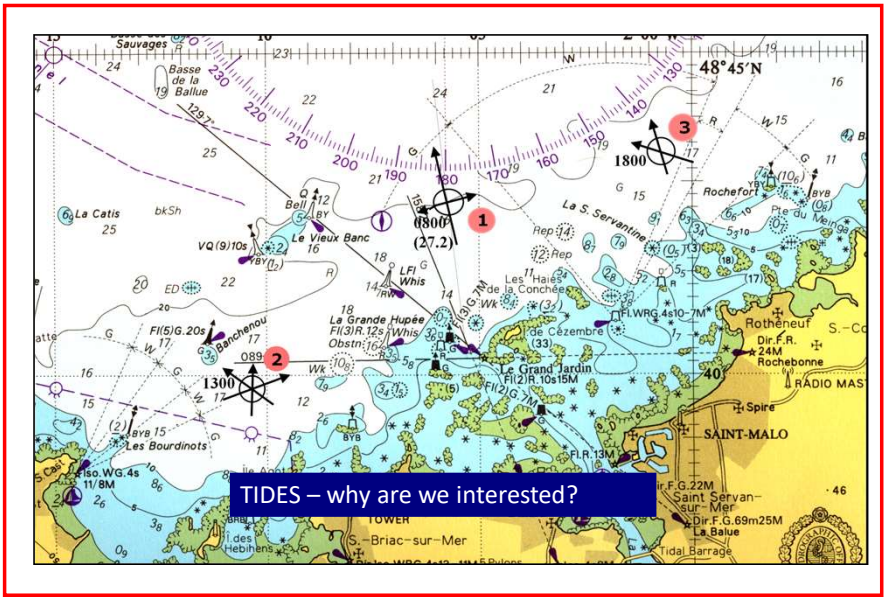
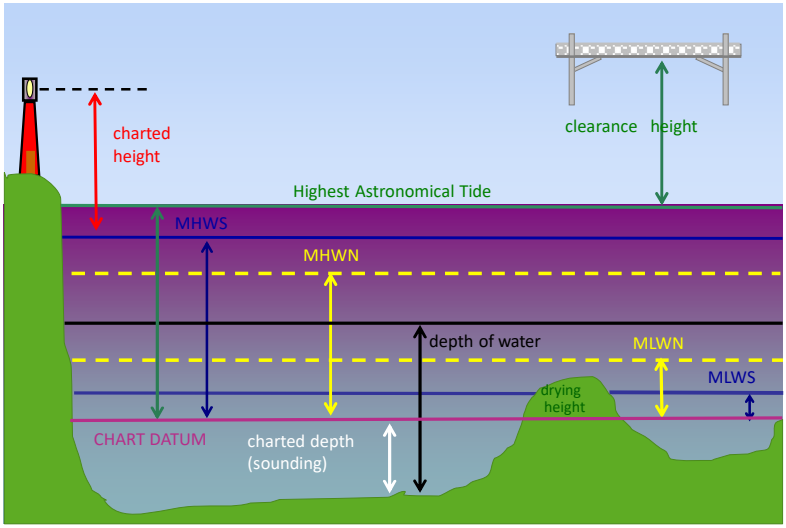
- Homework - Compass
- Tidal Heights

1



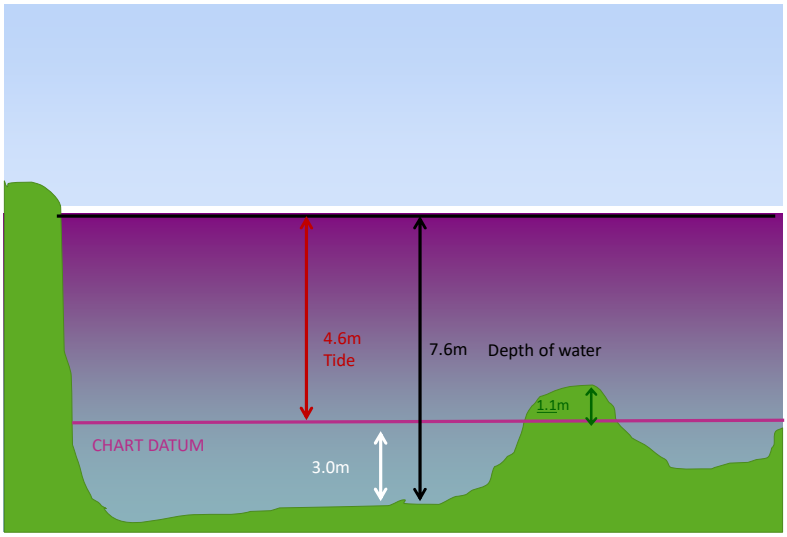
2

TIDAL HEIGHTS - DEFINITIONS



3

Tidal Heights - VICTORIA 1445hrs 21 March



4

Use of Tide Tables

- The Hydrographic Office of the Admiralty publishes Tide Tables annually.
- The tables give the time and height of high and low water at “Standard Ports” around the coast, for every day of the year.
- UK examples Plymouth(Devonport), Portsmouth, Dover.
- Training Almanac see page1

OCTOBER

	Time	m		Time	m
1	0350	1.1	16	0353	0.6
	1046	4.5		1041	5.0
	1608	1.1		1614	0.7
M	2252	4.4	TU	2256	4.9
2	0425	0.9	17	0436	0.5
	1116	4.6		1125	5.1
	1642	1.0		1657	0.5
TU	2323	4.5	W	2341	5.0

5

Tide Tables

- Tide tables give the times and heights of HW and LW
- Heights are given in meters above Chart Datum
- Range HW to LW
  - peak ranges at Springs, least range at Neaps
- Times are given in the time zone (standard time) appropriate to the location
  - Earth Rotates at 15 deg/hr which gives approx time zone
  - UT (GMT) for UK (add one hr for summer time)
  - UT+1 for France (add one hour for DST)

6

Time Zones

- **Tide tables are given in local time (standard time)**

For our exercises:

- Northern Territories are on standard time (UT) and , in Summer, UT + 1 hr (DST)
- Southern Peninsula is on Time Zone -0100 (SPST) and Summer Time +1 hr (SPDST)

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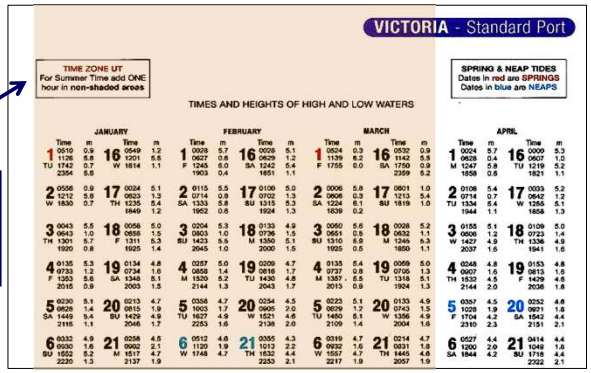
TIDE TABLES – TIME ZONES

TIME ZONE UT
For Summer time add ONE hour in non-shaded areas

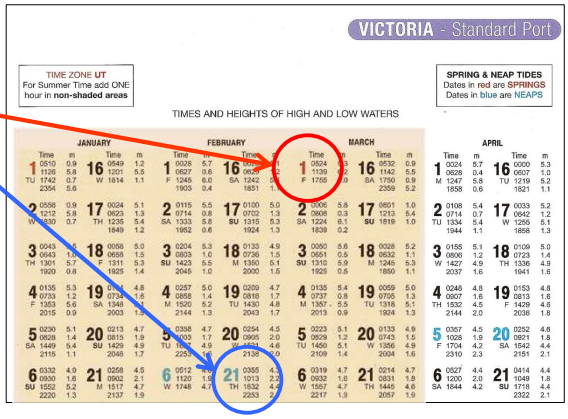


8

TIDE TABLES – SPRING & NEAPS

SPRING & NEAP TIDES
Dates in red are SPRINGS
Dates in blue are NEAPS

Page 33 Almanac



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Tide Tables – Training Almanac

Use To find Time and Depths of tides

Victoria –

H W (pm) 3 February

LW 22 April

Range 21 February (pm)

Range 1 March (pm)

Namley Harbour – use local time

HW (am)1 November

LW (am) 14 October

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Tide Tables

Victoria –

H W (pm) 3 February	1423 UT 5.5m
LW 22 April	1212 UT 1.6m
Range 21 February (pm)	2.3m
Range 1 March (pm)	6.2m

Namley Harbour – use local time

HW (am)1 November	0803 UT 3.4m
LW (am) 14 October	1236 DST($_{1136\ UT}$) 1.1m

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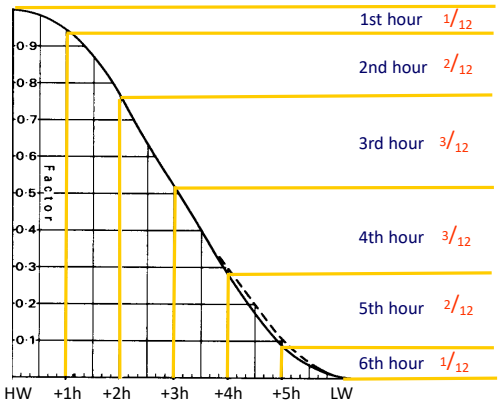
TIDAL HEIGHT CALCULATIONS

- Finding the height of tide at a certain time – for anchoring or to find when the boat will refloat having run aground.
- Finding the time at which the tide will reach a certain height - to find when sufficient depth to clear, for example, sill of a marina, bar, sand bank, rock etc.

12

RULE OF TWELFTHS

Often using the tidal curve the range of the tide may be divided into twelfths for a quick estimation of the height of tide.



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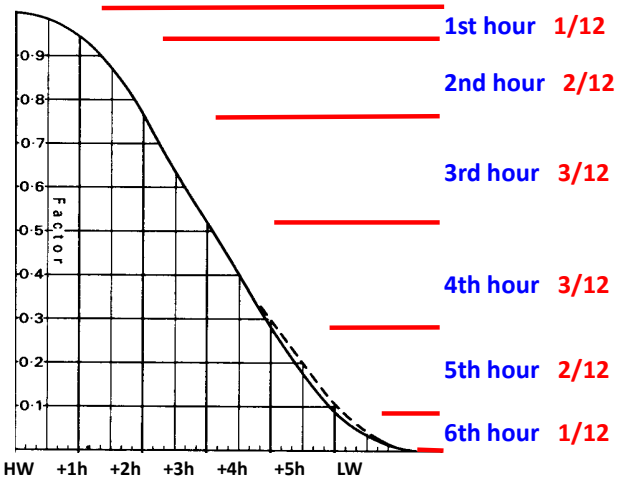
RULE OF TWELFTHS



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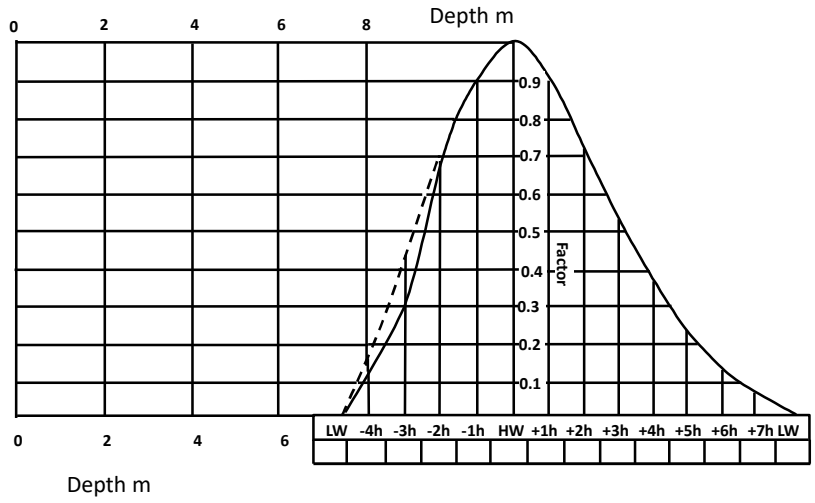
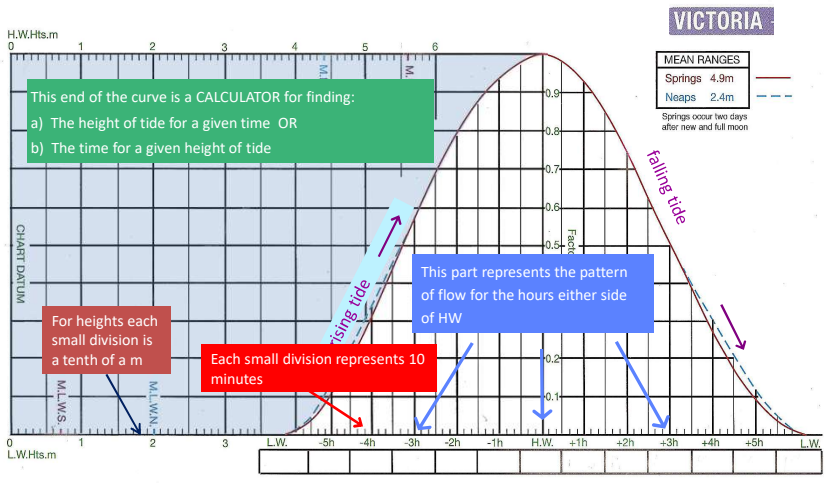
TIDAL CURVE



15

TIDAL CURVE



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HOW TO FIND THE HEIGHT OF THE TIDE USING THE CURVE

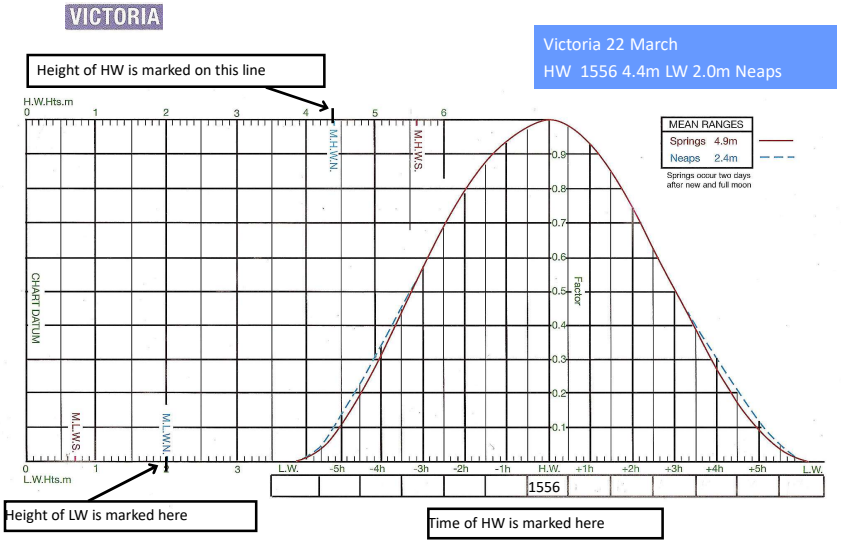
QUESTION HW Victoria on the afternoon of 22nd March

WHAT TO DO

1. Find the time & height of the HW closest to the afternoon.
   Answer: HW 1556 UT 4.4m (in the shaded area – no hour added)
2. What is the height of the preceding LW?
   Answer: 2.0m
3. What is the range?
   Answer: Range 2.4m
4. Is it Springs or Neaps?
   Answer: (very almost) Neaps

17

TIDAL CURVE



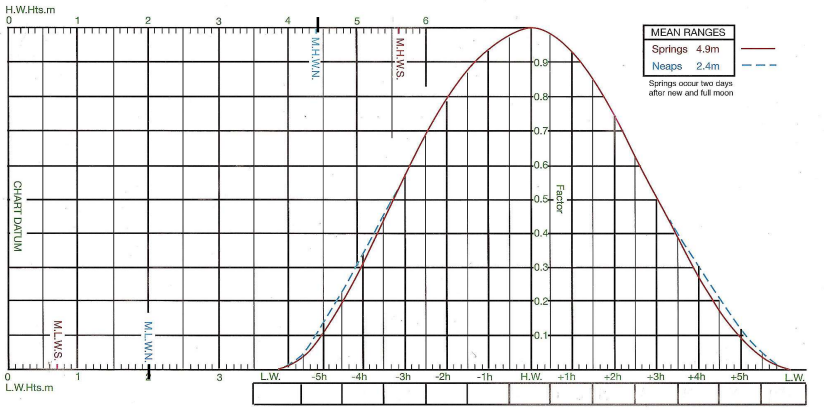
18

TIDAL CURVE

VICTORIA

Mark off HW & LW heights

Victoria 22 March
HW 1556hrs 4.4m LW 2.0m



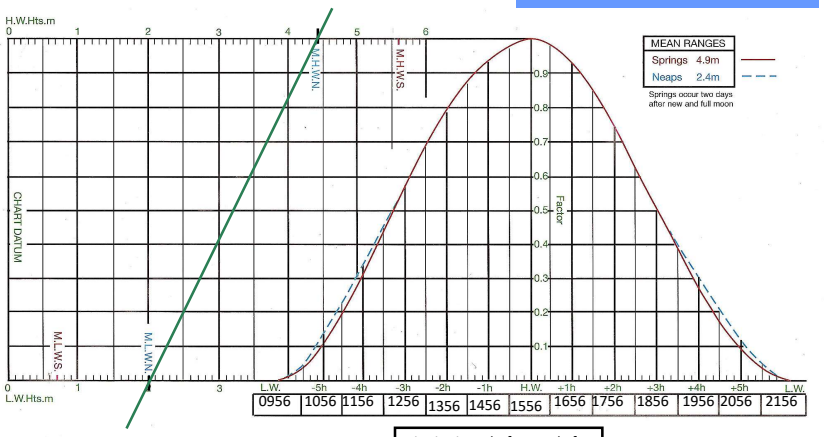
19

TIDAL CURVE

VICTORIA

Draw a line joining HW & LW heights

Victoria
HW 1556hrs 4.4m LW 2.0m



Write in times before and after HW

20

HOW TO FIND THE HEIGHT OF THE TIDE USING THE CURVE

QUESTION What is the height of tide at Victoria 2 hours before HW on the afternoon of 22nd March

WHAT TO DO

1. Find the time & height of the HW closest to the afternoon.
   Answer: HW 1556 UT 4.4m (in the shaded area – no hour added)
2. What is the height of the preceding LW?
   Answer: 2.0m
3. What is the range?
   Answer: Range 2.4m
4. Is it Springs or Neaps?
   Answer: Neaps

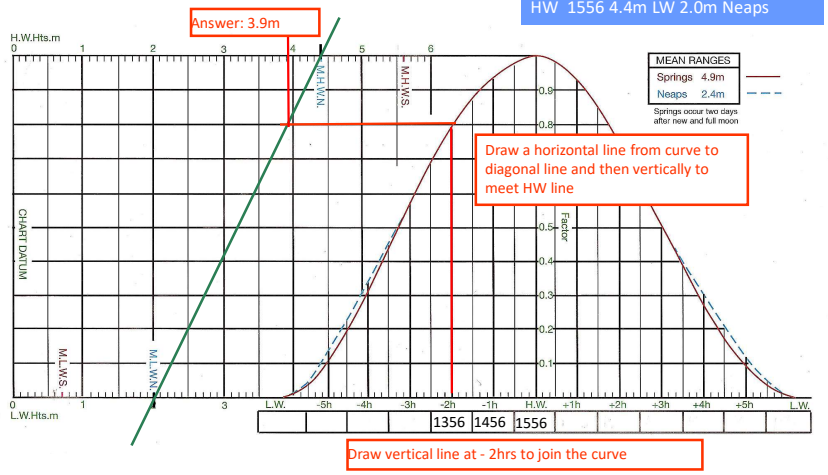
Now go to the curve and use this information

21

Height of Tide Two Hours Before HW

VICTORIA

Victoria 22 March
HW 1556 4.4m LW 2.0m Neaps



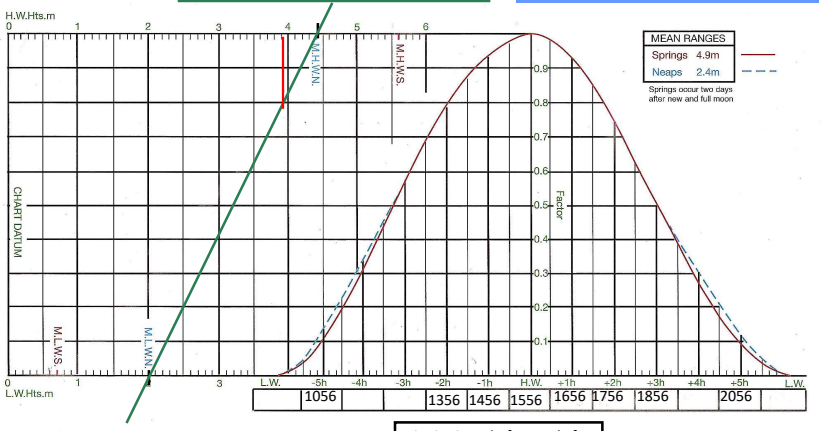
22

TIDAL CURVE

VICTORIA

When will height of tide be 3.9m?

Victoria
HW 1556hrs 4.4m LW 2.0m



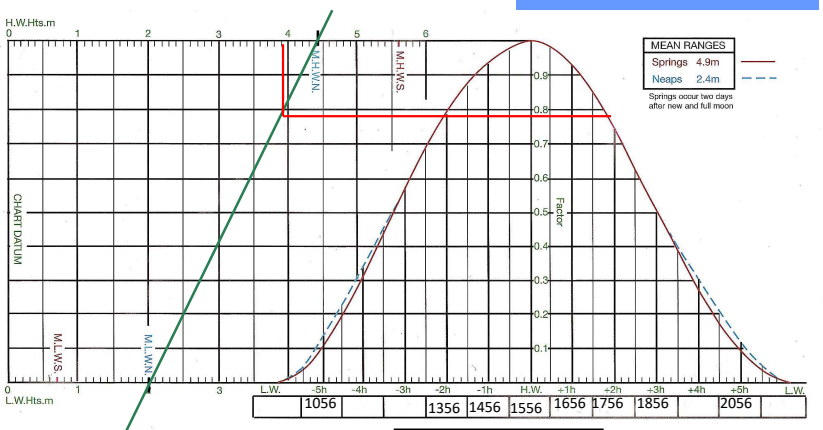
Write in times before and after HW

23

TIDAL CURVE

VICTORIA

Victoria
HW 1556hrs 4.4m LW 2.0m



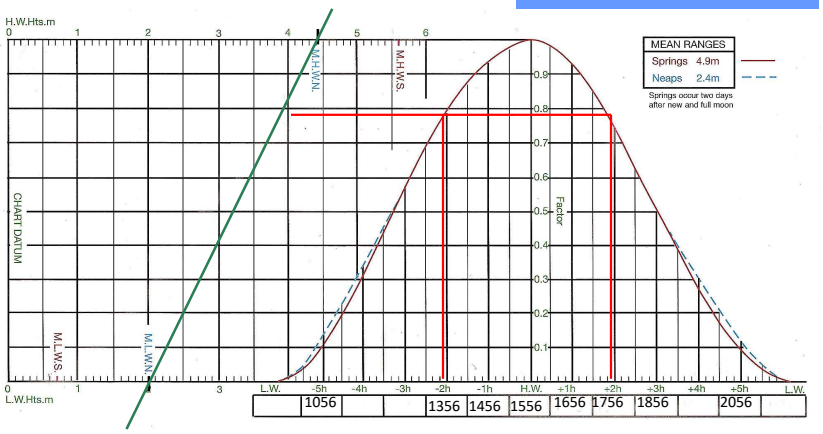
Write in times before and after HW

24

TIDAL CURVE

VICTORIA

Victoria
HW 1556hrs 4.4m LW 2.0m



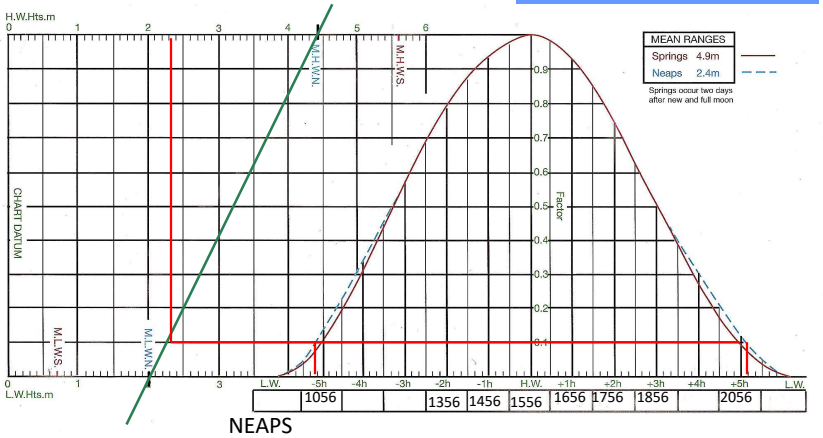
25

TIDAL CURVE

VICTORIA

What time will depth of tide be greater than 2.3m

Victoria
HW 1556hrs 4.4m LW 2.0m



NEAPS CURVE

26

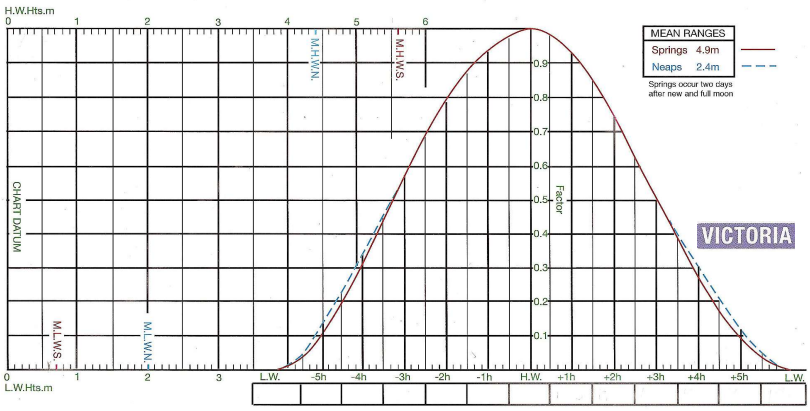
Exercises

27

TIDAL CURVE

Task: At what time during the afternoon of 3 January will the tide fall to 2.5m

3 January Victoria HW 1301 UT 5.7m LW 0.8m Range 4.9m Springs



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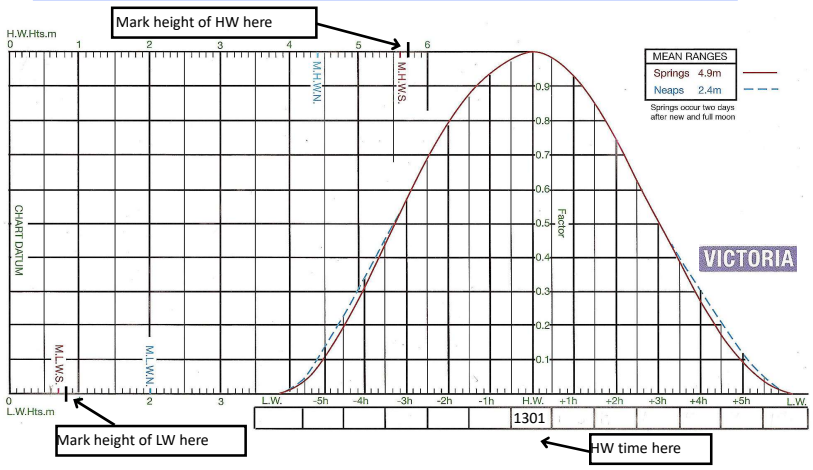
TIDAL CURVE

Task: At what time during the afternoon of 3 January will the tide fall to 2.5m

3 January Victoria HW 1301 UT 5.7m LW 0.8m Range 4.9m Springs

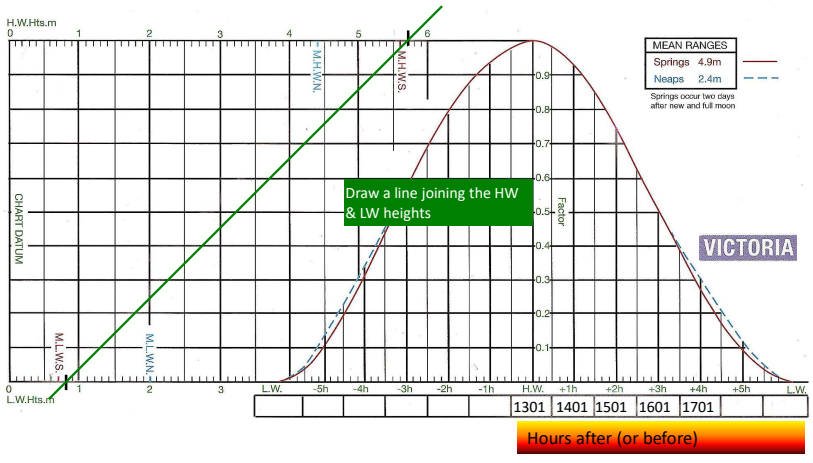


29

TIDAL CURVE

Task: At what time during the afternoon of 3 January will the tide fall to 2.5m

3 January Victoria HW 1301 UT 5.7m LW 0.8m Range 4.9m Springs

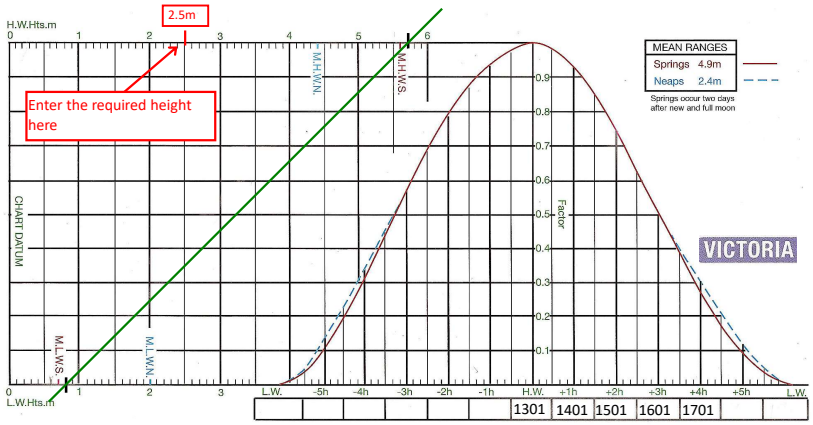


30

TIDAL CURVE

Task: At what time during the afternoon of 3 January will the tide fall to 2.5m

3 January Victoria HW 1301 UT 5.7m LW 0.8m Range 4.9m Springs

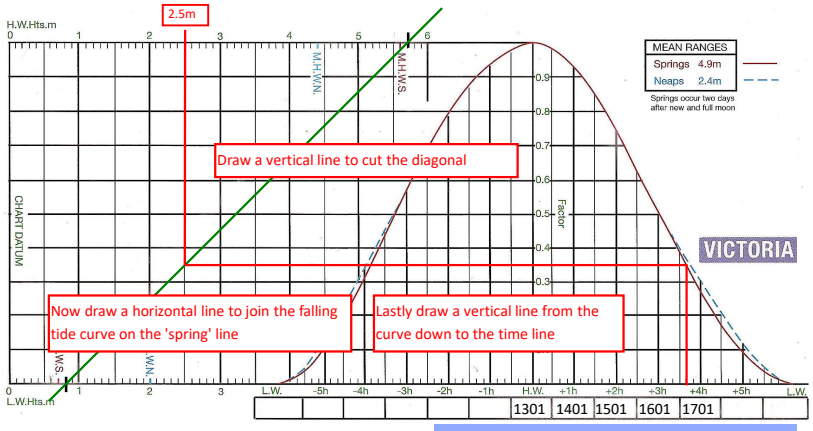


31

TIDAL CURVE

Task: At what time during the afternoon of 3 January will the tide fall to 2.5m

3 January Victoria HW 1301 UT 5.7m LW 0.8m Range 4.9m Springs



Answer: The tide will fall to 2.5m at 1641

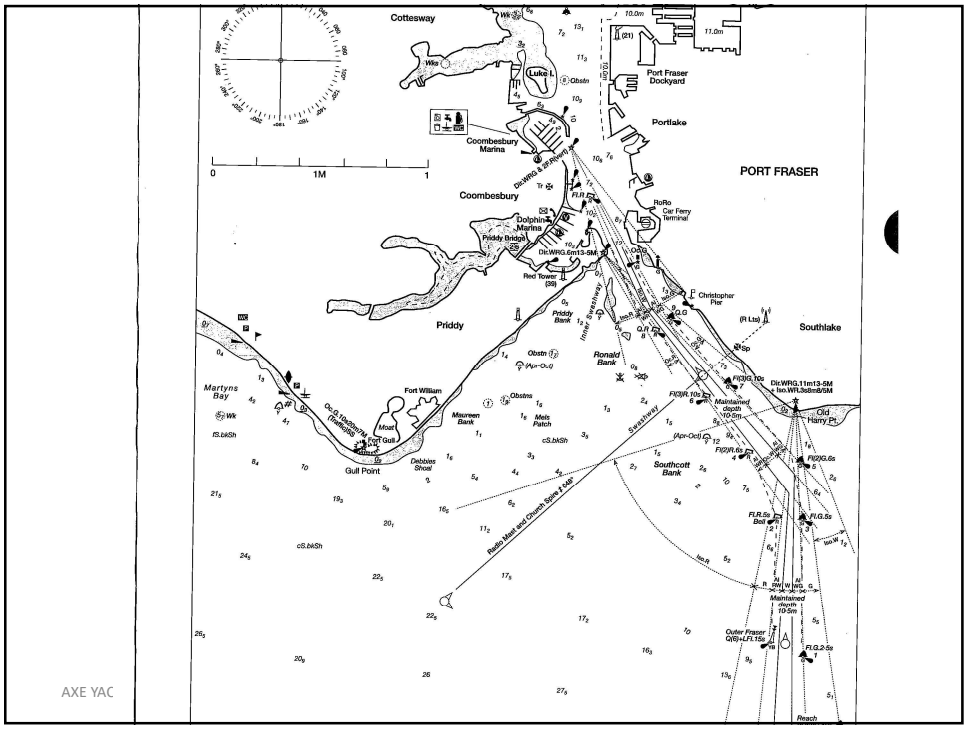
32

Tidal Height

- Finding the **height** of tide at a certain time - anchoring or when the boat will refloat!
- **Time** tide will reach a certain height – to allow crossing a sill of a marina or a sand bank etc.
  - Time and height of Standard Port for the HW and LW each side of time of interest
  - Use range to decide use of Spring or Neap curve
  - Tidal height curve to find height at known time - or
  - Use tidal height curve to find time for a known height

A yacht which draws 1.5 metres intends to anchor off Fort William (Port Fraser) at 1500 local on Thursday 25th July

1. What is the height of tide at 1500
2. What depth does the yacht need to anchor in in order to have 1m clearance beneath the keel at low water that evening?



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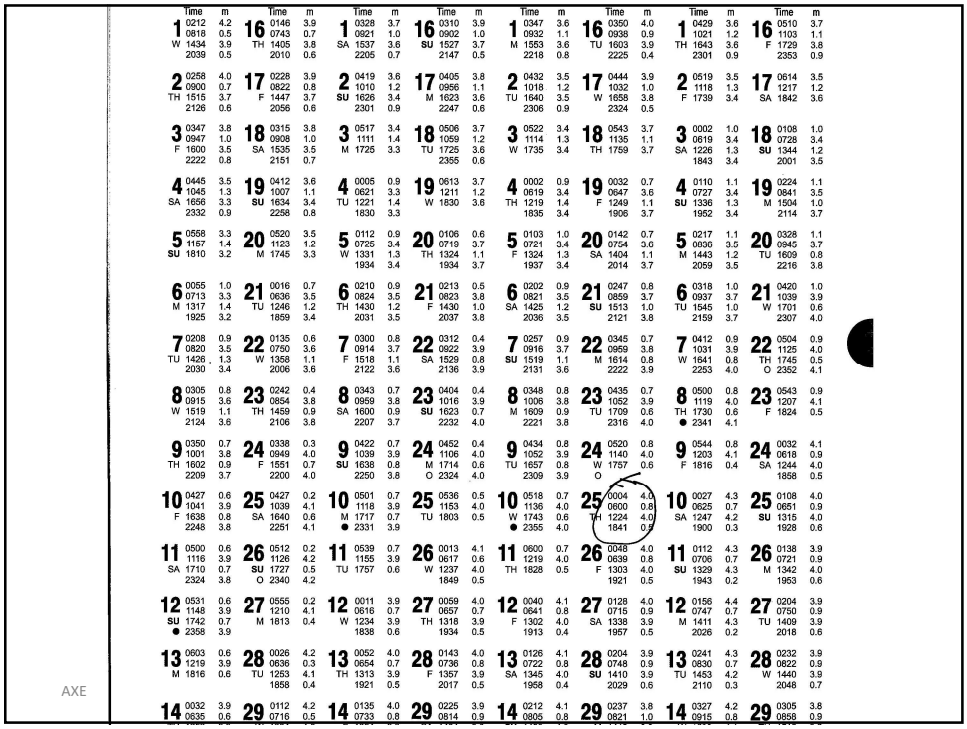


Time	m	Time	m	Time	m	Time	m	Time	m	Time	m	Time	m
1 0212	4.2	**16** 0146	3.9	**1** 0328	3.7	**16** 0310	3.9	**1** 0347	3.6	**16** 0350	4.0	**1** 0429	3.6	**16** 0510	3.7
0818	0.5	0743	0.7	0921	1.0	0902	1.0	0932	1.1	0938	0.9	1021	1.2	1103	1.1
W 1434	3.9	TH 1405	3.8	SA 1537	3.6	**SU** 1527	3.7	M 1553	3.6	TU 1603	3.9	TH 1643	3.6	F 1729	3.8
2039	0.5	2010	0.6	2205	0.7	2147	0.5	2218	0.8	2225	0.4	2301	0.9	2353	0.9
2 0258	4.0	**17** 0228	3.9	**2** 0419	3.6	**17** 0405	3.8	**2** 0432	3.5	**17** 0444	3.9	**2** 0519	3.5	**17** 0614	3.5
0900	0.7	0822	0.8	1010	1.2	0956	1.1	1018	1.2	1032	1.0	1118	1.3	1217	1.2
TH 1515	3.7	F 1447	3.7	**SU** 1626	3.4	M 1623	3.6	TU 1640	3.5	W 1658	3.8	F 1739	3.4	SA 1842	3.6
2126	0.6	2056	0.6	2301	0.9	2247	0.6	2306	0.9	2324	0.5				
3 0347	3.8	**18** 0315	3.8	**3** 0517	3.4	**18** 0506	3.7	**3** 0522	3.4	**18** 0543	3.7	**3** 0002	1.0	**18** 0108	1.0
0947	1.0	0908	1.0	1111	1.4	1059	1.2	1114	1.3	1135	1.1	0619	3.4	0728	3.4
F 1600	3.5	SA 1535	3.5	M 1725	3.3	TU 1725	3.6	W 1735	3.4	TH 1759	3.7	SA 1224	1.3	**SU** 1344	1.2
2222	0.8	2151	0.7			2355	0.6					1843	3.4	2001	3.5
4 0445	3.5	**19** 0412	3.6	**4** 0005	0.9	**19** 0613	3.7	**4** 0002	0.9	**19** 0032	0.7	**4** 0110	1.1	**19** 0224	1.1
1045	1.3	1007	1.1	0621	3.3	1211	1.2	0619	3.4	0647	3.6	0727	3.4	0841	3.5
SA 1656	3.3	**SU** 1634	3.4	TU 1221	1.4	W 1830	3.6	TH 1219	1.4	F 1249	1.1	**SU** 1336	1.3	M 1504	1.0
2332	0.9	2258	0.8	1830	3.3			1835	3.4	1906	3.7	1952	3.4	2114	3.7
5 0558	3.3	**20** 0520	3.5	**5** 0112	0.9	**20** 0106	0.6	**5** 0103	1.0	**20** 0142	0.7	**5** 0217	1.1	**20** 0328	1.1
1157	1.4	1123	1.2	0725	3.4	0719	3.7	0721	3.4	0754	3.6	0830	3.5	0945	3.7
SU 1810	3.2	M 1745	3.3	W 1331	1.3	TH 1324	1.1	F 1324	1.3	SA 1404	1.1	M 1443	1.2	TU 1609	0.8
				1934	3.4	1934	3.7	1937	3.4	2014	3.7	2059	3.5	2216	3.8
6 0055	1.0	**21** 0016	0.7	**6** 0210	0.9	**21** 0213	0.5	**6** 0202	0.9	**21** 0247	0.8	**6** 0318	1.0	**21** 0420	1.0
0713	3.3	0636	3.5	0824	3.5	0823	3.8	0821	3.5	0859	3.7	0937	3.7	1039	3.9
M 1317	1.4	TU 1246	1.2	TH 1430	1.2	F 1430	1.0	SA 1425	1.2	**SU** 1513	1.0	TU 1545	1.0	W 1701	0.6
1925	3.2	1859	3.4	2031	3.5	2037	3.8	2036	3.5	2121	3.8	2159	3.7	2307	4.0
7 0208	0.9	**22** 0135	0.6	**7** 0300	0.8	**22** 0312	0.4	**7** 0257	0.9	**22** 0345	0.7	**7** 0412	0.9	**22** 0504	0.9
TU 1426	1.3	W 1358	1.1	F 1518	1.1	SA 1529	0.8	**SU** 1519	1.1	M 1614	0.8	W 1641	0.8	TH 1745	0.5
2030	3.4	2006	3.6	2122	3.6	2136	3.9	2131	3.6	2222	3.9	2253	4.0	O 2352	4.1
8 0305	0.8	**23** 0242	0.4	**8** 0343	0.7	**23** 0404	0.4	**8** 0348	0.8	**23** 0435	0.7	**8** 0500	0.8	**23** 0543	0.9
0915	3.6	0854	3.8	0959	3.8	1016	3.9	1006	3.8	1052	3.9	1119	4.0	1207	4.1
W 1519	1.1	TH 1459	0.9	SA 1600	0.9	**SU** 1623	0.7	M 1609	0.9	TU 1709	0.6	TH 1730	0.6	F 1824	0.5
2124	3.6	2106	3.8	2207	3.7	2232	4.0	2221	3.8	2316	4.0	● 2341	4.1		
9 0350	0.7	**24** 0338	0.3	**9** 0422	0.7	**24** 0452	0.4	**9** 0434	0.8	**24** 0520	0.8	**9** 0544	0.8	**24** 0032	4.1
1001	3.8	0949	4.0	1039	3.9	1106	4.0	1052	3.9	1140	4.0	1203	4.1	0618	0.9
TH 1602	0.9	F 1551	0.7	**SU** 1638	0.8	M 1714	0.6	TU 1657	0.8	W 1757	0.6	F 1816	0.4	SA 1244	4.0
2209	3.7	2200	4.0	2250	3.8	O 2324	4.0	2309	3.9	O				1858	0.5
10 0427	0.6	**25** 0427	0.2	**10** 0501	0.7	**25** 0536	0.5	**10** 0518	0.7	**25** 0004	4.0	**10** 0027	4.3	**25** 0108	4.0
1041	3.9	1039	4.1	1118	3.9	1153	4.0	1136	4.0	0600	0.8	0625	0.7	0651	0.9
F 1638	0.8	SA 1640	0.6	M 1717	0.7	TU 1803	0.5	W 1743	0.6	TH 1224	4.0	SA 1247	4.2	**SU** 1315	4.0
2248	3.8	2251	4.1	● 2331	3.9			● 2355	4.0	1841	0.7	1900	0.3	1928	0.6
11 0500	0.6	**26** 0512	0.2	**11** 0539	0.7	**26** 0013	4.1	**11** 0600	0.7	**26** 0048	4.0	**11** 0112	4.3	**26** 0138	3.9
1116	3.9	**SU** 1126	4.2	1155	3.9	0617	0.6	1219	4.0	0639	0.8	0706	0.7	0721	0.9
SA 1710	0.7	**SU** 1727	0.5	TU 1757	0.6	W 1237	4.0	TH 1828	0.5	F 1303	4.0	**SU** 1329	4.3	M 1342	4.0
2324	3.8	O 2340	4.2			1849	0.5			1921	0.5	1943	0.2	1953	0.6
12 0531	0.6	**27** 0555	0.2	**12** 0011	3.9	**27** 0059	4.0	**12** 0040	4.1	**27** 0128	4.0	**12** 0156	4.4	**27** 0204	3.9
1148	3.9	1210	4.1	0616	0.7	0657	0.7	0641	0.8	0715	0.9	0747	0.7	0750	0.9
SU 1742	0.7	M 1813	0.4	W 1234	3.9	TH 1318	3.9	F 1302	4.0	SA 1338	3.9	M 1411	4.3	TU 1409	3.9
● 2358	3.9			1838	0.6	1934	0.5	1913	0.4	1957	0.5	2026	0.2	2018	0.6
13 0603	0.6	**28** 0026	4.2	**13** 0052	4.0	**28** 0143	4.0	**13** 0126	4.1	**28** 0204	3.9	**13** 0241	4.3	**28** 0232	3.9
1219	3.9	0636	0.3	0654	0.7	0736	0.8	0722	0.8	0748	0.9	0830	0.7	0822	0.9
M 1816	0.6	TU 1253	4.1	TH 1313	3.9	F 1357	3.9	SA 1345	4.0	**SU** 1410	3.9	TU 1453	4.2	W 1440	3.9
		1858	0.4	1921	0.5	2017	0.5	1958	0.4	2029	0.6	2110	0.3	2048	0.7
14 0032	3.9	**29** 0112	4.2	**14** 0135	4.0	**29** 0225	3.9	**14** 0212	4.1	**29** 0237	3.8	**14** 0327	4.2	**29** 0305	3.8
0635	0.6	0716	0.5	0733	0.8	0814	0.9	0805	0.8	0821	1.0	0915	0.8	0858	0.9

AXE

36

A yacht which draws 1.5 metres intends to anchor off Fort William (Port Fraser) at 1500 local on Thursday 25th July

What is the height of tide at 1500

1. From tide tables

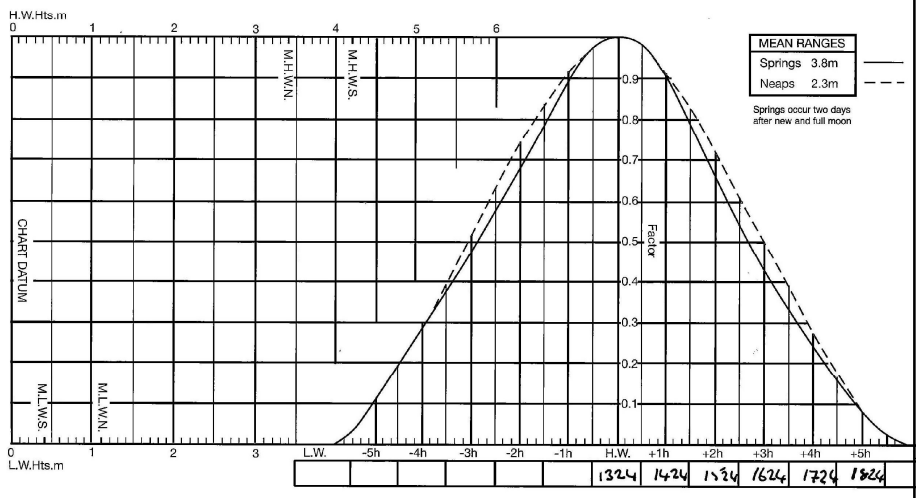
HW	1324	DST (1224 UT)	4.0m
LW	1941	DST	0.5m

Range = 3.5m therefore use Springs curve

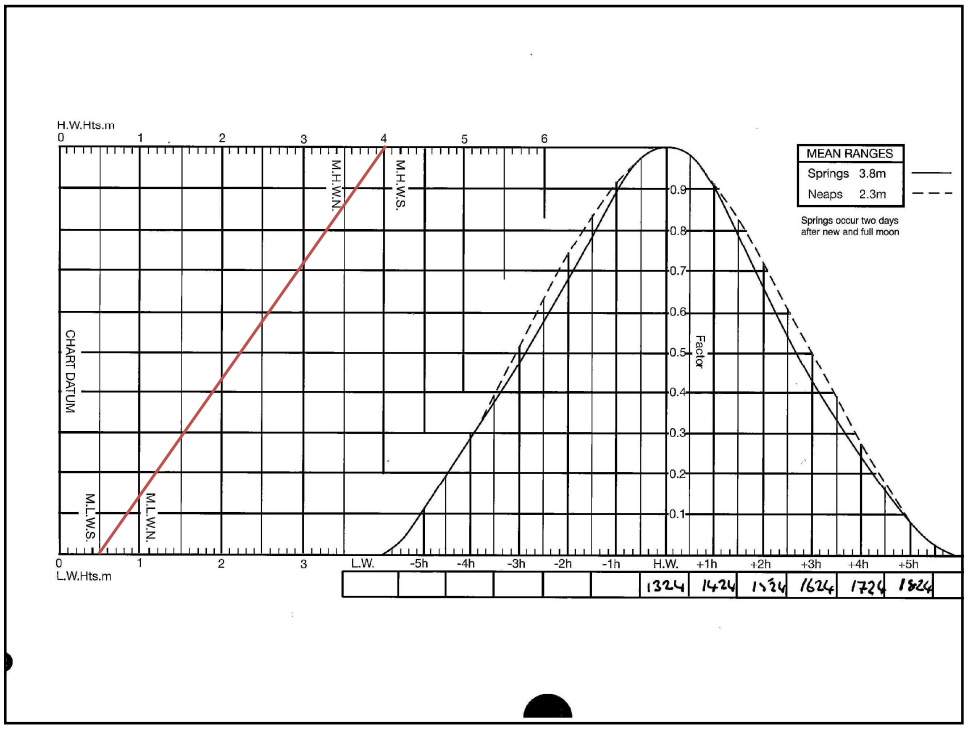
1500 is 1hr 36 mins after HW

AXE YACHT CLUB

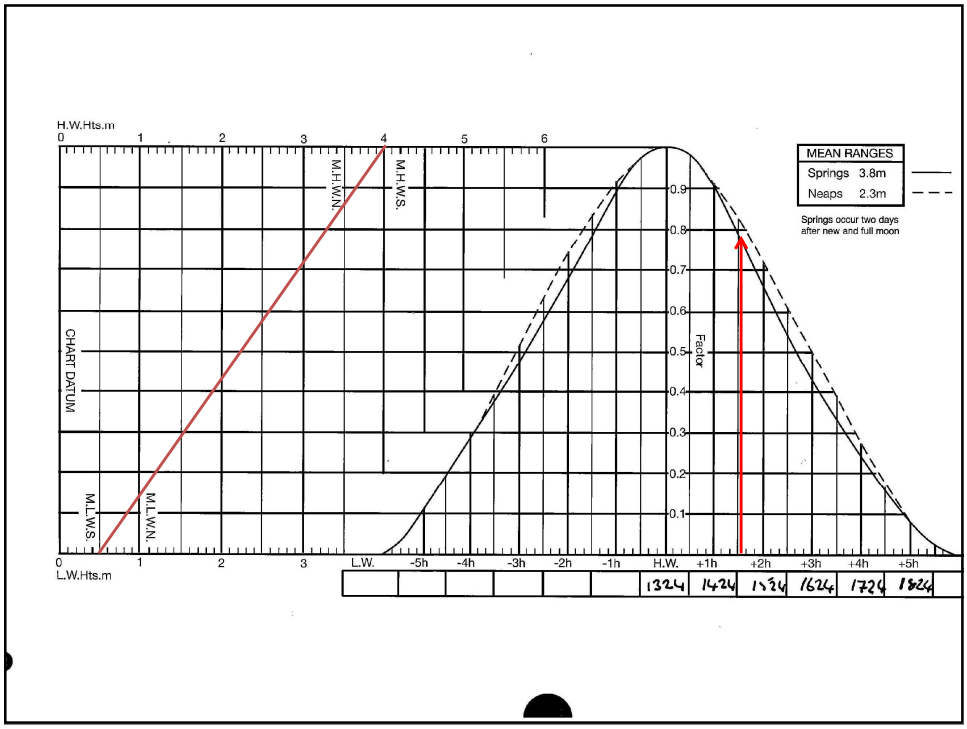
37



38


H.W.Hts.m
0 1 2 3 4 5 6
M.H.W.N.
M.H.W.S.
CHART DATUM
M.L.W.S.
M.L.W.N.
0 1 2 3
L.W.Hts.m
MEAN RANGES
Springs 3.8m
Neaps 2.3m
Springs occur two days after new and full moon
Factor
0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1
L.W. -5h -4h -3h -2h -1h H.W. +1h +2h +3h +4h +5h
1324 1424 1524 1624 1724 1824

39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0 1 2 3 4 5 6
M.H.W.N.
M.H.W.S.
CHART DATUM
M.L.W.S.
M.L.W.N.
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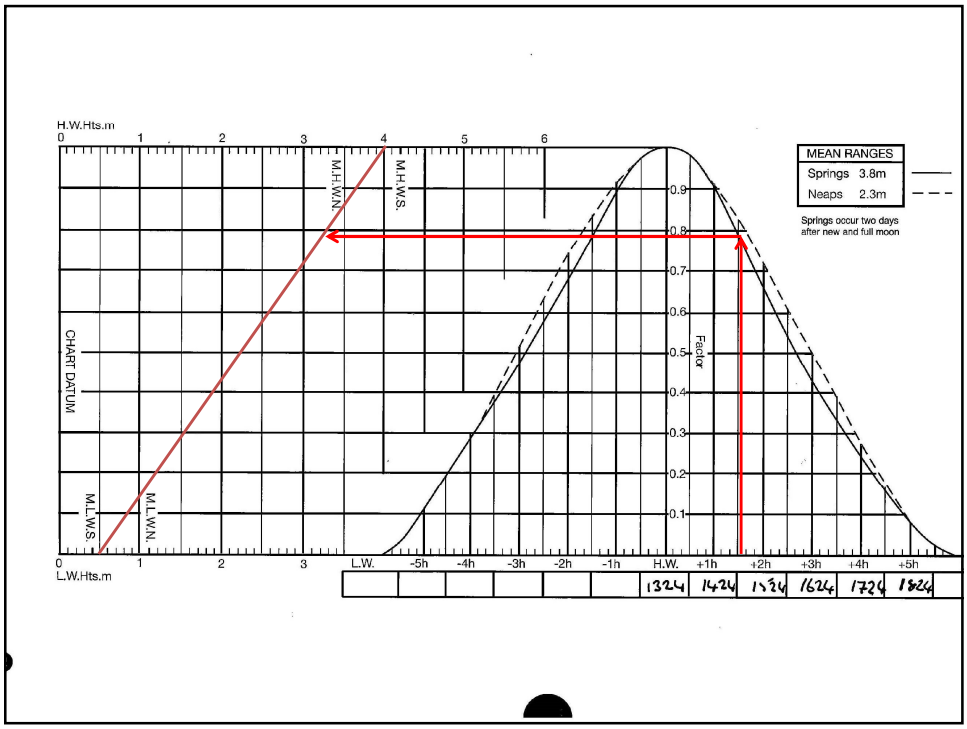
L.W. -5h -4h -3h -2h -1h H.W. +1h +2h +3h +4h +5h
1324 1424 1524 1624 1724 1824

40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0 1 2 3 4 5 6
M.H.W.N.
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CHART DATUM
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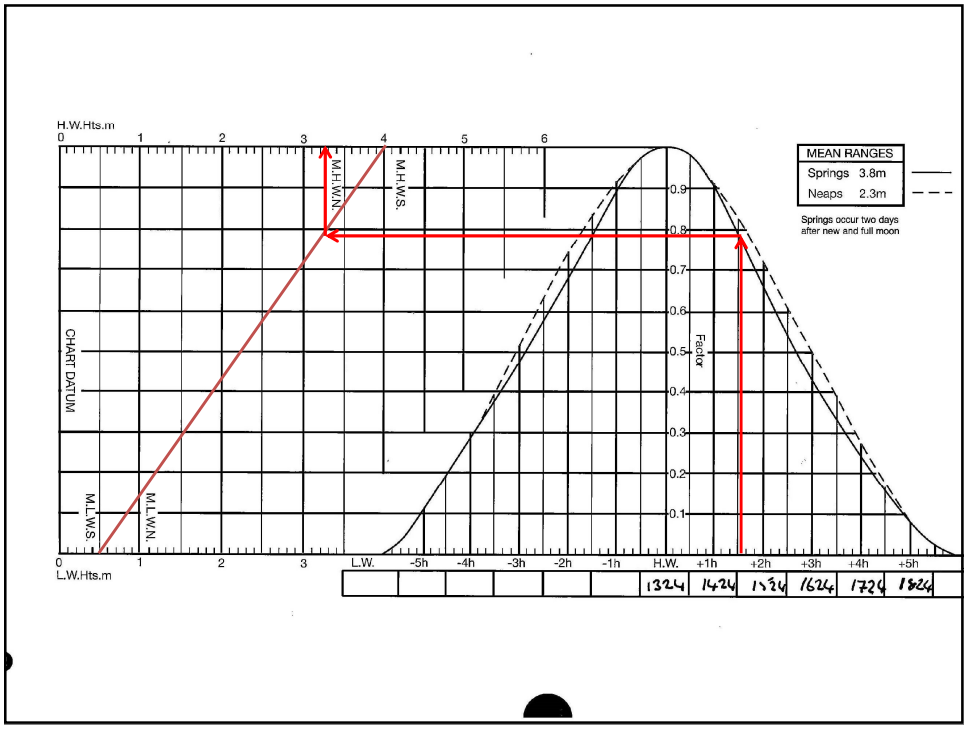
L.W. -5h -4h -3h -2h -1h H.W. +1h +2h +3h +4h +5h
1324 1424 1524 1624 1724 1824

41


H.W.Hts.m
0 1 2 3 4 5 6
M.H.W.N.
M.H.W.S.
CHART DATUM
M.L.W.S.
M.L.W.N.
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Factor
0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1
L.W. -5h -4h -3h -2h -1h H.W. +1h +2h +3h +4h +5h
1324 1424 1524 1624 1724 1824

42

A yacht which draws 1.5 metres intends to anchor off Fort William (Port Fraser) at 1500 local on Thursday 25th July

1. What is the height of tide at 1500?

From tide tables

HW 1324 4.0m
LW 1941 0.5m
Range = 3.5m therefore use springs curve
1500 is 1 hour 36 mins after HW

From tidal curve Height of tide = 3.3m

AXE YACHT CLUB

43

A yacht which draws 1.5 metres intends to anchor off Fort William (Port Fraser) at 1500 local on Thursday 25th July

What depth does the yacht need to anchor in in order to have 1m clearance beneath the keel at Low Water that evening?

From tide tables

HW 1324 4.0m
LW 1941 0.5m
Range = 3.5m therefore use springs curve
1500 is 1hr 36 mins after HW

From tidal curve height of tide at 1500 = 3.3m

AXE YACHT CLUB

44

A yacht which draws 1.5 metres intends to anchor off Fort William (Port Fraser) at 1500 local on Thursday 25th July

What depth does the yacht need to anchor in in order to have 1m clearance beneath the keel at Low Water that evening?

From tide tables

HW 1324 4.0m
LW 1941 0.5m
Range = 3.5m therefore use springs curve
1500 is 1hr 36 mins after HW

From tidal curve height of tide at 1500 = 3.3m

Tide will fall another (3.3m – 0.5m) = 2.8m until low water

Tide Fall 2.8
Draught 1.5
Clearance 1.0
= 5.3m depth of water to anchor in at 1500

AXE YACHT CLUB

45

What is the latest time that the yacht can enter Portlake (Port Fraser) and have 2 metres clearance under the keel?

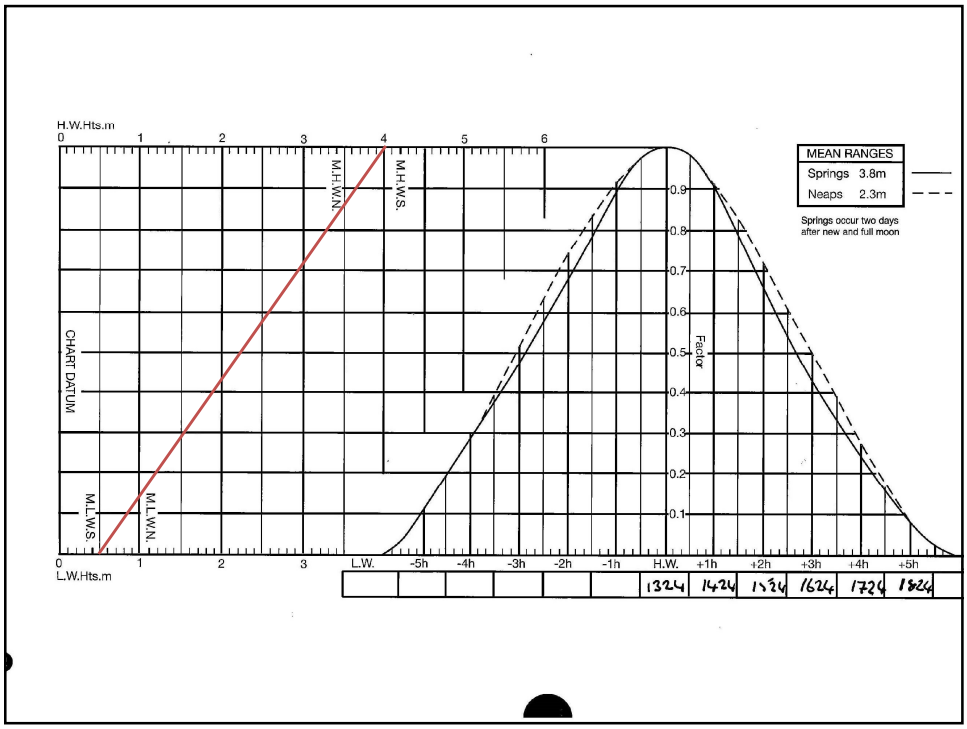
Charted depth in entrance channel 2.1 metres

1.5m (draught)
+ 2.0 m (required clearance)
– 2.1m (charted depth)

= 1.4 metres which is the height of tide needed

AXE YACHT CLUB

46


H.W.Hts.m
0 1 2 3 4 5 6
M.H.W.N.
M.H.W.S.
CHART DATUM
M.L.W.S.
M.L.W.N.
0 1 2 3
L.W.Hts.m
MEAN RANGES
Springs 3.8m
Neaps 2.3m
Springs occur two days after new and full moon
Factor
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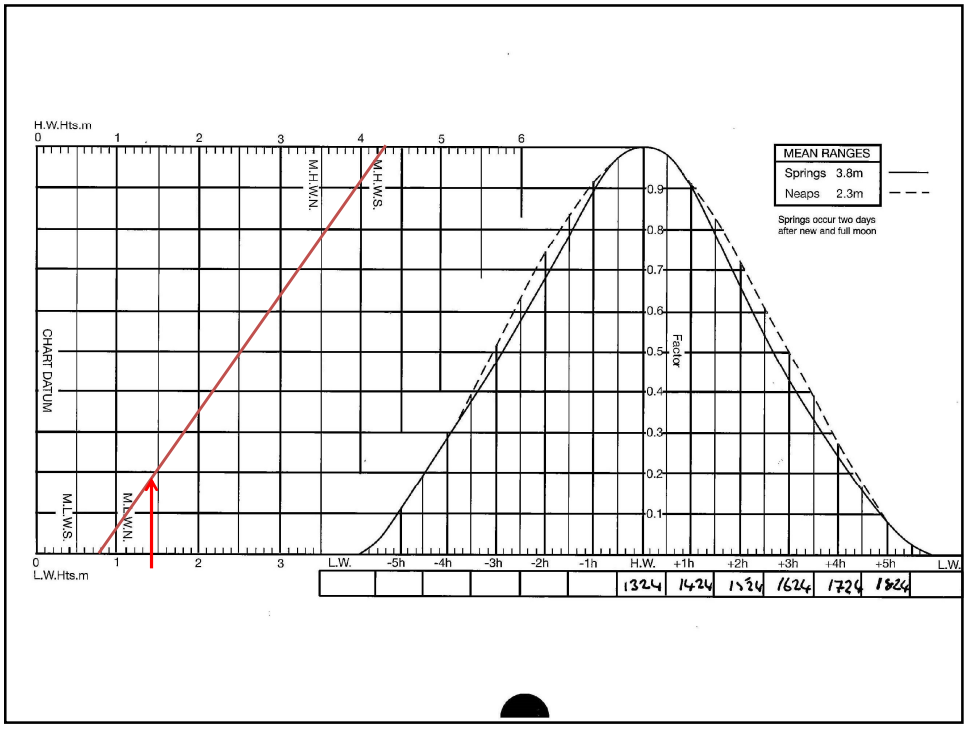
L.W. -5h -4h -3h -2h -1h H.W. +1h +2h +3h +4h +5h
1324 1424 1524 1624 1724 1824

47


H.W.Hts.m
0 1 2 3 4 5 6
M.H.W.N.
M.H.W.S.
CHART DATUM
M.L.W.S.
M.L.W.N.
0 1 2 3
L.W.Hts.m
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Springs 3.8m
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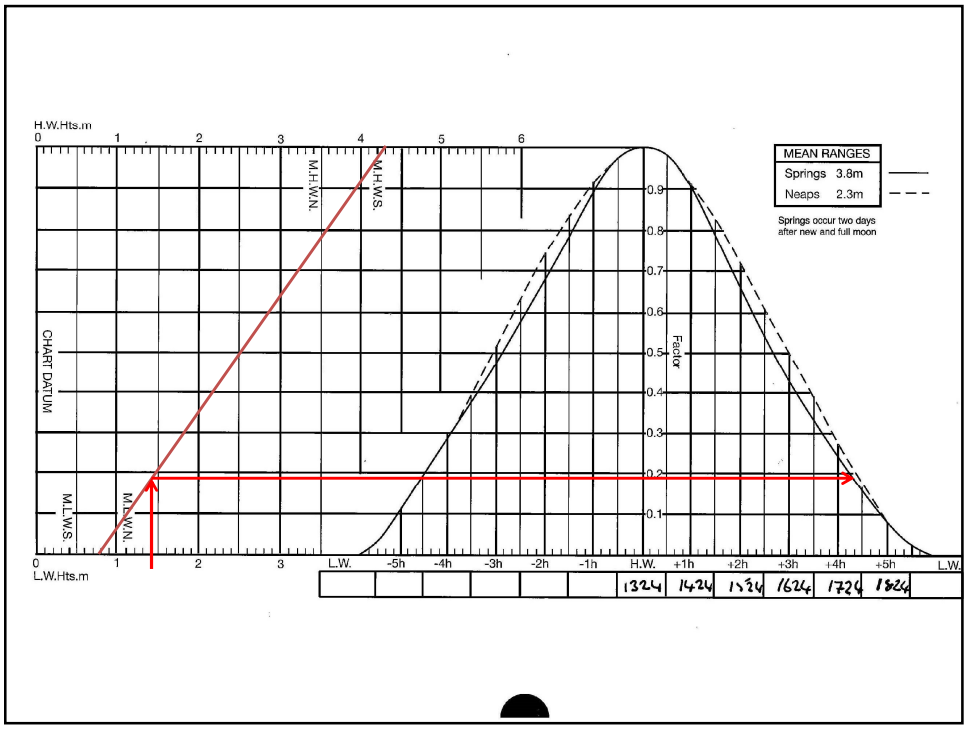
Springs occur two days after new and full moon
Factor
0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1
L.W. -5h -4h -3h -2h -1h H.W. +1h +2h +3h +4h +5h L.W.
1324 1424 1524 1624 1724 1824

48


H.W.Hts.m
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M.L.W.N.
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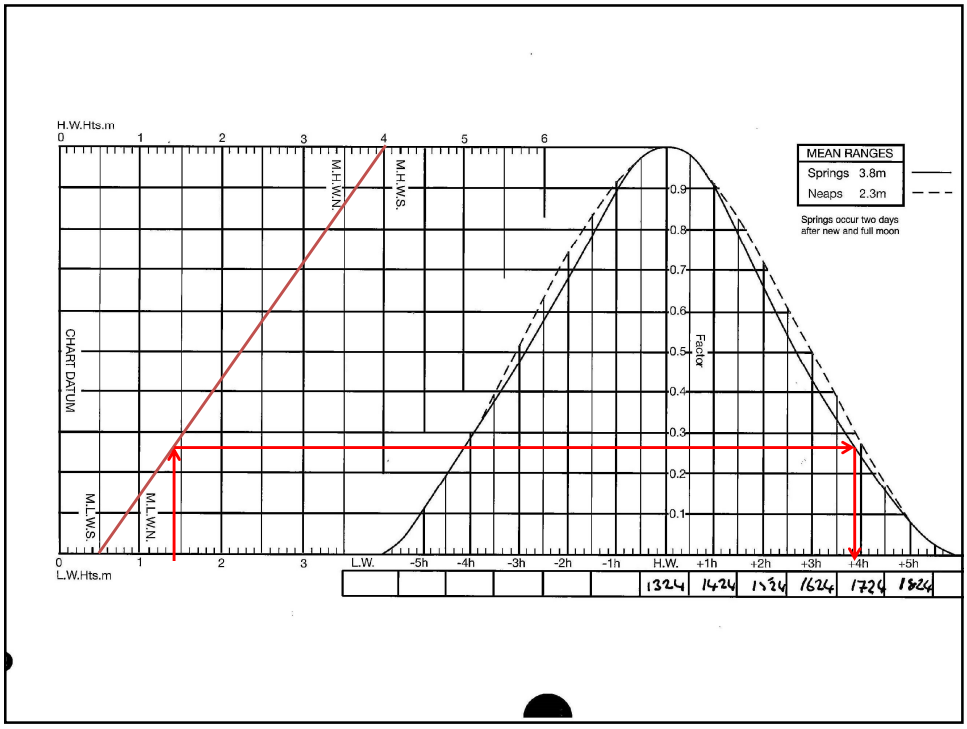
L.W.Hts.m
L.W. -5h -4h -3h -2h -1h H.W. +1h +2h +3h +4h +5h L.W.
1324 1424 1524 1624 1724 1824

49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M.H.W.N.
M.H.W.S.
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0.5
0.4
0.3
0.2
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M.L.W.S.
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0 1 2 3
L.W.Hts.m
L.W. -5h -4h -3h -2h -1h H.W. +1h +2h +3h +4h +5h
1324 1424 1524 1624 1724 1824

50

What is the latest time that the yacht can enter Portlake (Port Fraser) and have 2 metres clearance under the keel

Charted depth in entrance (Chart 4 , D) 2.1 metres

1.5m (draught)
+ 2.0 m (required clearance)
– 2.1m (charted depth)

= 1.4 metres which is the height of tide needed

ENTER No later than HW+ 3hrs 50min = 1714 local

AXE YACHT CLUB

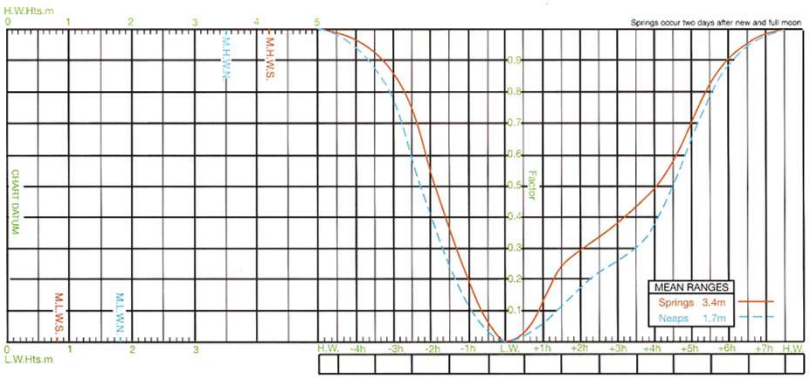
51

LOW WATER CURVES

SOME PORTS USE THE LOW WATER AS THE REFERENCE POINT.

This is because the HW time is difficult to calculate accurately

DUNBARTON Mean Spring and Neap Curves Training Almanac p 43



52

Use of Tide Tables

- The Hydrographic Office of the Admiralty publishes Tide Tables annually.
- The tables give the time and height of high and low water at “Standard Ports” around the coast, for every day of the year.
- The tables also give “differences” for other ports, which are termed “Secondary Ports”.
- Very often it is possible to purchase “Local Tide Tables” which have already had the “differences” applied.

OCTOBER

	Time	m		Time	m
1	0350	1.1	16	0353	0.6
	1046	4.5		1041	5.0
	1608	1.1		1614	0.7
M	2252	4.4	TU	2256	4.9
2	0425	0.9	17	0436	0.5
	1116	4.6		1125	5.1
	1642	1.0		1657	0.5
TU	2323	4.5	W	2341	5.0

53

Secondary Ports

- Next week.....

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