	217.9 (209.4)	219.7 (207.6)
4. Fishing Vessels	104.1	84.2 (90.0)	69.0 (76.6)	54.4 (60.7)	40.8 (41.8)
5. Mainland Vessels Seeking Shelter in HK Waters during Typhoon Passage	52.8	64.1 (57.1)	71.8 (69.1)	80.0 (83.0)	79.3 (99.2)
6. Miscellaneous Vessels	32.1	33.0 (35.4)	35.5 (40.3)	38.0 (46.3)	40.7 (53.8)
<hr/>					
All Types of Vessels (Other than Pleasure Vessels)	391.2	426.4 (422.7)	430.3 (430.9)	436.0 (439.0)	433.1 (446.3)
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7. Pleasure Vessels	138.0	146.0 (148.9)	151.5 (154.3)	157.1 (159.7)	162.8 (165.1)

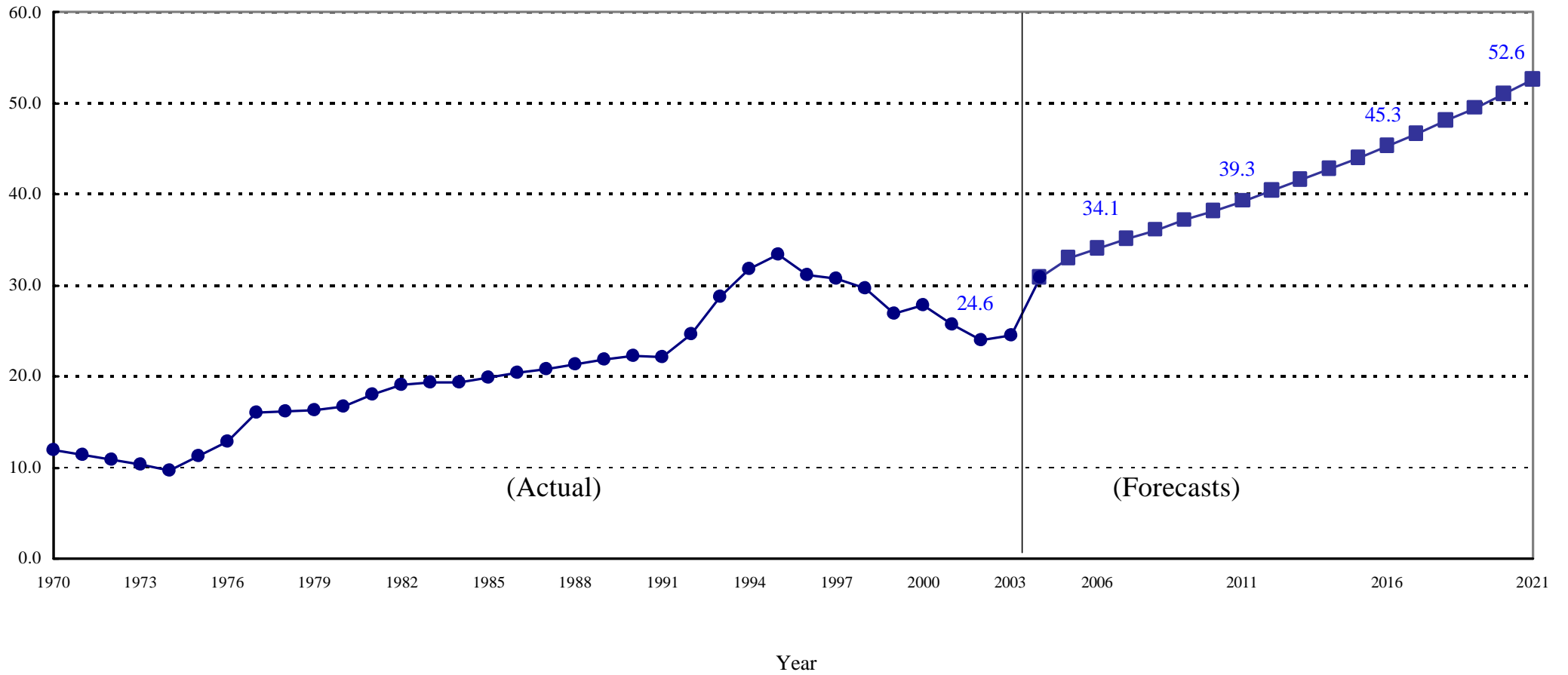
Note: Forecast demand figures of the 2002 assessment are shown in brackets for comparison purpose.

Appendix 4 (Cont'd)

Forecasts of Demand for Typhoon Shelter/Sheltered Anchorage Space (in ha.), 2004-2021

Chart 1
Ferries and Launches

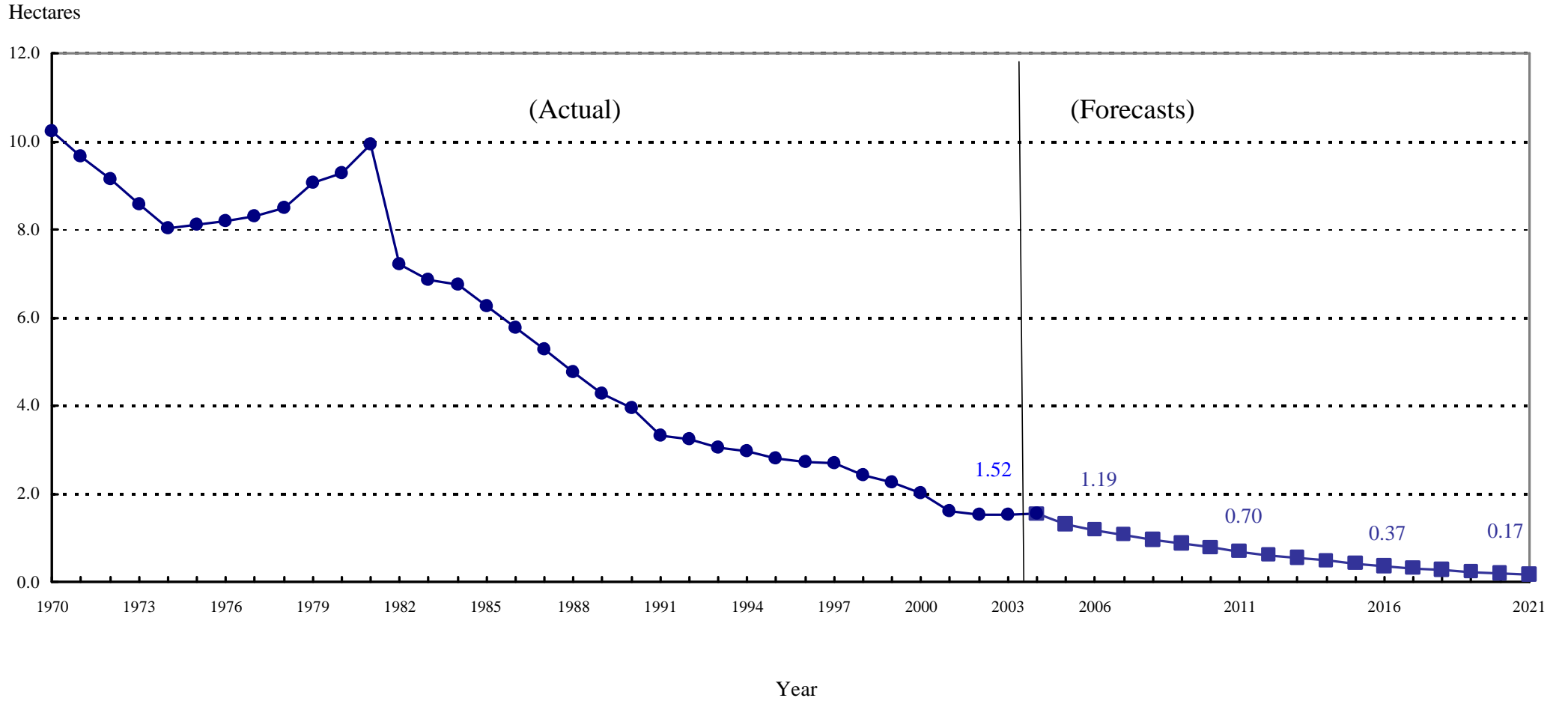
Hectares



Appendix 4 (Cont'd)

Forecasts of Demand for Typhoon Shelter/Sheltered Anchorage Space (in ha.), 2004-2021

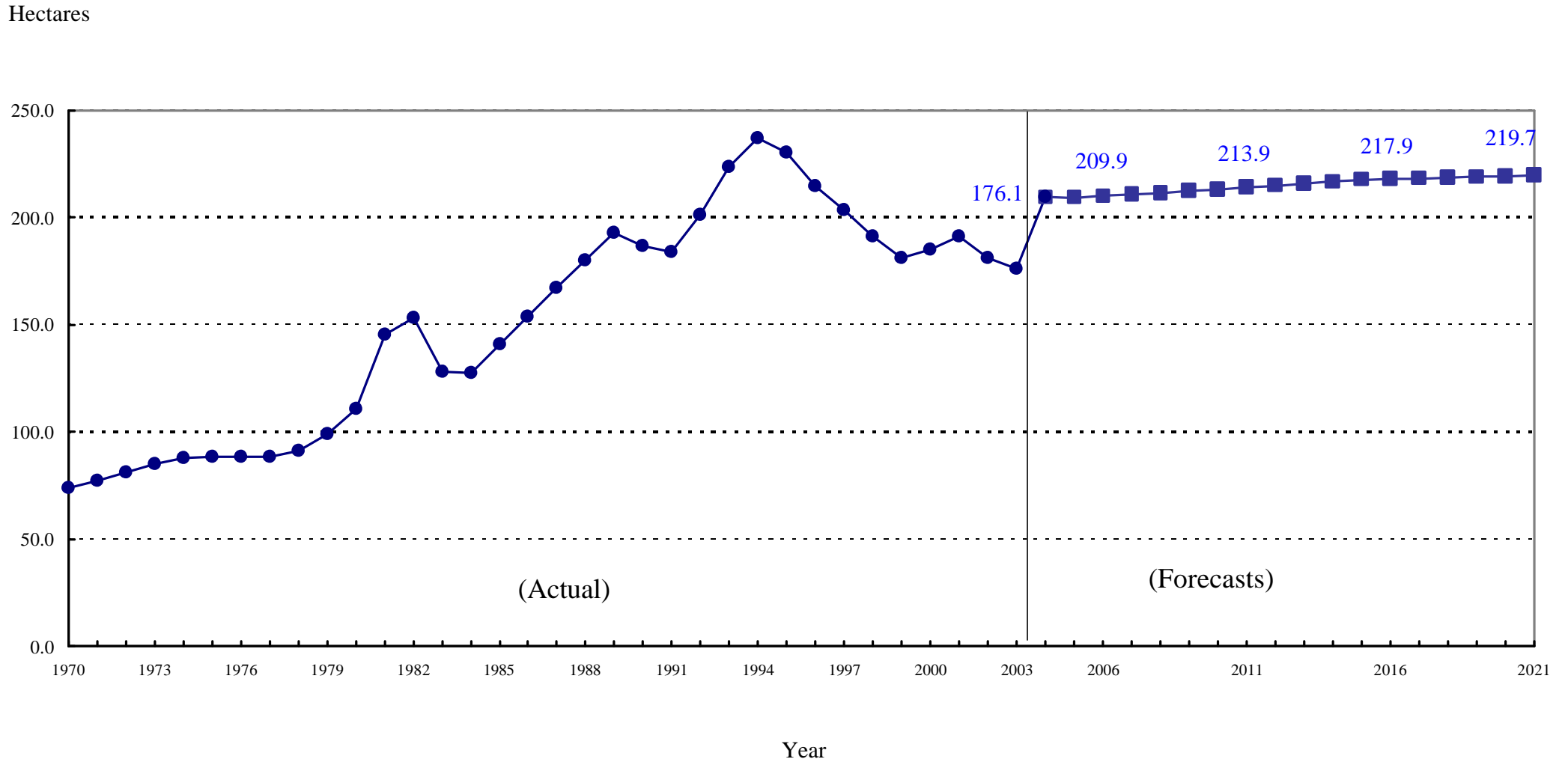
Chart 2
Passenger and Trading Vessels
(Class 1 and Class 5)



Appendix 4 (Cont'd)

Forecasts of Demand for Typhoon Shelter/Sheltered Anchorage Space (in ha.), 2004-2021

Chart 3
Lighters and Barges
(Class 2)

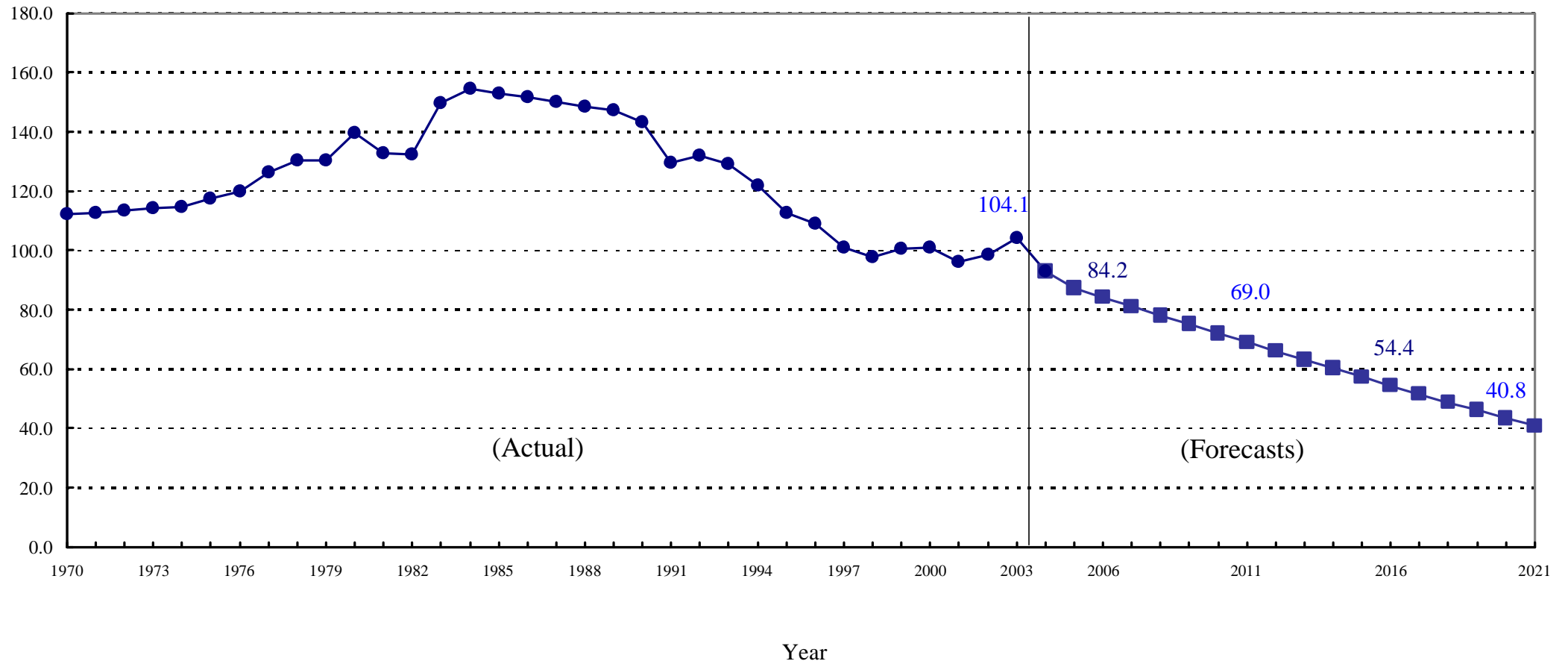


Appendix 4 (Cont'd)

Forecasts of Demand for Typhoon Shelter/Sheltered Anchorage Space (in ha.), 2004-2021

Chart 4
Fishing Vessels
(Class 4 and Class 6)

Hectares

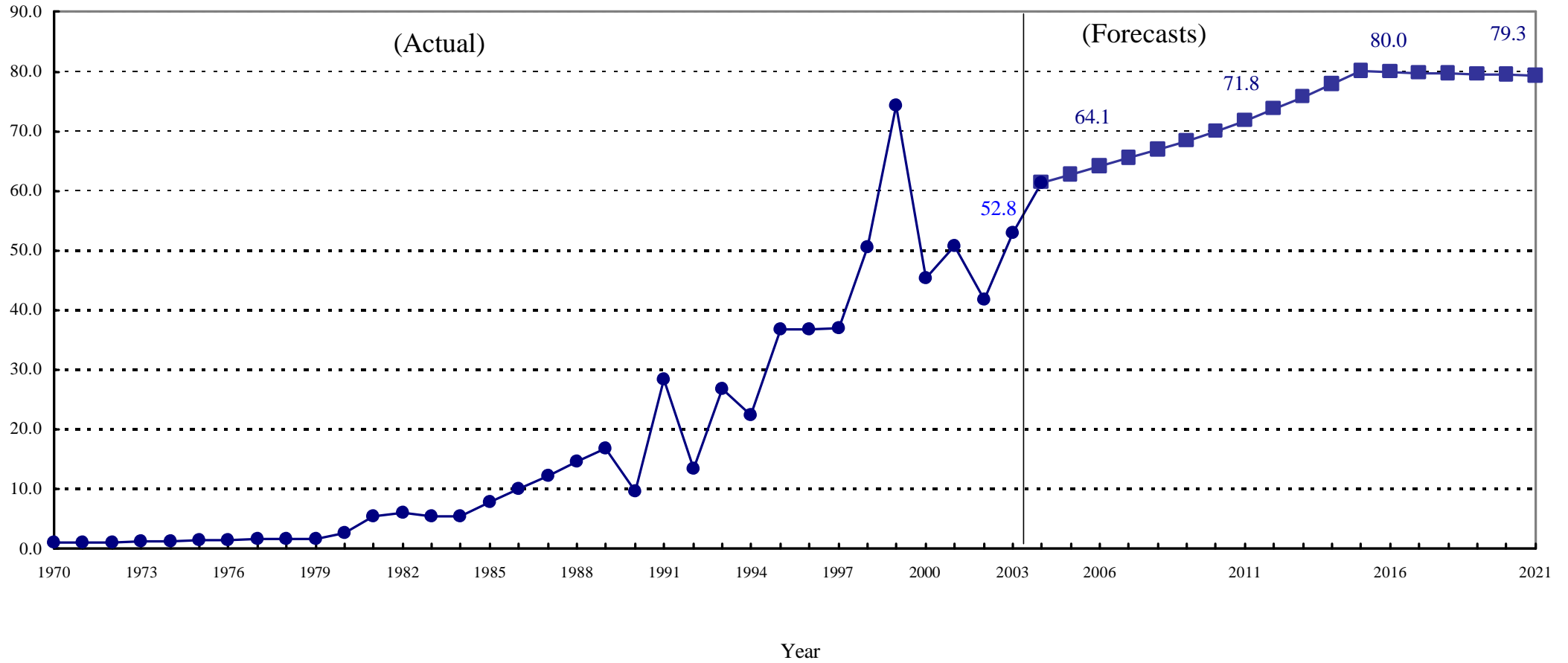


Appendix 4 (Cont'd)

Forecasts of Demand for Typhoon Shelter/Sheltered Anchorage Space (in ha.), 2004-2021

Chart 5
Mainland Vessels Seeking Shelter in HK Waters during Typhoon Passage

Hectares

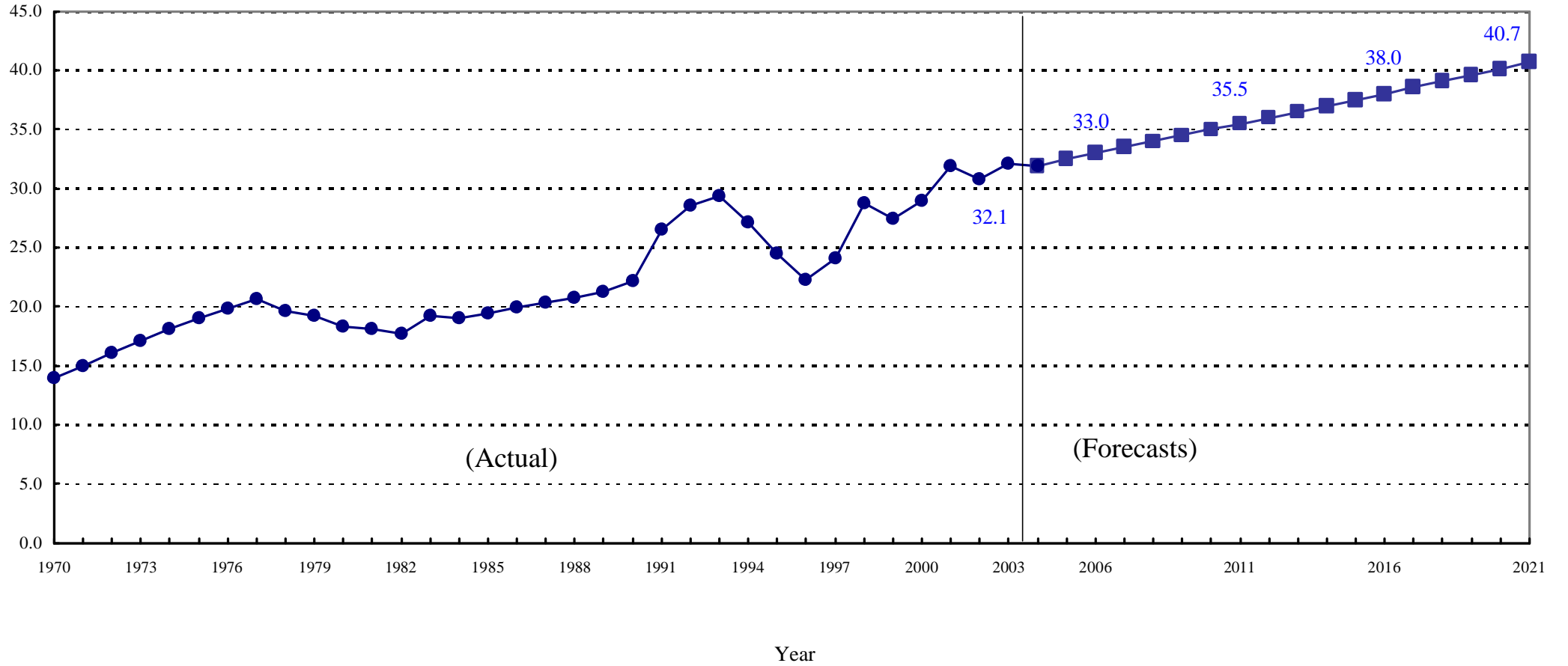


Appendix 4 (Cont'd)

Forecasts of Demand for Typhoon Shelter/Sheltered Anchorage Space (in ha.), 2004-2021

Chart 6
Miscellaneous Vessels
(Class 3 & Class 4 (Misc.))

Hectares

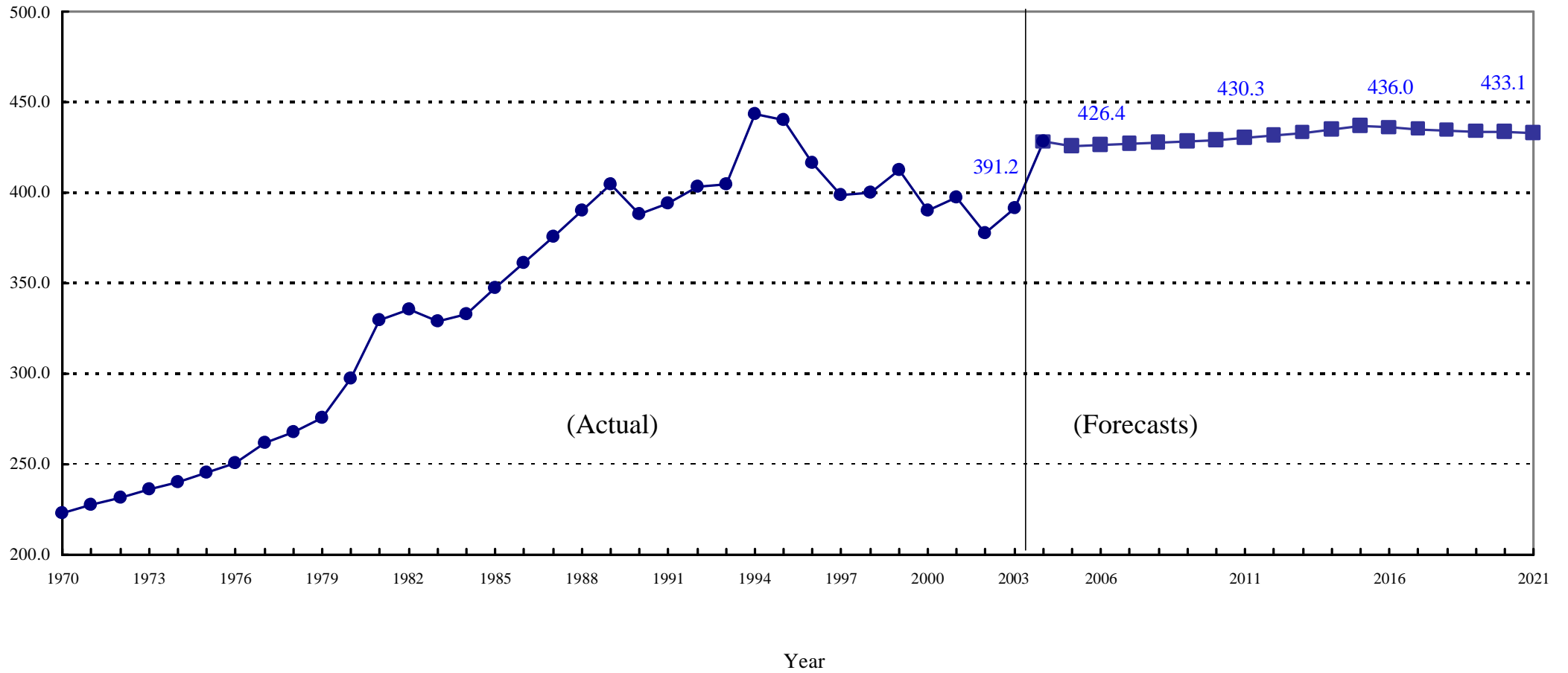


Appendix 4 (Cont'd)

Forecasts of Demand for Typhoon Shelter/Sheltered Anchorage Space (in ha.), 2004-2021

Chart 7
All Types of Vessels (Other than Pleasure Vessels)

Hectares



Appendix 5

Forecasts of Supply of Typhoon Shelters and Sheltered Anchorages (Effective Area in ha.)

Type	End					Remarks
	2003	2006	2011	2016	2021	
Part A						
For vessels other than pleasure vessels (excluding the 60 DG barges)						
I. Typhoon Shelter (TS)						
Aberdeen (West)	34.2	34.2	34.2	34.2	34.2	
Shau Kei Wan	17.2	17.2	17.2	17.2	17.2	
Cheung Chau	50.0	50.0	50.0	50.0	50.0	
Causeway Bay (cargo vessels)	4.3	4.3	4.3	4.3	4.3	Part of Causeway Bay TS for cargo vessels may be affected by the Wan Chai Development Project Phase 2.
Kwun Tong	33.8	33.8	33.8	33.8	33.8	} Kwun Tong TS and To Kwa Wan TS may be affected by the SE Kowloon Development Project.
To Kwa Wan	14.8	14.8	14.8	14.8	14.8	
Rambler Channel	12.9	12.9	12.9	12.9	12.9	
Sam Ka Chuen	1.9	1.9	1.9	1.9	1.9	
Shuen Wan	10.3	10.3	10.3	10.3	10.3	
Tuen Mun	56.8	56.8	56.8	56.8	56.8	
New Yaumatei	64.6	64.6	64.6	64.6	64.6	
Yim Tin Tsai	9.2	9.2	9.2	9.2	9.2	
Hei Ling Chau	76.6	76.6	76.6	76.6	76.6	
Sub-total	382.4	382.4	382.4	382.4	382.4	Excluding 4.2 hectares of TS space occupied by Government buoys

Appendix 5 (Cont'd)

**Forecasts of Supply of Typhoon Shelters and Sheltered Anchorages
(Effective Area in ha.)**

Type	End					Remarks
	2003	2006	2011	2016	2021	
II. Sheltered Anchorage						
Chai Wan Cargo Basin	11.2	11.2	11.2	11.2	11.2	
Kat O	1.6	1.6	1.6	1.6	1.6	
Sha Tau Kok	0.6	0.6	0.6	0.6	0.6	
Wan Chai Cargo Basin	2.0	2.0	2.0	2.0	2.0	Wan Chai Cargo Basin may be affected by the Wan Chai Development Projects Phase 2.
Tai O Sheltered Boat Anchorage	-	4.0	4.0	4.0	4.0	The new Tai O Sheltered Boat Anchorage will be available by mid-2005.
Tsuen Wan Bay Minor Moorings	3.7	3.7	3.7	3.7	3.7	
Sub-total	19.1	23.1	23.1	23.1	23.1	
Total for Part (A)	401.5	405.5	405.5	405.5	405.5	Assume existing supply of TS space remains unchanged.

Appendix 5 (Cont'd)

Forecasts of Supply of Typhoon Shelters and Sheltered Anchorages (Effective Area in ha.)

Type	End					Remarks
	2003	2006	2011	2016	2021	
<u>Part B</u>						
For pleasure vessels						
III. Traditional Typhoon Shelters / Sheltered Anchorage						
Causeway Bay (pleasure vessel)	9.9	9.9	9.9	9.9	9.9	
Aberdeen South	26.1	26.1	26.1	26.1	26.1	
Middle Island	6.9	6.9	6.9	6.9	6.9	
Pak Sha Wan (Hebe Haven)	84.0	84.0	84.0	84.0	84.0	
Sai Kung Harbour	4.3	4.3	4.3	4.3	4.3	
Tai Tam Bay	5.7	5.7	5.7	5.7	5.7	
Tsam Chuk Wan (Jude Bay)	7.5	7.5	7.5	7.5	7.5	
St. Stephen's Bay	1.3	1.3	1.3	1.3	1.3	
Tai Mei Tuk	12.3	12.3	12.3	12.3	12.3	
Ting Kau	0.7	0.7	0.7	0.7	0.7	
Sub-total	158.7	158.7	158.7	158.7	158.7	

Appendix 5 (Cont'd)

Forecasts of Supply of Typhoon Shelters and Sheltered Anchorages (Effective Area in ha.)

Type	End					Remarks
	2003	2006	2011	2016	2021	
IV. Marinas						
Clearwater Bay	7.4	7.4	7.4	7.4	7.4	
Discovery Bay	8.5	8.5	8.5	8.5	8.5	
Marina Cove (Port Shelter)	10.0	10.0	10.0	10.0	10.0	
Gold Coast	4.8	4.8	4.8	4.8	4.8	
Sub-total	30.7	30.7	30.7	30.7	30.7	
Total for Part (B)	189.4	189.4	189.4	189.4	189.4	

Sources: Drawings, plans and known programmes from the Planning and Development Sections of the Marine Department.

Appendix 6

Matching of Demand and Supply 2006-2021

	<u>2006</u>	<u>2011</u>	<u>2016</u>	<u>2021</u>
Demand	426.1	430.3	436.0	433.1
Supply	405.5	405.5	405.5	405.5
Shortfall(-)/Surplus(+)	<u>-20.6</u>	<u>-24.8</u>	<u>-30.5</u>	<u>-27.6</u>
As % of demand	-4.8%	-5.8%	-7.0%	-6.4%

(hectares)

Note : Assume existing supply of TS space remains unchanged.