

This booklet is intended for use in nautical college lessons and in SQA and HND examinations relating to calculation of times and heights of tides and directions and rates of tidal streams within the SQA and HND syllabuses.

It contains references relating to topics outside the two syllabuses.

The following do not apply to these extracts :

- All references to Part III
- All references to Shallow Water Corrections
- All references to Harmonic Constants and Tidal Angles and Factors
- All references to simplified harmonic method of tidal prediction
- All references to Tables I to VIII
- All references to Tidal Levels
- References to ports between Swanage and Selsey including Shoreham
- References to Padstow in the instructions
- Co-tidal Charts
- All references to Tidal Stream Atlases
- Tidal prediction forms and NP 159
- All references to page 344

For details of the above, please see the Admiralty Tide Table Volume 1 for the current year.

The data used in examples contained in the instructions do not refer to the current year of these tables.

## **Index to UK and European Ports**

|               |    |
|---------------|----|
| Southampton   | 16 |
| Lowestoft     | 18 |
| River Tyne    | 20 |
| Devonport     | 22 |
| Antwerp       | 24 |
| Le Havre      | 26 |
| Portland      | 28 |
| Portsmouth    | 30 |
| Dover         | 32 |
| Aberdeen      | 36 |
| Ullapool      | 38 |
| Greenock      | 42 |
| Liverpool     | 46 |
| Milford Haven | 50 |
| Avonmouth     | 52 |
| Cobh          | 56 |

## INTRODUCTION

### Methods of Prediction

(1) *Standard ports in the British Isles.* Wherever possible predictions are based on continuous observation of the tide over a period of at least one year; in such cases the average changes in mean sea level due to changes in meteorological conditions for the year in question are calculated and are included in the predictions. These changes do not, however, repeat themselves exactly from year to year; it has been found advisable, therefore, to observe and analyse changes in mean sea-level for a period of not less than three years and in the case of modern analyses this practice is followed wherever possible.

As predictions are given for average meteorological conditions it follows that when conditions are not average the actual tides may differ from those predicted. Under extreme conditions these differences can be very large. The effects of varying meteorological conditions are discussed in subsequent paragraphs.

(2) *Standard ports outside the British Isles.* Predictions for most Standard Ports outside the British Isles are obtained from the National Authorities responsible for the predictions. The method of prediction is not always known but it can be assumed that, under average weather conditions, the predictions will be adequate for all normal navigational requirements.

(3) *Secondary Ports.* Predictions for Secondary Ports are made by applying time and height differences to predictions at a selected Standard Port or by using the harmonic constants and the Simplified Harmonic Method of Tidal Prediction. The data on which the differences are based are extremely variable in quality. Modern revisions are almost invariably based on the analysis of one complete month's observations but some of the data are based on less comprehensive observations. When harmonic constants are based on less than one month's data a reference is made.

In order that the average time and height differences given in Part II may be as reliable as possible, it is necessary that the Standard Port chosen should have tidal characteristics which are similar to those of the Secondary Port. In some cases there is no local Standard Port with similar characteristics and it is necessary to choose a Standard Port which may be distant from the Secondary Port. In still other cases it is not possible to refer the tides to any published Standard Port, and in such cases prediction should only be carried out using harmonic constants to be found in Part III.

The term "Secondary Port" does not imply that the place concerned must be of secondary importance. Considerations of space preclude the inclusion, as Standard Ports, of many important ports, particularly outside the British Isles. Many Secondary Ports in these tables are, in fact, Standard Ports in the national tables of the country concerned, and these are marked accordingly.

### Tidal Levels

A list of tidal levels for Standard Ports is given in Table V and the levels thus given are defined in the notes attached to that table. As well as average levels at Springs and Neaps, extreme high and low levels are given; these, like the predictions, are valid for average meteorological conditions though higher and lower levels than those given have been recorded at most places. Tidal levels for a large number of Secondary Ports can be calculated from Part II.

Tidal levels are referred to Chart Datum of the largest scale Admiralty chart; the connection between Chart Datum and Ordnance Datum in the United Kingdom is given in Table III. The same information for ports outside the United Kingdom is given, where it is known, in Table IV.

Tidal levels for Standard Ports are subject to re-examination from time to time; due to changes in mean sea level they do not necessarily remain constant; recent analyses have caused a number of levels to be raised by an average of about 0·1 m which is the estimated amount by which sea level has risen around the British Isles during the last 40 years or so.

### Meteorological Effects on Tides

Meteorological conditions which differ from the average will cause corresponding differences between the predicted and the actual tide. Variations in tidal heights are mainly caused by strong or prolonged winds and by unusually high or low barometric pressure. Differences between predicted and actual times of high and low water are caused mainly by wind. The two effects are discussed separately in the following paragraphs.

*Barometric pressure.* Tidal predictions are computed for average barometric pressure. A difference from the average of 34 millibars can cause a difference in height of about 0.3m. A low barometer will tend to raise sea level and a high barometer will tend to depress it. The water level does not, however, adjust itself immediately to a change of pressure and it responds, moreover, to the average change in pressure over a considerable area. The average barometric pressure for certain places is given in Sailing Directions and information is also given in some instances concerning the changes in level which can be expected under different conditions. Changes in level due to barometric pressure seldom exceed 0.3m but, when mean sea level is raised or lowered by strong winds or by storm surges, this effect can be important.

*The effect of wind.* The effect of wind on sea level - and therefore on tidal heights and times - is considerably variable and depends largely on the topography of the area in question; thus the effects on the south coast of England may be very different from those on the east coast, while the effects on the east coast of Scotland may again be different from those experienced on the Suffolk coast. In general it can be said that wind will raise sea level in the direction towards which it is blowing. A strong wind blowing straight onshore will pile up the water and cause high waters to be higher than predicted, while winds blowing off the land will have the reverse effect. Winds blowing along a coast tend to set up long waves which travel along the coast, raising sea level where the crest of the wave appears and lowering sea level in the trough. These waves, which are known as "storm surges", are discussed in succeeding paragraphs.

*Seiches.* Abrupt changes in meteorological conditions, such as the passage of an intense depression or line squall, may cause oscillations in sea level. The period between successive waves may be anything between a few minutes and about two hours and the height of the waves may be anything from a few centimetres to a metre or even more.

Small seiches are not uncommon round the coast of the British Isles. The shape and size of certain harbours makes them very susceptible to seiches, especially in the winter months. Fishguard and Wick are examples of harbours where seiches regularly occur.

*North Sea. Abnormal high and low waters. Storm surges.* Strong winds in the North Sea and in the surrounding waters have three main effects, namely (a) they may cause a general raising or lowering of sea level; (b) they may cause oscillations in sea level in one or more directions; and (c) they may generate storm surges which have a considerable variety of forms.

(a) A general raising of sea level is sometimes caused in the southern part of the North Sea by a steady northerly wind; this sometimes has the effect of lowering sea level in the northern part of the North Sea.

(b) A typical oscillation of sea level can be set up when a strong southerly wind is abruptly replaced by a strong northerly wind; water which has been piled up in the north part of the North Sea is released and travels south as a wave or series of waves, being given added impetus and amplitude by the northerly wind. On reaching the southern shores of the North Sea the waves are reflected and travel north again with diminished amplitude. Changes in the force of the wind may sustain these oscillations for a considerable time. It should be noted that oscillations of sea level are not restricted to movements from north to south and vice versa; similar oscillations may take place from east to west and in other directions, the combination of several different oscillations resulting in a complicated pattern of changes in sea level.

(c) A storm surge may be generated either in the northern part of the North Sea or in the Atlantic. In the latter case, the wave may travel round the north of Scotland and, on entering the North Sea, be deflected by the rotation of the earth towards the south.

The most dangerous surges occur when a deep depression, moving in from the Atlantic, travels slowly across the north of Scotland from west to east, causing strong and sustained northwesterly or northerly winds. A wave is set up which travels down the coast at approximately the same speed as the tidal wave, i.e. if the wave's crest arrives at, say, Aberdeen near the time of high water, the same crest will arrive at the Tyne near high water and will also arrive farther south at or near the time of local high water.

Of equal importance to the time at which the crest of the surge arrives is the range of the tide on the day in question. Surges which occur at or near neaps seldom cause abnormally high levels, but relatively small surges occurring at high water or equinoctial springs can be very dangerous.

The height of surges in the North Sea can reach considerable proportions, the maximum height increasing from north to south. At Aberdeen, for instance, the height of a surge would not normally exceed 0.9m. The same surge, by the time it reaches the Humber, may have a height of 2.4m, and by the time it reaches the Netherlands coast 3.0m or more.

Large surges of this kind are fortunately rare but smaller surges which raise the height of high or low water between 0.6m and 0.9m are not infrequent and they may occur several times during a normal year in the North Sea.

A very severe storm surge occurred on 31st January, 1953, when a northerly gale of exceptional strength and duration, blowing over the whole of the North Sea, raised sea level by 2.7m on the east coast of England and by even more on the Netherlands coast. Predicted high waters were exceeded by nearly 2.4m on the coast between the rivers Humber and Thames and by more than 3.0m on the Netherlands coast, resulting in disastrous flooding with considerable loss of life and property.

### Negative Surges

In a manner somewhat similar to the Storm Surges described above, the level of the sea can also be lower than the predicted level. Again the cause is usually meteorological. This effect is of great importance to very large vessels which may be navigating with small under-keel clearances. Negative surges of over 0.6m occur about 15 times a year in the southern North Sea, 3 or 4 of them exceeding 1m. Negative surges are about twice as frequent in the Thames Estuary and, on one occasion in 1982, the level of the sea at Southend was 2.3m below predictions.

In order to provide the mariner with some warning of the onset of Negative Surges in the Southern North Sea a warning service has been established for this area only. It is hoped that experience will improve the efficiency of this service.

### Shallow Water Corrections

Shallow water effects can be included in the Simplified Harmonic Method of Tidal Prediction. At ports where the shallow water effect is noticeable and can reasonably be represented by corrections, data for use in the Simplified Harmonic Method of Tidal Prediction is included in Part III of the tables and in Table VI.

### Seasonal Changes in Mean Level

The monthly variations in mean sea level do not necessarily repeat themselves exactly from year to year; hence the values given may be found to differ from observed values by as much as 0.1m, even where the values given are based on several years' observations. In consequence, where the maximum variation of mean sea level above and below the mean value is less than about 0.1m, the changes are listed as "negligible". In practice, mean sea level data are largely based on a relatively small number of observations for one year only and the figures for many places have been obtained by interpolation.

Variations in mean sea level over short periods may be considerably greater than the values given; mean sea level may remain as much as 0.3m above or below the average for as long as a month.

### Seasonal Variations in Harmonic Constants

Variations have been detected in the harmonic constants of some ports. These can be included in the Simplified Harmonic Method of Tidal Prediction by the use of special values for the period of prediction. For those ports where the data is available and the variations are large enough, monthly values of the constants are given in Part III below the seasonal corrections for Mean Level.

## Zone Time and Time Differences

Universal Time (UT) is the mean solar time of the prime meridian obtained from direct astronomical observation and corrected for the effects of small movements of the Earth relative to the axis of rotation. Greenwich Mean Time (GMT) is based on the hour angle of the mean sun and for all tidal predictions may be taken as the same as UT. The term UT(GMT) is used throughout this volume.

There are twenty four Time Zones in the world each of which covers 15° of longitude. The zero time zone, in which the time kept corresponds to Greenwich Mean Time, is centred on the prime meridian and extends from 7½°W. to 7½°E. The other zones, in which the time kept differs from GMT by an integral number of hours, are sequentially numbered and have either a negative prefix if east of Greenwich or a positive prefix if west of Greenwich.

To convert Zone Time to GMT, the number of hours as given by the zone number is added to or subtracted from the Zone Time, e.g. in Zone - 0400 the time kept is 4 hours in advance of GMT and so at 2000 local time it is 1600 GMT, i.e. to obtain GMT apply zone number and its sign.

On land, a uniform time is adopted for convenience throughout a given country even though its boundaries may not wholly lie within a time zone. The Standard Time or Legal Time is in most cases that of the zone in which the country mainly lies. Countries having a longitudinal extent greater than a time zone may adopt more than one Standard Time, e.g. Eastern Standard Time, Pacific Standard Time in the United States.

Daylight Saving Time (Summer Time), introduced to prolong the hours of daylight in the evening, may in certain countries be the Legal Time for part of the year. The Standard Time of the zone to the eastward is normally adopted during such periods, e.g. BST (British Summer Time) is Zone - 0100. In certain countries this advanced time has been made Standard Time throughout the year. *In Admiralty Tide Tables no account is taken of Daylight Saving Time unless it has been adopted throughout the year.*

The times of Standard Port predictions are given in the normal Standard Time kept by the port. When using the tables it should be verified that this is the same as the time *which is actually being kept*. Changes in Zone Times are not always reported in sufficient time for inclusion in the tide tables. For the latest information consult Admiralty List of Radio Signals Vol.2 (NP282) corrected by Section VI of the weekly edition of Admiralty Notices to Mariners.

Time Differences for Secondary Ports, when applied to the printed times of high and low water at Standard Ports, will give times of high and low water at the Secondary Ports in the *Zone Time tabulated for the Secondary Port*. Any change in Zone Time at the Standard Port, or any difference between Zone Times at Reference and Secondary Ports has no significance; *the predicted values tabulated for the Standard Port must be used unaltered*. Only changes in Zone Time at the Secondary Port, where different from those tabulated, may be corrected for. It should be verified that the Zone Time tabulated for the Secondary Port is the same as the time being kept.

## Tidal Streams and Currents

A distinction is drawn between tidal streams, which are astronomical in origin, and currents, which are not dependent on astronomical conditions and which, in the waters around the British Isles, are mainly of meteorological origin; in practice, of course, the navigator experiences a combination of tidal stream and current.

Tidal streams can be predicted for any period in the future but currents caused by temporary meteorological conditions can only be assessed approximately when these conditions are known. In open waters around the British Isles, therefore, non-tidal currents are not included in the tidal stream prediction tables given on most Admiralty Charts. With strong or prolonged winds these currents may, nevertheless, be considerable and they must be assessed separately. In rivers and estuaries there is often a permanent current caused by the flow of river water; such currents are included in the tidal stream tables.

The tidal streams in European waters are, for the most part, of the same type as the tides, i.e. they are semi-diurnal in character. They can therefore be predicted by reference to a suitable Standard Port by tables printed on the published charts and there is no necessity for daily predictions to be published. In some other parts of the world, however, the pattern of the tidal streams is entirely unrelated to the pattern of the tides and in these cases daily predictions are necessary; such predictions will be found in Volumes 3 and 4 of Admiralty Tide Tables.

The prevailing south-westerly wind causes a weak residual current from west to east in the English Channel. On the east coast of Britain there is a weak residual current from north to south, possibly due in part to the difference in average barometric pressure between Scotland and southern England causing a slightly higher mean sea level in the north. On the west coasts of Scotland and Ireland there is probably a weak residual current to the northward caused by the prevailing south-westerly wind. Except during and following periods of strong winds, these currents can be neglected for normal navigational purposes.

Temporary wind-induced currents may attain a rate of about 1 knot in a strong gale, though the effect of the gale on the ship's speed may be as much as 2 knots. The current takes some time to develop and it may continue to run for some time after the wind has dropped.

The tidal streams around the British Isles are shown in pictorial form in a series of tidal stream atlases, details of which are given, together with other publications on tides, etc., on page 428. More detailed information may be found in the relevant Admiralty Sailing Directions.

A diagram showing the direction of the main flood stream round the coasts of the British Isles is on page 429.

#### Tidal Data on Admiralty Charts

Large scale modern charts of the British Isles contain a panel giving tidal information; this normally consists of the mean heights of high and low water at both springs and neaps. This information is intended solely as a guide to the approximate depths which may be found at springs and neaps under *average* conditions. It should be borne in mind that, at extreme springs, the range of the tide will be increased by an amount which varies from 20% to 30% in different places. The tidal heights given refer to the datum of the chart and its connection to Ordnance Datum is given wherever possible on the larger scale charts for the use of surveyors and engineers. If precise information is required concerning either times or heights of the tide, Admiralty Tide Tables should invariably be consulted.

Tidal heights given in the "tidal panel" indicate, apart from the range of the tide, the datum in terms of low water levels. Thus, if the mean spring tidal range is 3.7m and the value of MLWS is given as 0.5m, it can be inferred that soundings have been reduced approximately to lowest predictable low water. Where MLWS is given as 0.0, soundings have in fact been reduced exactly to MLWS. Examination of the value of MLWS will give information regarding the Chart Datum used. Additionally information is included under the titles of Metric Charts, e.g. "reduced to Chart Datum, which is approximately the level of Lowest Astronomical Tide".

#### Datums of Tidal Predictions

The datum for tidal predictions must be the same as the datum for soundings since the total depth of water is found by the addition of the height of the tide to the charted depth. The levels at which datums have been established at Standard Ports, however, vary widely and the datums do not conform to any uniform tidal level. Modern practice is to establish datum at or near the level of Lowest Astronomical Tide but reference to Table V will show that many datums are established considerably above this level and a few are established below it. For areas where the Hydrographer of the Navy is the surveying authority, datums have been adjusted to approximate to LAT. It should be emphasised that the level of LAT will be reached occasionally in the normal course of events and that lower levels than this may be reached with particular meteorological conditions. At Sheerness, for instance, a low water level of 2.3m below predictions has been recorded.

For those areas where the Hydrographer is the surveying authority details of the Bench Marks used, and the connections between them and Chart Datum, are available on application to the UK Hydrographic Office, Taunton.

**TABLE V - Part 1**  
**TIDAL LEVELS IN METRES AT STANDARD PORT**

| Standard Port        | LAT  | MLWS | MLWN | MSL  | MHWN  | MHWS  | HAT   |
|----------------------|------|------|------|------|-------|-------|-------|
| Plymouth (Devonport) | 0.0  | +0.8 | +2.2 | +3.4 | +4.4  | +5.5  | +5.9  |
| Portland .....       | -0.2 | +0.2 | +0.7 | +1.0 | +1.4  | +2.1  | +2.5  |
| Southampton .....    | -0.1 | 0.5  | +1.8 | +2.9 | +3.7  | +4.5  | +5.0  |
| Portsmouth .....     | +0.1 | +0.6 | +1.8 | +2.8 | +3.8  | +4.7  | +5.1  |
| Lowestoft .....      | +0.1 | +0.5 | +1.0 | +1.6 | +2.1  | +2.4  | +3.0  |
| River Tyne .....     | +0.0 | +0.7 | +1.8 | +2.9 | +3.9  | +5.0  | +5.7  |
| Greenock .....       | -0.3 | +0.4 | +1.0 | +2.0 | +2.9  | +3.4  | +3.9  |
| Liverpool .....      | 0.0  | +0.9 | +2.9 | +5.3 | +7.4  | +9.3  | +10.4 |
| Milford Haven .....  | 0.0  | +0.7 | +2.5 | +3.8 | +5.2  | +7.0  | +7.9  |
| Bristol (Avonmouth)  | -0.1 | +0.9 | +3.5 | +7.0 | +10.0 | +13.2 | +14.7 |
| Cobh .....           | -0.1 | +0.5 | +1.4 | +2.2 | +3.3  | +4.2  | +4.5  |
| Antwerp .....        | -0.6 | +0.0 | +1.0 | +2.9 | +4.2  | +5.8  | +6.7  |
| Le Havre .....       | +0.3 | +1.2 | +3.0 | +4.9 | +6.6  | +7.9  | +8.4  |

Notes

The above levels, in metres, are referred to Chart Datum, which is same as the zero of the tidal predictions in all cases.

## TABLE V - Part 1

### TIDAL LEVELS

The preceding table gives average tidal levels of all Standard Ports in this volume.

In general the levels are computed from at least a year's predictions. The values of Lowest Astronomical Tide (LAT) and Highest Astronomical Tide (HAT) are noted over a span of years and are defined below.

All levels in this table and all predictions in this volume are referred to Chart Datum of the largest scale Admiralty Chart of the area.

#### Tidal levels

*HAT (Highest Astronomical Tide), LAT (Lowest Astronomical Tide).* The highest and lowest levels respectively which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions; these levels will not be reached every year. HAT and LAT are not the extreme levels which can be reached, as storm surges (see page i) may cause considerably higher and lower levels to occur.

*MHWS (Mean High Water Springs), MLWS (Mean Low Water Springs).* The height of mean high water springs is the average, throughout a year, when the average maximum declination of the moon is  $23\frac{1}{2}^{\circ}$ , of the heights of two successive high waters during those periods of 24 hrs (approximately once a fortnight) when the range of the tide is greatest. The height of mean low water springs is the average height obtained by the two successive low waters during the same periods.

*MHWN (Mean High Water Neaps), MLWN (Mean Low Water Neaps).* The height of mean high water neaps is the average, throughout a year as defined above, of the heights of two successive high waters during those periods (approximately once a fortnight) when the range of the tide is least. The height of mean low water neaps is the average height obtained from the two successive low waters during the same periods.

Note: - The average value of MHWS, etc, varies from year to year in a cycle of approximately 18.6 years. The tidal levels given in Table V are average values for the whole cycle, obtained by computing values of a year or more and correcting the results by the value of  $f/f_0$  of  $M_2$ .

*MSL (Mean Sea Level).* Mean sea level is the average level of the sea surface over a long period, preferably 18.6 years, or the average level which would exist in the absence of tides.

**TABLE V - Part 2**  
**HIGHEST ASTRONOMICAL TIDAL LEVELS (HAT) IN METRES AT SECONDARY PORTS**

| No. | Place                          | HAT(m)    | No.  | Place                         | HAT(m)    |
|-----|--------------------------------|-----------|------|-------------------------------|-----------|
| 1   | St. Mary's .....               | ..... 6.3 | 48   | Freshwater Bay .....          | ..... 2.6 |
| 2   | Penzance (Newlyn) .....        | ..... 6.2 | 51   | Ventnor .....                 | ..... 4.2 |
| 2a  | Porthleven .....               | ..... 6.0 | 53   | Sandown .....                 | ..... 4.5 |
| 3   | Lizard Point .....             | ..... 5.8 | 54   | Bembridge Harbour .....       | ..... 3.6 |
| 4   | Coverack .....                 | ..... 5.9 | 58   | Ryde .....                    | ..... 5.0 |
| 4a  | Helford River (Entrance) ..... | ..... 5.7 | 60a  | Folly Inn .....               | ..... 4.4 |
| 5a  | Truro .....                    | ..... 3.9 | 60b  | Newport (Isle Of Wight) ..... | ..... 4.4 |
| 7   | Mevagissey .....               | ..... 5.8 | 61   | Calshot Castle .....          | ..... 5.0 |
| 7a  | Par .....                      | ..... 5.5 | 62a  | Redbridge .....               | ..... 4.9 |
| 8   | Fowey .....                    | ..... 5.8 | 63   | Warsash .....                 | ..... 5.0 |
| 8a  | Lostwithiel .....              | ..... 1.8 | 63a  | Bursledon .....               | ..... 5.1 |
| 11  | Looe .....                     | ..... 5.9 | 64   | Lee-On-The-Solent .....       | ..... 4.9 |
| 12  | Whitsand Bay .....             | ..... 5.9 | 68a  | Northney .....                | ..... 5.3 |
| 14a | Jupiter Point .....            | ..... 6.0 | 68b  | Bosham .....                  | ..... 5.3 |
| 14b | Cargreen .....                 | ..... 5.9 | 68c  | Itchenor .....                | ..... 5.2 |
| 14c | Cotehele Quay .....            | ..... 5.0 | 68d  | Deli Quay .....               | ..... 5.3 |
| 14d | Lopwell .....                  | ..... 3.4 | 69   | Selsey Bill .....             | ..... 5.7 |
| 14e | Jupiter Point .....            | ..... 5.9 | 70   | Nab Tower .....               | ..... 4.9 |
| 14f | St. Germans .....              | ..... 5.5 | 134  | Woodbridge Haven .....        | ..... 4.1 |
| 15  | Turnchapel .....               | ..... 5.9 | 134a | Woodbridge .....              | ..... 4.5 |
| 15a | Bovisand Pier .....            | ..... 5.7 | 135  | Bawdsey .....                 | ..... 3.7 |
| 17  | River Yealm Entrance ..        | ..... 5.8 | 136  | Orford Haven Bar .....        | ..... 3.5 |
| 20  | Salcombe .....                 | ..... 5.7 | 136a | Orford Quay .....             | ..... 3.1 |
| 21  | Start Point .....              | ..... 6.1 | 136b | Slaughden Quay .....          | ..... 3.1 |
| 23a | Greenway Quay .....            | ..... 5.6 | 136c | Iken Cliffs .....             | ..... 3.2 |
| 23b | Totnes .....                   | ..... 4.1 | 137  | Orford Ness .....             | ..... 3.0 |
| 26  | Telgnmouth (Approaches) .....  | ..... 5.4 | 139  | Aldeburgh .....               | ..... 3.5 |
| 26a | Telgnmouth (New Quay) .....    | ..... 5.5 | 139a | Sizewell .....                | ..... 3.2 |
| 26b | Exmouth (Approaches) .....     | ..... 4.8 | 140  | Southwold .....               | ..... 3.0 |
| 27  | Exmouth Dock .....             | ..... 4.5 | 142  | Gorleston .....               | ..... 2.9 |
| 27a | Starcross .....                | ..... 4.6 | 143  | Caister .....                 | ..... 3.2 |
| 27b | Turf Lock .....                | ..... 4.3 | 144  | Winterton .....               | ..... 4.3 |
| 27c | Topsham .....                  | ..... 4.5 | 154  | Cromer .....                  | ..... 5.5 |
| 28  | Lyme Regis .....               | ..... 4.8 | 155  | Blakeney Bar .....            | ..... 6.3 |
| 29  | Bridport (West Bay) .....      | ..... 4.5 | 155a | Blakeney .....                | ..... 4.1 |
| 30  | Chesil Beach .....             | ..... 4.4 | 157  | Wells Bar .....               | ..... 6.6 |
| 31  | Chesil Cove .....              | ..... 4.4 | 157a | Wells .....                   | ..... 4.2 |
| 34  | Lulworth Cove .....            | ..... 2.6 | 158  | Bumham (Overy Staith) .....   | ..... 3.0 |
| 34a | Mupe Bay .....                 | ..... 2.6 | 161  | Hunstanton .....              | ..... 8.3 |
| 35  | Swanage .....                  | ..... 2.4 | 161a | West Stones .....             | ..... 8.3 |
| 36  | Pool (Entrance) .....          | ..... 2.7 | 162  | King's Lynn .....             | ..... 7.7 |
| 36a | Town Quay .....                | ..... 2.4 | 163  | Outer Westmark Knock .....    | ..... 8.0 |
| 36b | Pottery Pier .....             | ..... 2.5 | 164  | Wisbech Cut .....             | ..... 7.9 |
| 36c | Wareham (River Frome) .....    | ..... 2.4 | 164b | Lawyer's Sluice .....         | ..... 7.9 |
| 36d | Cleavel Point .....            | ..... 2.4 | 165  | Tabs Head .....               | ..... 8.4 |
| 37  | Bournemouth .....              | ..... 2.4 | 166  | Boston .....                  | ..... 7.6 |
| 38  | Christchurch (Entrance) ..     | ..... 2.0 | 167  | Skegness .....                | ..... 7.7 |
| 38a | Christchurch (Quay) .....      | ..... 1.9 | 168  | Inner Dowsing Light .....     | ..... 7.1 |
| 38b | Christchurch (Tuckton) .....   | ..... 1.9 | 171  | Bull Sand Fort .....          | ..... 7.7 |
| 39  | Hurst Point .....              | ..... 2.9 | 172  | Grimsby .....                 | ..... 7.8 |
| 40  | Lymington .....                | ..... 3.2 | 174  | Kingston upon Hull .....      | ..... 8.5 |
| 42  | Bucklers Hard .....            | ..... 4.0 | 174a | Burton Stather .....          | ..... 6.2 |
| 43  | Stansore Point .....           | ..... 4.3 | 174b | Keadby .....                  | ..... 5.6 |
| 45  | Yarmouth .....                 | ..... 3.2 | 175  | Blacktoft .....               | ..... 6.7 |
| 46  | Totland Bay .....              | ..... 2.7 | 176  | Goole .....                   | ..... 6.7 |
|     |                                |           | 181  | Bridlington .....             | ..... 6.8 |

TABLE V - Part 2

|      |  |          |      |                          |           |
|------|--|----------|------|--------------------------|-----------|
| 182  | Filey Bay .....                            | .... 6.2 | 356  | Loch Eatharna .....      | ..... 4.9 |
| 183  | Scarborough .....                          | .... 6.5 | 357  | Gott Bay .....           | ..... 4.4 |
| 184  | Whitby .....                               | .... 6.2 | 359  | Carsaig Bay (Mull) ..... | ..... 4.5 |
| 186  | Middlesbrough<br>(Dock Entrance) .....     | .... 6.1 | 360  | Iona .....               | ..... 4.4 |
| 187  | Tees Bridge (Newport)...                   | .... 6.1 | 361  | Bunessan .....           | ..... 4.9 |
| 188  | Hartlepool .....                           | .... 6.0 | 362  | Ulva Sound .....         | ..... 4.9 |
| 189  | Seaham .....                               | .... 5.7 | 363  | Salen .....              | ..... 5.0 |
| 190  | Sunderland .....                           | .... 5.7 | 364  | Tobermory .....          | ..... 4.9 |
| 201  | Entrance .....                             | ... 5.8  | 364a | Salen (Sound Of Mull)..  | .... 4.7  |
| 203  | Newcastle-Upon-Tyne .....                  | .... 6.1 | 365  | Loch Aline .....         | .... 5.1  |
| 204  | Blyth .....                                | .... 5.6 | 365a | Craignure .....          | .... 4.4  |
| 205  | Coquet Island .....                        | .... 5.8 | 367  | Corran .....             | .... 4.9  |
| 206  | Amble .....                                | .... 5.7 | 368  | Corpach .....            | .... 4.5  |
| 207  | North Sunderland<br>(Northumberland) ..... | .... 5.5 | 368a | Loch Eil Head .....      | .... ⊙    |
| 208  | Holy Island .....                          | .... 5.5 | 369  | Loch Leven Head .....    | .... ⊙    |
| 209  | Berwick .....                              | .... 5.3 | 370  | Port Appin .....         | .... 4.7  |
| 221  | Eyemouth .....                             | .... 5.8 | 370a | Barcaldine Pier .....    | .... 4.6  |
| 222  | Dunbar .....                               | .... 5.9 | 370b | Loch Cieran Head .....   | .... 4.2  |
| 223  | Fidra .....                                | .... 6.0 | 371  | Dunstaffnage Bay ...     | .... 4.6  |
| 224  | Cockenzie .....                            | .... 5.9 | 371a | Connel .....             | .... 4.1  |
| 226  | Granton .....                              | .... 6.2 | 371b | Bonawe .....             | .... 2.3  |
| 228  | Grangemouth .....                          | .... 6.4 | 373  | Seil Sound .....         | .... 3.0  |
| 229  | Kincardine .....                           | .... 6.5 | 374  | Scalasaig .....          | .... 4.1  |
| 229a | Alloa .....                                | .... 6.3 | 375  | Glengarrisdale Bay ..... | .... 4.0  |
| 229b | Stirling .....                             | .... 3.6 | 377  | Rubha A'Mhail .....      | .... 4.1  |
| 230  | Burntisland .....                          | .... 6.4 | 378  | Ardnave Point .....      | .... 4.0  |
| 231  | Kirkcaldy .....                            | .... 5.9 | 379  | Orsay Island .....       | .... 3.0  |
| 232  | Methil .....                               | .... 6.2 | 380  | Bruichladdich .....      | .... 2.6  |
| 233  | Anstruther Easter .....                    | .... 5.9 | 381  | Port Ellen .....         | .... 1.0  |
| 322  | St. Kilda .....                            | .... 4.0 | 382  | Port Askaig .....        | .... 2.4  |
| 323  | Flannan Isles .....                        | .... 4.5 | 383  | Craighouse .....         | .... 2.7  |
| 324  | Rookcall .....                             | .... 3.6 | 384  | Loch Beag .....          | .... 1.2  |
| 327  | Loch Bervie .....                          | .... 5.4 | 387  | Carsaig Bay .....        | .... 2.2  |
| 328  | Loch Laxford .....                         | .... 5.6 | 389  | Gigha Sound .....        | .... 1.6  |
| 329  | Badcall Bay .....                          | .... 5.1 | 390  | Machirianish .....       | .... ⊙    |
| 330  | Loch Nedd .....                            | .... 5.5 | 391  | Southend (Kintyre) ..... | .... 2.5  |
| 332  | Loch Inver .....                           | .... 5.6 | 392  | Sanda Island .....       | .... ⊙    |
| 333  | Tanera Mor .....                           | .... 5.7 | 393  | Campbeltown .....        | .... 3.2  |
| 336  | Mellon Charles .....                       | .... 5.4 | 393a | Carradale .....          | .... 3.5  |
| 337  | Gairloch .....                             | .... 5.8 | 393b | Loch Ranza .....         | .... 3.4  |
| 338  | Shieldaig .....                            | .... 6.3 | 394  | East Loch Tarbert .....  | .... 4.2  |
| 338a | Applecross .....                           | .... 5.9 | 395  | Inverary .....           | .... ⊙    |
| 339  | Plockton .....                             | .... 6.4 | 396  | Rubha Bodach .....       | .... 3.6  |
| 341  | Broadford Bay .....                        | .... 6.1 | 396a | Tighnabruaich .....      | .... 3.7  |
| 342  | Portree .....                              | .... 6.1 | 398  | Millport .....           | .... 3.9  |
| 343  | Loch Snizort (Uig Bay) .....               | .... 6.2 | 399  | Rothesay Bay .....       | .... 4.1  |
| 344  | Loch Dunvegan .....                        | .... 5.9 | 399a | Wemyss Bay .....         | .... 3.9  |
| 345  | Loch Harport .....                         | .... 5.8 | 399b | Couplport .....          | .... 4.0  |
| 346  | Camus Nan Gall .....                       | .... 5.4 | 399c | Lochgoilhead .....       | .... 3.8  |
| 349  | Kyle of Lochalsh .....                     | .... 5.9 | 401  | Arrochar .....           | .... 3.9  |
| 349a | Dornie Bridge .....                        | .... 5.8 | 402  | Rosneath .....           | .... 3.8  |
| 351  | Gleneig Bay .....                          | .... 5.5 | 402a | Shandon .....            | .... 3.8  |
| 352  | Loch Hourn .....                           | .... 5.6 | 402b | Garelochhead .....       | .... 3.9  |
| 353  | Inverie Bay .....                          | .... 5.5 | 403  | Helensburgh .....        | .... 3.9  |
| 353a | Mallaig .....                              | .... 5.6 | 405  | Port Glasgow .....       | .... 4.2  |
| 354  | Bay Of Laig .....                          | .... 5.2 | 406  | Bowling .....            | .... 4.6  |
| 355  | Loch Moidart .....                         | .... 5.4 | 406a | Renfrew .....            | .... 5.1  |
|      |  |          | 407  | Glasgow .....            | .... 5.3  |
|      |  |          | 408  | Brodick Bay .....        | .... 3.6  |
|      |  |          | 409  | Lamlash .....            | .... 3.7  |
|      |  |          | 410  | Ardrossan .....          | .... 3.7  |
|      |  |          | 411  | Irvine .....             | .... 3.6  |

TABLE V - Part 2

|      |                                  |           |      |                          |           |
|------|----------------------------------|-----------|------|--------------------------|-----------|
| 412  | Troon .....                      | .... 3.7  | 476  | Trwyn Dinmor .....       | .... 8.5  |
| 413  | Ayr .....                        | .... 3.4  | 476a | Moelfre .....            | .... 8.5  |
| 414  | Girvan .....                     | .... 3.6  | 477  | Amlwch .....             | .... 8.1  |
| 414a | Stranraer .....                  | .... 3.7  | 477a | Cemaes Bay .....         | .... 7.5  |
| 415  | Portpatrick .....                | .... 4.3  | 479  | Trearddur Bay .....      | .... 5.9  |
| 420  | Drummore .....                   | .... 6.5  | 479a | Porth Treecastell .....  | .... 5.7  |
| 420a | Port William .....               | .... 7.2  | 480  | Llanddwyn Island .....   | .... 5.5  |
| 421  | Isle Of Whithorn .....           | .... 7.9  | 480a | Trevor .....             | .... 5.6  |
| 422  | Garlieston .....                 | .... 7.8  | 481  | Porth Dinllaen .....     | .... 5.3  |
| 422a | Kirkcudbright Bay .....          | .... 8.5  | 481a | Forth Ysgaden .....      | .... 5.2  |
| 424  | Hestan Islet .....               | .... 9.6  | 482  | Bardsey Island .....     | .... 5.1  |
| 425  | Southerness Point .....          | .... 9.8  | 482a | Aberdaron .....          | .... 5.3  |
| 426  | Annan Waterfoot .....            | .... 8.6  | 482b | St. Tudwal's Roads ..... | .... 5.6  |
| 430  | Torduff Point .....              | .... 7.0  | 483  | Pwllheli .....           | .... 5.8  |
| 431  | Redkirk .....                    | .... 5.5  | 483a | Criccieth .....          | .... 5.8  |
| 432  | Silloth .....                    | .... 10.6 | 484  | Porthmadog .....         | .... 5.9  |
| 433  | Maryport .....                   | .... 9.9  | 485  | Barmouth .....           | .... 5.5  |
| 434  | Workington .....                 | .... 9.2  | 486  | Aberdovey .....          | .... 5.5  |
| 435  | Whitehaven .....                 | .... 9.1  | 487  | Aberystwyth .....        | .... 5.8  |
| 436  | Tarn Point .....                 | .... 9.5  | 488  | New Quay .....           | .... 5.6  |
| 437  | Duddon Bar .....                 | .... 9.7  | 488a | Aberporth .....          | .... 5.4  |
| 440  | Barrow .....                     | .... 10.4 | 489  | Port Cardigan .....      | .... 5.3  |
| 440a | Haws Point .....                 | .... 10.3 | 489a | Cardigan (Town) .....    | .... 5.4  |
| 440b | Ulverston .....                  | .... 10.6 | 491  | Porthgain .....          | .... 5.0  |
| 440c | Arnside .....                    | .... 11.2 | 492  | Ramsey Sound .....       | .... 5.7  |
| 440d | Morecambe .....                  | .... 10.9 | 492a | Solva .....              | .... 6.1  |
| 441  | Heysham .....                    | .... 11.0 | 492b | Little Haven .....       | .... 6.6  |
| 442  | Glasson Dock .....               | .... 8.0  | 493  | Martin's Haven .....     | .... 6.9  |
| 442a | Lancaster .....                  | .... 5.5  | 494  | Skomer Island .....      | .... 7.3  |
| 443  | Wyre Lighthouse .....            | .... 10.4 | 495  | Dale Roads .....         | .... 7.9  |
| 444  | Fleetwood .....                  | .... 10.4 | 497  | Neyland .....            | .... 7.9  |
| 445  | Blackpool .....                  | .... 10.1 | 498  | Black Tar .....          | .... 8.0  |
| 446  | Preston .....                    | .... 6.5  | 499  | Haverfordwest .....      | .... 3.1  |
| 447  | Southport .....                  | .... 10.2 | 501  | Stackpole Quay .....     | .... 8.8  |
| 448  | Formby .....                     | .... 10.0 | 502  | Tenby .....              | .... 9.4  |
| 450  | Rock Channel .....               | .... 10.1 | 504  | Ferryside .....          | .... 7.7  |
| 451  | Liverpool (Gladstone Dock) ..... | .... 10.4 | 504a | Carmarthen .....         | .... 3.6  |
| 453  | Bestham .....                    | .... 10.9 | 505  | Burry Port .....         | .... 9.5  |
| 455  | Hale Head .....                  | .... 8.1  | 505a | Llanelli .....           | .... 8.7  |
| 456  | Widnes .....                     | .... 6.4  | 508  | Mumbles .....            | .... 10.4 |
| 456a | Fiddler's Ferry .....            | .... 4.8  | 510  | Port Talbot .....        | .... 10.8 |
| 461  | Hilbre Island .....              | .... 10.2 | 512  | Porthcawl .....          | .... 11.0 |
| 462  | Chester .....                    | .... 5.2  | 513  | Barry .....              | .... 13.0 |
| 463  | Connah's Quay .....              | .... 5.7  | 513a | Flat Holm .....          | .... 13.0 |
| 464  | Mostyn Docks .....               | .... 9.6  | 513b | Steep Holm .....         | .... 12.7 |
| 466  | Peel .....                       | .... 5.8  | 514  | Cardiff .....            | .... 13.5 |
| 467  | Ramsey .....                     | .... 8.4  | 515  | Newport .....            | .... 13.7 |
| 468  | Douglas .....                    | .... 7.9  | 516  | Chepstow .....           | .... ①    |
| 468a | Port St. Mary .....              | .... 6.6  | 517  | Sudbrook .....           | .... 14.9 |
| 469  | Calf Sound .....                 | .... 6.9  | 518  | Beachley (Aust) .....    | .... 14.5 |
| 469a | Port Erin .....                  | .... 5.8  | 519  | Inward Rocks .....       | .... 13.7 |
| 470  | Colwyn Bay .....                 | .... 8.9  | 520  | Narwood Rocks .....      | .... 12.8 |
| 471  | Llandudno .....                  | .... 8.6  | 521  | White House .....        | .... 11.7 |
| 471a | Conwy .....                      | .... 8.9  | 522  | Berkeley .....           | .... 10.9 |
| 472  | Beaumaris .....                  | .... 8.6  | 522a | Sharpness Dock .....     | .... 10.9 |
| 473  | Menai Bridge .....               | .... 8.2  | 522b | Wellhouse Rock .....     | .... 10.7 |
| 474  | Port Dinorwic .....              | .... 6.3  | 522c | Epney .....              | .... ①    |
| 475  | Caernarvon .....                 | .... 5.9  | 522d | Minsterworth .....       | .... ①    |
| 475a | Port Belan .....                 | .... 5.3  | 522e | Llanthony .....          | .... ①    |

TABLE V - Part 2

|      |                           |           |       |                                |           |
|------|---------------------------|-----------|-------|--------------------------------|-----------|
| 523a | Shirehampton .....        | .... 14.0 | 721   | Fenit Pier .....               | .... 5.1  |
| 523b | Sea Mills .....           | .... 13.3 | 722   | Smerwick Harbour .....         | .... 4.3  |
| 524  | Cumberland Basin Entrance | .... 11.8 | 723   | Dingle Harbour .....           | .... 4.4  |
| 524a | Portishead .....          | .... 14.6 | 724   | Cromane Point .....            | .... 5.0  |
| 525  | Clevedon .....            | .... 14.2 | 725   | Knights Town .....             | .... 4.2  |
| 525a | St. Thomas Head .....     | .... 14.2 | 726   | Ballyniskelligs Bay Castle ... | .... 4.0  |
| 526  | English And Welsh Grounds | .... 14.3 | 727   | West Cove .....                | .... 3.9  |
| 527  | Weston-Super-Mare ....    | .... 13.4 | 728   | Dunkerron Harbour .....        | .... 4.4  |
| 528  | Burnham-On-Sea .....      | .... 12.2 | 731   | Ballycrovane Harbour .....     | .... 3.9  |
| 529  | Bridgwater .....          | .... 5.9  | 732   | Black Ball Harbour .....       | .... 3.8  |
| 530  | Hinkley Point .....       | .... 12.8 | 733   | Castletown Bearhaven .....     | .... 3.5  |
| 531  | Watchet .....             | .... 12.6 | 734   | Bantry .....                   | .... 3.8  |
| 532  | Minehead .....            | .... 11.8 | 736   | Dunbeacon Harbour .....        | .... 3.7  |
| 533  | Porlock Bay .....         | .... 11.3 | 737   | Dunmanus Harbour .....         | .... 3.8  |
| 534  | Lynmouth .....            | .... 10.7 | 741   | Crookhaven .....               | .... 3.6  |
| 535  | Ifracombe .....           | .... 10.4 | 742   | Skull .....                    | .... 3.5  |
| 536  | Appledore .....           | .... 8.7  | 743   | Baltimore, Ireland .....       | .... 3.8  |
| 537  | Yelland Marsh .....       | .... 8.1  | 744   | Castletownshend .....          | .... 4.0  |
| 538  | Fremington .....          | .... 7.1  | 745   | Clonakilty Bay .....           | .... 4.1  |
| 539  | Barnstaple .....          | .... 5.4  | 746   | Courtmacsherry .....           | .... 4.3  |
| 540  | Bideford .....            | .... 7.0  | 747   | Kinsale .....                  | .... 4.2  |
| 541  | Clovelly .....            | .... 9.2  | 752   | Passage West .....             | .... 4.5  |
| 542  | Lundy .....               | .... 8.9  | 753   | Cork .....                     | .... 4.8  |
| 543  | Bude .....                | .... 8.6  | 754   | Ballycotton .....              | .... 4.4  |
| 544  | Boscastle .....           | .... 8.1  | 755   | Youghal .....                  | .... 4.2  |
| 696  | Clare Island .....        | .... 5.0  | 756   | Dungarvan Harbour .....        | .... 4.4  |
| 697  | Inishgort .....           | .... 4.9  | 761   | Dunmore East .....             | .... 4.6  |
| 701  | Killary Harbour .....     | .... 4.6  | 761a  | Checkpoint .....               | .... 4.9  |
| 702  | Bofin Harbour .....       | .... 4.6  | 762   | Waterford .....                | .... 5.0  |
| 703  | Clifden Bay .....         | .... 4.9  | 763   | New Ross .....                 | .... 4.7  |
| 704  | Slyne Head .....          | .... 4.9  | 765   | Great Saltee .....             | .... 4.2  |
| 705  | Roundstone Bay .....      | .... 4.9  | 766   | Cansote Point .....            | .... 3.9  |
| 706  | Kilkieran Cove .....      | .... 5.3  |       |                                |           |
| 707  | Killeany Bay .....        | .... 5.2  |       |                                |           |
| 711  | Liscannor .....           | .... 5.2  | 1603  | Braye .....                    | .... 6.9  |
| 712  | Seafield Point .....      | .... 5.1  | 1603a | Maiseline Pier .....           | .... 9.9  |
| 713  | Killaha Bay .....         | .... 4.7  | 1606  | St Catherine Bay .....         | .... 12.2 |
| 713a | Carrigaholt .....         | .... 5.4  | 1606a | Bouley Bay .....               | .... 11.9 |
| 714  | Kilrush .....             | .... 5.6  | 1607  | Les Ecrehou .....              | .... 12.1 |
| 716  | Foynes Island .....       | .... 5.7  | 1608  | Les Minquiers .....            | .... 12.9 |
| 717  | Mellan Point .....        | .... 6.5  |       |                                |           |
| 718  | Limerick Dock .....       | .... 6.7  |       |                                |           |
| 719  | Coney Island .....        | .... 5.8  |       |                                |           |

The preceding table gives HAT tidal levels of all Secondary Ports in this volume, and are referred to Chart Datum, which is the same as the zero of the tidal predictions in all cases.

Notes:

① No data

## Height Differences

For semi-diurnal ports, heights obtained by applying the height differences are those for the *mean* spring and neap levels.

## Seismic Sea Waves

Submarine earthquakes set up long waves which travel across the ocean at very great speeds, often reaching a speed of 400 knots in the Pacific. On entering shallow water these waves increase in height and often reach destructive proportions; it is, however, rare for a seismic sea wave to be recorded in the British Isles.

## Supplementary Tables

- Table I. - Conversion Table - metres to feet.
- Table II. - Multiplication table.
- Table III. - Height of Chart Datum relative to Ordnance Datum in the United Kingdom.
- Table IV. - Height of Chart Datum relative to the Land Levelling System in countries outside the United Kingdom.
- Table V. - Standard Ports: Tidal Levels and Authorities for observations, analyses and predictions.
- Table VI. - Fortnightly Shallow Water Corrections.
- Table VII. - Table of Tidal Angles and Factors, which is the astronomical data for each day of the year (at 0000) used in the Simplified Harmonic Method of Tidal Prediction and in the short period analysis of 24-hourly heights or rates.
- Table VIII. - Table of weekly values of Orbital Elements required for use in the derivation of the Astronomical Arguments ( $E_0$ ,  $u$  and  $f$ ) for all constituents.

## INSTRUCTIONS FOR THE USE OF TABLES

### TO FIND THE TIMES AND HEIGHTS OF HIGH AND LOW WATER

#### *Standard Ports*

The times and heights of high and low water are tabulated for every day of the year. The zone time used for the predicted times is usually the standard time for the area and is given at the top of each page. Care should be taken to ensure that this is the actual time zone in use on that date, the predicted time being corrected if necessary. Special care is needed for those ports whose time is changed during the year. In the British Isles, Greenwich Mean Time is shown throughout the year and a correction must be applied during the period of "Summer Time".

The heights are shown in metres referred to the chart datum of the port concerned.

#### *Secondary Ports*

The times of high and low water are obtained by applying the time differences tabulated in Part II to the daily prediction for the most suitable (not necessarily the closest) Standard Port. The Standard Port to be used is that which appears in bold type at the head of the subsection in Part II. Other Standard Ports may occur within a subsection in their correct geographical sequence but full data for these are not shown. The times obtained by applying these corrections are in the zone time shown next above the Secondary Port irrespective of the zone time used for the Standard Port predictions. Special care is needed when considering adjacent ports in different countries which may not be keeping the same time.

The time differences given are approximately the maximum and minimum differences which will be found to occur under normal weather conditions. Although these differences are normally shown to the nearest minute it must not be assumed that the resulting predictions will be to this accuracy.

Predictions which fall between the times given for the Standard Port at the head of each column can be obtained by simple interpolation between the columns. Time differences must not be extrapolated but only interpolated between the given values for times at Standard Ports which give values throughout a 24 hour period. Thus for secondary ports referred to SHOREHAM:

|                                 | H.W.                | L.W.                |                             |
|---------------------------------|---------------------|---------------------|-----------------------------|
| 81 SHOREHAM ..... (see page 42) | 0500<br>and<br>1700 | 1000<br>and<br>2200 | 0000<br>and<br>1200<br>1800 |
| 75 Worthing .....               | 50 48 0 22          | +0010               | 0000 -0005 -0010            |

the HW time difference for a tide which occurs at SHOREHAM at 1230 must be interpolated between the values tabulated for 1000 and 1700. High waters which occur at SHOREHAM at both 2330 and at 0300 must have their time differences interpolated between those values tabulated for 2200 and 0500. If a number of tides are required stretching over a period a graphical solution is a convenient method of obtaining this interpolation.

The heights of high and low water are obtained by applying the height differences tabulated in Part II to the daily predictions for the same Standard Port as is used for the times. These differences are tabulated for mean spring and mean neap levels at the Standard Port. Unless there is a statement to the contrary in Part II it may be assumed that the variation is linear and differences for heights other than springs and neaps may be obtained by interpolation or extrapolation. It MUST be noted that the predictions for the Standard Ports include the seasonal variations for the Standard Port which may be different from those for the Secondary Port. The first step is therefore to SUBTRACT algebraically the seasonal variation for the Standard Port from the predicted height obtained from Part I. The next step is to apply the height difference corresponding to this corrected height at the Standard Port, interpolating or extrapolating as necessary. The final step is to ADD algebraically the seasonal variation for the Secondary Port. In both cases great care must be taken to ensure that the signs of the seasonal variations are correctly applied. Where no seasonal variations are given they are less than 0.1 m. and can be ignored. Allowance has been made in the preparation of the tables for any difference in the level of chart datum between the Standard and Secondary Port and the resulting heights are referred to *chart datum at the Secondary Port concerned*. See Example I.

Programmable Calculators can be used with advantage for the arithmetic of the Simplified Harmonic Method of Tidal Prediction. A recommended method with a form and worked example for use when programming can be found on page xxvi.

The accuracy of a prediction for a Secondary Port will depend on the amount of work involved. The less work undertaken, the less accurate the prediction is likely to be. All the data necessary for a more accurate prediction are published in this volume where such data exists.

## TO FIND THE HEIGHT OF TIDE AT TIMES BETWEEN HIGH AND LOW WATER

### *Standard Ports*

Intermediate times and heights may best be predicted by the use of the Mean Spring and Neap Curves which are given before the daily predictions for each port. See Examples II and III.

### *Secondary Ports*

For Secondary Ports on a stretch of coast where there is little change of shape between adjacent Standard Port curves and where the duration of rise or fall at the Secondary Port is not markedly different from that of the appropriate Standard Port (i.e. where HW and LW time differences in Part II are nearly the same) intermediate times and heights may be obtained by using the Mean Spring and Neap Curves for the appropriate Standard Port. See Examples IV and V.

Between Swanage and Selsey the tide is of considerable complexity and justifies the inclusion of individual curves - shown on pages xxii to xxv.

In some other cases the use of the Simplified Harmonic Method of Tidal Prediction is recommended where the intermediate heights are important; these ports are indicated in Part II by "c". This method may sometimes be improved by adjusting the curve to fit high and low waters derived from the time and height differences, particularly when a large range of tide is involved.

See page xxvi for instructions on the use of calculators and the Simplified Harmonic Method of Tidal Prediction. The harmonic constants required for this method will be found in Part III of these tables, the Tidal Angles and Factors in Table VII, and Forms A and B at the back of the book. The remainder of this section is therefore devoted to the descriptions of and instructions for the use of the Mean Spring and Neap Curves in Admiralty Tide Tables.

### CURVE INTERPOLATION

Mean Spring and Neap Curves for Standard Ports show the factor of the range attained at given time intervals relative to that of HW: thus by definition  $HW=1$  and  $LW=0$

The spring curve is shown in solid line and the neap curve, where it differs from the spring in pecked. Interpolation can be made by eye using the plotted positions of the predicted heights with reference to the levels of MHWS etc. *No attempt should be made to extrapolate beyond the spring or neap curves:* for ranges greater than springs the spring curve should be used, while for ranges less than neaps the neap curve should be used.

Where there is an appreciable change in duration between spring and neap tides the results obtained may have a slight error. This error will normally be greatest near LW but in the few cases where the times are plotted relative to LW it will be greatest near HW

### MEAN LEVELS

The values of LAT, MLWS, MLWN, ML, MHWN, MHWS and HAT are shown for Standard Ports in Table V. The values of MLWS, MLWN, MHWN and MHWS may be found for Secondary Ports by the direct application of the appropriate height difference tabulated in Part II.

The values of HAT and LAT may be found for a Secondary Port by extrapolating beyond the given differences for a tide that reaches the appropriate level at the Standard Port.

### OFFSHORE AREAS AND PLACES BETWEEN SECONDARY PORTS

Tidal predictions for offshore areas and stretches of coastline between Secondary Ports should be obtained by the use of Co-Tidal Charts. For details of Co-Tidal Charts available see page 428 and the Catalogue of Admiralty Charts. Full instructions for their use are contained on the body of the charts.

### DETAILED INSTRUCTIONS AND EXAMPLES

The Tidal Prediction Form is intended to assist with time and height calculations. The examples have been carried out on these forms and the instructions refer to the boxes. Copies of the form are bound in the back of Admiralty Tide Tables.

- I. To find the time and height of HW and LW at a Secondary Port
- I. Complete heading of the Tidal Prediction Form.
  - II. Transfer data from ATT Part I to boxes (1), (2), (3) and (4).
  - III. Interpolate data from ATT Part II and insert in boxes (7), (8), (9) and (10).
  - IV. Enter Seasonal Changes for Standard and Secondary Ports from ATT Part II in boxes (6) and (11).
  - V. Apply results of Steps III and IV to obtain boxes (12), (13), (14) and (15).

**Example:**

Find the time (BST) and height of the afternoon HW and LW at ST. MARY'S (Isles of Scilly) on 14th July.  
*Note:* The data used in this example do not refer to the year of these tables.

Extract from ATT Part I.

| JULY                 |  |    |      |     |
|----------------------|--|----|------|-----|
| PLYMOUTH (DEVONPORT) |  |    |      | 14  |
|                      |  |    | 0309 | 1.0 |
|                      |  |    | 0927 | 5.3 |
|                      |  | SA | 1532 | 1.1 |
|                      |  |    | 2149 | 5.0 |

Extract from ATT Part II.

| No. | PLACE                         | Lat.<br>N. | Long.<br>W.  | TIME DIFFERENCES    |                     |                     |                     | HEIGHT DIFFERENCES (IN METRES) |      |      |      |
|-----|-------------------------------|------------|--------------|---------------------|---------------------|---------------------|---------------------|--------------------------------|------|------|------|
|     |                               |            |              | High Water<br>Zone  | UT(GMT)             | Low water<br>Zone   | UT(GMT)             | MHWS                           | MHWN | MLWN | MLWS |
| 14  | PLYMOUTH<br>(DEVONPORT)       |            | (see page 6) | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 5.5                            | 4.4  | 2.2  | 0.8  |
| 1   | Isles of Scilly<br>St. Mary's | 49 55      | 6 19         | -0050               | -0100               | -0045               | -0045               | +0.2                           | -0.1 | -0.2 | -0.1 |

SEASONAL CHANGES IN MEAN LEVEL

| No.   | Jan. 1 | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1     | Aug. 1 | Sep. 1 | Oct. 1 | Nov. 1 | Dec. 1 |
|-------|--------|--------|--------|--------|-------|--------|------------|--------|--------|--------|--------|--------|
| 1-60b |        |        |        |        |       |        | Negligible |        |        |        |        |        |

**TIDAL PREDICTION FORM**

STANDARD PORT...Devonport..... TIME/HEIGHT REQUIRED.P.m.....

SECONDARY PORT...St. Mary's..... DATE 14 July TIME ZONE BST.....

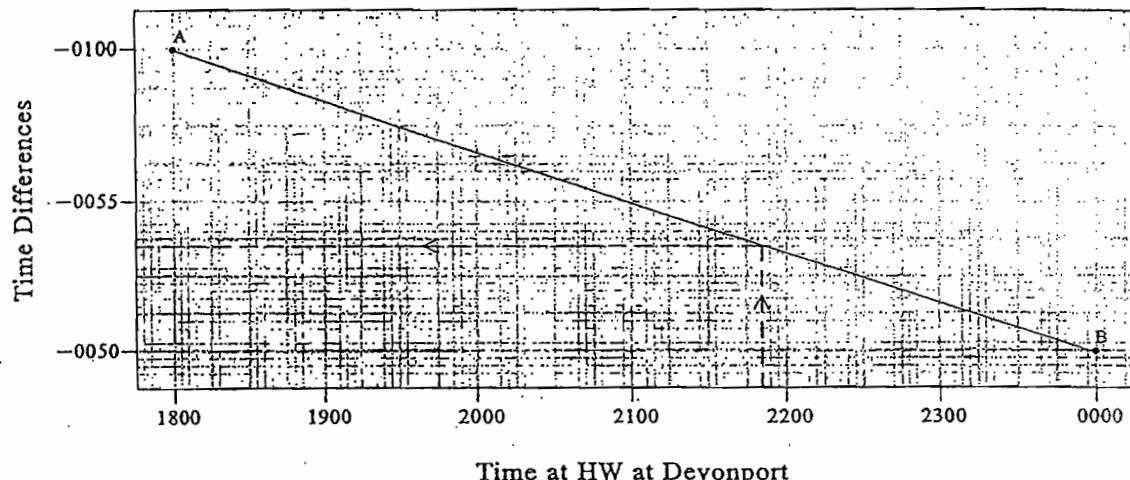
| STANDARD PORT   | TIME           |         | HEIGHT |         | RANGE |
|-----------------|----------------|---------|--------|---------|-------|
|                 | HW             | LW      | HW     | LW      |       |
| 1 2149          | 2 1532         | 3 5.0   | 4 1.1  | 5 3.9   |       |
| Seasonal change | Standard Port  |         | 6 0.0  | 6 0.0   |       |
| DIFFERENCES     | 7*-0054        | 8*-0045 | 9*+0.1 | 10*-0.1 |       |
| Seasonal change | Secondary Port |         | 11 0.0 | 11 0.0  |       |
| SECONDARY PORT  | 12 2055        | 13 1447 | 14 5.1 | 15 1.0  |       |
| Duration        | 16 0608        |         |        |         |       |

LW 1447 GMT = 1547 BST  
 HW 2055 GMT = 2155 BST

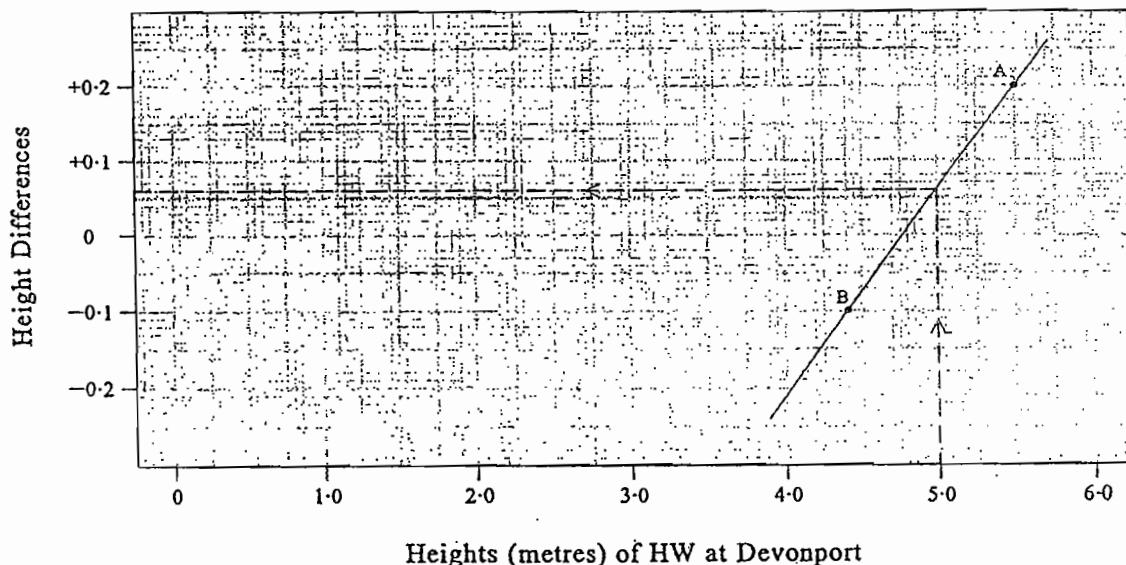
### SECONDARY PORT TIME AND HEIGHT DIFFERENCE INTERPOLATION

In most cases interpolation can be carried out by eye. For complex examples or where greater accuracy is required the use of a pocket calculator may be preferred. These interpolations can also be shown graphically at any convenient scale.

Plot the two high water time differences A (-0100 at 1800) and B (-0050 at 0000) and join AB. Read off the Time Difference for St Mary's corresponding to a HW time at Devonport of 2149 = -0054.



The height difference can be plotted in the same way. Plot A (MHWS of 5.5 and +0.2) and B (MHWN of 4.4 and -0.1). Draw a line through A and B. Read off the height difference for St Mary's corresponding to a height at Devonport of 5.0 = +0.1m.



Similarly plot the low water time and height differences.

*IV and V. Intermediate Times/Heights (Secondary Port)*

These are the same as the appropriate calculations for a Standard Port (Examples *II* and *III*) except that the Standard Curve diagram for the Standard Port must be entered with HW and LW heights and times for the Secondary Port obtained on the Tidal Prediction Form (Example *I*). When interpolating between the spring and neap curves (see para. III of Examples *II* and *III*) the range at the Standard Port must be used.

**Examples:**

Find the height of the tide at PADSTOW at 1100 on 28th February. Find the time at which the morning tide at PADSTOW falls to 4.9m on 28th February.

**Notes:** The data used in these examples do not refer to the year of these tables.

For Instructions on graphical interpolation of differences, see page xv.

Extract from ATT Part I.

|    |    | FEBRUARY      |     |  |  |
|----|----|---------------|-----|--|--|
|    |    | MILFORD HAVEN |     |  |  |
|    | 28 | 0315          | 1.1 |  |  |
|    |    | 0922          | 6.6 |  |  |
| TU |    | 1538          | 1.3 |  |  |
|    |    | 2145          | 6.3 |  |  |

Extract from ATT Part II.

|     |               |                |                     |                     |                     |                     |      |      |      |      |
|-----|---------------|----------------|---------------------|---------------------|---------------------|---------------------|------|------|------|------|
| 496 | MILFORD HAVEN | (see page 150) | 0100<br>and<br>1300 | 0700<br>and<br>1900 | 0100<br>and<br>1300 | 0700<br>and<br>1900 | 7.0  | 5.2  | 2.5  | 0.7  |
| 545 | Padstow       | 50 33 4 56     | -0055               | -0050               | -0040               | -0050               | +0.3 | +0.4 | +0.1 | +0.1 |

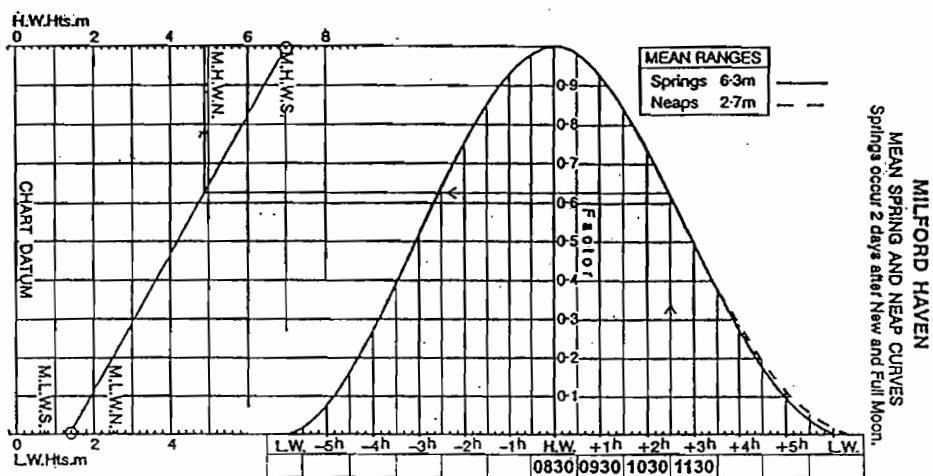
| SEASONAL CHANGES IN MEAN LEVEL |        |        |        |        |       |        |        |        |        |        |        |        |
|--------------------------------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|
| No.                            | Jan. 1 | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1 | Aug. 1 | Sep. 1 | Oct. 1 | Nov. 1 | Dec. 1 |
| 496                            | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | -0.1   | 0.0    | 0.0    | 0.0    | +0.1   | +0.1   |
| 544-548                        | +0.1   | 0.0    | 0.0    | -0.1   | -0.1  | -0.1   | 0.0    | 0.0    | 0.0    | 0.0    | +0.1   | +0.1   |

**TIDAL PREDICTION FORM**

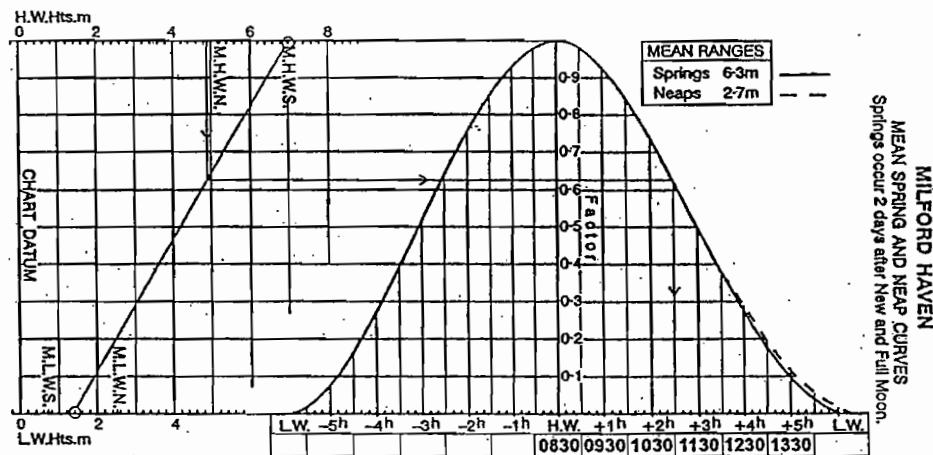
STANDARD PORT Milford Haven TIME/HEIGHT REQUIRED 1100 : 4.9

SECONDARY PORT Padstow DATE 28 Feb TIME ZONE GMT

| STANDARD PORT   | TIME           |        | HEIGHT  |          | RANGE |
|-----------------|----------------|--------|---------|----------|-------|
|                 | HW             | LW     | HW      | LW       |       |
| 1 0922          | 2 1538         | 3 6.6  | 4 1.3   | 5 5.3    |       |
| Seasonal change | Standard Port  | 6 0.0  | 6 0.0   |          |       |
| DIFFERENCES     | 7* -0052       | 8* —   | 9* +0.3 | 10* +0.1 |       |
| Seasonal change | Secondary Port | 11 0.0 | 11 0.0  |          |       |
| SECONDARY PORT  | 12 0830        | 13 —   | 14 6.9  | 15 1.4   |       |
| Duration        | 16 —           |        |         |          |       |



Height 4.9m



Time 1100

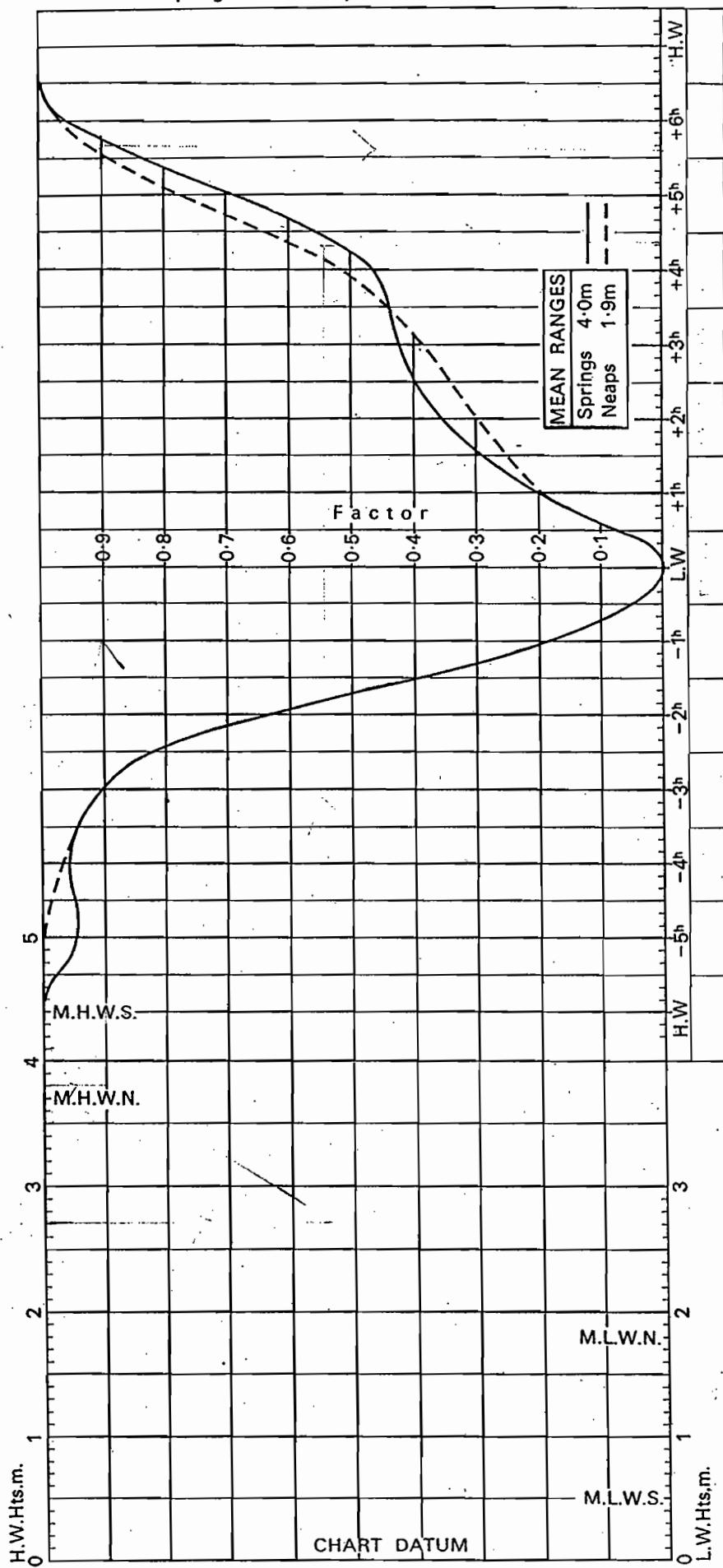
# **ENGLAND, SOUTH COAST - SOUTHAMPTON**

LAT 50°54'N      LONG 1°24'W

| TIME ZONE UT (GMT) |     |         |     | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |     |         |     |         |     |         |     |         |     |         |     | YEAR 0000 |  |
|--------------------|-----|---------|-----|--|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|-----------|--|
| JANUARY            |     |         |     | FEBRUARY                                 |     |         |     | MARCH   |     |         |     | APRIL   |     |         |     |           |  |
| TIME               | M   | TIME    | M   | TIME                                     | M   | TIME    | M   | TIME    | M   | TIME    | M   | TIME    | M   | TIME    | M   |           |  |
| 1 0504             | 0.6 | 16 0507 | 1.0 | 1 0036                                   | 4.7 | 0021    | 4.5 | 1 0524  | 0.3 | 16 0502 | 0.6 | 1 0018  | 4.6 | 0546    | 0.4 |           |  |
| 1123               | 4.5 | 1138    | 4.3 | 1 0629                                   | 0.4 | 16 0600 | 0.7 | 1 1141  | 4.6 | 1130    | 4.4 | 1 0608  | 0.4 | 16 1209 | 4.5 |           |  |
| TH 1728            | 0.4 | F 1726  | 0.8 | SU 1245                                  | 4.6 | M 1223  | 4.4 | SU 1744 | 0.1 | M 1719  | 0.4 | W 1233  | 4.5 | TH 1803 | 0.4 |           |  |
|                    |     |         |     | 1846                                     | 0.2 | 1815    | 0.5 |         |     | 2353    | 4.6 | 1823    | 0.5 |         |     |           |  |
| 2 0000             | 4.6 | 17 0010 | 4.3 | 2 0121                                   | 4.7 | 0050    | 4.5 | 2 0012  | 4.8 | 17 0536 | 0.5 | 2 0053  | 4.4 | 17 0028 | 4.6 |           |  |
| 0555               | 0.6 | 17 0542 | 1.0 | 2 0709                                   | 0.5 | 17 0633 | 0.6 | 2 0605  | 0.3 | 17 1159 | 4.5 | 2 0638  | 0.5 | 17 0622 | 0.4 |           |  |
| F 1211             | 4.5 | SA 1212 | 4.3 | M 1329                                   | 4.5 | TU 1254 | 4.4 | M 1222  | 4.6 | TU 1751 | 0.4 | TH 1309 | 4.3 | F 1248  | 4.4 |           |  |
| 1817               | 0.3 | 1758    | 0.7 | 1925                                     | 0.4 | 1845    | 0.5 | 1822    | 0.2 |         |     | 1850    | 0.7 | 1840    | 0.6 |           |  |
| 3 0051             | 4.6 | 18 0043 | 4.3 | 3 0204                                   | 4.6 | 18 0120 | 4.5 | 3 0051  | 4.7 | 18 0021 | 4.6 | 3 0126  | 4.2 | 18 0107 | 4.4 |           |  |
| 0645               | 0.6 | 18 0616 | 0.9 | 3 0747                                   | 0.6 | 18 0703 | 0.7 | 3 0641  | 0.3 | 18 0610 | 0.4 | 3 0704  | 0.8 | 18 0658 | 0.6 |           |  |
| SA 1301            | 4.5 | SU 1244 | 4.3 | TU 1413                                  | 4.3 | W 1327  | 4.4 | TU 1301 | 4.5 | W 1231  | 4.5 | F 1347  | 4.1 | SA 1335 | 4.3 |           |  |
| 1904               | 0.4 | 1832    | 0.7 | 2001                                     | 0.6 | 1915    | 0.7 | 1856    | 0.3 | 1823    | 0.4 | 1917    | 1.1 | 1919    | 0.9 |           |  |
| 4 0142             | 4.6 | 19 0116 | 4.3 | 4 0248                                   | 4.3 | 19 0154 | 4.4 | 4 0128  | 4.5 | 19 0052 | 4.6 | 4 0202  | 4.0 | 19 0154 | 4.3 |           |  |
| 0731               | 0.7 | 19 0650 | 1.0 | 4 0822                                   | 0.9 | 19 0733 | 0.9 | 4 0713  | 0.5 | 19 0640 | 0.5 | 4 0731  | 1.1 | 19 0738 | 0.9 |           |  |
| SU 1352            | 4.4 | M 1318  | 4.2 | W 1500                                   | 4.1 | TH 1407 | 4.2 | W 1341  | 4.4 | TH 1304 | 4.4 | SA 1428 | 3.9 | SU 1432 | 4.1 |           |  |
| 1948               | 0.5 | 1904    | 0.8 | 2036                                     | 1.0 | 1946    | 0.9 | 1926    | 0.6 | 1855    | 0.6 | 1947    | 1.5 | 2007    | 1.2 |           |  |
| 5 0234             | 4.4 | 20 0149 | 4.3 | 5 0334                                   | 4.1 | 20 0235 | 4.3 | 5 0207  | 4.3 | 20 0127 | 4.5 | 5 0243  | 3.8 | 20 0251 | 4.0 |           |  |
| 0815               | 0.9 | 20 0724 | 1.0 | 5 0859                                   | 1.2 | 20 0809 | 1.1 | 5 0741  | 0.8 | 20 0713 | 0.7 | 5 0806  | 1.5 | 20 0832 | 1.2 |           |  |
| M 1445             | 4.2 | TU 1354 | 4.2 | TH 1550                                  | 3.9 | F 1453  | 4.1 | TH 1421 | 4.1 | F 1345  | 4.3 | SU 1518 | 3.6 | M 1543  | 3.9 |           |  |
| 2032               | 0.8 | 1937    | 0.9 | 2116                                     | 1.4 | 2027    | 1.2 | 1953    | 1.0 | 1928    | 0.8 | 2030    | 1.9 | 2113    | 1.6 |           |  |
| 6 0328             | 4.3 | 21 0228 | 4.2 | 6 0426                                   | 3.9 | 21 0326 | 4.1 | 6 0245  | 4.1 | 21 0209 | 4.3 | 6 0334  | 3.6 | 21 0404 | 3.8 |           |  |
| 0901               | 1.1 | 21 0800 | 1.2 | 6 0945                                   | 1.6 | 21 0855 | 1.4 | 6 0810  | 1.2 | 21 0747 | 1.0 | 6 0857  | 1.9 | 21 0947 | 1.5 |           |  |
| TU 1541            | 4.0 | W 1437  | 4.1 | F 1649                                   | 3.6 | SA 1551 | 3.9 | F 1504  | 3.9 | SA 1434 | 4.1 | M 1625  | 3.4 | TU 1712 | 3.8 |           |  |
| 2119               | 1.1 | 2014    | 1.1 | 2210                                     | 1.8 | 2122    | 1.6 | 2026    | 1.4 | 2009    | 1.2 | 2137    | 2.2 | 2243    | 1.8 |           |  |
| 7 0427             | 4.1 | 22 0312 | 4.1 | 7 0527                                   | 3.7 | 22 0428 | 3.9 | 7 0328  | 3.8 | 22 0302 | 4.1 | 7 0442  | 3.4 | 22 0534 | 3.7 |           |  |
| 0951               | 1.4 | 22 0841 | 1.4 | 7 1048                                   | 1.9 | 22 1003 | 1.7 | 7 0848  | 1.6 | 22 0836 | 1.3 | 7 1019  | 2.1 | 22 1121 | 1.6 |           |  |
| W 1642             | 3.8 | TH 1525 | 4.0 | SA 1802                                  | 3.5 | SU 1711 | 3.7 | SA 1556 | 3.6 | SU 1538 | 3.9 | TU 1757 | 3.4 | W 1844  | 3.9 |           |  |
| 2214               | 1.4 | 2059    | 1.4 | 2324                                     | 2.1 | 2245    | 1.9 | 2110    | 1.9 | 2109    | 1.6 | 2314    | 2.3 |         |     |           |  |
| 8 0530             | 3.9 | 23 0406 | 4.0 | 8 0638                                   | 3.6 | 23 0550 | 3.8 | 8 0421  | 3.6 | 23 0408 | 3.9 | 8 0614  | 3.4 | 23 0013 | 1.6 |           |  |
| 1051               | 1.6 | 23 0934 | 1.6 | 8 1208                                   | 2.0 | 23 1135 | 1.8 | 8 0943  | 1.9 | 23 0947 | 1.7 | 8 1202  | 2.0 | 23 0702 | 3.8 |           |  |
| TH 1750            | 3.7 | F 1625  | 3.8 | SU 1927                                  | 3.5 | M 1851  | 3.7 | SU 1705 | 3.4 | M 1707  | 3.7 | W 1928  | 3.5 | TH 1248 | 1.4 |           |  |
| 2318               | 1.7 | 2159    | 1.6 |  |     | 2040    | 3.6 | 2017    | 3.9 | 2219    | 2.2 | 2240    | 1.9 | 1954    | 4.2 |           |  |
| 9 0634             | 3.8 | 24 0508 | 3.9 | 9 0049                                   | 2.1 | 24 0027 | 1.8 | 9 0531  | 3.4 | 24 0539 | 3.7 | 9 0047  | 2.1 | 24 0126 | 1.3 |           |  |
| 1156               | 1.7 | 24 1043 | 1.7 | 9 0751                                   | 3.6 | 24 0718 | 3.8 | 9 1108  | 2.1 | 24 1128 | 1.7 | 9 0738  | 3.5 | 24 0808 | 4.0 |           |  |
| F 1902             | 3.7 | SA 1740 | 3.7 | M 1329                                   | 1.9 | TU 1314 | 1.6 | M 1841  | 3.4 | TU 1852 | 3.8 | TH 1322 | 1.8 | F 1352  | 1.0 |           |  |
|                    |     | 2315    | 1.7 | 2040                                     | 3.6 | 2017    | 3.9 | 2359    | 2.3 |         |     | 2028    | 3.7 | 2045    | 4.4 |           |  |
| 10 0028            | 1.8 | 25 0620 | 3.9 | 10 0203                                  | 2.0 | 25 0154 | 1.5 | 10 0704 | 3.4 | 25 0025 | 1.8 | 10 0153 | 1.7 | 25 0221 | 1.0 |           |  |
| 0737               | 3.8 | 25 1204 | 1.7 | 10 0852                                  | 3.7 | 25 0832 | 4.0 | 10 1250 | 2.1 | 25 0713 | 3.8 | 10 0836 | 3.7 | 25 0858 | 4.2 |           |  |
| SA 1303            | 1.7 | SU 1903 | 3.8 | TU 1435                                  | 1.6 | W 1428  | 1.1 | TU 2012 | 3.5 | W 1305  | 1.5 | F 1418  | 1.4 | SA 1444 | 0.7 |           |  |
| 2008               | 3.7 |         |     | 2134                                     | 3.8 | 2118    | 4.2 |         |     | 2012    | 4.0 | 2110    | 4.0 | 2127    | 4.5 |           |  |
| 11 0133            | 1.8 | 26 0041 | 1.7 | 11 0259                                  | 1.7 | 26 0300 | 1.1 | 11 0130 | 2.1 | 26 0147 | 1.5 | 11 0240 | 1.3 | 26 0308 | 0.7 |           |  |
| 0831               | 3.9 | 26 0734 | 4.0 | 11 0939                                  | 3.9 | 26 0928 | 4.2 | 11 0822 | 3.6 | 26 0824 | 4.0 | 11 0918 | 3.9 | 26 0939 | 4.3 |           |  |
| SU 1403            | 1.6 | M 1324  | 1.5 | W 1523                                   | 1.3 | TH 1527 | 0.7 | W 1407  | 1.7 | TH 1416 | 1.1 | SA 1459 | 1.0 | SU 1528 | 0.5 |           |  |
| 2103               | 3.8 | 2019    | 3.9 | 2215                                     | 4.0 | 2207    | 4.4 | 2110    | 3.7 | 2107    | 4.3 | 2145    | 4.2 | 2204    | 4.6 |           |  |
| 12 0229            | 1.7 | 27 0158 | 1.4 | 12 0342                                  | 1.4 | 27 0355 | 0.7 | 12 0234 | 1.7 | 27 0247 | 1.0 | 12 0317 | 0.9 | 27 0349 | 0.5 |           |  |
| 0916               | 3.9 | 27 0838 | 4.1 | 12 1017                                  | 4.0 | 27 1016 | 4.4 | 12 0914 | 3.8 | 27 0918 | 4.2 | 12 0954 | 4.1 | 27 1018 | 4.4 |           |  |
| M 1455             | 1.4 | TU 1434 | 1.1 | TH 1602                                  | 1.0 | F 1617  | 0.4 | TH 1458 | 1.4 | F 1510  | 0.7 | SU 1535 | 0.7 | M 1607  | 0.4 |           |  |
| 2148               | 4.0 | 2121    | 4.2 | 2250                                     | 4.2 | 2252    | 4.6 | 2151    | 4.0 | 2150    | 4.5 | 2217    | 4.4 | 2240    | 4.6 |           |  |
| 13 0317            | 1.5 | 28 0304 | 1.1 | 13 0419                                  | 1.1 | 28 0441 | 0.5 | 13 0317 | 1.3 | 28 0335 | 0.7 | 13 0354 | 0.7 | 28 0427 | 0.4 |           |  |
| 0955               | 4.0 | 28 0935 | 4.3 | 13 1052                                  | 4.2 | 28 1100 | 4.5 | 13 0954 | 4.0 | 28 1001 | 4.4 | 13 1027 | 4.3 | 28 1056 | 4.4 |           |  |
| TU 1539            | 1.2 | W 1535  | 0.8 | F 1637                                   | 0.8 | SA 1701 | 0.2 | F 1537  | 1.0 | SA 1556 | 0.4 | M 1610  | 0.5 | TU 1645 | 0.5 |           |  |
| 2227               | 4.1 | 2216    | 4.4 | O 2322                                   | 4.3 | ● 2332  | 4.7 | 2224    | 4.2 | 2230    | 4.6 | 2249    | 4.5 | ● 2315  | 4.5 |           |  |
| 14 0357            | 1.3 | 29 0403 | 0.8 | 14 0453                                  | 0.9 |         |     | 14 0353 | 1.0 | 29 0417 | 0.4 | 14 0430 | 0.5 | 29 0503 | 0.4 |           |  |
| 1031               | 4.1 | 29 1025 | 4.4 | 14 1124                                  | 4.3 |         |     | 14 1027 | 4.2 | 29 1040 | 4.5 | 14 1059 | 4.4 | 29 1132 | 4.4 |           |  |
| W 1617             | 1.0 | TH 1628 | 0.5 | SA 1710                                  | 0.6 |         |     | SA 1611 | 0.7 | SU 1637 | 0.2 | TU 1648 | 0.4 | W 1719  | 0.6 |           |  |
| 2303               | 4.2 | ● 2305  | 4.6 | 2352                                     | 4.4 |         |     | 2255    | 4.3 | ● 2308  | 4.7 | O 2320  | 4.6 | 2348    | 4.4 |           |  |
| 15 0434            | 1.2 | 30 0456 | 0.6 | 15 0527                                  | 0.7 |         |     | 15 0427 | 0.7 | 30 0458 | 0.3 | 15 0508 | 0.4 | 30 0535 | 0.5 |           |  |
| 1105               | 4.2 | 30 1114 | 4.5 | 15 1154                                  | 4.4 |         |     | 15 1059 | 4.3 | 30 1120 | 4.6 | 15 1133 | 4.5 | 30 1208 | 4.3 |           |  |
| TH 1652            | 0.8 | F 1719  | 0.3 | SU 1743                                  | 0.5 |         |     | SU 1645 | 0.5 | M 1716  | 0.2 | W 1726  | 0.4 | TH 1752 | 0.7 |           |  |
| O 2339             | 4.2 | 2351    | 4.7 |  |     |         |     | O 2323  | 4.5 | 30 2345 | 4.7 | 2352    | 4.6 |         |     |           |  |
| 31 0544            | 0.4 |         |     |  |     |         |     | 31 0534 | 0.3 |         |     |         |     |         |     |           |  |
| 1159               | 4.6 |         |     |  |     |         |     | 31 1156 | 4.5 |         |     |         |     |         |     |           |  |
| SA 1805            | 0.2 |         |     |  |     |         |     | 31 1752 | 0.3 |         |     |         |     |         |     |           |  |

HIGH WATERS - IMPORTANT NOTE. DOUBLE HIGH WATERS OCCUR AT SOUTHAMPTON. THE PREDICTIONS ARE FOR THE FIRST HIGH WATER.

**SOUTHAMPTON**  
**MEAN SPRING AND NEAP CURVES**  
 For instructions see page XIV  
 Springs occur 2 days after New and Full Moon



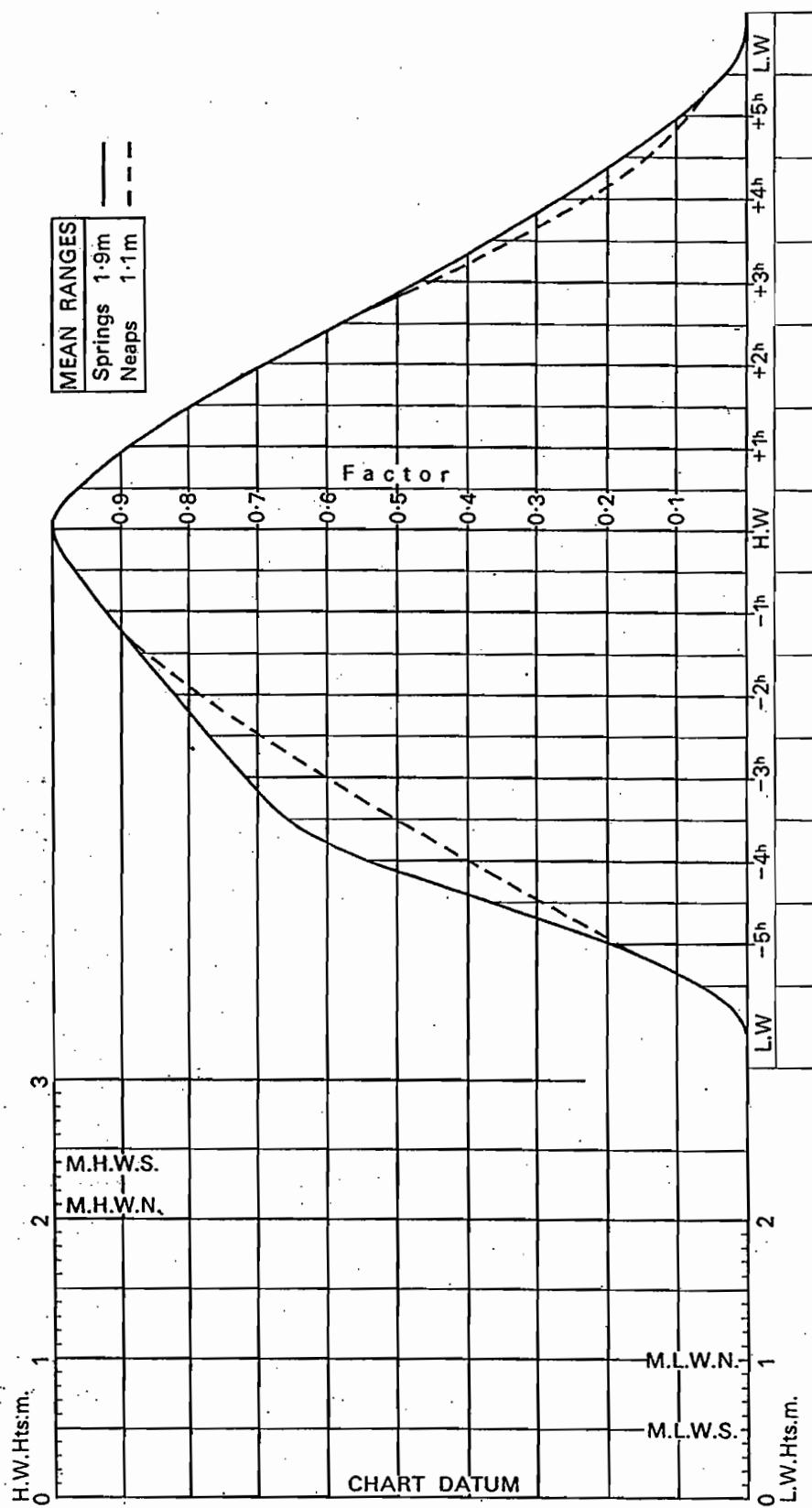
**ENGLAND, EAST COAST - LOWESTOFT**

LAT 52°28'N LONG 1°45'E

| TIME ZONE UT (GMT) |      |     |           | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |           |      |          |           |      |      |           |      |      |           | YEAR  | 0000    |           |      |     |
|--------------------|------|-----|-----------|--|------|-----------|------|----------|-----------|------|------|-----------|------|------|-----------|-------|---------|-----------|------|-----|
|                    |      |     |           | JANUARY                                  |      |           |      | FEBRUARY |           |      |      | MARCH     |      |      |           | APRIL |         |           |      |     |
|                    | TIME | M   | TIME      | M  | TIME | M         | TIME | M        | TIME      | M    | TIME | M         | TIME | M    | TIME      | M     | TIME    | M         |      |     |
| <b>1</b>           | 0402 | 0.5 | <b>16</b> | 0424                                     | 0.6  | <b>1</b>  | 0526 | 0.0      | <b>16</b> | 0511 | 0.3  | <b>1</b>  | 0423 | 0.0  | <b>16</b> | 0407  | 0.3     | <b>1</b>  | 0512 | 0.3 |
| 1002               | 2.5  |     | 1040      | 2.2                                      |      | 1         | 1136 | 2.3      | 16        | 1119 | 2.2  | 1033      | 2.3  | 16   | 1021      | 2.2   | 1       | 1119      | 2.2  |     |
| TH 1613            | 0.7  | F   | 1555      | 0.9                                      | SU   | 1727      | 0.7  | M        | 1655      | 0.6  | SU   | 1624      | 0.5  | M    | 1559      | 0.6   | W       | 1711      | 0.5  |     |
| 2209               | 2.6  |     | 2217      | 2.4                                      |      | 2323      | 2.6  |          | 2309      | 2.5  |      | 2221      | 2.6  |      | 2212      | 2.5   |         | 2320      | 2.5  |     |
| <b>2</b>           | 0454 | 0.3 | <b>17</b> | 0459                                     | 0.6  | <b>2</b>  | 0608 | 0.0      | <b>17</b> | 0544 | 0.3  | <b>2</b>  | 0502 | 0.0  | <b>17</b> | 0442  | 0.3     | <b>2</b>  | 0546 | 0.5 |
| 1058               | 2.5  |     | 1111      | 2.2                                      |      | 1219      | 2.2  | 17       | 1149      | 2.1  | 2    | 1112      | 2.3  | 17   | 1049      | 2.2   | 2       | 1153      | 2.2  |     |
| F 1702             | 0.8  | SA  | 1631      | 0.9                                      | M    | 1805      | 0.7  | TU       | 1727      | 0.6  | M    | 1702      | 0.5  | TU   | 1634      | 0.5   | TH      | 1743      | 0.6  |     |
| 2254               | 2.6  |     | 2251      | 2.4                                      |      |           |      |          | 2344      | 2.5  |      | 2304      | 2.6  |      | 2247      | 2.5   |         | 2358      | 2.4  |     |
| <b>3</b>           | 0542 | 0.2 | <b>18</b> | 0533                                     | 0.5  | <b>3</b>  | 0007 | 2.6      | <b>18</b> | 0617 | 0.4  | <b>3</b>  | 0542 | 0.1  | <b>18</b> | 0515  | 0.3     | <b>3</b>  | 0615 | 0.7 |
| 1151               | 2.4  |     | 1142      | 2.1                                      |      | 0649      | 0.2  | 18       | 1222      | 2.1  | 3    | 1150      | 2.2  | 18   | 1120      | 2.2   | 3       | 1225      | 2.1  |     |
| SA 1747            | 0.8  | SU  | 1708      | 0.8                                      | TU   | 1304      | 2.1  | W        | 1801      | 0.7  | TU   | 1737      | 0.6  | W    | 1706      | 0.6   | F       | 1817      | 0.7  |     |
| 2340               | 2.6  |     | 2327      | 2.4                                      |      | 1842      | 0.8  |          |           |      | 2344 | 2.6       |      | 2322 | 2.5       |       | SA 1808 | 0.6       |      |     |
| <b>4</b>           | 0629 | 0.2 | <b>19</b> | 0608                                     | 0.5  | <b>4</b>  | 0050 | 2.5      | <b>19</b> | 0019 | 2.4  | <b>4</b>  | 0619 | 0.3  | <b>19</b> | 0547  | 0.4     | <b>4</b>  | 0039 | 2.2 |
| 1245               | 2.3  |     | 1215      | 2.1                                      |      | 0731      | 0.4  | 19       | 0650      | 0.5  | 4    | 1228      | 2.1  | 19   | 1153      | 2.2   | 4       | 0642      | 0.9  |     |
| SU 1831            | 0.9  | M   | 1746      | 0.8                                      | W    | 1351      | 2.0  | TH       | 1259      | 2.1  | W    | 1811      | 0.6  | TH   | 1740      | 0.6   | SA 1300 | 2.1       |      |     |
|                    |      |     |           |  |      | 1920      | 0.9  |          | 1836      | 0.8  |      |           |      |      | 2358      | 2.5   | 1246    | 2.2       |      |     |
| <b>5</b>           | 0027 | 2.6 | <b>20</b> | 0004                                     | 2.4  | <b>5</b>  | 0137 | 2.4      | <b>20</b> | 0056 | 2.4  | <b>5</b>  | 0024 | 2.5  | <b>20</b> | 0619  | 0.5     | <b>5</b>  | 0130 | 2.1 |
| 0716               | 0.2  |     | 0645      | 0.5                                      |      | 0813      | 0.6  | 20       | 0728      | 0.5  | 5    | 0655      | 0.5  | 20   | 1228      | 2.1   | 5       | 0713      | 1.1  |     |
| M 1338             | 2.2  | TU  | 1253      | 2.1                                      | TH   | 1442      | 2.0  | F        | 1341      | 2.0  | TH   | 1307      | 2.1  | F    | 1815      | 0.7   | SU 1344 | 2.0       |      |     |
| 1914               | 1.0  |     | 1824      | 0.9                                      |      | 2002      | 1.0  |          | 1920      | 0.9  |      | 1846      | 0.7  |      |           |       | 1944    | 0.9       |      |     |
|                    |      |     |           |  |      |           |      |          |           |      |      |           |      |      |           |       | 2011    | 0.7       |      |     |
| <b>6</b>           | 0116 | 2.5 | <b>21</b> | 0042                                     | 2.4  | <b>6</b>  | 0232 | 2.3      | <b>21</b> | 0142 | 2.3  | <b>6</b>  | 0107 | 2.3  | <b>21</b> | 0039  | 2.4     | <b>6</b>  | 0237 | 1.9 |
| 0804               | 0.4  |     | 0721      | 0.5                                      |      | 0903      | 0.8  | 21       | 0815      | 0.7  | 6    | 0730      | 0.7  | 21   | 0657      | 0.6   | 6       | 0759      | 1.3  |     |
| TU 1436            | 2.1  | W   | 1335      | 2.0                                      | F    | 1542      | 1.9  | SA       | 1437      | 2.0  | F    | 1349      | 2.0  | SA   | 1309      | 2.1   | M 1440  | 1.9       |      |     |
| 1958               | 1.1  |     | 1904      | 0.9                                      |      | 2056      | 1.1  |          | 2013      | 1.0  |      | 1924      | 0.9  |      | 1900      | 0.7   |         | 2050      | 1.0  |     |
|                    |      |     |           |  |      |           |      |          |           |      |      |           |      |      |           |       | 2132    | 0.7       |      |     |
| <b>7</b>           | 0208 | 2.4 | <b>22</b> | 0121                                     | 2.3  | <b>7</b>  | 0336 | 2.1      | <b>22</b> | 0249 | 2.2  | <b>7</b>  | 0158 | 2.2  | <b>22</b> | 0131  | 2.2     | <b>7</b>  | 0406 | 1.9 |
| 0856               | 0.5  |     | 0804      | 0.6                                      |      | 1009      | 1.0  | 22       | 0918      | 0.8  | 7    | 0808      | 1.0  | 22   | 0745      | 0.8   | 7       | 0917      | 1.4  |     |
| W 1538             | 2.0  | TH  | 1426      | 2.0                                      | SA   | 1651      | 1.9  | SU       | 1550      | 1.9  | SA   | 1440      | 1.9  | SU   | 1401      | 2.0   | TU      | 1550      | 1.9  |     |
| 2049               | 1.1  |     | 1951      | 1.0                                      |      | 2221      | 1.2  |          | 2129      | 1.0  |      | 2013      | 1.0  |      | 1959      | 0.8   |         | 2308      | 1.0  |     |
|                    |      |     |           |  |      |           |      |          |           |      |      |           |      |      |           |       | 2302    | 0.6       |      |     |
| <b>8</b>           | 0307 | 2.3 | <b>23</b> | 0208                                     | 2.3  | <b>8</b>  | 0458 | 2.0      | <b>23</b> | 0419 | 2.1  | <b>8</b>  | 0304 | 2.0  | <b>23</b> | 0247  | 2.1     | <b>8</b>  | 0540 | 1.9 |
| 0956               | 0.7  |     | 0854      | 0.6                                      |      | 1136      | 1.1  | 23       | 1041      | 0.9  | 8    | 0900      | 1.2  | 23   | 0851      | 1.0   | 8       | 1151      | 1.3  |     |
| TH 1642            | 2.0  | F   | 1529      | 2.0                                      | SU   | 1801      | 2.0  | M        | 1705      | 2.0  | SU   | 1545      | 1.9  | M    | 1510      | 1.9   | W       | 1701      | 1.9  |     |
| 2152               | 1.2  |     | 2047      | 1.1                                      |      |           |      | M        | 2313      | 1.0  |      | 2127      | 1.2  |      | 2125      | 0.9   | TH      | 1716      | 2.1  |     |
|                    |      |     |           |  |      |           |      |          |           |      |      |           |      |      |           |       |         |           |      |     |
| <b>9</b>           | 0414 | 2.2 | <b>24</b> | 0311                                     | 2.2  | <b>9</b>  | 0027 | 1.1      | <b>24</b> | 0543 | 2.1  | <b>9</b>  | 0433 | 1.9  | <b>24</b> | 0423  | 2.1     | <b>9</b>  | 0021 | 0.9 |
| 1105               | 0.8  |     | 0957      | 0.7                                      |      | 0639      | 2.0  | 24       | 1200      | 0.9  | 9    | 1057      | 1.3  | 24   | 1024      | 1.1   | 9       | 0655      | 2.0  |     |
| F 1746             | 2.0  | SA  | 1638      | 2.0                                      | M    | 1250      | 1.1  | TU       | 1808      | 2.0  | M    | 1658      | 1.9  | TU   | 1630      | 1.9   | TH      | 1236      | 1.2  |     |
| 2313               | 1.2  |     | 2203      | 1.1                                      |      | 1906      | 2.0  |          |           |      |      |           |      |      | 2312      | 0.8   | 1807    | 2.0       | 1825 | 2.2 |
|                    |      |     |           |  |      |           |      |          |           |      |      |           |      |      |           |       |         |           |      |     |
| <b>10</b>          | 0530 | 2.2 | <b>25</b> | 0434                                     | 2.2  | <b>10</b> | 0134 | 1.0      | <b>25</b> | 0045 | 0.8  | <b>10</b> | 0007 | 1.1  | <b>25</b> | 0551  | 2.1     | <b>10</b> | 0106 | 0.7 |
| 1210               | 0.9  |     | 1109      | 0.8                                      |      | 0754      | 2.0  | 25       | 0700      | 2.2  | 10   | 0624      | 1.9  | 25   | 1151      | 1.1   | 10      | 0744      | 2.1  |     |
| SA 1846            | 2.1  | SU  | 1742      | 2.0                                      | TU   | 1341      | 1.1  | W        | 1309      | 0.9  | TU   | 1234      | 1.2  | W    | 1743      | 2.0   | F       | 1309      | 1.1  |     |
|                    |      |     |           |  |      | 1954      | 2.1  |          | 1907      | 2.1  |      | 1812      | 1.9  |      |           |       | 1902    | 2.1       | 1924 | 2.3 |
|                    |      |     |           |  |      |           |      |          |           |      |      |           |      |      |           |       |         |           |      |     |
| <b>11</b>          | 0034 | 1.2 | <b>26</b> | 0550                                     | 2.2  | <b>11</b> | 0220 | 0.9      | <b>26</b> | 0158 | 0.5  | <b>11</b> | 0110 | 0.9  | <b>26</b> | 0039  | 0.6     | <b>11</b> | 0144 | 0.6 |
| 0646               | 2.1  |     | 1215      | 0.8                                      |      | 0843      | 2.1  | 26       | 0812      | 2.3  | 11   | 0737      | 2.0  | 26   | 0712      | 2.2   | 11      | 0819      | 2.1  |     |
| SU 1306            | 0.9  | M   | 1836      | 2.1                                      | W    | 1419      | 1.1  | TH       | 1411      | 0.8  | W    | 1321      | 1.2  | TH   | 1300      | 1.0   | SA 1342 | 0.9       |      |     |
| 1935               | 2.2  |     |           |  |      | 2030      | 2.2  |          | 2002      | 2.3  |      | 1914      | 2.0  |      | 1848      | 2.1   | 1948    | 2.2       |      |     |
|                    |      |     |           |  |      |           |      |          |           |      |      |           |      |      |           |       | 2013    | 2.4       |      |     |
| <b>12</b>          | 0141 | 1.1 | <b>27</b> | 0046                                     | 0.9  | <b>12</b> | 0257 | 0.7      | <b>27</b> | 0253 | 0.3  | <b>12</b> | 0152 | 0.8  | <b>27</b> | 0142  | 0.4     | <b>12</b> | 0220 | 0.4 |
| 0754               | 2.1  |     | 0657      | 2.3                                      |      | 0921      | 2.1  | 27       | 0907      | 2.3  | 12   | 0822      | 2.1  | 27   | 0811      | 2.2   | 12      | 0850      | 2.2  |     |
| M 1352             | 1.0  | TU  | 1314      | 0.8                                      | TH   | 1447      | 1.0  | F        | 1501      | 0.7  | TH   | 1352      | 1.1  | F    | 1354      | 0.8   | SU 1418 | 0.8       |      |     |
| 2018               | 2.2  |     | 1928      | 2.2                                      |      | 2100      | 2.2  |          | 2053      | 2.4  |      | 1957      | 2.1  |      | 1945      | 2.3   |         | 2027      | 2.3  |     |
|                    |      |     |           |  |      |           |      |          |           |      |      |           |      |      |           |       | 2058    | 2.5       |      |     |
| <b>13</b>          | 0232 | 1.0 | <b>28</b> | 0159                                     | 0.7  | <b>13</b> | 0331 | 0.6      | <b>28</b> | 0339 | 0.1  | <b>13</b> | 0227 | 0.6  | <b>28</b> | 0233  | 0.2     | <b>13</b> | 0257 | 0.3 |
| 0844               | 2.1  |     | 0804      | 2.3                                      |      | 0953      | 2.1  | 28       | 0952      | 2.4  | 13   | 0857      | 2.1  | 28   | 0854      | 2.3   | 13      | 0918      | 2.2  |     |
| TU 1429            | 1.0  | W   | 1415      | 0.7                                      | F    | 1515      | 0.9  | SA       | 1545      | 0.6  | F    | 1420      | 0.9  | SA   | 1439      | 0.7   | M 1456  | 0.6       |      |     |
| 2051               | 2.3  |     | 2019      | 2.3                                      | O    | 2128      | 2.3  | ●        | 2139      | 2.5  |      | 2029      | 2.2  |      | 2034      | 2.4   | 2107    | 2.4       |      |     |
|                    |      |     |           |  |      |           |      |          |           |      |      |           |      |      |           |       | ● 2141  | 2.5       |      |     |
| <b>14</b>          | 0312 | 0.8 | <b>29</b> | 0303                                     | 0.5  | <b>14</b> | 0403 | 0.5      |           |      |      | <b>14</b> | 0300 | 0.5  | <b>29</b> | 0317  | 0.1     | <b>14</b> | 0334 | 0.3 |
| 0928               | 2.1  |     | 0907      | 2.4                                      |      | 1023      | 2.2  |          |           |      |      | <b>14</b> | 0927 | 2.2  | <b>29</b> | 0932  | 2.3     | <b>14</b> | 0948 | 2.3 |
| W 1457             | 1.0  | TH  | 1512      | 0.7                                      | SA   | 1546      | 0.7  |          |           |      |      | 14        | 1451 | 0.8  | SU        | 1519  | 0.6     | TU        | 1532 | 0.6 |
| 2119               | 2.3  |     | 2108      | 2.4                                      |      | 2200      | 2.4  |          |           |      |      | 14        | 2103 | 2.3  | ●         | 2119  | 2.5     | W 1612    | 0.6  |     |
|                    |      |     |           |  |      |           |      |          |           |      |      |           |      |      |           |       | 2220    | 2.4       |      |     |
| <b>15</b>          | 0349 | 0.7 | <b>30</b> | 0355                                     | 0.2  | <b>15</b> | 0437 | 0.4      |           |      |      | <b>15</b> | 0334 | 0.3  | <b>30</b> | 0357  |         |           |      |     |

✓

**LOWESTOFT**  
MEAN SPRING AND NEAP CURVES  
Springs occur 2 days after New and Full Moon.



# ENGLAND, EAST COAST - RIVER TYNE (NORTH SHIELDS)

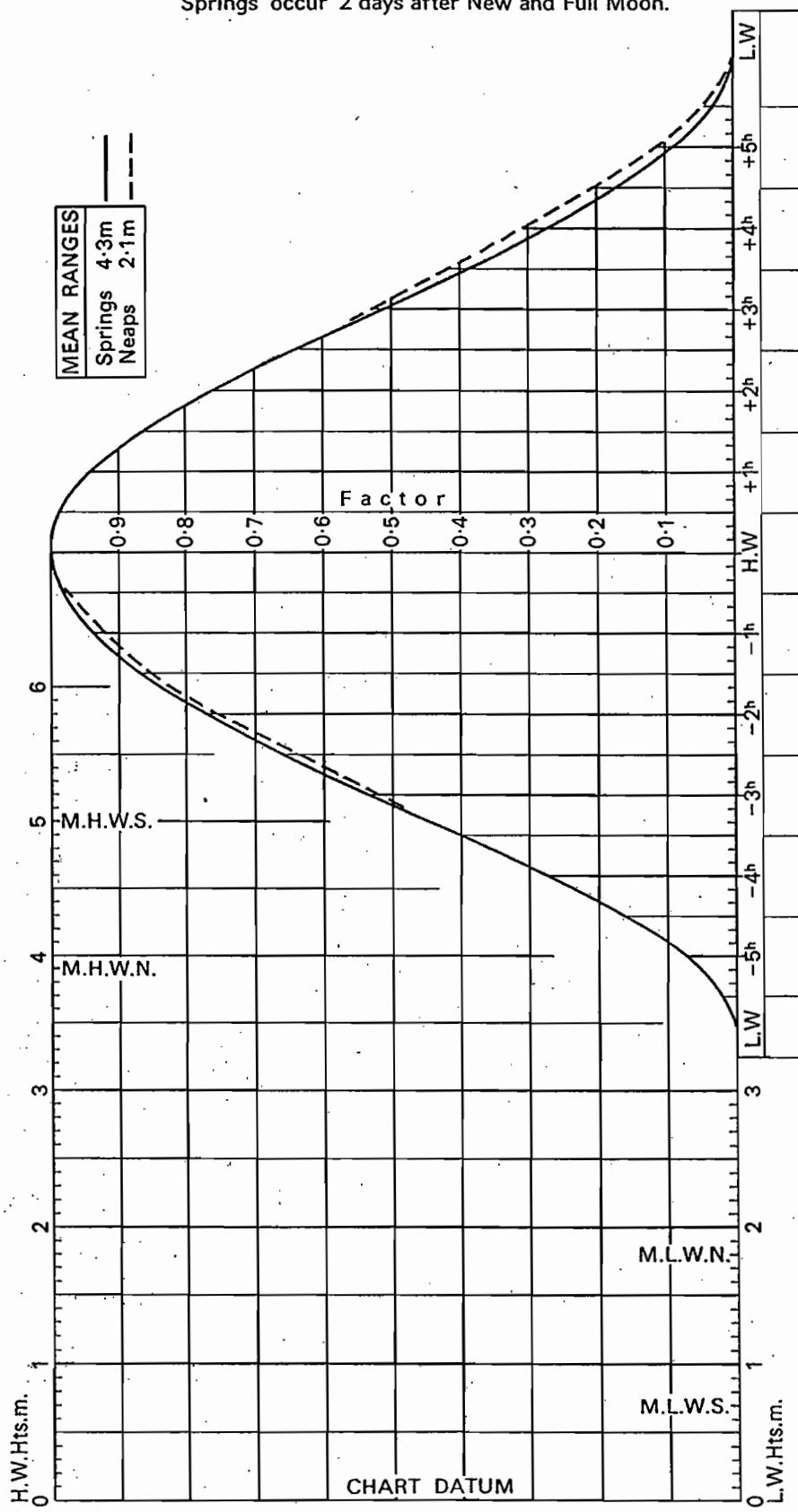
LAT 55°00'N LONG 1°26'W

| TIMEZONE UT (GMT) |         |           |           | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |           |           |       |           |           |       |           |           |      |           |           | YEAR 0000 |      |     |
|-------------------|---------|-----------|-----------|--|-----------|-----------|-------|-----------|-----------|-------|-----------|-----------|------|-----------|-----------|-----------|------|-----|
|                   | JANUARY |           |           | FEBRUARY                                 |           |           | MARCH |           |           | APRIL |           |           |      |           |           |           |      |     |
|                   | TIME    | M         | TIME      | M  | TIME      | M         | TIME  | M         | TIME      | M     | TIME      | M         | TIME | M         | TIME      | M         |      |     |
| <b>1</b>          | 0355    | 5.2       | <b>16</b> | 0413                                     | 4.6       | <b>1</b>  | 0523  | 5.0       | <b>16</b> | 0457  | 4.6       | <b>1</b>  | 0421 | 5.0       | <b>16</b> | 0359      | 4.7  |     |
| TH                | 1013    | 1.1       | <b>16</b> | 1016                                     | 1.3       | <b>1</b>  | 1129  | 0.9       | <b>16</b> | 1059  | 0.9       | <b>1</b>  | 1030 | 0.7       | <b>16</b> | 1007      | 0.8  |     |
| TH                | 1604    | 5.1       | F         | 1617                                     | 4.8       | SU        | 1723  | 5.3       | M         | 1657  | 4.9       | SU        | 1623 | 5.3       | M         | 1559      | 5.0  |     |
|                   | 2242    | 0.7       |           | 2247                                     | 1.0       |           | 2333  | 0.6       |           | 2306  | 0.2       |           | 2235 | 0.5       |           | 2340      | 0.8  |     |
| <b>2</b>          | 0447    | 5.2       | <b>17</b> | 0447                                     | 4.6       | <b>2</b>  | 0008  | 0.4       | <b>17</b> | 0527  | 4.6       | <b>2</b>  | 0501 | 5.0       | <b>17</b> | 0428      | 4.8  |     |
| 1059              | 1.1     | <b>17</b> | 1047      | 1.2                                      | <b>2</b>  | 0607      | 4.8   | <b>17</b> | 1130      | 0.9   | <b>2</b>  | 1106      | 0.7  | <b>17</b> | 1038      | 0.8       |      |     |
| F                 | 1652    | 5.2       | SA        | 1648                                     | 4.8       | M         | 1207  | 0.9       | TU        | 1727  | 5.0       | M         | 1701 | 5.3       | TU        | 1630      | 5.1  |     |
|                   | 2333    | 0.6       |           | 2320                                     | 0.9       |           | 1807  | 5.2       |           | 2343  | 0.3       |           | 2306 | 0.5       |           | TH        | 1753 | 4.8 |
| <b>3</b>          | 0537    | 5.0       | <b>18</b> | 0519                                     | 4.6       | <b>3</b>  | 0049  | 0.5       | <b>18</b> | 0004  | 0.7       | <b>3</b>  | 0539 | 4.8       | <b>18</b> | 0501      | 4.8  |     |
| 1144              | 1.2     | <b>18</b> | 1119      | 1.2                                      | <b>3</b>  | 0650      | 4.6   | <b>18</b> | 0601      | 4.6   | <b>3</b>  | 1140      | 0.8  | <b>18</b> | 1109      | 0.8       |      |     |
| SA                | 1740    | 5.1       | SU        | 1719                                     | 4.8       | TU        | 1246  | 1.1       | W         | 1203  | 1.0       | TU        | 1740 | 5.2       | W         | 1704      | 5.1  |     |
|                   | 2354    | 0.9       |           | 1852                                     | 5.0       |           | 1804  | 4.9       |           |       |           |           | 2339 | 0.6       |           | F         | 1221 | 1.2 |
| SA                | 1824    | 4.7       |           |  |           |           |       |           |           |       |           |           | 1835 | 4.5       |           | SA        | 1824 | 4.7 |
| <b>4</b>          | 0024    | 0.7       | <b>19</b> | 0553                                     | 4.5       | <b>4</b>  | 0130  | 0.8       | <b>19</b> | 0038  | 0.8       | <b>4</b>  | 0017 | 0.6       | <b>19</b> | 0534      | 4.8  |     |
| 0628              | 4.8     | <b>19</b> | 1151      | 1.2                                      | <b>4</b>  | 0735      | 4.4   | <b>19</b> | 0639      | 4.5   | <b>4</b>  | 0617      | 4.7  | <b>19</b> | 1143      | 0.9       |      |     |
| SU                | 1231    | 1.3       | M         | 1753                                     | 4.7       | W         | 1328  | 1.4       | TH        | 1239  | 1.2       | W         | 1215 | 1.0       | TH        | 1743      | 5.0  |     |
|                   | 1831    | 5.0       |           |  |           |           | 1938  | 4.7       |           | 1846  | 4.8       |           | 1821 | 4.9       |           |           | 1920 | 4.2 |
| <b>5</b>          | 0116    | 0.8       | <b>20</b> | 0029                                     | 0.9       | <b>5</b>  | 0211  | 1.2       | <b>20</b> | 0116  | 1.0       | <b>5</b>  | 0049 | 0.9       | <b>20</b> | 0012      | 0.8  |     |
| 0720              | 4.5     | <b>20</b> | 0629      | 4.4                                      | <b>5</b>  | 0822      | 4.1   | <b>20</b> | 0723      | 4.4   | <b>5</b>  | 0655      | 4.4  | <b>20</b> | 0611      | 4.7       |      |     |
| M                 | 1317    | 1.4       | TU        | 1227                                     | 1.3       | TH        | 1415  | 1.7       | F         | 1320  | 1.4       | TH        | 1252 | 1.2       | F         | 1219      | 1.1  |     |
|                   | 1923    | 4.8       |           | 1831                                     | 4.7       |           | 2030  | 4.3       |           | 1937  | 4.6       |           | 1903 | 4.6       |           | SU        | 1347 | 1.7 |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           | M         | 1406      | 1.5  |     |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           |           | 2034      | 4.1  |     |
| <b>6</b>          | 0206    | 1.0       | <b>21</b> | 0106                                     | 1.0       | <b>6</b>  | 0258  | 1.6       | <b>21</b> | 0201  | 1.3       | <b>6</b>  | 0123 | 1.3       | <b>21</b> | 0050      | 1.1  |     |
| 0815              | 4.3     | <b>21</b> | 0710      | 4.3                                      | <b>6</b>  | 0915      | 3.9   | <b>21</b> | 0813      | 4.2   | <b>6</b>  | 0734      | 4.2  | <b>21</b> | 0655      | 4.5       |      |     |
| TU                | 1409    | 1.6       | W         | 1306                                     | 1.4       | F         | 1517  | 2.0       | SA        | 1413  | 1.7       | F         | 1331 | 1.6       | SA        | 1303      | 1.3  |     |
|                   | 2018    | 4.6       |           | 1913                                     | 4.6       |           | 2131  | 4.0       |           | 2037  | 4.4       |           | 1951 | 4.2       |           | M         | 1454 | 1.9 |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           |           | 2125      | 3.6  |     |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           |           | 2203      | 3.9  |     |
| <b>7</b>          | 0301    | 1.2       | <b>22</b> | 0147                                     | 1.1       | <b>7</b>  | 0400  | 1.9       | <b>22</b> | 0300  | 1.7       | <b>7</b>  | 0201 | 1.8       | <b>22</b> | 0138      | 1.5  |     |
| 0912              | 4.1     | <b>22</b> | 0758      | 4.3                                      | <b>7</b>  | 1021      | 3.8   | <b>22</b> | 0915      | 4.0   | <b>7</b>  | 0819      | 3.9  | <b>22</b> | 0747      | 4.2       |      |     |
| W                 | 1510    | 1.8       | TH        | 1351                                     | 1.6       | SA        | 1642  | 2.1       | SU        | 1527  | 1.9       | SA        | 1423 | 1.9       | SU        | 1359      | 1.6  |     |
|                   | 2118    | 4.4       |           | 2005                                     | 4.5       |           | 2249  | 3.8       |           | 2155  | 4.1       |           | 2047 | 3.9       |           | TU        | 1635 | 2.0 |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           |           | W         | 1715 | 1.4 |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           |           |           | 2336 | 4.0 |
| <b>8</b>          | 0400    | 1.4       | <b>23</b> | 0236                                     | 1.3       | <b>8</b>  | 0523  | 2.1       | <b>23</b> | 0426  | 1.9       | <b>8</b>  | 0253 | 2.1       | <b>23</b> | 0244      | 1.9  |     |
| 1016              | 4.0     | <b>23</b> | 0851      | 4.2                                      | <b>8</b>  | 1142      | 3.8   | <b>23</b> | 1035      | 3.9   | <b>8</b>  | 0915      | 3.7  | <b>23</b> | 0854      | 4.0       |      |     |
| TH                | 1620    | 2.0       | F         | 1449                                     | 1.8       | SU        | 1812  | 2.1       | M         | 1711  | 1.9       | SU        | 1541 | 2.1       | M         | 1524      | 1.8  |     |
|                   | 2224    | 4.2       |           | 2105                                     | 4.4       |           |       |           |           | 2333  | 4.1       |           | 2204 | 3.6       |           | W         | 1803 | 1.7 |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           | TH        | 1828      | 1.1  |     |
| <b>9</b>          | 0505    | 1.6       | <b>24</b> | 0335                                     | 1.5       | <b>9</b>  | 0018  | 3.8       | <b>24</b> | 0607  | 1.9       | <b>9</b>  | 0424 | 2.4       | <b>24</b> | 0424      | 2.1  |     |
| 1122              | 4.0     | <b>24</b> | 0953      | 4.1                                      | <b>9</b>  | 0642      | 2.1   | <b>24</b> | 1207      | 4.0   | <b>9</b>  | 1041      | 3.6  | <b>24</b> | 1024      | 3.8       |      |     |
| F                 | 1736    | 2.0       | SA        | 1559                                     | 1.9       | M         | 1252  | 3.9       | TU        | 1849  | 1.7       | M         | 1733 | 2.1       | TU        | 1720      | 1.8  |     |
|                   | 2333    | 4.1       |           | 2217                                     | 4.3       |           | 1919  | 1.8       |           |       |           |           | 2351 | 3.6       |           | TH        | 1227 | 3.8 |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           | F         | 1245      | 4.4  |     |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           |           | 1926      | 0.9  |     |
| <b>10</b>         | 0611    | 1.7       | <b>25</b> | 0449                                     | 1.6       | <b>10</b> | 0126  | 4.0       | <b>25</b> | 0102  | 4.3       | <b>10</b> | 0612 | 2.3       | <b>25</b> | 0607      | 2.0  |     |
| 1225              | 4.1     | <b>25</b> | 1104      | 4.1                                      | <b>10</b> | 0737      | 4.9   | <b>25</b> | 0724      | 1.7   | <b>10</b> | 1215      | 3.7  | <b>25</b> | 1203      | 4.0       |      |     |
| SA                | 1843    | 1.9       | SU        | 1725                                     | 1.9       | TU        | 1344  | 4.1       | W         | 1321  | 4.3       | TU        | 1850 | 1.8       | W         | 1848      | 1.4  |     |
|                   | 2336    | 4.3       |           |  |           |           | 2008  | 1.6       |           | 1959  | 1.3       |           |      |           |           | SA        | 1334 | 4.7 |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           |           | 1942      | 1.2  |     |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           |           | 2013      | 0.6  |     |
| <b>11</b>         | 0039    | 4.1       | <b>26</b> | 0611                                     | 1.7       | <b>11</b> | 0213  | 4.2       | <b>26</b> | 0206  | 4.6       | <b>11</b> | 0106 | 3.8       | <b>26</b> | 0102      | 4.2  |     |
| 0709              | 1.8     | <b>26</b> | 1217      | 4.2                                      | <b>11</b> | 0819      | 1.7   | <b>26</b> | 0822      | 1.4   | <b>11</b> | 0713      | 2.0  | <b>26</b> | 0716      | 1.6       |      |     |
| SU                | 1320    | 4.2       | M         | 1848                                     | 1.7       | W         | 1423  | 4.3       | TH        | 1415  | 4.7       | W         | 1316 | 3.9       | TH        | 1310      | 4.3  |     |
|                   | 1938    | 1.7       |           |  |           |           | 2049  | 1.3       |           | 2056  | 0.8       |           | 1942 | 1.5       |           | SA        | 1349 | 4.3 |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           |           | SU        | 1416 | 4.9 |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           |           |           | 2056 | 0.5 |
| <b>12</b>         | 0137    | 4.2       | <b>27</b> | 0056                                     | 4.5       | <b>12</b> | 0251  | 4.3       | <b>27</b> | 0256  | 4.8       | <b>12</b> | 0152 | 4.0       | <b>27</b> | 0157      | 4.5  |     |
| 0755              | 1.7     | <b>27</b> | 0724      | 1.6                                      | <b>12</b> | 0856      | 1.5   | <b>27</b> | 0910      | 1.1   | <b>12</b> | 0757      | 1.7  | <b>27</b> | 0808      | 1.3       |      |     |
| M                 | 1404    | 4.4       | TU        | 1324                                     | 4.5       | TH        | 1458  | 4.5       | F         | 1501  | 5.0       | TH        | 1357 | 4.2       | F         | 1359      | 4.7  |     |
|                   | 2022    | 1.5       |           | 1957                                     | 1.4       |           | 2125  | 1.1       |           | 2143  | 0.5       |           | 2023 | 1.2       |           | SU        | 1422 | 4.6 |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           |           | M         | 1456 | 5.0 |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           |           |           | 2134 | 0.6 |
| <b>13</b>         | 0223    | 4.4       | <b>28</b> | 0204                                     | 4.7       | <b>13</b> | 0325  | 4.5       | <b>28</b> | 0341  | 5.0       | <b>13</b> | 0229 | 4.2       | <b>28</b> | 0242      | 4.8  |     |
| 0836              | 1.6     | <b>28</b> | 0826      | 1.4                                      | <b>13</b> | 0928      | 1.3   | <b>28</b> | 0952      | 0.8   | <b>13</b> | 0832      | 1.4  | <b>28</b> | 0851      | 1.0       |      |     |
| TU                | 1442    | 4.5       | W         | 1420                                     | 4.7       | F         | 1528  | 4.7       | SA        | 1542  | 5.2       | F         | 1430 | 4.4       | SA        | 1442      | 5.0  |     |
|                   | 2101    | 1.4       |           | 2057                                     | 1.0       | O         | 2159  | 0.9       | ●         | 2227  | 0.3       |           | 2100 | 0.9       | ●         | 2125      | 0.4  |     |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           | ●         | 2131      | 0.6  |     |
| <b>14</b>         | 0303    | 4.5       | <b>29</b> | 0301                                     | 4.9       | <b>14</b> | 0356  | 4.6       |           |       |           | <b>14</b> | 0300 | 4.4       | <b>29</b> | 0321      | 4.9  |     |
| 0911              | 1.5     | <b>29</b> | 0919      | 1.2                                      | <b>14</b> | 0959      | 1.1   |           |           |       | <b>14</b> | 0904      | 1.2  | <b>29</b> | 0939      | 0.8       |      |     |
| W                 | 1515    | 4.6       | TH        | 1511                                     | 5.0       | SA        | 1557  | 4.8       |           |       |           | SA        | 1500 | 4.6       | SU        | 1521      | 5.2  |     |
|                   | 2138    | 1.2       |           | 2150                                     | 0.7       |           | 2231  | 0.7       |           |       |           | 2134      | 0.7  | ●         | 2203      | 0.3       |      |     |
|                   |         |           |           |  |           |           |       |           |           |       |           |           |      |           | O         | 2204      | 0.5  |     |
| <b>15</b>         | 0339    | 4.6       | <b>30</b> | 0350                                     | 5.1       | <b>15</b> | 0426  | 4.6       |           |       |           | <b>15</b> | 0329 | 4.6       | <b>30</b> | 0357      | 5.0  |     |
| 0943              | 1.4     | <b>30</b> | 1006      | 1.0                                      | <b>15</b> | 1030      |       |           |           |       |           |           |      |           |           |           |      |     |

## RIVER TYNE (NORTH SHIELDS)

MEAN SPRING AND NEAP CURVES

Springs occur 2 days after New and Full Moon.



**ENGLAND, SOUTH COAST - PLYMOUTH (DEVONPORT)**

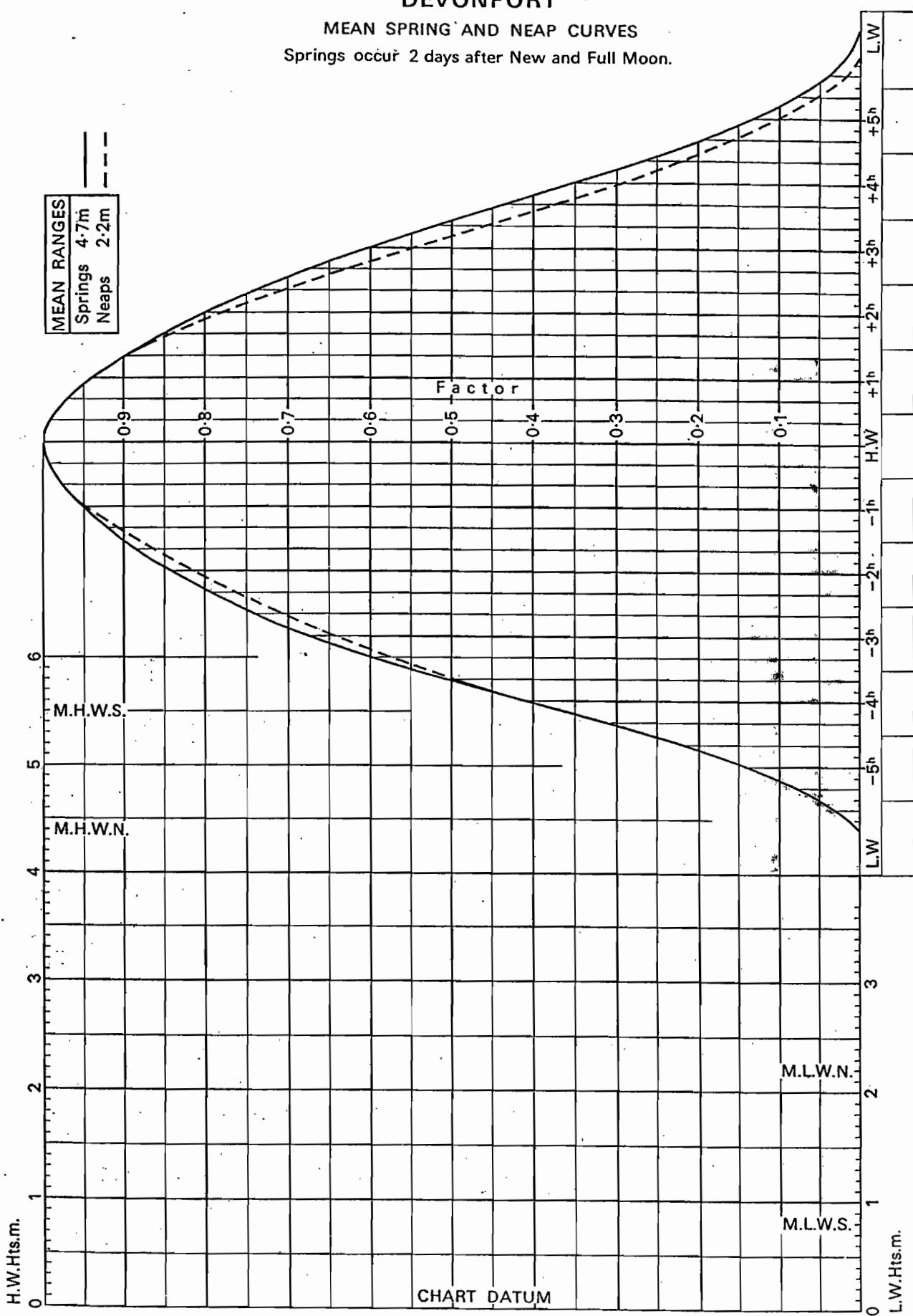
LAT 50°22'N LONG 4°11'W

| TIMEZONE UT (GMT) |      | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |      |          |      |      |       |      |      |       |      |      | YEAR | 0000 |      |      |
|-------------------|------|--|------|------|----------|------|------|-------|------|------|-------|------|------|------|------|------|------|
|                   |      | JANUARY                                  |      |      | FEBRUARY |      |      | MARCH |      |      | APRIL |      |      |      |      |      |      |
|                   | TIME | M  | TIME | M    | TIME     | M    | TIME | M     | TIME | M    | TIME  | M    | TIME | M    | TIME |      |      |
| 1                 | 0014 | 0.9                                      | 16   | 0025 | 1.3      | 1    | 0136 | 0.6   | 16   | 0111 | 1.0   | 1    | 0035 | 0.5  | 16   |      |      |
|                   | 0634 | 5.6                                      | 0633 | 5.3  | 1        | 0803 | 5.8  | 16    | 0716 | 5.4  | 1     | 0702 | 5.8  | 0620 | 5.5  |      |      |
| TH                | 1242 | 0.7                                      | F    | 1247 | 1.2      | SU   | 1401 | 0.6   | M    | 1330 | 0.9   | SU   | 1259 | 0.4  | M    | 1232 |      |
|                   | 1908 | 5.4                                      |      | 1855 | 5.0      |      | 2028 | 5.4   |      | 1936 | 5.2   |      | 1926 | 5.6  |      | 1843 |      |
| 2                 | 0103 | 0.9                                      | 17   | 0058 | 1.3      | 2    | 0216 | 0.7   | 17   | 0143 | 1.0   | 2    | 0115 | 0.5  | 17   | 0046 |      |
|                   | 0727 | 5.7                                      | 0705 | 5.3  | 2        | 0840 | 5.6  | 17    | 0743 | 5.4  | 2     | 0739 | 5.8  | 0654 | 5.5  |      |      |
| F                 | 1331 | 0.7                                      | SA   | 1319 | 1.2      | M    | 1439 | 0.8   | TU   | 1402 | 0.9   | M    | 1336 | 0.5  | TU   | 1306 |      |
|                   | 2000 | 5.4                                      |      | 1926 | 5.0      |      | 2101 | 5.3   |      | 2001 | 5.2   |      | 1959 | 5.5  |      | 1915 |      |
| 3                 | 0149 | 0.9                                      | 18   | 0130 | 1.3      | 3    | 0253 | 0.9   | 18   | 0215 | 1.1   | 3    | 0150 | 0.6  | 18   | 0121 |      |
|                   | 0815 | 5.6                                      | 0734 | 5.3  | 3        | 0909 | 5.4  | 18    | 0806 | 5.3  | 3     | 0809 | 5.6  | 0724 | 5.5  |      |      |
| SA                | 1417 | 0.8                                      | SU   | 1350 | 1.2      | TU   | 1515 | 1.0   | W    | 1435 | 1.1   | TU   | 1410 | 0.7  | W    | 1340 |      |
|                   | 2047 | 5.2                                      |      | 1953 | 5.0      |      | 2128 | 5.1   |      | 2024 | 5.1   |      | 2024 | 5.4  |      | 1944 |      |
| 4                 | 0234 | 1.0                                      | 19   | 0201 | 1.3      | 4    | 0328 | 1.2   | 19   | 0249 | 1.2   | 4    | 0223 | 0.8  | 19   | 0155 |      |
|                   | 0859 | 5.5                                      | 0759 | 5.2  | 4        | 0935 | 5.2  | 19    | 0830 | 5.2  | 4     | 0831 | 5.4  | 0751 | 5.4  |      |      |
| SU                | 1501 | 1.0                                      | M    | 1422 | 1.3      | W    | 1549 | 1.4   | TH   | 1509 | 1.2   | W    | 1440 | 1.0  | TH   | 1414 |      |
|                   | 2128 | 5.1                                      |      | 2018 | 5.0      |      | 2154 | 4.9   |      | 2050 | 5.0   |      | 2044 | 5.2  |      | 2008 |      |
| 5                 | 0317 | 1.3                                      | 20   | 0233 | 1.4      | 5    | 0404 | 1.6   | 20   | 0325 | 1.4   | 5    | 0253 | 1.1  | 20   | 0230 |      |
|                   | 0939 | 5.3                                      | 0823 | 5.2  | 5        | 1002 | 4.9  | 20    | 0902 | 5.0  | 5     | 0850 | 5.2  | 0816 | 5.2  |      |      |
| M                 | 1545 | 1.3                                      | TU   | 1455 | 1.4      | TH   | 1626 | 1.7   | F    | 1547 | 1.5   | TH   | 1509 | 1.3  | F    | 1449 |      |
|                   | 2207 | 4.9                                      |      | 2044 | 4.9      |      | 2228 | 4.7   |      | 2127 | 4.8   |      | 2105 | 5.0  |      | 2033 |      |
| 6                 | 0401 | 1.5                                      | 21   | 0308 | 1.5      | 6    | 0446 | 1.9   | 21   | 0408 | 1.7   | 6    | 0323 | 1.4  | 21   | 0307 |      |
|                   | 1017 | 5.1                                      | 0852 | 5.1  | 6        | 1042 | 4.6  | 21    | 0947 | 4.8  | 6     | 0915 | 4.9  | 0847 | 4.9  |      |      |
| TU                | 1630 | 1.5                                      | W    | 1532 | 1.5      | F    | 1712 | 2.0   | SA   | 1634 | 1.8   | F    | 1540 | 1.6  | SA   | 1526 |      |
|                   | 2246 | 4.7                                      |      | 2117 | 4.8      |      | 2319 | 4.4   |      | 2222 | 4.6   |      | 2136 | 4.7  |      | 2108 |      |
| 7                 | 0448 | 1.8                                      | 22   | 0348 | 1.7      | 7    | 0540 | 2.2   | 22   | 0503 | 1.9   | 7    | 0358 | 1.8  | 22   | 0349 |      |
|                   | 1058 | 4.8                                      | 0930 | 5.0  | 7        | 1144 | 4.3  | 22    | 1053 | 4.5  | 7     | 0953 | 4.5  | 0933 | 4.6  |      |      |
| W                 | 1719 | 1.8                                      | TH   | 1615 | 1.7      | SA   | 1815 | 2.2   | SU   | 1738 | 2.1   | SA   | 1616 | 2.0  | SU   | 1612 |      |
|                   | 2332 | 4.6                                      |      | 2202 | 4.7      |      |      |       |      | 2342 | 4.4   |      | 2224 | 4.4  |      | 2204 |      |
| 8                 | 0542 | 2.0                                      | 23   | 0436 | 1.9      | 8    | 0035 | 4.3   | 23   | 0624 | 2.2   | 8    | 0443 | 2.2  | 23   | 0446 |      |
|                   | 1148 | 4.6                                      | 1020 | 4.8  | 8        | 0701 | 2.4  | 23    | 1233 | 4.2  | 8     | 1052 | 4.2  | 1048 | 4.3  |      |      |
| TH                | 1816 | 2.0                                      | F    | 1709 | 1.8      | SU   | 1312 | 4.2   | M    | 1914 | 2.2   | SU   | 1710 | 2.4  | M    | 1718 |      |
|                   |      |  |      | 2302 | 4.6      |      | 1946 | 2.3   |      |      |       |      | 2337 | 4.2  |      | 2333 |      |
| 9                 | 0031 | 4.5                                      | 24   | 0537 | 2.0      | 9    | 0206 | 4.3   | 24   | 0133 | 4.4   | 9    | 0600 | 2.5  | 24   | 0616 |      |
|                   | 0645 | 2.1                                      | 1128 | 4.6  | 9        | 0837 | 2.3  | 24    | 0815 | 2.1  | 9     | 1223 | 3.9  | 1242 | 4.1  |      |      |
| F                 | 1252 | 4.5                                      | SA   | 1817 | 2.0      | M    | 1446 | 4.2   | TU   | 1437 | 4.3   | M    | 1851 | 2.6  | TU   | 1438 |      |
|                   | 1922 | 2.0                                      |      |      | 2110     | 2.1  |      | 2057  | 2.0  |      |       |      |      | 2057 | 2.2  |      | 2126 |
| 10                | 0142 | 4.5                                      | 25   | 0019 | 4.5      | 10   | 0321 | 4.5   | 25   | 0316 | 4.7   | 10   | 0115 | 4.1  | 25   | 0129 |      |
|                   | 0756 | 2.1                                      | 0656 | 2.1  | 10       | 0947 | 2.0  | 25    | 0941 | 1.6  | 10    | 0809 | 2.5  | 0812 | 2.0  |      |      |
| SA                | 1407 | 4.5                                      | SU   | 1255 | 4.5      | TU   | 1553 | 4.4   | W    | 1604 | 4.6   | TU   | 1412 | 3.9  | W    | 1441 |      |
|                   | 2030 | 2.0                                      |      | 1941 | 2.0      |      | 2208 | 1.9   |      | 2208 | 1.5   |      | 2044 | 2.4  |      | 2048 |      |
| 11                | 0249 | 4.7                                      | 26   | 0153 | 4.6      | 11   | 0416 | 4.7   | 26   | 0429 | 5.1   | 11   | 0246 | 4.3  | 26   | 0309 |      |
|                   | 0903 | 2.0                                      | 0825 | 1.9  | 11       | 1037 | 1.7  | 26    | 1042 | 1.1  | 11    | 0926 | 2.1  | 0930 | 1.5  |      |      |
| SU                | 1513 | 4.6                                      | M    | 1436 | 4.6      | W    | 1643 | 4.6   | TH   | 1708 | 5.0   | W    | 1528 | 4.2  | TH   | 1557 |      |
|                   | 2131 | 1.8                                      |      | 2106 | 1.8      |      | 2253 | 1.6   |      | 2304 | 1.1   |      | 2143 | 2.0  |      | 2153 |      |
| 12                | 0346 | 4.8                                      | 27   | 0321 | 4.8      | 12   | 0500 | 5.0   | 27   | 0528 | 5.5   | 12   | 0346 | 4.6  | 27   | 0520 |      |
|                   | 1001 | 1.8                                      | 0945 | 1.6  | 12       | 1118 | 1.4  | 27    | 1133 | 0.7  | 12    | 1012 | 1.8  | 1025 | 1.1  |      |      |
| M                 | 1609 | 4.8                                      | TU   | 1602 | 4.8      | TH   | 1725 | 4.8   | F    | 1801 | 5.3   | TH   | 1618 | 4.5  | F    | 1652 |      |
|                   | 2223 | 1.6                                      |      | 2216 | 1.5      |      | 2331 | 1.4   |      | 2352 | 0.7   |      | 2225 | 1.7  |      | 2244 |      |
| 13                | 0434 | 5.0                                      | 28   | 0432 | 5.1      | 13   | 0539 | 5.2   | 28   | 0619 | 5.7   | 13   | 0431 | 4.9  | 28   | 0510 |      |
|                   | 1050 | 1.6                                      | 1049 | 1.2  | 13       | 1153 | 1.2  | 28    | 1219 | 0.5  | 13    | 1049 | 1.5  | 1112 | 0.7  |      |      |
| TU                | 1657 | 4.9                                      | W    | 1710 | 5.1      | F    | 1802 | 5.0   | SA   | 1847 | 5.5   | F    | 1657 | 4.8  | SA   | 1738 |      |
|                   | 2309 | 1.5                                      |      | 2314 | 1.1      | O    |      |       |      |      |       |      | 2302 | 1.4  |      | 2329 |      |
| 14                | 0518 | 5.1                                      | 29   | 0535 | 5.4      | 14   | 0005 | 1.2   |      |      |       | 14   | 0509 | 5.1  | 29   | 0514 |      |
|                   | 1134 | 1.4                                      | 1145 | 0.8  | 14       | 0614 | 5.3  |       |      |      |       | 14   | 1124 | 1.2  | 1048 | 0.8  |      |
| W                 | 1741 | 5.0                                      | TH   | 1810 | 5.3      | SA   | 1226 | 1.1   |      |      |       | SA   | 1733 | 5.1  | 1818 | 0.8  |      |
|                   | 2349 | 1.4                                      |      |      |          |      | 1836 | 5.1   |      |      |       |      | 2337 | 1.1  | O    | 1844 |      |
| 15                | 0557 | 5.2                                      | 30   | 0006 | 0.8      | 15   | 0038 | 1.1   |      |      |       | 15   | 0645 | 5.3  | 30   | 0018 |      |
|                   | 1212 | 1.3                                      | 0630 | 5.7  | 15       | 0646 | 5.4  |       |      |      |       | 15   | 1157 | 0.9  | 30   | 0628 |      |
| TH                | 1820 | 5.0                                      | F    | 1235 | 0.6      | SU   | 1258 | 1.0   |      |      |       | SU   | 1808 | 5.3  | M    | 1241 |      |
|                   | O    |  |      |      |          |      | 1907 | 5.2   |      |      |       |      | O    |      | W    | 1308 |      |
|                   |      |  |      |      |          |      |      |       |      |      |       |      | 1853 | 5.6  | 1852 | 5.4  |      |
|                   |      |  |      |      |          |      |      |       |      |      |       |      |      |      |      | 1911 |      |
|                   |      |  |      |      |          |      |      |       |      |      |       |      |      |      |      | 5.3  |      |
| 31                | 0053 | 0.7                                      |      |      |          |      |      |       |      |      |       |      | 31   | 0047 | 0.5  |      |      |
|                   | 0720 | 5.8                                      |      |      |          |      |      |       |      |      |       |      | TU   | 0706 | 5.6  |      |      |
| SA                | 1320 | 0.5                                      |      |      |          |      |      |       |      |      |       |      |      | 1306 | 0.6  |      |      |
|                   | 1949 | 5.5                                      |      |      |          |      |      |       |      |      |       |      |      | 1921 | 5.5  |      |      |

# DEVONPORT

## MEAN SPRING AND NEAP CURVES

Springs occur 2 days after New and Full Moon.



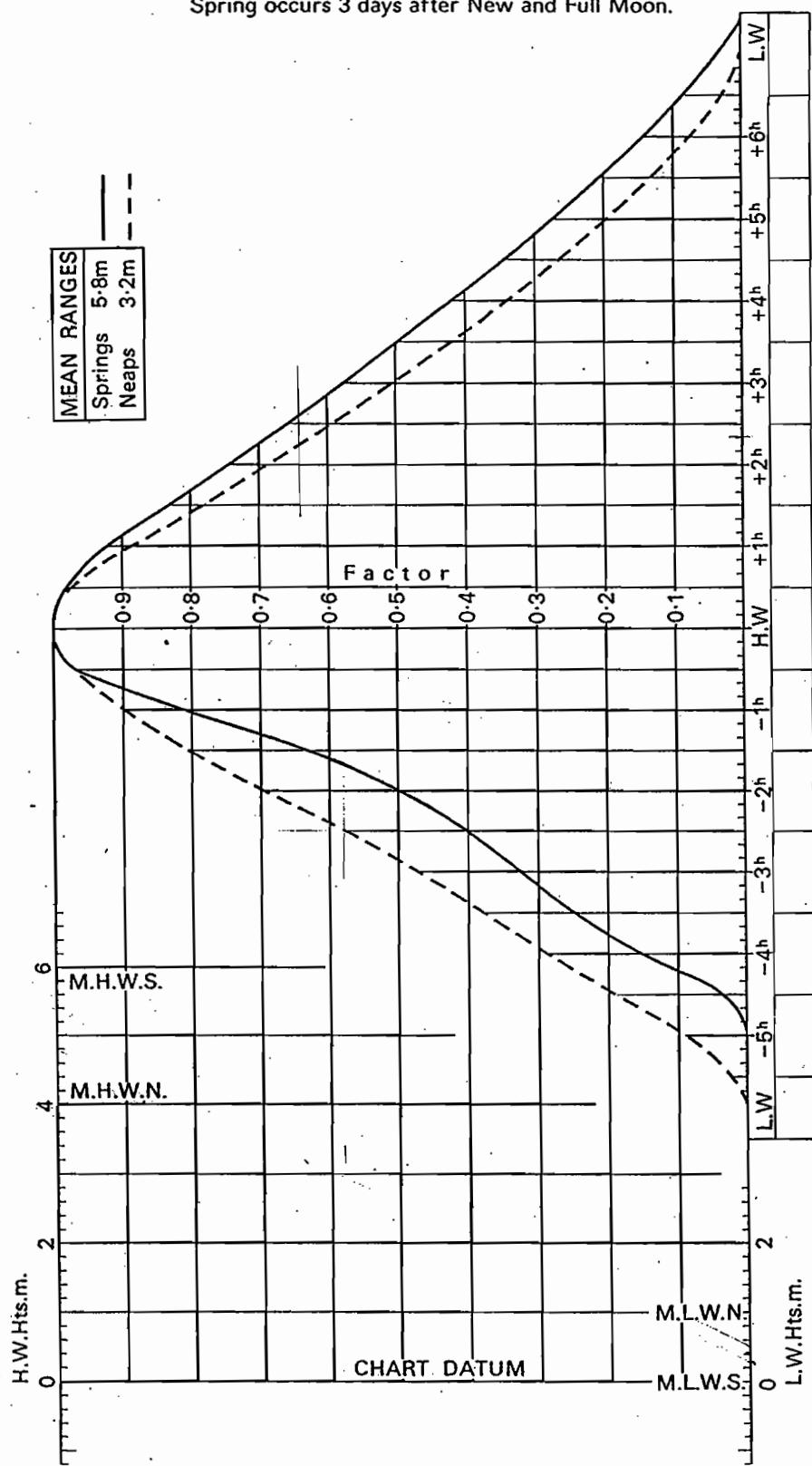
## **BELGIUM - ANTWERP (PROSPERPOLDER)**

LAT 51°21'N

# ANTWERP (PROSPER POLDER)

MEAN SPRING AND NEAP CURVES

Spring occurs 3 days after New and Full Moon.



## **FRANCE, NORTH COAST - LE HAVRE**

LAT 49°29'N                    LONG 0°07'E

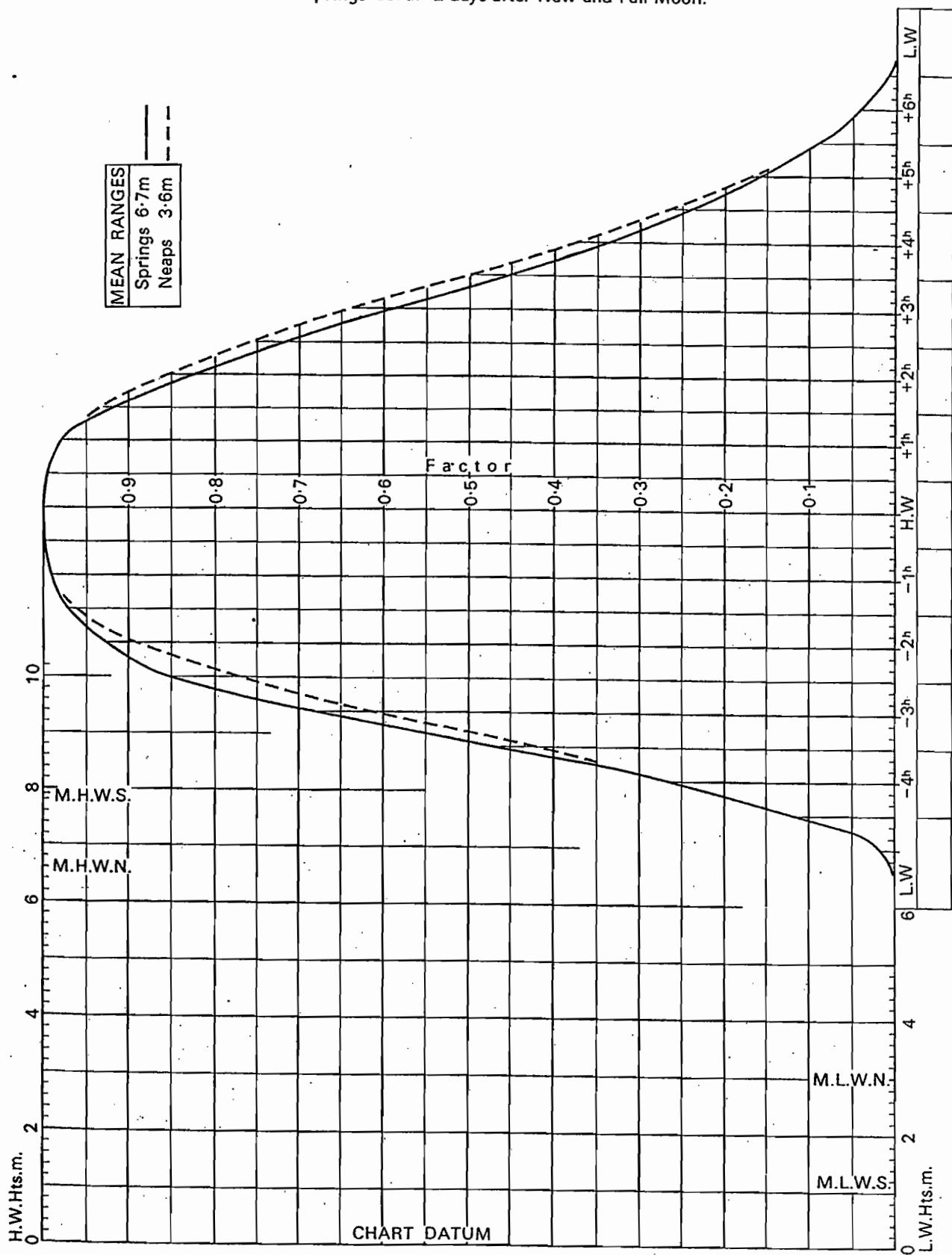
TIME ZONE - 0100

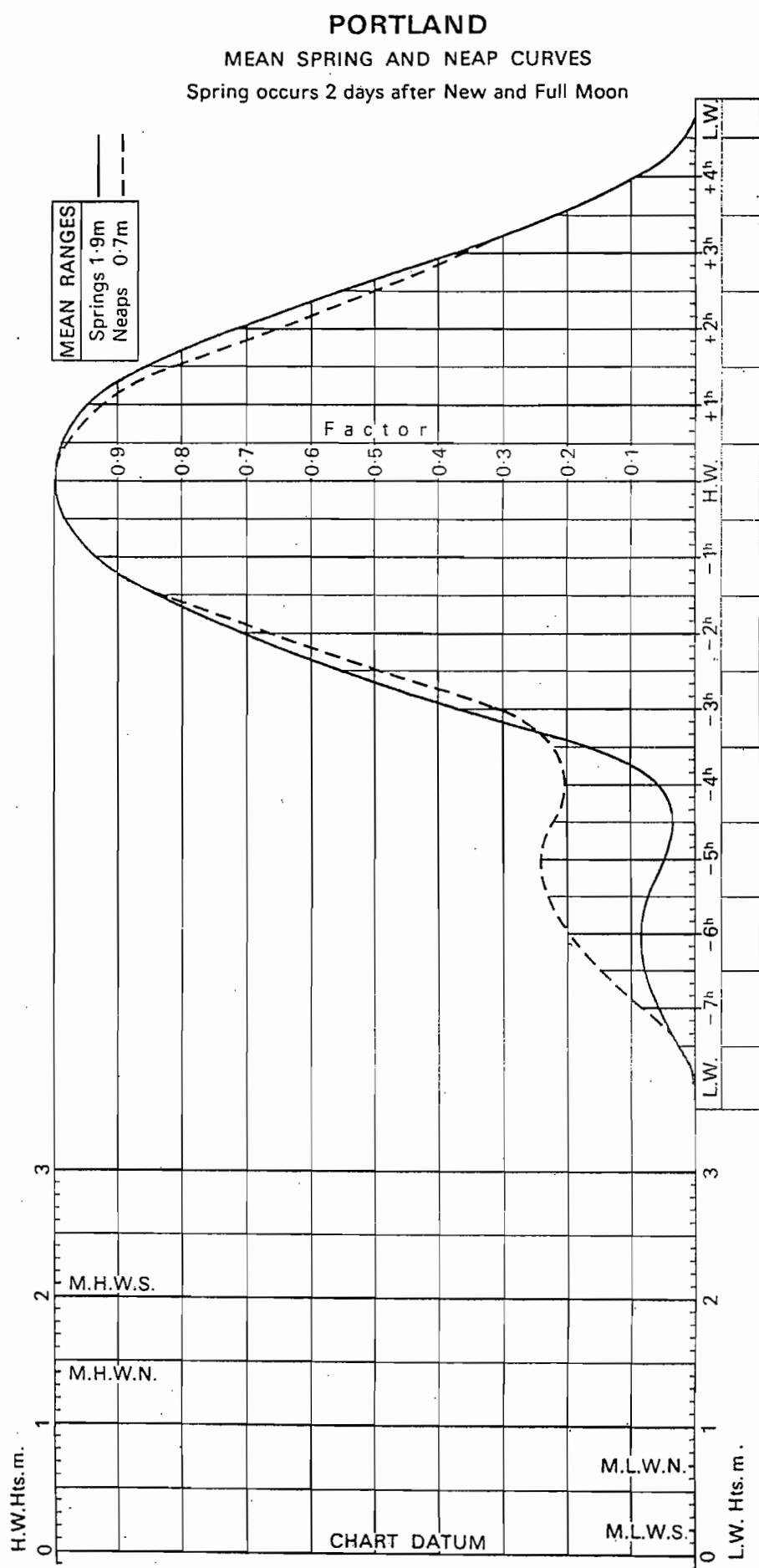
## TIMES AND HEIGHTS OF HIGH AND LOW WATERS

YEAR 0000

| JANUARY |     |         | FEBRUARY |         |     | MARCH   |     |         | APRIL |         |     |
|---------|-----|---------|----------|---------|-----|---------|-----|---------|-------|---------|-----|
| TIME    | M   | TIME    | M        | TIME    | M.  | TIME    | M   | TIME    | M     | TIME    | M   |
| 1 0611  | 1.4 | 16 0617 | 2.0      | 1 0033  | 8.0 | 0011    | 7.6 | 1 0646  | 0.9   | 16 0617 | 1.3 |
| 1123    | 8.0 | 1131    | 7.5      | 1 0745  | 1.1 | 16 0712 | 1.5 | 1 1143  | 8.1   | 16 1122 | 7.8 |
| TH 1841 | 1.1 | F 1840  | 1.7      | SU 1246 | 8.1 | M 1219  | 7.8 | SU 1907 | 0.6   | M 1836  | 1.1 |
| 2357    | 7.9 | 2358    | 7.4      | 2007    | 0.8 | 1931    | 1.3 |         |       | 2345    | 7.8 |
| 2 0704  | 1.4 | 17 0652 | 2.0      | 2 0115  | 7.9 | 0044    | 7.7 | 2 0009  | 8.0   | 17 0649 | 1.2 |
| 1213    | 8.0 | 1204    | 7.6      | 2 0823  | 1.2 | 17 0743 | 1.5 | 2 0723  | 0.9   | 17 1156 | 7.9 |
| F 1933  | 1.0 | SA 1914 | 1.7      | M 1327  | 7.9 | TU 1253 | 7.8 | M 1223  | 8.1   | TU 1908 | 1.0 |
|         |     |         |          | 2043    | 1.1 | 2002    | 1.3 | 1942    | 0.7   | TH 1305 | 7.6 |
| 3 0047  | 7.9 | 18 0031 | 7.4      | 3 0155  | 7.7 | 18 0117 | 7.6 | 3 0047  | 7.9   | 18 0018 | 7.8 |
| 0754    | 1.4 | 0726    | 1.9      | 3 0857  | 1.5 | 18 0815 | 1.5 | 3 0756  | 1.0   | 18 0722 | 1.2 |
| SA 1302 | 7.9 | SU 1237 | 7.6      | TU 1407 | 7.7 | W 1327  | 7.6 | TU 1300 | 8.0   | W 1231  | 7.9 |
| 2021    | 1.1 | 1947    | 1.7      | 2114    | 1.5 | 2033    | 1.5 | 2012    | 1.0   | 1939    | 1.1 |
| 4 0136  | 7.7 | 19 0105 | 7.4      | 4 0232  | 7.4 | 19 0151 | 7.5 | 4 0121  | 7.8   | 19 0052 | 7.8 |
| 0841    | 1.6 | 0759    | 2.0      | 4 0929  | 1.9 | 19 0847 | 1.8 | 4 0825  | 1.4   | 19 0755 | 1.2 |
| SU 1350 | 7.7 | M 1312  | 7.5      | W 1445  | 7.3 | TH 1402 | 7.5 | W 1335  | 7.7   | TH 1306 | 7.7 |
| 2105    | 1.4 | 2020    | 1.8      | 2143    | 2.0 | 2103    | 1.8 | 2037    | 1.5   | 2011    | 1.3 |
| 5 0224  | 7.5 | 20 0140 | 7.3      | 5 0309  | 7.1 | 20 0225 | 7.3 | 5 0153  | 7.5   | 20 0126 | 7.6 |
| 0925    | 1.9 | 0833    | 2.1      | 5 1000  | 2.4 | 20 0921 | 2.0 | 5 0850  | 1.8   | 20 0828 | 1.5 |
| M 1437  | 7.4 | TU 1348 | 7.4      | TH 1526 | 6.9 | F 1439  | 7.2 | TH 1408 | 7.4   | F 1343  | 7.5 |
| 2147    | 1.7 | 2052    | 1.9      | 2214    | 2.5 | 2137    | 2.2 | 2100    | 2.0   | 2042    | 1.7 |
| 6 0312  | 7.2 | 21 0217 | 7.2      | 6 0351  | 6.8 | 21 0303 | 7.1 | 6 0224  | 7.2   | 21 0201 | 7.4 |
| 1007    | 2.2 | 0907    | 2.2      | 6 1038  | 2.9 | 21 1001 | 2.4 | 6 0914  | 2.3   | 21 0901 | 1.9 |
| TU 1526 | 7.2 | W 1426  | 7.2      | F 1617  | 6.5 | SA 1525 | 6.9 | F 1442  | 6.9   | SA 1423 | 7.2 |
| 2228    | 2.1 | 2126    | 2.1      | 2256    | 3.1 | 2222    | 2.6 | 2124    | 2.5   | 2116    | 2.2 |
| 7 0401  | 7.0 | 22 0256 | 7.0      | 7 0449  | 6.4 | 22 0357 | 6.8 | 7 0256  | 6.8   | 22 0243 | 7.1 |
| 1051    | 2.6 | 0946    | 2.4      | 7 1132  | 3.3 | 22 1056 | 2.8 | 7 0945  | 2.8   | 22 0942 | 2.3 |
| W 1619  | 6.9 | TH 1507 | 7.1      | SA 1732 | 6.2 | SU 1637 | 6.5 | SA 1523 | 6.4   | SU 1515 | 6.8 |
| 2312    | 2.6 | 2206    | 2.4      | 2359    | 3.5 | 2330    | 3.0 | 2200    | 3.1   | 2204    | 2.7 |
| 8 0457  | 6.8 | 23 0340 | 6.9      | 8 0612  | 6.2 | 23 0528 | 6.5 | 8 0343  | 6.3   | 23 0342 | 6.7 |
| 1143    | 2.9 | 1031    | 2.7      | 8 1258  | 3.5 | 23 1218 | 3.0 | 8 1033  | 3.3   | 23 1040 | 2.7 |
| TH 1721 | 6.6 | F 1557  | 6.9      | SU 1910 | 6.1 | M 1826  | 6.4 | SU 1634 | 6.0   | M 1637  | 6.4 |
|         |     | 2256    | 2.7      |         |     |         |     | 2300    | 3.6   | 2318    | 3.2 |
| 9 0005  | 2.9 | 24 0437 | 6.8      | 9 0137  | 3.5 | 24 0110 | 3.1 | 9 0510  | 5.9   | 24 0524 | 6.4 |
| 0600    | 6.6 | 1130    | 2.8      | 9 0752  | 6.3 | 24 0708 | 6.6 | 9 1155  | 3.6   | 24 1210 | 3.0 |
| F 1246  | 3.1 | SA 1705 | 6.7      | M 1430  | 3.2 | TU 1404 | 2.7 | M 1830  | 5.8   | TU 1830 | 6.4 |
| 1833    | 6.5 |         |          | 2028    | 6.3 | 1958    | 6.7 |         |       |         |     |
| 10 0113 | 3.1 | 25 0003 | 2.9      | 10 0300 | 3.2 | 25 0247 | 2.7 | 10 0048 | 3.8   | 25 0109 | 3.1 |
| 0711    | 6.6 | 0557    | 6.7      | 10 0849 | 6.5 | 25 0827 | 7.0 | 10 0703 | 5.9   | 25 0704 | 6.5 |
| SA 1359 | 3.0 | SU 1247 | 2.9      | TU 1536 | 2.8 | W 1527  | 2.2 | TU 1352 | 3.5   | W 1359  | 2.6 |
| 1947    | 6.5 | 1837    | 6.6      | 2120    | 6.6 | 2111    | 7.2 | 1959    | 6.1   | 2005    | 6.8 |
| 11 0225 | 3.0 | 26 0131 | 2.8      | 11 0400 | 2.8 | 26 0403 | 2.1 | 11 0235 | 3.4   | 26 0245 | 2.6 |
| 0820    | 6.7 | 0720    | 6.8      | 11 0936 | 6.9 | 26 0928 | 7.4 | 11 0823 | 6.3   | 26 0819 | 7.0 |
| SU 1504 | 2.8 | M 1419  | 2.6      | W 1629  | 2.3 | TH 1638 | 1.6 | W 1509  | 2.9   | TH 1522 | 2.0 |
| 2048    | 6.7 | 2000    | 6.8      | 2159    | 7.0 | 2204    | 7.6 | 2054    | 6.5   | 2101    | 7.2 |
| 12 0325 | 2.8 | 27 0257 | 2.5      | 12 0448 | 2.4 | 27 0509 | 1.5 | 12 0338 | 2.8   | 27 0358 | 1.9 |
| 0910    | 6.9 | 0831    | 7.1      | 12 1007 | 7.1 | 27 1017 | 7.8 | 12 0911 | 6.7   | 27 0914 | 7.4 |
| M 1557  | 2.5 | TU 1535 | 2.1      | TH 1713 | 2.0 | F 1738  | 1.1 | TH 1604 | 2.3   | F 1629  | 1.4 |
| 2135    | 6.9 | 2109    | 7.2      | 2233    | 7.2 | 2248    | 7.9 | 2132    | 6.9   | 2147    | 7.6 |
| 13 0415 | 2.6 | 28 0405 | 2.1      | 13 0530 | 2.0 | 28 0602 | 1.1 | 13 0426 | 2.3   | 28 0456 | 1.4 |
| 0947    | 7.1 | 0932    | 7.5      | 13 1041 | 7.4 | 28 1101 | 8.0 | 13 0942 | 7.1   | 28 0959 | 7.7 |
| TU 1644 | 2.3 | W 1640  | 1.6      | F 1753  | 1.7 | SA 1827 | 0.7 | F 1649  | 1.9   | SA 1721 | 1.0 |
| 2215    | 7.1 | 2208    | 7.6      | O 2305  | 7.4 | ● 2330  | 8.0 | 2206    | 7.3   | 2226    | 7.8 |
| 14 0500 | 2.4 | 29 0510 | 1.7      | 14 0607 | 1.8 |         |     | 14 0507 | 1.9   | 29 0542 | 1.1 |
| 1023    | 7.3 | 1026    | 7.8      | 14 1114 | 7.6 |         |     | 14 1016 | 7.4   | 29 1040 | 7.9 |
| W 1726  | 2.0 | TH 1743 | 1.2      | SA 1828 | 1.5 |         |     | SA 1728 | 1.5   | SU 1803 | 0.9 |
| 2250    | 7.3 | ● 2300  | 7.8      | 2338    | 7.5 |         |     | 2239    | 7.5   | ● 2305  | 7.9 |
| 15 0540 | 2.2 | 30 0609 | 1.3      | 15 0640 | 1.6 |         |     | 15 0543 | 1.6   | 30 0621 | 1.0 |
| 1057    | 7.4 | 1116    | 8.0      | 15 1146 | 7.7 |         |     | 15 1049 | 7.7   | 30 1118 | 8.0 |
| TH 1804 | 1.8 | F 1839  | 0.9      | SU 1900 | 1.3 |         |     | SU 1803 | 1.3   | M 1839  | 0.8 |
| O 2324  | 7.3 | 2348    | 8.0      |         |     |         |     | O 2312  | 7.7   | 2341    | 7.9 |
| 31 0700 | 1.1 |         |          |         |     |         |     | 31 0654 | 1.0   |         |     |
|         |     | 1202    | 8.1      |         |     |         |     | 31 1155 | 8.0   |         |     |
|         |     | SA 1926 | 0.7      |         |     |         |     | TU 1909 | 1.0   |         |     |

LE HAVRE  
MEAN SPRING AND NEAP CURVES  
Springs occur 2 days after New and Full Moon.



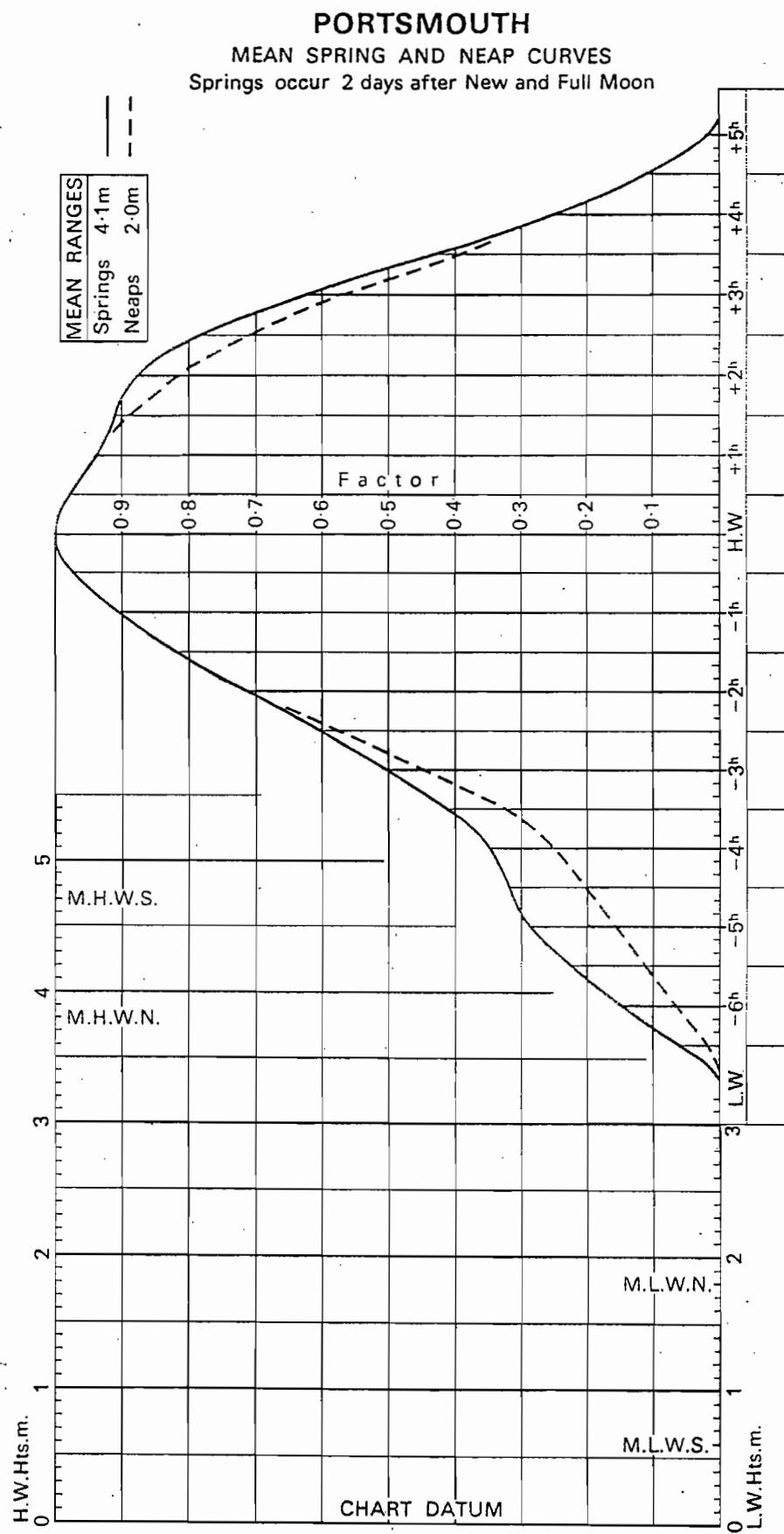


# ENGLAND, SOUTH COAST - PORTLAND

LAT 50°34'N LONG 2°28'W

| TIME ZONE GMT |      |         |     | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |     |         |     |          |      |         |     |         |     |         |     | YEAR 1987 |   |  |  |
|---------------|------|---------|-----|--|-----|---------|-----|----------|------|---------|-----|---------|-----|---------|-----|-----------|---|--|--|
|               |      |         |     | JANUARY                                  |     |         |     | FEBRUARY |      |         |     | MARCH   |     |         |     | APRIL     |   |  |  |
| TIME          | M    | TIME    | M   | TIME                                     | M   | TIME    | M   | TIME     | M    | TIME    | M   | TIME    | M   | TIME    | M   | TIME      | M |  |  |
| 1 0741        | 2.4  | 16 0000 | 0.4 | 1 0057                                   | 0.3 | 16 0039 | 0.2 | 1 0002   | 0.2  | 16 0726 | 2.1 | 1 0044  | 0.1 | 16 0025 | 0.1 |           |   |  |  |
| 1213          | 0.4  | 0740    | 2.0 | 1 0849                                   | 2.5 | 16 0819 | 2.1 | 1 0756   | 2.5  | 1205    | 0.1 | 1 0836  | 2.2 | 16 0817 | 2.1 |           |   |  |  |
| TH 2013       | 2.2  | F 1220  | 0.4 | SU 1328                                  | 0.2 | M 1300  | 0.2 | SU 1227  | 0.0  | M 2008  | 2.1 | W 1308  | 0.1 | TH 1244 | 0.2 |           |   |  |  |
|               |      | 2010    | 1.8 | 2121                                     | 2.2 | 2100    | 1.9 | 2025     | 2.2  |         |     | 2043    | 2.1 | 2043    | 2.1 |           |   |  |  |
| 2 0030        | 0.4  | 17 0030 | 0.4 | 2 0134                                   | 0.3 | 17 0107 | 0.2 | 2 0036   | 0.1  | 17 0015 | 0.2 | 2 0115  | 0.1 | 17 0101 | 0.2 |           |   |  |  |
| 0825          | 2.5  | 0808    | 2.0 | 2 0923                                   | 2.4 | 17 0848 | 2.1 | 2 0830   | 2.5  | 0759    | 2.2 | 2 0903  | 2.0 | 17 0855 | 2.0 |           |   |  |  |
| F 1259        | 0.4  | SA 1250 | 0.4 | M 1409                                   | 0.2 | TU 1334 | 0.2 | M 1304   | 0.0  | TU 1235 | 0.1 | TH 1339 | 0.2 | F 1322  | 0.1 |           |   |  |  |
| 2100          | 2.2  | 2044    | 1.8 | 2153                                     | 2.1 | 2128    | 1.9 | 2053     | 2.2  | 2037    | 2.1 | 2106    | 2.0 | 2116    | 2.0 |           |   |  |  |
| 3 0113        | 0.5  | 18 0058 | 0.4 | 3 0211                                   | 0.3 | 18 0138 | 0.2 | 3 0109   | 0.2  | 18 0045 | 0.1 | 3 0145  | 0.2 | 18 0139 | 0.2 |           |   |  |  |
| 0905          | 2.5  | 0836    | 2.0 | 3 0959                                   | 2.2 | 18 0920 | 2.0 | 3 0901   | 2.3  | 18 0833 | 2.1 | 3 0926  | 1.8 | 18 0931 | 1.8 |           |   |  |  |
| SA 1345       | 0.4  | SU 1322 | 0.3 | TU 1450                                  | 0.3 | W 1407  | 0.2 | TU 1340  | 0.1  | W 1308  | 0.1 | F 1404  | 0.3 | SA 1400 | 0.3 |           |   |  |  |
| 2141          | 2.1  | 2115    | 1.8 | 2224                                     | 1.9 | 2156    | 1.8 | 2119     | 2.1  | 2105    | 2.0 | 2127    | 1.8 | 2150    | 1.8 |           |   |  |  |
| 4 0156        | 0.5  | 19 0127 | 0.4 | 4 0248                                   | 0.4 | 19 0211 | 0.3 | 4 0143   | 0.2  | 19 0118 | 0.1 | 4 0210  | 0.4 | 19 0216 | 0.3 |           |   |  |  |
| 0943          | 2.3  | 0903    | 2.0 | 4 1033                                   | 1.9 | 19 0952 | 1.9 | 4 0931   | 2.1  | 0907    | 2.0 | 4 0944  | 1.6 | 19 1006 | 1.6 |           |   |  |  |
| SU 1432       | 0.3  | M 1356  | 0.3 | W 1527                                   | 0.4 | TH 1439 | 0.3 | W 1416   | 0.2  | TH 1343 | 0.1 | SA 1423 | 0.4 | SU 1437 | 0.4 |           |   |  |  |
| 2222          | 1.9  | 2146    | 1.7 | 2252                                     | 1.7 | 2221    | 1.7 | 2144     | 1.9  | 2134    | 1.9 | 2146    | 1.6 | 2225    | 1.6 |           |   |  |  |
| 5 0239        | 0.5  | 20 0158 | 0.4 | 5 0323                                   | 0.5 | 20 0242 | 0.4 | 5 0215   | 0.3  | 20 0151 | 0.2 | 5 0231  | 0.5 | 20 0303 | 0.4 |           |   |  |  |
| 1023          | 2.2  | 0933    | 1.9 | 5 1105                                   | 1.7 | 20 1022 | 1.7 | 5 0959   | 1.9  | 20 0939 | 1.9 | 5 0956  | 1.3 | 20 1051 | 1.4 |           |   |  |  |
| M 1520        | 0.4  | TU 1430 | 0.4 | TH 1559                                  | 0.5 | F 1512  | 0.4 | TH 1445  | 0.3  | F 1416  | 0.2 | SU 1432 | 0.5 | M 1523  | 0.5 |           |   |  |  |
| 2301          | 1.7  | 2216    | 1.7 | 2319                                     | 1.5 | 2249    | 1.5 | 2206     | 1.7  | 2201    | 1.7 | 2200    | 1.4 | 2315    | 1.5 |           |   |  |  |
| 6 0321        | 0.6  | 21 0231 | 0.5 | 6 0356                                   | 0.6 | 21 0319 | 0.5 | 6 0243   | 0.4  | 21 0223 | 0.3 | 6 0253  | 0.7 | 21 0414 | 0.5 |           |   |  |  |
| 1105          | 1.9  | 1006    | 1.8 | 6 1136                                   | 1.5 | 21 1059 | 1.5 | 6 1022   | 1.6  | 1008    | 1.7 | 6 1009  | 1.2 | 21 1213 | 1.2 |           |   |  |  |
| TU 1607       | 0.4  | W 1506  | 0.5 | F 1630                                   | 0.6 | SA 1551 | 0.6 | F 1507   | 0.4  | SA 1447 | 0.4 | M 1439  | 0.6 | TU 1647 | 0.7 |           |   |  |  |
| 2343          | 1.6  | 2246    | 1.6 | 2351                                     | 1.4 | 2330    | 1.4 | 2224     | 1.5  | 2229    | 1.6 | 2221    | 1.3 |         |     |           |   |  |  |
| 7 0408        | 0.7  | 22 0308 | 0.6 | 7 0437                                   | 0.8 | 22 0415 | 0.7 | 7 0306   | 0.5  | 22 0301 | 0.5 | 7 0341  | 0.8 | 22 0041 | 1.4 |           |   |  |  |
| 1150          | 1.7  | 1044    | 1.7 | 7 1213                                   | 1.3 | 22 1158 | 1.4 | 7 1039   | 1.4  | 2042    | 1.5 | 7 1104  | 1.0 | 22 0557 | 0.5 |           |   |  |  |
| W 1657        | 0.5  | TH 1546 | 0.6 | SA 1711                                  | 0.8 | SU 1658 | 0.8 | SA 1521  | 0.6  | SU 1524 | 0.5 | TU 1503 | 0.8 | W 1404  | 1.3 |           |   |  |  |
|               |      | 2324    | 1.5 |  |     |         |     | 2241     | 1.4  | 2310    | 1.4 | 2339    | 1.2 | 1838    | 0.7 |           |   |  |  |
| 8 0029        | 1.5  | 23 0354 | 0.7 | 8 0044                                   | 1.3 | 23 0050 | 1.3 | 8 0329   | 0.7  | 23 0401 | 0.6 | 8 0644  | 0.8 | 23 0217 | 1.5 |           |   |  |  |
| 0500          | 0.8  | 1131    | 1.6 | 8 0553                                   | 0.9 | 23 0559 | 0.8 | 8 1053   | 1.2  | 1149    | 1.3 | 8 1519  | 1.1 | 23 0724 | 0.4 |           |   |  |  |
| TH 1243       | 1.6  | F 1637  | 0.7 | SU 1328                                  | 1.2 | M 1349  | 1.3 | SU 1534  | 0.7  | M 1637  | 0.7 | W 1919  | 0.8 | TH 1521 | 1.4 |           |   |  |  |
| 1752          | 0.7  |         |     | 1829                                     | 0.8 | 1849    | 0.8 | 2306     | 1.3  |         |     |         |     | 1956    | 0.6 |           |   |  |  |
| 9 0123        | 1.5  | 24 0017 | 1.4 | 9 0224                                   | 1.3 | 24 0243 | 1.4 | 9 0419   | 0.8  | 0037    | 1.3 | 9 0245  | 1.3 | 24 0331 | 1.7 |           |   |  |  |
| 0606          | 0.8  | 0500    | 0.8 | 9 0800                                   | 0.9 | 24 0755 | 0.7 | 9 1141   | 1.1  | 0600    | 0.7 | 9 0816  | 0.6 | 24 0831 | 0.3 |           |   |  |  |
| F 1346        | 1.5  | SA 1238 | 1.5 | M 1539                                   | 1.2 | TU 1545 | 1.4 | M 1614   | 0.8  | TU 1404 | 1.2 | TH 1608 | 1.3 | F 1623  | 1.6 |           |   |  |  |
| 1852          | 0.7  | 1747    | 0.8 | 2022                                     | 0.8 | 2028    | 0.7 |          |      | 1848    | 0.8 | 2039    | 0.7 | 2057    | 0.5 |           |   |  |  |
| 10 0226       | 1.5  | 25 0133 | 1.4 | 10 0404                                  | 1.5 | 25 0413 | 1.7 | 10 0043  | 1.2  | 0236    | 1.5 | 10 0354 | 1.5 | 25 0435 | 1.9 |           |   |  |  |
| 0723          | 0.9  | 0630    | 0.9 | 0927                                     | 0.8 | 25 0912 | 0.5 | 10 0733  | 0.9  | 0747    | 0.6 | 10 0904 | 0.5 | 25 0930 | 0.2 |           |   |  |  |
| SA 1459       | 1.4  | SU 1409 | 1.4 | TU 1703                                  | 1.4 | W 1705  | 1.6 | TU 1545  | 1.1  | W 1543  | 1.4 | F 1653  | 1.5 | SA 1722 | 1.8 |           |   |  |  |
| 1958          | 0.7  | 1913    | 0.8 | 2141                                     | 0.7 | 2140    | 0.5 | 2000     | 0.8  | 2019    | 0.6 | 2127    | 0.5 | 2150    | 0.3 |           |   |  |  |
| 11 0332       | 1.6  | 26 0302 | 1.5 | 11 0512                                  | 1.7 | 26 0524 | 1.9 | 11 0337  | 1.4  | 0358    | 1.7 | 11 0444 | 1.7 | 26 0533 | 2.0 |           |   |  |  |
| 0838          | 0.8  | 0804    | 0.8 | 1019                                     | 0.6 | 26 1013 | 0.3 | 11 0907  | 0.7  | 0857    | 0.4 | 1098    | 0.3 | 26 1022 | 0.1 |           |   |  |  |
| SU 1612       | 1.5  | M 1546  | 1.5 | W 1758                                   | 1.5 | TH 1811 | 1.8 | W 1650   | 1.3  | TH 1651 | 1.6 | SA 1741 | 1.7 | SU 1815 | 1.9 |           |   |  |  |
| 2102          | 0.7  | 2037    | 0.7 | 2234                                     | 0.5 | 2236    | 0.3 | 2122     | 0.7  | 2123    | 0.5 | 2209    | 0.4 | 2238    | 0.2 |           |   |  |  |
| 12 0435       | 1.7  | 27 0425 | 1.7 | 12 0604                                  | 1.8 | 27 0625 | 2.2 | 12 0443  | 1.6  | 0503    | 1.9 | 12 0531 | 1.9 | 27 0625 | 2.0 |           |   |  |  |
| 0942          | 0.7  | 0920    | 0.6 | 1058                                     | 0.5 | 27 1104 | 0.1 | 12 0951  | 0.5  | 0955    | 0.2 | 1029    | 0.2 | 27 1105 | 0.0 |           |   |  |  |
| M 1716        | 1.6  | TU 1708 | 1.7 | TH 1843                                  | 1.7 | F 1906  | 2.0 | TH 1734  | 1.5  | F 1753  | 1.8 | SU 1826 | 1.9 | M 1857  | 2.1 |           |   |  |  |
| 2200          | 0.6  | 2148    | 0.5 | 2315                                     | 0.4 | 2323    | 0.2 | 2209     | 0.5  | 2217    | 0.3 | 2246    | 0.3 | 2318    | 0.1 |           |   |  |  |
| 13 0532       | 1.8  | 28 0537 | 2.0 | 13 0648                                  | 2.0 | 28 0715 | 2.4 | 13 0532  | 1.8  | 0602    | 2.1 | 13 0615 | 2.0 | 28 0707 | 2.1 |           |   |  |  |
| 1033          | 0.6  | 1023    | 0.5 | 1131                                     | 0.3 | 28 1149 | 0.0 | 13 1030  | 0.3  | 1047    | 0.0 | 13 1104 | 0.2 | 28 1140 | 0.0 |           |   |  |  |
| TU 1810       | 1.6  | W 1818  | 1.9 | F 1923                                   | 1.8 | SA 1951 | 2.2 | F 1819   | 1.7  | SA 1846 | 2.0 | M 1906  | 2.1 | TU 1928 | 2.1 |           |   |  |  |
| 2249          | 0.5  | 2248    | 0.4 | O 2346                                   | 0.3 |         |     | 2248     | 0.4  | 2303    | 0.2 | 2320    | 0.2 | O 2352  | 0.1 |           |   |  |  |
| 14 0624       | 1.9  | 29 0640 | 2.2 | 14 0722                                  | 2.0 |         |     | 14 0614  | 2.0  | 0652    | 2.3 | 14 0657 | 2.1 | 29 0742 | 2.1 |           |   |  |  |
| 1115          | 0.5  | 1115    | 0.3 | 1201                                     | 0.3 |         |     | 14 1105  | 0.2  | 1130    | 0.0 | 1136    | 0.1 | 29 1210 | 0.1 |           |   |  |  |
| W 1856        | 1.7  | TH 1916 | 2.0 | SA 1958                                  | 1.9 |         |     | SA 1900  | 1.9  | SU 1928 | 2.1 | TH 1940 | 2.1 | W 1952  | 2.1 |           |   |  |  |
| 2328          | 0.5  | 2337    | 0.3 |  |     |         |     | 2320     | 0.3  | 2341    | 0.1 | O 2351  | 0.1 |         |     |           |   |  |  |
| 15 0706       | 2.0  | 30 0731 | 2.4 | 15 0012                                  | 0.3 |         |     | 15 0652  | 2.1  | 0733    | 2.3 | 15 0738 | 2.2 | 30 0022 | 0.1 |           |   |  |  |
| 1149          | 0.5  | 1202    | 0.2 | 0751                                     | 2.1 |         |     | 15 1136  | 0.2  | 30 1206 | 0.0 | 15 1209 | 0.1 | 30 0810 | 2.0 |           |   |  |  |
| TH 1935       | 1.8  | F 2005  | 2.2 | SU 1230                                  | 0.2 |         |     | SU 1936  | 2.0  | M 1958  | 2.2 | W 2011  | 2.2 | TH 1237 | 0.2 |           |   |  |  |
| O             |      |         |     | 2030                                     | 1.9 |         |     | O 2349   | 0.1  |         |     |         |     | 2015    | 2.0 |           |   |  |  |
| 31            | 0018 | 0.3     |     |  |     |         |     | 31       | 0014 | 0.0     |     |         |     |         |     |           |   |  |  |
| 0813          | 2.5  |         |     |  |     |         |     | 31       | 0807 | 2.3     |     |         |     |         |     |           |   |  |  |
| SA 1246       | 0.2  |         |     |  |     |         |     | TU 1238  | 0.0  |         |     |         |     |         |     |           |   |  |  |
| 2045          | 2.2  |         |     |  |     |         |     | 2021     | 2.2  |         |     |         |     |         |     |           |   |  |  |

LOW WATERS - IMPORTANT NOTE. DOUBLE LOW WATERS OCCUR AT PORTLAND. THE PREDICTIONS ARE FOR THE FIRST LOW WATER.



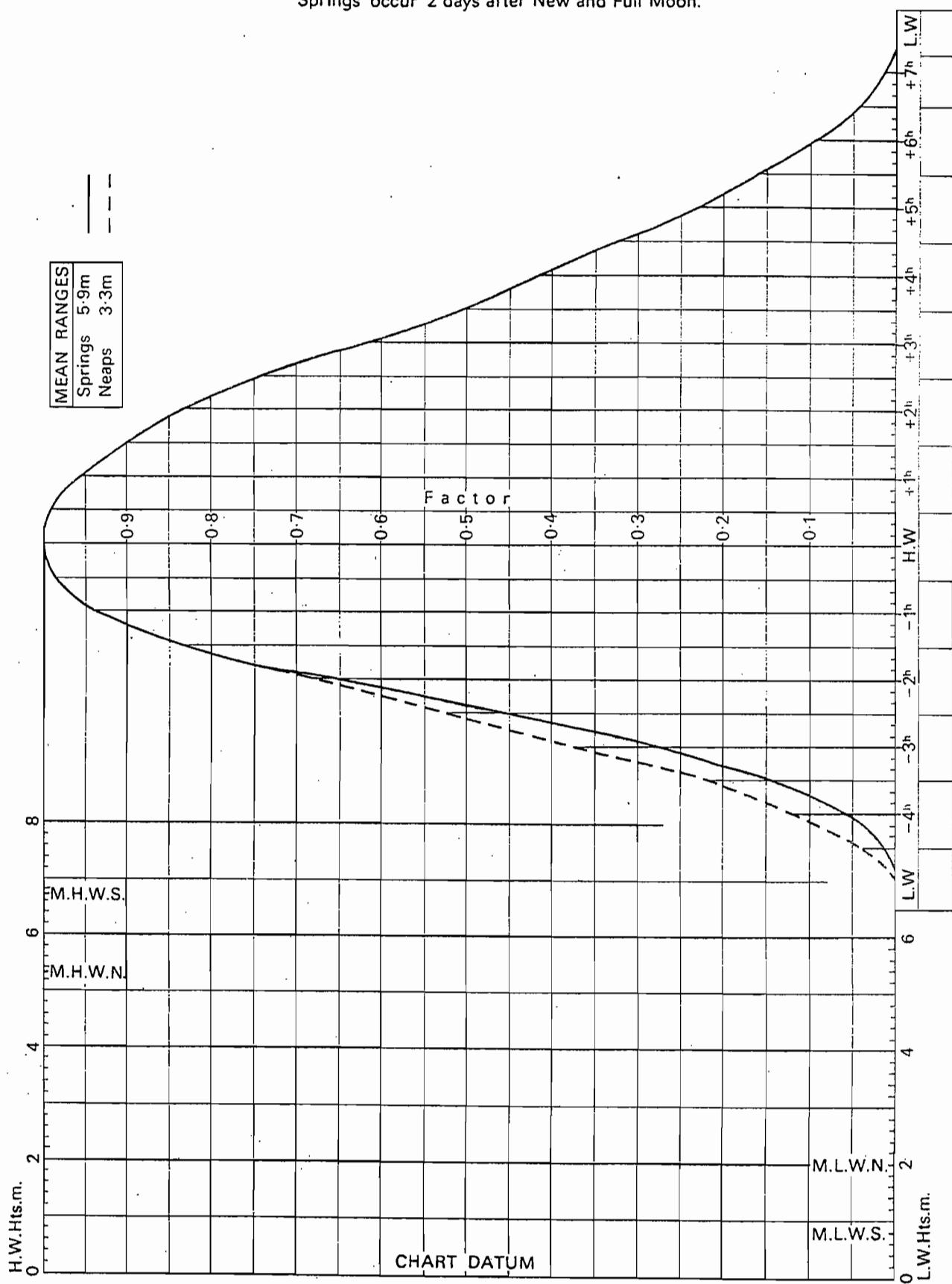
# ENGLAND, SOUTH COAST - PORTSMOUTH

LAT 50°48'N LONG 1°07'W

| TIME ZONE GMT |         |         | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |          |      |           |       |        |           |       |      |           |      |      | YEAR 1987 |        |        |        |         |      |     |
|---------------|---------|---------|--|----------|------|-----------|-------|--------|-----------|-------|------|-----------|------|------|-----------|--------|--------|--------|---------|------|-----|
|               | JANUARY |         |  | FEBRUARY |      |           | MARCH |        |           | APRIL |      |           |      |      |           |        |        |        |         |      |     |
|               | TIME    | M       | TIME                                     | M        | TIME | M         | TIME  | M      | TIME      | M     | TIME | M         | TIME | M    | TIME      | M      |        |        |         |      |     |
| 1             | 0455    | 0.9     | <b>16</b>                                | 0006     | 4.3  | <b>1</b>  | 0111  | 4.8    | <b>16</b> | 0047  | 4.4  | <b>1</b>  | 0009 | 4.8  | <b>16</b> | 0026   | 4.7    |        |         |      |     |
|               | 1201    | 4.7     | <b>16</b>                                | 0513     | 1.2  | <b>1</b>  | 0616  | 0.8    | <b>16</b> | 0600  | 0.8  | <b>1</b>  | 0517 | 0.6  | <b>16</b> | 0542   | 0.5    |        |         |      |     |
| TH            | 1722    | 0.7     | F  | 1211     | 4.3  | SU        | 1318  | 4.7    | M         | 1256  | 4.3  | SU        | 1218 | 4.7  | M         | 1717   | 0.5    |        |         |      |     |
|               | 1729    | 1.0     |  |          | 1838 | 0.5       |       | 1815   | 0.6       |       | 1738 | 0.3       |      |      |           | W      | 1312   | 4.6    |         |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      | TH        | 1248   | 4.6    |        |         |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 1823   | 0.7    | 1804   | 0.5     |      |     |
| 2             | 0037    | 4.7     | <b>17</b>                                | 0039     | 4.3  | <b>2</b>  | 0154  | 4.8    | <b>17</b> | 0123  | 4.5  | <b>2</b>  | 0049 | 4.8  | <b>17</b> | 0019   | 4.6    |        |         |      |     |
|               | 0544    | 0.9     | <b>17</b>                                | 0546     | 1.1  | <b>2</b>  | 0657  | 0.9    | <b>17</b> | 0632  | 0.8  | <b>2</b>  | 0555 | 0.6  | <b>17</b> | 0533   | 0.6    |        |         |      |     |
| F             | 1248    | 4.7     | SA                                       | 1244     | 4.2  | M         | 1400  | 4.6    | TU        | 1332  | 4.4  | M         | 1258 | 4.7  | TU        | 1230   | 4.5    |        |         |      |     |
|               | 1810    | 0.7     |  |          | 1919 | 0.7       |       | 1848   | 0.5       |       | 1817 | 0.4       |      | 1752 | 0.5       |        | TH     | 1349   | 4.5     |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | F      | 1331   | 4.5    |         |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 1854   | 0.9    | 1842   | 0.7     |      |     |
| 3             | 0126    | 4.7     | <b>18</b>                                | 0113     | 4.3  | <b>3</b>  | 0235  | 4.8    | <b>18</b> | 0159  | 4.5  | <b>3</b>  | 0127 | 4.8  | <b>18</b> | 0055   | 4.6    |        |         |      |     |
|               | 0631    | 1.0     | <b>18</b>                                | 0619     | 1.1  | <b>3</b>  | 0739  | 1.0    | <b>18</b> | 0704  | 0.7  | <b>3</b>  | 0632 | 0.7  | <b>18</b> | 0710   | 0.9    |        |         |      |     |
| SA            | 1333    | 4.6     | SU                                       | 1318     | 4.2  | TU        | 1442  | 4.5    | W         | 1409  | 4.4  | TU        | 1336 | 4.7  | W         | 1308   | 4.5    |        |         |      |     |
|               | 1857    | 0.8     |  |          | 2001 | 0.9       |       | 1921   | 0.6       |       | 1852 | 0.6       |      | 1826 | 0.4       |        | SA     | 1419   | 4.4     |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 1927   | 1.3    | 1922   | 0.9     |      |     |
| 4             | 0215    | 4.7     | <b>19</b>                                | 0148     | 4.3  | <b>4</b>  | 0317  | 4.6    | <b>19</b> | 0236  | 4.5  | <b>4</b>  | 0203 | 4.7  | <b>19</b> | 0132   | 4.6    |        |         |      |     |
|               | 0719    | 1.2     | <b>19</b>                                | 0653     | 1.1  | <b>4</b>  | 0821  | 1.2    | <b>19</b> | 0737  | 0.8  | <b>4</b>  | 0708 | 0.8  | <b>19</b> | 0642   | 0.5    |        |         |      |     |
| SU            | 1420    | 4.5     | M  | 1353     | 4.2  | W         | 1525  | 4.3    | TH        | 1447  | 4.3  | W         | 1415 | 4.6  | TH        | 1349   | 4.5    |        |         |      |     |
|               | 1944    | 0.9     |  |          | 2045 | 1.2       |       | 1957   | 0.8       |       | 1927 | 0.9       |      | 1901 | 0.5       |        | SA     | 1502   | 4.1     |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 2005   | 1.6    | 2012   | 1.3     |      |     |
| 5             | 0304    | 4.6     | <b>20</b>                                | 0225     | 4.3  | <b>5</b>  | 0400  | 4.4    | <b>20</b> | 0313  | 4.4  | <b>5</b>  | 0238 | 4.6  | <b>20</b> | 0210   | 4.5    |        |         |      |     |
|               | 0808    | 1.3     | <b>20</b>                                | 0726     | 1.1  | <b>5</b>  | 0909  | 1.4    | <b>20</b> | 0814  | 1.0  | <b>5</b>  | 0743 | 1.0  | <b>20</b> | 0716   | 0.6    |        |         |      |     |
| M             | 1510    | 4.4     | TU                                       | 1430     | 4.2  | TH        | 1615  | 4.1    | F         | 1528  | 4.1  | M         | 1452 | 4.4  | F         | 1430   | 4.3    |        |         |      |     |
|               | 2034    | 1.1     |  |          | 2135 | 1.5       |       | 2038   | 1.1       |       | 2003 | 1.2       |      | 1937 | 0.8       |        | SU     | 1549   | 3.8     |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 2057   | 1.9    | 2119   | 1.6     |      |     |
| 6             | 0355    | 4.5     | <b>21</b>                                | 0303     | 4.3  | <b>6</b>  | 0448  | 4.1    | <b>21</b> | 0355  | 4.2  | <b>6</b>  | 0313 | 4.4  | <b>21</b> | 0249   | 4.4    |        |         |      |     |
|               | 0901    | 1.5     | <b>21</b>                                | 0802     | 1.2  | <b>6</b>  | 1005  | 1.7    | <b>21</b> | 0901  | 1.3  | <b>6</b>  | 0824 | 1.3  | <b>21</b> | 0756   | 0.9    |        |         |      |     |
| TU            | 1604    | 4.2     | W  | 1509     | 4.1  | F         | 1716  | 3.8    | SA        | 1618  | 3.9  | F         | 1534 | 4.1  | SA        | 1514   | 4.1    |        |         |      |     |
|               | 2129    | 1.3     |  |          | 2238 | 1.0       |       | 2132   | 1.5       |       | 2045 | 1.5       |      | 2019 | 1.1       |        | M      | 1654   | 3.5     |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 2214   | 2.2    | 2250   | 1.8     |      |     |
| 7             | 0450    | 4.3     | <b>22</b>                                | 0342     | 4.3  | <b>7</b>  | 0548  | 3.8    | <b>22</b> | 0450  | 3.9  | <b>7</b>  | 0352 | 4.1  | <b>22</b> | 0333   | 4.1    |        |         |      |     |
|               | 1001    | 1.6     | <b>22</b>                                | 0843     | 1.3  | <b>7</b>  | 1117  | 1.8    | <b>22</b> | 1009  | 1.5  | <b>7</b>  | 0912 | 1.6  | <b>22</b> | 0844   | 1.2    |        |         |      |     |
| W             | 1705    | 4.0     | TH                                       | 1552     | 4.0  | SA        | 1835  | 3.6    | SU        | 1732  | 3.7  | SA        | 1625 | 3.8  | SU        | 1608   | 3.8    |        |         |      |     |
|               | 2230    | 1.5     |  |          | 2357 | 2.0       |       | 2254   | 1.7       |       | 2142 | 1.9       |      | 2118 | 1.5       |        | TU     | 1827   | 3.4     |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 2354   | 2.2    |        | W       | 1910 | 3.8 |
| 8             | 0549    | 4.2     | <b>23</b>                                | 0427     | 4.1  | <b>8</b>  | 0703  | 3.7    | <b>23</b> | 0610  | 3.8  | <b>8</b>  | 0447 | 3.7  | <b>23</b> | 0434   | 3.8    |        |         |      |     |
|               | 1107    | 1.7     | <b>23</b>                                | 0936     | 1.5  | <b>8</b>  | 1240  | 1.9    | <b>23</b> | 1143  | 1.7  | <b>8</b>  | 1017 | 1.9  | <b>23</b> | 0956   | 1.6    |        |         |      |     |
| TH            | 1814    | 3.8     | F  | 1646     | 3.9  | SU        | 2002  | 3.5    | M         | 1911  | 3.6  | SU        | 1739 | 3.5  | M         | 1731   | 3.6    |        |         |      |     |
|               | 2339    | 1.7     |  |          | 2206 | 1.5       |       | 2113   | 3.7       |       | 2040 | 3.9       |      | 2303 | 2.2       |        | W      | 1955   | 3.5     |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | TH     | 1256   | 1.4    |         |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 2021   | 4.1    |        |         |      |     |
| 9             | 0652    | 4.0     | <b>24</b>                                | 0524     | 4.0  | <b>9</b>  | 0119  | 2.0    | <b>24</b> | 0033  | 1.8  | <b>9</b>  | 0606 | 3.5  | <b>24</b> | 0603   | 3.6    |        |         |      |     |
|               | 1217    | 1.7     | <b>24</b>                                | 1043     | 1.6  | <b>9</b>  | 0818  | 3.7    | <b>24</b> | 0742  | 3.8  | <b>9</b>  | 1149 | 2.0  | <b>24</b> | 0811   | 3.5    |        |         |      |     |
| F             | 1928    | 3.8     | SA                                       | 1757     | 3.8  | M         | 1354  | 1.7    | TU        | 1318  | 1.5  | M         | 1920 | 3.4  | TU        | 1917   | 3.6    |        |         |      |     |
|               | 2321    | 1.6     |  |          | 2113 | 3.7       |       | 2040   | 3.9       |       | 2044 | 4.2       |      | 2038 | 3.9       |        | TH     | 1339   | 1.7     |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 2054   | 3.8    | 2113   | 4.3     |      |     |
| 10            | 0048    | 1.8     | <b>25</b>                                | 0636     | 4.0  | <b>10</b> | 0223  | 1.8    | <b>25</b> | 0157  | 1.5  | <b>10</b> | 0042 | 2.1  | <b>25</b> | 0034   | 1.8    |        |         |      |     |
|               | 0754    | 4.0     | <b>25</b>                                | 1205     | 1.6  | <b>10</b> | 0920  | 3.8    | <b>25</b> | 0858  | 4.0  | <b>10</b> | 0741 | 3.5  | <b>25</b> | 0740   | 3.7    |        |         |      |     |
| SA            | 1322    | 1.6     | SU                                       | 1920     | 3.8  | TU        | 1450  | 1.5    | W         | 1431  | 1.1  | TU        | 1322 | 1.9  | W         | 1314   | 1.4    |        |         |      |     |
|               | 2035    | 3.8     |  |          | 2205 | 3.9       |       | 2146   | 4.2       |       | 2044 | 3.5       |      | 2038 | 3.9       |        | F      | 1425   | 1.3     |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 2135   | 4.1    | 2157   | 4.5     |      |     |
| 11            | 0148    | 1.8     | <b>26</b>                                | 0044     | 1.6  | <b>11</b> | 0310  | 1.6    | <b>26</b> | 0258  | 1.2  | <b>11</b> | 0200 | 1.9  | <b>26</b> | 0152   | 1.5    |        |         |      |     |
|               | 0850    | 4.0     | <b>26</b>                                | 0752     | 4.1  | <b>11</b> | 1009  | 4.0    | <b>26</b> | 0959  | 4.3  | <b>11</b> | 0854 | 3.6  | <b>26</b> | 0852   | 3.9    |        |         |      |     |
| SU            | 1419    | 1.5     | M  | 1325     | 1.4  | W         | 1532  | 1.3    | TH        | 1528  | 0.8  | W         | 1425 | 1.6  | TH        | 1420   | 1.1    |        |         |      |     |
|               | 2132    | 4.0     |  |          | 2040 | 4.0       |       | 2244   | 4.1       |       | 2139 | 3.8       |      | 2136 | 4.2       |        | SA     | 1501   | 1.0     |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 2209   | 4.3    | 2236   | 4.7     |      |     |
| 12            | 0240    | 1.6     | <b>27</b>                                | 0159     | 1.4  | <b>12</b> | 0349  | 1.3    | <b>27</b> | 0349  | 0.9  | <b>12</b> | 0249 | 1.6  | <b>27</b> | 0248   | 1.1    |        |         |      |     |
|               | 0940    | 4.1     | <b>27</b>                                | 0903     | 4.2  | <b>12</b> | 1049  | 4.2    | <b>27</b> | 1051  | 4.5  | <b>12</b> | 0946 | 3.8  | <b>27</b> | 0946   | 4.2    |        |         |      |     |
| M             | 1506    | 1.4     | TU                                       | 1435     | 1.1  | TH        | 1607  | 1.1    | F         | 1615  | 0.5  | TH        | 1507 | 1.3  | F         | 1511   | 0.7    |        |         |      |     |
|               | 2218    | 4.1     |  |          | 2148 | 4.3       |       | 2317   | 4.3       |       | 2326 | 4.7       |      | 2218 | 4.1       |        | SU     | 1535   | 0.8     |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 2241   | 4.5    | 2314   | 4.7     |      |     |
| 13            | 0324    | 1.5     | <b>28</b>                                | 0303     | 1.2  | <b>13</b> | 0422  | 1.1    | <b>28</b> | 0435  | 0.7  | <b>13</b> | 0326 | 1.3  | <b>28</b> | 0334   | 0.8    |        |         |      |     |
|               | 1023    | 4.2     | <b>28</b>                                | 1006     | 4.4  | <b>13</b> | 1122  | 4.2    | <b>28</b> | 1137  | 4.6  | <b>13</b> | 1024 | 4.1  | <b>28</b> | 1051   | 4.4    |        |         |      |     |
| TU            | 1547    | 1.2     | W  | 1534     | 0.9  | F         | 1639  | 0.9    | SA        | 1658  | 0.4  | F         | 1541 | 1.0  | SA        | 1555   | 0.5    |        |         |      |     |
|               | 2258    | 4.2     |  |          | 2247 | 4.5       |       | O 2345 | 4.3       |       | 2249 | 4.3       |      | 2304 | 4.7       |        | M 1610 | 0.6    | TU 1647 | 0.6  |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 2313   | 4.7    | O 2350 | 4.7     |      |     |
| 14            | 0402    | 1.3     | <b>29</b>                                | 0357     | 0.9  | <b>14</b> | 0454  | 1.0    |           |       |      | <b>14</b> | 0357 | 1.1  | <b>29</b> | 0414   | 0.6    |        |         |      |     |
|               | 1103    | 4.3     | <b>29</b>                                | 1102     | 4.5  | <b>14</b> | 1152  | 4.3    |           |       |      | <b>14</b> | 1055 | 4.2  | <b>29</b> | 1114   | 4.6    |        |         |      |     |
| W             | 1624    | 1.1     | TH                                       | 1627     | 0.6  | SA        | 1710  | 0.8    |           |       |      | SA        | 1611 | 0.8  | SA        | 1636   | 0.4    |        |         |      |     |
|               | 2333    | 4.3     |  |          | 2339 | 4.6       |       |        |           |       |      |           | 2317 | 4.4  |           | O 2344 | 4.8    | W 1723 | 0.7     |      |     |
|               |         |         |  |          |      |           |       |        |           |       |      |           |      |      |           | 2349   | 4.7    |        |         |      |     |
| 15            | 0439    | 1.2</td |  |          |      |           |       |        |           |       |      |           |      |      |           |        |        |        |         |      |     |

# DOVER

MEAN SPRING AND NEAP CURVES  
Springs occur 2 days after New and Full Moon.



# ENGLAND, SOUTH COAST - DOVER

LAT 51°07'N LONG 1°19'E

| TIME ZONE GMT |         |         |     | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |     |         |       |         |     |         |     |         |     |         |     | YEAR 1987 |   |
|---------------|---------|---------|-----|--|-----|---------|-------|---------|-----|---------|-----|---------|-----|---------|-----|-----------|---|
|               | JANUARY |         |     | FEBRUARY                                 |     |         | MARCH |         |     | APRIL   |     |         |     |         |     |           |   |
| TIME          | M       | TIME    | M   | TIME                                     | M   | TIME    | M     | TIME    | M   | TIME    | M   | TIME    | M   | TIME    | M   | TIME      | M |
| 1 0646        | 1.0     | 16 0650 | 1.3 | 1 0038                                   | 6.8 | 16 0018 | 6.5   | 1 0730  | 0.4 | 16 0653 | 0.8 | 1 0027  | 6.7 | 16 0723 | 0.7 |           |   |
| 1 1139        | 6.6     | 16 1150 | 6.1 | 1 0829                                   | 0.5 | 16 0748 | 1.0   | 1 1200  | 6.6 | 16 1126 | 6.4 | 1 0806  | 0.6 | 16 1211 | 6.5 |           |   |
| TH 1914       | 1.0     | F 1907  | 1.2 | SU 1302                                  | 6.6 | M 1227  | 6.3   | SU 1952 | 0.5 | M 1906  | 0.9 | W 1248  | 6.4 | TH 1934 | 0.8 |           |   |
|               |         |         |     | 2051                                     | 0.7 | 1954    | 1.0   |         |     | 2347    | 6.5 | 2011    | 0.8 |         |     |           |   |
| 2 0008        | 6.7     | 17 0011 | 6.4 | 2 0117                                   | 6.8 | 17 0050 | 6.5   | 2 0015  | 6.8 | 17 0723 | 0.8 | 2 0102  | 6.6 | 17 0029 | 6.5 |           |   |
| 2 0741        | 0.9     | 17 0728 | 1.2 | 2 0910                                   | 0.6 | 17 0815 | 1.0   | 2 0809  | 0.4 | 17 1200 | 6.5 | 2 0832  | 0.8 | 17 0757 | 0.7 |           |   |
| F 1231        | 6.6     | SA 1218 | 6.2 | M 1342                                   | 6.5 | TU 1300 | 6.3   | M 1238  | 6.6 | TU 1930 | 0.9 | TH 1323 | 6.2 | F 1252  | 6.4 |           |   |
| 2009          | 0.9     | 1942    | 1.3 | 2127                                     | 0.9 | 2019    | 1.1   | 2026    | 0.6 |         |     | 2034    | 1.0 | 2012    | 0.9 |           |   |
| 3 0055        | 6.7     | 18 0042 | 6.4 | 3 0157                                   | 6.7 | 18 0121 | 6.5   | 3 0053  | 6.8 | 18 0021 | 6.6 | 3 0134  | 6.3 | 18 0109 | 6.3 |           |   |
| 0833          | 0.8     | 0804    | 1.2 | 3 0946                                   | 0.8 | 18 0842 | 1.0   | 3 0843  | 0.5 | 18 0748 | 0.8 | 3 0858  | 1.1 | 18 0834 | 0.9 |           |   |
| SA 1319       | 6.5     | SU 1250 | 6.2 | TU 1423                                  | 6.3 | W 1334  | 6.2   | TU 1314 | 6.5 | W 1234  | 6.5 | F 1357  | 6.0 | SA 1335 | 6.2 |           |   |
| 2101          | 1.0     | 2013    | 1.3 | 2156                                     | 1.2 | 2047    | 1.1   | 2051    | 0.8 | 1955    | 0.9 | 2105    | 1.3 | 2054    | 1.1 |           |   |
| 4 0138        | 6.6     | 19 0114 | 6.4 | 4 0239                                   | 6.5 | 19 0152 | 6.4   | 4 0130  | 6.7 | 19 0053 | 6.5 | 4 0208  | 6.0 | 19 0155 | 6.0 |           |   |
| 0924          | 0.9     | 0836    | 1.2 | 4 1020                                   | 1.1 | 19 0912 | 1.1   | 4 0911  | 0.7 | 19 0816 | 0.8 | 4 0928  | 1.4 | 19 0921 | 1.2 |           |   |
| SU 1406       | 6.3     | M 1324  | 6.1 | W 1507                                   | 6.0 | TH 1409 | 6.1   | W 1352  | 6.3 | TH 1309 | 6.4 | SA 1433 | 5.7 | SU 1427 | 5.9 |           |   |
| 2149          | 1.2     | 2042    | 1.4 | 2223                                     | 1.5 | 2121    | 1.3   | 2112    | 1.1 | 2026    | 0.9 | 2139    | 1.6 | 2143    | 1.4 |           |   |
| 5 0222        | 6.5     | 20 0149 | 6.3 | 5 0324                                   | 6.2 | 20 0227 | 6.2   | 5 0206  | 6.5 | 20 0126 | 6.4 | 5 0243  | 5.6 | 20 0256 | 5.7 |           |   |
| 1012          | 1.0     | 20 0907 | 1.3 | 5 1052                                   | 1.5 | 20 0949 | 1.3   | 5 0936  | 1.1 | 20 0850 | 0.9 | 5 1004  | 1.8 | 20 1016 | 1.6 |           |   |
| M 1453        | 6.1     | TU 1401 | 6.0 | TH 1555                                  | 5.7 | F 1451  | 5.9   | TH 1430 | 6.0 | F 1345  | 6.2 | SU 1517 | 5.3 | M 1531  | 5.5 |           |   |
| 2233          | 1.4     | 2111    | 1.5 | 2254                                     | 1.9 | 2200    | 1.6   | 2136    | 1.4 | 2103    | 1.1 | 2221    | 2.0 | 2245    | 1.7 |           |   |
| 6 0308        | 6.3     | 21 0225 | 6.2 | 6 0414                                   | 5.9 | 21 0315 | 6.0   | 6 0246  | 6.2 | 21 0204 | 6.2 | 6 0334  | 5.1 | 21 0410 | 5.4 |           |   |
| 1059          | 1.3     | 21 0941 | 1.4 | 6 1132                                   | 1.9 | 21 1033 | 1.6   | 6 1004  | 1.5 | 21 0928 | 1.2 | 6 1049  | 2.2 | 21 1130 | 1.9 |           |   |
| TU 1543       | 5.9     | W 1442  | 5.9 | F 1655                                   | 5.3 | SA 1548 | 5.6   | F 1511  | 5.7 | SA 1429 | 5.9 | M 1623  | 4.9 | TU 1647 | 5.3 |           |   |
| 2316          | 1.7     | 2146    | 1.6 | 2337                                     | 2.2 | 2249    | 1.9   | 2209    | 1.7 | 2145    | 1.4 | 2316    | 2.3 |         |     |           |   |
| 7 0400        | 6.1     | 22 0304 | 6.1 | 7 0519                                   | 5.4 | 22 0417 | 5.6   | 7 0328  | 5.7 | 22 0253 | 5.8 | 7 0509  | 4.7 | 22 0008 | 1.8 |           |   |
| 1147          | 1.6     | 22 1019 | 1.5 | 7 1225                                   | 2.3 | 22 1133 | 1.9   | 7 1040  | 1.9 | 22 1016 | 1.6 | 7 1151  | 2.5 | 22 0549 | 5.2 |           |   |
| W 1641        | 5.6     | TH 1531 | 5.7 | SA 1815                                  | 5.1 | SU 1658 | 5.3   | SA 1602 | 5.3 | SU 1528 | 5.6 | TU 1803 | 4.8 | W 1300  | 1.9 |           |   |
|               |         | 2227    | 1.8 |  |     |         |       | 2251    | 2.1 | 2238    | 1.8 |         |     | 1829    | 5.2 |           |   |
| 8 0003        | 2.0     | 23 0355 | 5.9 | 8 0042                                   | 2.5 | 23 0000 | 2.2   | 8 0426  | 5.2 | 23 0402 | 5.4 | 8 0034  | 2.5 | 23 0142 | 1.6 |           |   |
| 0459          | 5.8     | 23 1106 | 1.7 | 8 0645                                   | 5.2 | 23 0534 | 5.3   | 8 1127  | 2.3 | 23 1122 | 1.9 | 8 0656  | 4.7 | 23 0733 | 5.4 |           |   |
| TH 1242       | 1.8     | F 1630  | 5.5 | SU 1348                                  | 2.4 | M 1257  | 2.1   | SU 1720 | 4.9 | M 1644  | 5.2 | W 1323  | 2.5 | TH 1429 | 1.6 |           |   |
| 1750          | 5.4     | 2319    | 2.1 | 1937                                     | 5.1 | 1828    | 5.1   | 2350    | 2.4 | 2357    | 2.0 | 1921    | 5.0 | 1954    | 5.5 |           |   |
| 9 0057        | 2.2     | 24 0457 | 5.7 | 9 0222                                   | 2.5 | 24 0138 | 2.2   | 9 0605  | 4.8 | 24 0533 | 5.1 | 9 0212  | 2.3 | 24 0305 | 1.2 |           |   |
| 0610          | 5.6     | 24 1208 | 1.9 | 9 0805                                   | 5.2 | 24 0713 | 5.3   | 9 1238  | 2.6 | 24 1255 | 2.1 | 9 0801  | 4.9 | 24 0834 | 5.8 |           |   |
| F 1348        | 2.0     | SA 1737 | 5.4 | M 1515                                   | 2.3 | TU 1434 | 2.0   | M 1859  | 4.8 | TU 1831 | 5.0 | TH 1449 | 2.2 | F 1541  | 1.2 |           |   |
| 1903          | 5.4     |         |     | 2042                                     | 5.3 | 2018    | 5.3   |         |     |         |     | 2015    | 5.3 | 2049    | 5.9 |           |   |
| 10 0208       | 2.3     | 25 0031 | 2.2 | 10 0339                                  | 2.2 | 25 0321 | 1.8   | 10 0120 | 2.6 | 25 0141 | 2.0 | 10 0321 | 1.8 | 25 0410 | 0.9 |           |   |
| 0723          | 5.6     | 25 0605 | 5.6 | 10 0907                                  | 5.4 | 25 0851 | 5.6   | 10 0740 | 4.8 | 25 0735 | 5.2 | 10 0844 | 5.3 | 25 0921 | 6.0 |           |   |
| SA 1457       | 2.0     | SU 1324 | 1.9 | TU 1612                                  | 2.0 | W 1606  | 1.6   | TU 1425 | 2.5 | W 1437  | 1.9 | F 1546  | 1.8 | SA 1640 | 1.0 |           |   |
| 2009          | 5.5     | 1852    | 5.4 | 2134                                     | 5.6 | 2129    | 5.7   | 2012    | 5.0 | 2016    | 5.3 | 2057    | 5.7 | 2131    | 6.2 |           |   |
| 11 0317       | 2.2     | 26 0157 | 2.2 | 11 0431                                  | 1.9 | 26 0440 | 1.3   | 11 0304 | 2.3 | 26 0318 | 1.5 | 11 0413 | 1.4 | 26 0506 | 0.7 |           |   |
| 0827          | 5.7     | 26 0721 | 5.6 | 11 0956                                  | 5.6 | 26 0953 | 6.0   | 11 0846 | 5.1 | 26 0854 | 5.7 | 11 0917 | 5.6 | 26 0959 | 6.2 |           |   |
| SU 1553       | 1.9     | M 1446  | 1.8 | W 1657                                   | 1.7 | TH 1718 | 1.2   | W 1539  | 2.1 | TH 1600 | 1.4 | SA 1635 | 1.4 | SU 1730 | 0.8 |           |   |
| 2105          | 5.7     | 2012    | 5.5 | 2214                                     | 5.9 | 2217    | 6.2   | 2104    | 5.4 | 2115    | 5.8 | 2132    | 6.0 | 2209    | 6.4 |           |   |
| 12 0409       | 2.0     | 27 0325 | 1.9 | 12 0516                                  | 1.5 | 27 0544 | 0.9   | 12 0404 | 1.8 | 27 0430 | 1.0 | 12 0459 | 1.1 | 27 0554 | 0.6 |           |   |
| 0921          | 5.8     | 27 0837 | 5.8 | 12 1031                                  | 5.8 | 27 1041 | 6.3   | 12 0934 | 5.4 | 27 0945 | 6.1 | 12 0948 | 6.0 | 27 1034 | 6.3 |           |   |
| M 1637        | 1.8     | TU 1606 | 1.6 | TH 1739                                  | 1.4 | F 1819  | 0.8   | TH 1630 | 1.7 | F 1706  | 1.0 | SU 1719 | 1.2 | M 1811  | 0.8 |           |   |
| 2152          | 5.9     | 2129    | 5.8 | 2248                                     | 6.1 | 2259    | 6.5   | 2143    | 5.7 | 2159    | 6.2 | 2206    | 6.3 | 2247    | 6.6 |           |   |
| 13 0452       | 1.8     | 28 0442 | 1.5 | 13 0558                                  | 1.3 | 28 0641 | 0.6   | 13 1002 | 5.7 | 28 1026 | 6.3 | 13 1021 | 6.2 | 28 1111 | 6.4 |           |   |
| 1007          | 5.9     | 28 0948 | 6.0 | 13 1059                                  | 5.9 | 28 1122 | 6.5   | 13 1715 | 1.4 | 28 1801 | 0.7 | M 1800  | 1.0 | TU 1842 | 0.9 |           |   |
| TU 1715       | 1.6     | W 1718  | 1.3 | F 1819                                   | 1.2 | SA 1912 | 0.6   | F 1715  | 1.4 | SA 1801 | 0.7 | M 1903  | 0.8 | TH 1225 | 6.3 |           |   |
| 2234          | 6.1     | 2226    | 6.2 | O 2316                                   | 6.3 | ● 2337  | 6.7   | 2214    | 6.0 | 2237    | 6.5 | 2241    | 6.5 | ● 2325  | 6.6 |           |   |
| 14 0532       | 1.6     | 29 0547 | 1.2 | 14 1125                                  | 6.1 |         |       | 14 1026 | 1.2 | 29 1101 | 6.5 | 14 1057 | 6.4 | 29 1149 | 6.4 |           |   |
| 1048          | 6.0     | 29 1045 | 6.3 | 14 1125                                  | 6.1 |         |       | 14 1757 | 1.1 | 29 1848 | 0.6 | 14 1834 | 0.9 | 29 1907 | 0.9 |           |   |
| W 1753        | 1.4     | TH 1822 | 1.0 | SA 1857                                  | 1.1 |         |       | 2244    | 6.2 | ● 2313  | 6.7 | O 2316  | 6.6 |         |     |           |   |
| 2311          | 6.3     | ● 2313  | 6.5 | 2346                                     | 6.4 |         |       |         |     |         |     |         |     |         |     |           |   |
| 15 0611       | 1.4     | 30 0648 | 0.8 | 15 1154                                  | 6.3 |         |       | 15 1054 | 6.2 | 30 1136 | 6.5 | 15 1133 | 6.5 | 30 0728 | 0.8 |           |   |
| 1120          | 6.1     | 30 1133 | 6.5 | 15 1154                                  | 6.3 |         |       | SU 1835 | 1.0 | M 1923  | 0.6 | W 1903  | 0.8 | 30 0728 | 0.8 |           |   |
| TH 1831       | 1.3     | F 1920  | 0.8 | SU 1930                                  | 1.1 |         |       | O 2315  | 6.4 | 2350    | 6.8 | 2353    | 6.6 | 30 0728 | 0.8 |           |   |
| O 2342        | 6.3     | 2357    | 6.7 |  |     |         |       |         |     |         |     |         |     | 1935    | 1.0 |           |   |
| 31 0741       | 0.6     |         |     |  |     |         |       | 31 0740 | 0.5 |         |     |         |     |         |     |           |   |
| 1219          | 6.6     |         |     |  |     |         |       | 31 1212 | 6.5 |         |     |         |     |         |     |           |   |
| SA 2009       | 0.7     |         |     |  |     |         |       | TU 1948 | 0.7 |         |     |         |     |         |     |           |   |

# ENGLAND, SOUTH COAST - DOVER

LAT 51°07'N LONG 1°19'E

TIME ZONE GMT

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

YEAR 1987

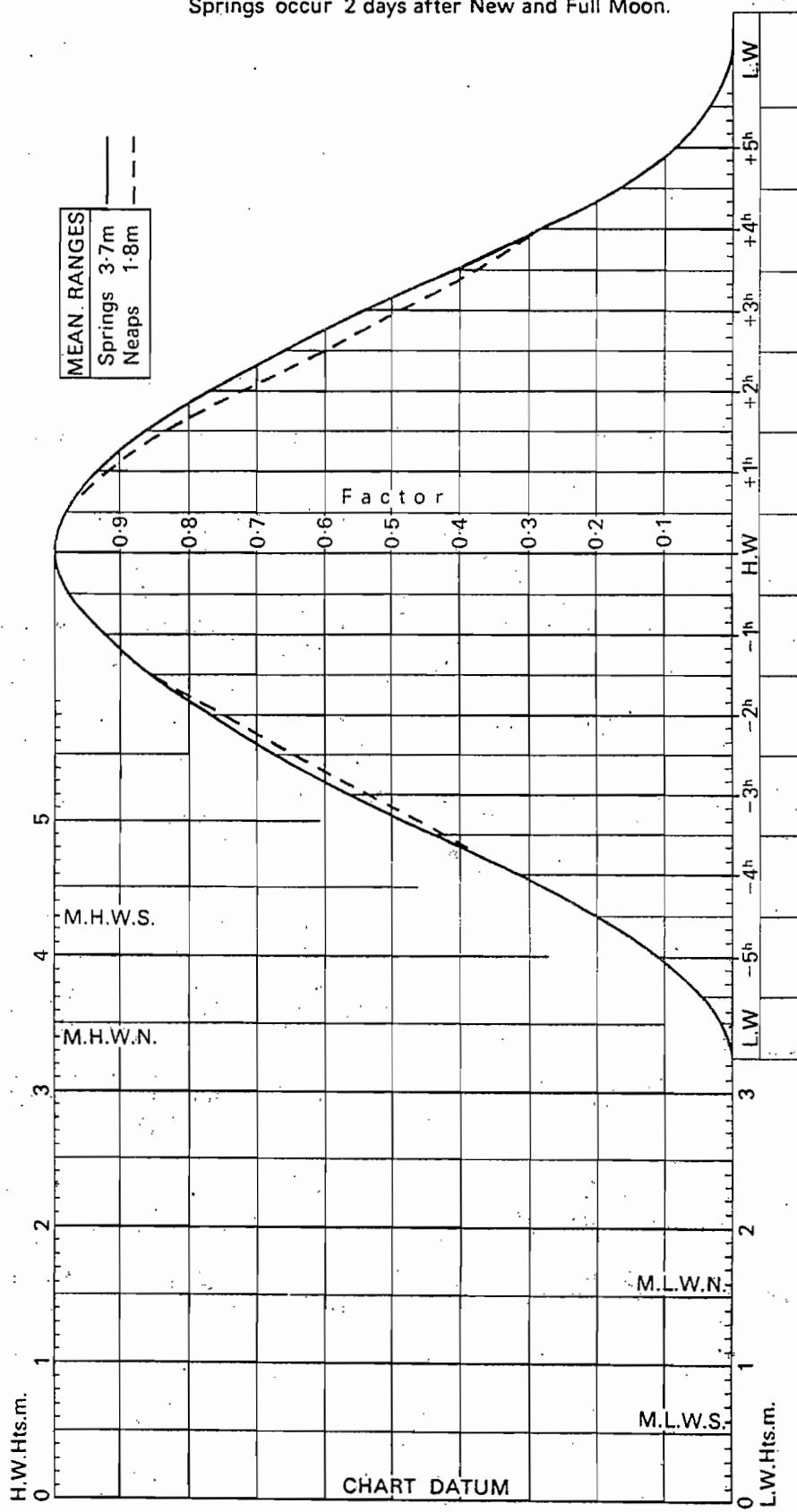
|    | MAY JUNE JULY AUGUST |           |            |   |             |           |          |    |             |           |          |             |
|----|----------------------|-----------|------------|---|-------------|-----------|----------|----|-------------|-----------|----------|-------------|
|    | TIME                 | M         | TIME       | M | TIME        | M         | TIME     | M  | TIME        | M         | TIME     | M           |
| 1  | 0036 6.4             | <b>16</b> | 0017 6.4   |   | 0120 5.8    | <b>16</b> | 0208 6.2 |    | 0138 5.9    | <b>16</b> | 0237 6.3 |             |
|    | 0757 0.9             |           | 0745 0.8   |   | 0840 1.4    | <b>16</b> | 0934 1.0 |    | 0857 1.5    | <b>16</b> | 1013 1.0 |             |
| F  | 1300 6.2             | SA        | 1248 6.4   |   | M 1348 5.9  | TU        | 1426 6.3 |    | W 1405 6.1  | TH        | 1450 6.4 | SA          |
|    | 2006 1.1             |           | 2008 0.9   |   | 2101 1.5    |           | 2159 0.9 |    | 2121 1.4    |           | 2235 0.9 | 2202 1.5    |
| 2  | 0107 6.2             | <b>17</b> | 0109 6.3   |   | 0157 5.6    | <b>17</b> | 0300 6.1 |    | 0219 5.7    | <b>17</b> | 0324 6.1 |             |
|    | 0827 1.1             |           | 0833 0.9   |   | 0915 1.6    | <b>17</b> | 1028 1.2 |    | 0929 1.6    | <b>17</b> | 1052 1.3 |             |
| SA | 1331 6.0             | SU        | 1341 6.2   |   | TU 1427 5.8 | W         | 1517 6.1 | TH | 1444 6.0    | F         | 1539 6.2 | SU          |
|    | 2042 1.3             |           | 2057 1.0   |   | 2141 1.7    |           | 2254 1.1 |    | 2159 1.5    |           | 2319 1.2 | M 1654 5.6  |
| 3  | 0137 5.9             | <b>18</b> | 0206 6.0   |   | 0242 5.4    | <b>18</b> | 0356 5.9 |    | 0305 5.6    | <b>18</b> | 0416 5.9 |             |
|    | 0901 1.4             |           | 0925 1.2   |   | 0955 1.8    | <b>18</b> | 1123 1.4 |    | 1006 1.8    | <b>18</b> | 1134 1.6 |             |
| SU | 1405 5.8             | M         | 1434 6.0   |   | W 1515 5.6  | TH        | 1612 5.9 |    | F 1531 5.8  | SA        | 1633 6.0 | M           |
|    | 2118 1.6             |           | 2152 1.2   |   | 2224 1.8    |           | 2353 1.2 |    | 2240 1.7    |           | 2337 1.9 | TU 1225 2.4 |
| 4  | 0212 5.5             | <b>19</b> | 0307 5.8   |   | 0342 5.2    | <b>19</b> | 0459 5.7 |    | 0400 5.5    | <b>19</b> | 0008 1.5 |             |
|    | 0938 1.7             |           | 1026 1.5   |   | 1041 2.0    | <b>19</b> | 1221 1.5 |    | 1049 1.9    | <b>19</b> | 0516 5.6 |             |
| M  | 1447 5.5             | TU        | 1531 5.8   |   | TH 1614 5.5 | F         | 1716 5.8 | SA | 1624 5.7    | SU        | 1224 1.9 | TU 1225 2.4 |
|    | 2159 1.9             |           | 2257 1.4   |   | 2318 1.9    |           |          |    | 2329 1.8    |           | 1737 5.7 | M 1359 2.5  |
| 5  | 0301 5.2             | <b>20</b> | 0414 5.6   |   | 0452 5.1    | <b>20</b> | 0055 1.4 |    | 0458 5.4    | <b>20</b> | 0107 1.8 |             |
|    | 1020 2.1             |           | 1136 1.6   |   | 1136 2.1    | <b>20</b> | 0608 5.6 |    | 1143 2.1    | <b>20</b> | 0627 5.4 |             |
| TU | 1545 5.2             |           | W 1637 5.6 |   | F 1719 5.4  | SA        | 1323 1.7 |    | SU 1720 5.7 | M         | 1328 2.1 | W 1319 2.2  |
|    | 2249 2.1             |           |            |   |             |           | 1824 5.8 |    |             |           | 1850 5.6 | TH 1524 2.2 |
| 6  | 0419 4.9             | <b>21</b> | 0010 1.5   |   | 0021 1.9    | <b>21</b> | 0201 1.5 |    | 0028 1.8    | <b>21</b> | 0219 2.0 |             |
|    | 1115 2.3             |           | 0539 5.5   |   | 0557 5.2    | <b>21</b> | 0712 5.6 |    | 0557 5.4    | <b>21</b> | 0737 5.4 |             |
| W  | 1701 5.1             | TH        | 1250 1.6   |   | SA 1243 2.1 | SU        | 1426 1.7 |    | M 1248 2.1  | TU        | 1443 2.1 | TH 1449 2.0 |
|    | 2354 2.2             |           | 1800 5.5   |   | 1819 5.5    |           | 1928 5.8 |    | 1819 5.7    |           | 2001 5.6 | F 1620 1.9  |
| 7  | 0550 4.8             | <b>22</b> | 0127 1.4   |   | 0127 1.8    | <b>22</b> | 0305 1.5 |    | 0133 1.8    | <b>22</b> | 0327 2.0 |             |
|    | 1227 2.4             |           | 0659 5.6   |   | 0653 5.4    | <b>22</b> | 0809 5.7 |    | 0657 5.5    | <b>22</b> | 0839 5.6 |             |
| TH | 1817 5.1             | F         | 1404 1.5   |   | SU 1349 2.0 | M         | 1525 1.7 |    | TU 1359 2.1 | W         | 1546 2.0 | F 1614 1.6  |
|    | 1914 5.7             |           |            |   | 1914 5.7    |           | 2026 5.9 |    | 1920 5.7    |           | 2101 5.6 | SA 1705 1.6 |
| 8  | 0114 2.1             | <b>23</b> | 0239 1.2   |   | 0229 1.6    | <b>23</b> | 0400 1.5 |    | 0240 1.7    | <b>23</b> | 0420 1.8 |             |
|    | 0657 5.0             |           | 0758 5.8   |   | 0745 5.6    | <b>23</b> | 0901 5.8 |    | 0759 5.6    | <b>23</b> | 0932 5.8 |             |
| F  | 1347 2.2             | SA        | 1508 1.4   |   | M 1451 1.8  | TU        | 1616 1.6 |    | W 1512 1.9  | TH        | 1637 1.8 | SA 1722 1.2 |
|    | 1917 5.4             |           | 2011 5.9   |   | 2004 6.0    |           | 2117 6.0 |    | 2022 5.9    |           | 2153 5.8 | SU 1747 1.3 |
| 9  | 0226 1.8             | <b>24</b> | 0342 1.1   |   | 0327 1.4    | <b>24</b> | 0447 1.5 |    | 0349 1.5    | <b>24</b> | 0505 1.7 |             |
|    | 0748 5.3             |           | 0846 5.9   |   | 0833 5.8    | <b>24</b> | 0948 5.9 |    | 0903 5.9    | <b>24</b> | 1017 6.0 |             |
| SA | 1450 1.9             | SU        | 1606 1.2   |   | TU 1550 1.6 | W         | 1659 1.6 | TH | 1626 1.6    | F         | 1720 1.6 | SU 1821 0.8 |
|    | 2006 5.7             |           | 2057 6.1   |   | 2051 6.2    |           | 2203 6.1 |    | 2122 6.0    |           | 2237 5.9 | M 1825 1.2  |
| 10 | 0324 1.5             | <b>25</b> | 0435 1.0   |   | 0423 1.2    | <b>25</b> | 0526 1.4 |    | 0457 1.3    | <b>25</b> | 0544 1.5 |             |
|    | 0830 5.6             |           | 0928 6.0   |   | 0921 6.1    | <b>25</b> | 1031 6.1 |    | 1003 6.1    | <b>25</b> | 1055 6.2 |             |
| SU | 1545 1.5             | M         | 1652 1.2   |   | W 1648 1.4  | TH        | 1737 1.4 |    | F 1729 1.3  | SA        | 1801 1.4 | M 1917 0.6  |
|    | 2049 6.0             |           | 2141 6.3   |   | 2139 6.3    |           | 2248 6.1 |    | 2221 6.2    |           | 2313 6.0 | TU 1902 1.1 |
| 11 | 0414 1.2             |           | 0520 1.0   |   | 0516 1.1    | <b>26</b> | 0601 1.4 |    | 0558 1.1    | <b>26</b> | 0622 1.4 |             |
|    | 0910 6.0             |           | 1009 6.1   |   | 1010 6.3    | <b>26</b> | 1112 6.2 |    | 1058 6.4    | <b>26</b> | 1130 6.3 |             |
| M  | 1635 1.3             | TU        | 1732 1.2   |   | TH 1742 1.2 | F         | 1814 1.3 | SA | 1827 1.0    | SU        | 1841 1.3 | TU 2006 0.4 |
|    | 2128 6.3             |           | 2221 6.4   | O | 2228 6.4    |           | 2327 6.1 | O  | 2318 6.4    |           | 2343 6.0 | W 1934 1.0  |
| 12 | 0502 1.0             |           | 0557 1.1   |   | 0607 1.0    | <b>27</b> | 0636 1.3 |    | 0657 1.0    | <b>27</b> | 0700 1.3 |             |
|    | 0949 6.2             |           | 1049 6.2   |   | 1101 6.4    | <b>27</b> | 1150 6.2 |    | 1147 6.6    | <b>27</b> | 1201 6.3 |             |
| TU | 1722 1.1             |           | W 1803 1.2 |   | F 1832 1.0  | SU        | 1852 1.3 |    | SU 1923 0.8 | M         | 1919 1.2 | W 1257 6.9  |
|    | 2207 6.5             |           | 2302 6.4   |   | 2320 6.4    |           |          |    |             |           |          | TH 1232 6.5 |
| 13 | 0546 0.8             | <b>28</b> | 0627 1.1   |   | 0656 0.9    | <b>28</b> | 0003 6.1 |    | 0011 6.5    | <b>28</b> | 0011 6.1 |             |
|    | 1030 6.4             |           | 1129 6.3   |   | 1154 6.5    | <b>28</b> | 0712 1.3 |    | 0752 0.8    | <b>28</b> | 0735 1.3 |             |
| W  | 1803 1.0             | TH        | 1835 1.2   |   | SA 1921 0.9 | SU        | 1224 6.2 |    | M 1235 6.7  | TU        | 1231 6.4 | TH 1338 6.8 |
|    | O 2248 6.5           |           | 2342 6.3   |   |             |           | 1931 1.2 |    | 2015 0.6    |           | 1955 1.2 | F 1302 6.5  |
| 14 | 0625 0.8             |           | 0657 1.1   |   | 0015 6.4    | <b>29</b> | 0034 6.0 |    | 0102 6.5    | <b>29</b> | 0041 6.1 |             |
|    | 1112 6.5             |           | 1207 6.3   |   | 0748 0.9    | <b>29</b> | 0748 1.3 |    | 0844 0.8    | <b>29</b> | 0806 1.3 |             |
| TH | 1842 0.9             | F         | 1909 1.1   |   | SU 1248 6.5 | M         | 1256 6.2 | TU | 1320 6.6    | W         | 1303 6.4 | F 1419 6.6  |
|    | 2330 6.5             |           |            |   | 2012 0.8    |           | 2009 1.3 |    | 2104 0.6    |           | 2027 1.2 | SA 1328 6.4 |
| 15 | 0704 0.7             |           | 0730 1.1   |   | 0018 6.2    | <b>30</b> | 0104 5.9 |    | 0151 6.5    | <b>30</b> | 0113 6.1 |             |
|    | 1158 6.5             |           | 0730 1.1   |   | 0840 0.9    | <b>30</b> | 0823 1.4 |    | 0931 0.8    | <b>30</b> | 0834 1.3 |             |
| F  | 1923 0.8             | SA        | 1242 6.2   |   | M 1337 6.4  | TU        | 1328 6.1 |    | W 1405 6.6  | TH        | 1335 6.3 | SA 1503 6.4 |
|    |                      |           | 1945 1.2   |   | 2104 0.8    |           | 2046 1.3 |    | 2150 0.7    |           | 2057 1.2 | SU 1358 6.2 |
| 31 | 0049 6.0             |           |            |   |             |           |          |    |             |           |          | 2235 1.3    |
|    | 0805 1.2             |           |            |   |             |           |          |    |             |           |          | 2131 1.4    |
| SU | 1314 6.1             |           |            |   |             |           |          |    |             |           |          | 2122 1.7    |
|    | 2023 1.3             |           |            |   |             |           |          |    |             |           |          |             |
| 31 | 0148 6.0             |           |            |   |             |           |          |    |             |           |          | 0220 5.9    |
|    | 0903 1.4             |           |            |   |             |           |          |    |             |           |          | 0941 1.7    |
| F  | 1408 6.2             |           |            |   |             |           |          |    |             |           |          | M 1439 6.0  |
|    | 2128 1.3             |           |            |   |             |           |          |    |             |           |          | 2212 1.7    |

# ENGLAND, SOUTH COAST - DOVER

LAT 51°07'N LONG 1°19'E

| TIME ZONE GMT |     | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |     |         |         |         |     |          |     |         |          |         |     | YEAR    | 1887 |
|---------------|-----|--|-----|---------|---------|---------|-----|----------|-----|---------|----------|---------|-----|---------|------|
|               |     | SEPTEMBER                                |     |         | OCTOBER |         |     | NOVEMBER |     |         | DECEMBER |         |     |         |      |
| TIME          | M   | TIME                                     | M   | TIME    | M       | TIME    | M   | TIME     | M   | TIME    | M        | TIME    | M   | TIME    | M    |
| 1 0310        | 5.7 | 16 0458                                  | 5.1 | 1 0403  | 5.3     | 16 0537 | 5.0 | 1 0148   | 1.9 | 0126    | 2.5      | 1 0230  | 1.7 | 0120    | 2.4  |
| 1 1027        | 2.0 | 16 1137                                  | 2.5 | 1 1126  | 2.2     | 16 1225 | 2.6 | 1 0716   | 5.6 | 16 0656 | 5.4      | 1 0734  | 5.9 | 16 0648 | 5.6  |
| TU 1535       | 5.7 | W 1744                                   | 4.9 | TH 1648 | 5.2     | F 1839  | 4.8 | SU 1427  | 1.5 | M 1405  | 2.1      | TU 1505 | 1.3 | W 1402  | 2.0  |
| 2305          | 2.0 |  |     |         |         |         |     | 2001     | 5.8 | 1935    | 5.3      | 2015    | 5.9 | 1926    | 5.4  |
| 2 0419        | 5.4 | 17 0029                                  | 2.7 | 2 0017  | 2.2     | 17 0114 | 2.7 | 2 0303   | 1.5 | 0229    | 2.2      | 2 0331  | 1.5 | 17 0225 | 2.2  |
| 1132          | 2.2 | 17 0636                                  | 5.0 | 2 0544  | 5.1     | 17 0703 | 5.1 | 2 0816   | 6.0 | 0749    | 5.7      | 2 0827  | 6.1 | 17 0742 | 5.8  |
| W 1652        | 5.3 | TH 1314                                  | 2.7 | F 1300  | 2.2     | SA 1402 | 2.4 | M 1535   | 1.2 | TU 1503 | 1.8      | W 1603  | 1.2 | TH 1503 | 1.7  |
| 1924          | 4.9 |  |     | 1900    | 5.2     | 1954    | 5.0 | 2051     | 6.2 | 2019    | 5.6      | 2103    | 6.1 | 2018    | 5.7  |
| 3 0021        | 2.2 | 18 0215                                  | 2.6 | 3 0157  | 2.1     | 18 0236 | 2.4 | 3 0403   | 1.2 | 0324    | 1.9      | 3 0423  | 1.5 | 18 0329 | 2.0  |
| 0546          | 5.1 | 18 0755                                  | 5.2 | 3 0744  | 5.4     | 18 0804 | 5.4 | 3 0903   | 6.3 | 0834    | 6.0      | 3 0914  | 6.3 | 18 0832 | 6.0  |
| TH 1300       | 2.3 | F 1454                                   | 2.4 | SA 1442 | 1.8     | SA 1508 | 2.0 | TU 1631  | 0.9 | W 1553  | 1.5      | TH 1651 | 1.2 | F 1602  | 1.5  |
| 1835          | 5.2 | 2037                                     | 5.2 | 2023    | 5.7     | 2042    | 5.4 | 2132     | 6.4 | 2058    | 5.9      | 2146    | 6.2 | 2107    | 5.9  |
| 4 0154        | 2.1 | 19 0328                                  | 2.3 | 4 0322  | 1.6     | 19 0331 | 2.0 | 4 0455   | 1.1 | 0414    | 1.6      | 4 0505  | 1.4 | 19 0431 | 1.7  |
| 0747          | 5.3 | 0851                                     | 5.5 | 4 0846  | 5.9     | 0846    | 5.8 | 4 0943   | 6.6 | 0914    | 6.3      | 4 0959  | 6.4 | 19 0921 | 6.1  |
| F 1444        | 2.0 | SA 1553                                  | 1.9 | SU 1555 | 1.2     | M 1557  | 1.6 | W 1722   | 0.8 | TH 1641 | 1.2      | F 1732  | 1.2 | SA 1657 | 1.3  |
| 2023          | 5.5 | 2127                                     | 5.5 | 2115    | 6.1     | 2111    | 5.7 | 2209     | 6.5 | 2136    | 6.2      | 2228    | 6.4 | 2155    | 6.2  |
| 5 0329        | 1.7 | 20 0419                                  | 1.9 | 5 0428  | 1.2     | 20 0416 | 1.6 | 5 0539   | 1.0 | 0501    | 1.4      | 5 0542  | 1.4 | 20 0525 | 1.4  |
| 0901          | 5.8 | 0932                                     | 5.9 | 5 0932  | 6.4     | 20 0921 | 6.1 | 5 1021   | 6.8 | 0952    | 6.5      | 5 1041  | 6.5 | 20 1009 | 6.3  |
| SA 1607       | 1.5 | SU 1640                                  | 1.6 | M 1655  | 0.8     | TU 1640 | 1.3 | TH 1803  | 0.8 | F 1725  | 1.1      | SA 1807 | 1.2 | SU 1747 | 1.2  |
| 2128          | 6.0 | 2157                                     | 5.8 | 2157    | 6.5     | 2139    | 6.1 | O 2247   | 6.6 | 2214    | 6.4      | O 2311  | 5.5 | 2244    | 6.4  |
| 6 0442        | 1.3 | 21 0501                                  | 1.6 | 6 0525  | 0.9     | 21 0458 | 1.4 | 6 0614   | 1.1 | 0546    | 1.3      | 6 0617  | 1.3 | 21 0614 | 1.2  |
| 0950          | 6.2 | 1003                                     | 6.2 | 6 1010  | 6.7     | 21 0953 | 6.4 | 6 1101   | 6.8 | 1028    | 6.6      | 6 1122  | 6.5 | 21 1058 | 6.4  |
| SU 1712       | 1.0 | M 1719                                   | 1.3 | TU 1749 | 0.6     | W 1720  | 1.1 | F 1836   | 0.9 | SA 1805 | 1.0      | SU 1839 | 1.2 | M 1835  | 1.1  |
| 2214          | 6.4 | 2219                                     | 6.0 | 2234    | 6.7     | 2209    | 6.3 | 2325     | 6.6 | 2254    | 6.6      | 2349    | 6.5 | 2332    | 6.6  |
| 7 0546        | 0.9 | 22 0539                                  | 1.3 | 7 0614  | 0.8     | 22 0537 | 1.2 | 7 0643   | 1.1 | 0625    | 1.2      | 7 0652  | 1.3 | 22 0700 | 1.1  |
| 1033          | 6.6 | 22 1031                                  | 6.4 | 7 1047  | 6.9     | 22 1026 | 6.5 | 7 1139   | 6.8 | 1108    | 6.6      | 7 1200  | 6.4 | 22 1149 | 6.5  |
| M 1810        | 0.6 | TU 1758                                  | 1.1 | W 1836  | 0.5     | TH 1758 | 1.0 | SA 1907  | 1.0 | SU 1843 | 1.0      | M 1913  | 1.3 | TU 1921 | 1.0  |
| O 2255        | 6.7 | 2242                                     | 6.2 | O 2309  | 6.8     | ● 2240  | 6.5 |          |     | 2336    | 6.6      |         |     |         |      |
| 8 0641        | 0.7 | 23 0615                                  | 1.2 | 8 0653  | 0.8     | 23 0612 | 1.1 | 8 0004   | 6.6 | 23 0703 | 1.1      | 8 0025  | 6.4 | 23 0019 | 6.7  |
| 1112          | 6.9 | 1059                                     | 6.6 | 8 1125  | 7.0     | 23 1058 | 6.7 | 8 0714   | 1.1 | 1151    | 6.5      | 8 0730  | 1.3 | 23 0748 | 1.0  |
| TU 1902       | 0.4 | W 1834                                   | 1.0 | TH 1914 | 0.6     | F 1832  | 0.9 | SU 1215  | 6.6 | M 1921  | 1.0      | TU 1235 | 6.2 | W 1239  | 6.5  |
| 2334          | 6.8 | ● 2311                                   | 6.4 | 2347    | 6.8     | 2313    | 6.6 | 1937     | 1.1 |         |          | 1948    | 1.4 | 2009    | 1.1  |
| 9 0727        | 0.6 | 24 0646                                  | 1.1 | 9 0723  | 0.8     | 24 0645 | 1.1 | 9 0041   | 6.4 | 24 0021 | 6.6      | 9 0059  | 6.3 | 24 0107 | 6.6  |
| 1151          | 7.0 | 24 1130                                  | 6.6 | 9 1203  | 7.0     | 24 1130 | 6.7 | 9 0748   | 1.3 | 0745    | 1.1      | 9 0808  | 1.4 | 24 0836 | 0.9  |
| W 1945        | 0.4 | TH 1904                                  | 1.0 | F 1945  | 0.7     | SA 1903 | 0.9 | M 1250   | 6.4 | TU 1238 | 6.4      | W 1307  | 6.0 | TH 1331 | 6.4  |
|               |     |  |     |         |         | 2342    | 6.5 | 2009     | 1.3 | 2005    | 1.2      | 2023    | 1.6 | 2058    | 1.1  |
| 10 0014       | 6.8 | 25 0713                                  | 1.1 | 10 0025 | 6.6     | 25 0716 | 1.1 | 10 0114  | 6.2 | 25 0832 | 1.2      | 10 0846 | 1.6 | 25 0927 | 1.0  |
| 0804          | 0.7 | 25 1200                                  | 6.7 | 10 0748 | 1.0     | 25 1204 | 6.6 | 10 0825  | 1.5 | 0832    | 1.2      | 10 0846 | 1.6 | 25 0927 | 1.0  |
| TH 1229       | 7.0 | F 1933                                   | 0.9 | SA 1239 | 6.8     | SU 1935 | 1.0 | TU 1323  | 6.1 | W 1331  | 6.2      | TH 1342 | 5.8 | F 1423  | 6.3  |
| 2022          | 0.5 |  |     | 2013    | 0.9     |         |     | 2043     | 1.6 | 2054    | 1.4      | 2057    | 1.8 | 2150    | 1.3  |
| 11 0053       | 6.7 | 26 0012                                  | 6.5 | 11 0102 | 6.5     | 26 0025 | 6.5 | 11 0149  | 6.0 | 0201    | 6.3      | 11 0209 | 6.1 | 26 0243 | 6.4  |
| 0832          | 0.8 | 26 0738                                  | 1.1 | 11 0818 | 1.2     | 26 0751 | 1.2 | 11 0903  | 1.7 | 0922    | 1.3      | 11 0925 | 1.8 | 26 1019 | 1.1  |
| F 1309        | 6.9 | SA 1229                                  | 6.6 | SU 1314 | 6.6     | M 1241  | 6.5 | W 1359   | 5.7 | TH 1429 | 6.0      | F 1425  | 5.6 | SA 1517 | 6.1  |
| 2053          | 0.7 | 1959                                     | 1.0 | 2042    | 1.2     | 2012    | 1.1 | 2119     | 2.0 | 2149    | 1.6      | 2134    | 2.0 | 2242    | 1.5  |
| 12 0133       | 6.5 | 27 0045                                  | 6.4 | 12 0138 | 6.2     | 27 0106 | 6.3 | 12 0230  | 5.8 | 0256    | 6.0      | 12 0254 | 5.9 | 27 0335 | 6.2  |
| 0857          | 1.1 | 27 0808                                  | 1.2 | 12 0849 | 1.4     | 27 0832 | 1.3 | 12 0943  | 2.0 | 1020    | 1.5      | 12 1007 | 1.9 | 27 1113 | 1.3  |
| SA 1347       | 6.7 | SU 1257                                  | 6.5 | M 1349  | 6.2     | TU 1323 | 6.2 | TH 1447  | 5.4 | F 1534  | 5.8      | SA 1518 | 5.4 | SU 1614 | 5.9  |
| 2121          | 1.0 | 2030                                     | 1.1 | 2112    | 1.6     | 2056    | 1.4 | 2202     | 2.3 | 2254    | 1.8      | 2217    | 2.2 | 2337    | 1.7  |
| 13 0211       | 6.2 | 28 0117                                  | 6.3 | 13 0215 | 5.9     | 28 0154 | 6.1 | 13 0324  | 5.5 | 0356    | 5.8      | 13 0348 | 5.7 | 28 0433 | 6.0  |
| 0924          | 1.4 | 28 0843                                  | 1.4 | 13 0925 | 1.8     | 28 0918 | 1.6 | 13 1034  | 2.3 | 1129    | 1.6      | 13 1057 | 2.1 | 28 1212 | 1.5  |
| SU 1425       | 6.3 | M 1331                                   | 6.3 | TU 1427 | 5.8     | W 1416  | 5.9 | F 1557   | 5.0 | SA 1647 | 5.6      | SU 1623 | 5.2 | M 1719  | 5.7  |
| 2150          | 1.5 | 2107                                     | 1.4 | 2149    | 2.0     | 2148    | 1.7 | 2257     | 2.5 |         |          | 2309    | 2.4 |         |      |
| 14 0253       | 5.8 | 29 0157                                  | 6.0 | 14 0300 | 5.5     | 29 0253 | 5.8 | 14 0434  | 5.3 | 0008    | 1.9      | 14 0448 | 5.6 | 29 0038 | 1.9  |
| 0956          | 1.8 | 29 0924                                  | 1.6 | 14 1007 | 2.2     | 29 1016 | 1.8 | 14 1140  | 2.4 | 29 0509 | 5.7      | 14 1156 | 2.1 | 29 0537 | 5.9  |
| M 1510        | 5.9 | TU 1415                                  | 6.0 | W 1519  | 5.3     | TH 1528 | 5.5 | SA 1726  | 4.9 | SU 1245 | 1.6      | M 1729  | 5.1 | TU 1319 | 1.7  |
| 2227          | 1.9 | 2152                                     | 1.7 | 2234    | 2.4     | 2254    | 2.0 |          |     | 1811    | 5.6      |         |     | 1828    | 5.6  |
| 15 0343       | 5.4 | 30 0250                                  | 5.7 | 15 1104 | 2.5     | 30 1130 | 2.0 | 15 0551  | 5.2 | 30 0628 | 5.7      | 15 0550 | 5.5 | 30 0648 | 5.8  |
| 1038          | 2.2 | 30 1014                                  | 1.9 | 15 1104 | 2.5     | 30 1130 | 2.0 | 15 0551  | 5.3 | SU 1256 | 2.4      | M 1359  | 1.5 | TU 1259 | 2.1  |
| TU 1607       | 5.3 | W 1518                                   | 5.6 | TH 1651 | 4.8     | F 1659  | 5.3 | SU 1256  | 2.4 | M 1359  | 1.5      | TU 1259 | 2.1 | W 1427  | 1.7  |
| 2315          | 2.4 | 2252                                     | 2.0 | 2340    | 2.7     |         |     | 1839     | 5.0 | 1920    | 5.8      | 1829    | 5.2 | 1935    | 5.6  |
|               |     |  |     |         |         |         |     |          |     |         |          |         |     |         |      |
| 31 0018       | 2.1 |  |     |         |         |         |     |          |     |         |          |         |     |         |      |
| 0539          | 5.3 |  |     |         |         |         |     |          |     |         |          |         |     |         |      |
| SA 1302       | 1.9 |  |     |         |         |         |     |          |     |         |          |         |     |         |      |
| 1853          | 5.5 |  |     |         |         |         |     |          |     |         |          |         |     |         |      |
|               |     |  |     |         |         |         |     |          |     |         |          |         |     |         |      |
| 31 0251       | 2.0 |  |     |         |         |         |     |          |     |         |          |         |     |         |      |
| 0754          | 5.8 |  |     |         |         |         |     |          |     |         |          |         |     |         |      |
| TH 1531       | 1.7 |  |     |         |         |         |     |          |     |         |          |         |     |         |      |
| 2036          | 5.7 |  |     |         |         |         |     |          |     |         |          |         |     |         |      |

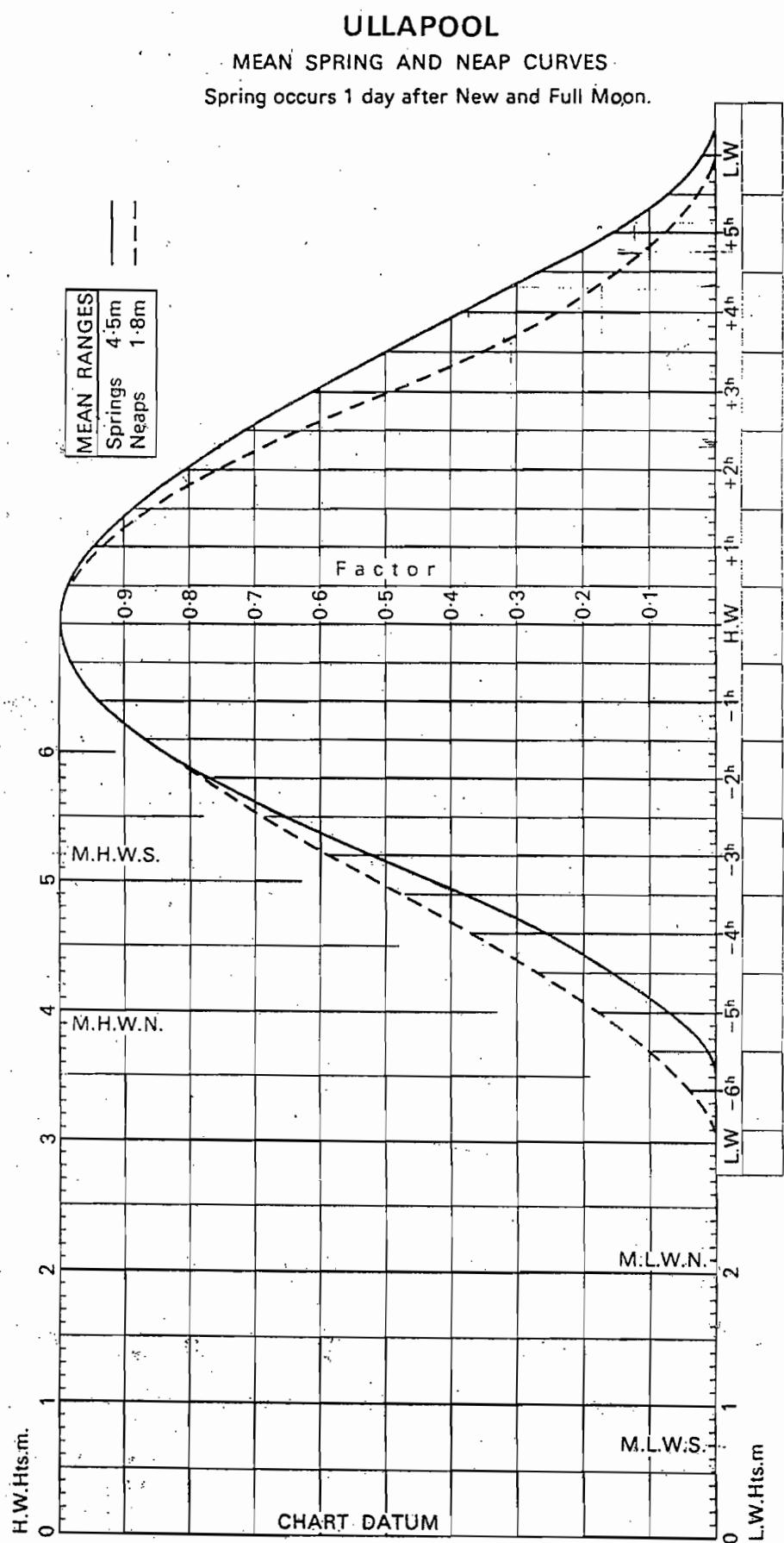
**ABERDEEN**  
**MEAN SPRING AND NEAP CURVES**  
Springs occur 2 days after New and Full Moon.



# SCOTLAND, EAST COAST - ABERDEEN

LAT 57°09'N LONG 2°05'W

| TIME ZONE GMT |      |      |      | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |      |      |          |      |      |      |       |      |     |      | YEAR 1987 |      |      |      |     |
|---------------|------|------|------|--|------|------|------|----------|------|------|------|-------|------|-----|------|-----------|------|------|------|-----|
|               |      |      |      | JANUARY                                  |      |      |      | FEBRUARY |      |      |      | MARCH |      |     |      | APRIL     |      |      |      |     |
|               | TIME | M    | TIME | M  | TIME | M    | TIME | M        | TIME | M    | TIME | M     | TIME | M   | TIME | M         | TIME | M    |      |     |
| 1             | 0145 | 4.4  | 0208 | 3.9                                      | 1    | 0314 | 4.3  | 16       | 0251 | 4.1  | 1    | 0208  | 4.4  | 16  | 0151 | 4.1       | 1    | 0251 | 4.0  |     |
| TH            | 0745 | 0.9  | 16   | 0757                                     | 1.3  | 1    | 0900 | 0.8      | 16   | 0840 | 1.0  | 1     | 0758 | 0.6 | 16   | 0744      | 0.8  | 1    | 0843 | 0.6 |
| TH            | 1355 | 4.5  | F    | 1406                                     | 4.1  | SU   | 1511 | 4.6      | M    | 1449 | 4.3  | SU    | 1408 | 4.6 | M    | 1351      | 4.3  | W    | 1458 | 4.2 |
| O             | 2016 | 0.5  |      | 2026                                     | 0.9  |      | 2135 | 0.3      |      | 2108 | 0.6  |       | 2029 | 0.2 |      | 2008      | 0.5  |      | 2108 | 0.6 |
| 2             | 0239 | 4.4  | 17   | 0243                                     | 4.0  | 2    | 0356 | 4.2      | 17   | 0322 | 4.0  | 2     | 0247 | 4.3 | 17   | 0222      | 4.1  | 2    | 0324 | 3.9 |
| F             | 0833 | 1.0  | 17   | 0829                                     | 1.3  | 2    | 0939 | 0.9      | 17   | 0911 | 1.0  | 2     | 0834 | 0.6 | 17   | 0813      | 0.7  | 2    | 0918 | 0.8 |
| F             | 1443 | 4.5  | SA   | 1437                                     | 4.2  | M    | 1553 | 4.5      | TU   | 1521 | 4.3  | M     | 1447 | 4.5 | TU   | 1422      | 4.3  | TH   | 1535 | 4.0 |
| F             | 2105 | 0.5  |      | 2058                                     | 0.8  |      | 2217 | 0.5      |      | 2141 | 0.7  |       | 2107 | 0.3 |      | 2039      | 0.5  |      | 2139 | 0.9 |
| 3             | 0332 | 4.3  | 18   | 0318                                     | 4.0  | 3    | 0438 | 3.9      | 18   | 0356 | 3.9  | 3     | 0324 | 4.1 | 18   | 0253      | 4.1  | 3    | 0357 | 3.7 |
| 0919          | 1.1  | 18   | 0901 | 1.3                                      | 3    | 1019 | 1.0  | 18       | 0945 | 1.0  | 3    | 0910  | 0.7  | 18  | 0846 | 0.7       | 3    | 0953 | 1.0  |     |
| SA            | 1531 | 4.5  | SU   | 1510                                     | 4.2  | TU   | 1637 | 4.3      | W    | 1556 | 4.2  | TU    | 1525 | 4.4 | W    | 1456      | 4.3  | F    | 1614 | 3.7 |
| SA            | 2156 | 0.5  |      | 2134                                     | 0.8  |      | 2259 | 0.8      |      | 2217 | 0.8  |       | 2143 | 0.5 |      | 2112      | 0.6  |      | 2212 | 1.2 |
| 4             | 0424 | 4.2  | 19   | 0353                                     | 3.9  | 4    | 0520 | 3.7      | 19   | 0433 | 3.8  | 4     | 0359 | 3.9 | 19   | 0325      | 4.0  | 4    | 0433 | 3.6 |
| 1006          | 1.3  | 19   | 0935 | 1.3                                      | 4    | 1059 | 1.2  | 19       | 1021 | 1.1  | 4    | 0946  | 0.8  | 19  | 0921 | 0.8       | 4    | 1033 | 1.2  |     |
| SU            | 1620 | 4.3  | M    | 1545                                     | 4.1  | W    | 1722 | 4.0      | TH   | 1635 | 4.1  | W     | 1603 | 4.2 | TH   | 1534      | 4.2  | SA   | 1658 | 3.4 |
| SU            | 2247 | 0.7  |      | 2210                                     | 0.9  |      | 2344 | 1.1      |      | 2257 | 1.0  |       | 2219 | 0.8 |      | 2149      | 0.7  |      | 2247 | 1.6 |
| 5             | 0516 | 3.9  | 20   | 0430                                     | 3.8  | 5    | 0605 | 3.4      | 20   | 0513 | 3.6  | 5     | 0435 | 3.7 | 20   | 0403      | 3.9  | 5    | 0512 | 3.4 |
| 1054          | 1.4  | 20   | 1012 | 1.4                                      | 5    | 1146 | 1.4  | 20       | 1104 | 1.3  | 5    | 1023  | 1.0  | 20  | 0959 | 0.9       | 5    | 1119 | 1.5  |     |
| M             | 1711 | 4.2  | TU   | 1623                                     | 4.1  | TH   | 1812 | 3.7      | F    | 1723 | 3.9  | TH    | 1644 | 3.9 | F    | 1617      | 4.0  | SU   | 1753 | 3.2 |
| M             | 2340 | 0.9  |      | 2248                                     | 1.0  |      |      |          |      | 2344 | 1.2  |       | 2254 | 1.2 |      | 2230      | 1.0  |      | 2330 | 1.9 |
| 6             | 0608 | 3.7  | 21   | 0509                                     | 3.7  | 6    | 0034 | 1.4      | 21   | 0607 | 3.5  | 6     | 0513 | 3.5 | 21   | 0445      | 3.7  | 6    | 0605 | 3.2 |
| 1144          | 1.5  | 21   | 1051 | 1.4                                      | 6    | 0700 | 3.2  | 21       | 1157 | 1.5  | 6    | 1102  | 1.3  | 21  | 1044 | 1.1       | 6    | 1224 | 1.7  |     |
| TU            | 1805 | 3.9  | W    | 1705                                     | 4.0  | F    | 1242 | 1.7      | SA   | 1827 | 3.6  | F     | 1729 | 3.6 | SA   | 1711      | 3.8  | M    | 1909 | 3.0 |
|               | 2332 | 1.1  |      | 1914                                     | 3.4  |      |      |          |      | 2032 | 3.2  |       | 2332 | 1.5 |      | 2318      | 1.3  |      | 1959 | 3.4 |
| 7             | 0038 | 1.1  | 22   | 0554                                     | 3.6  | 7    | 0135 | 1.7      | 22   | 0043 | 1.4  | 7     | 0558 | 3.3 | 22   | 0539      | 3.5  | 7    | 0042 | 2.1 |
| 0704          | 3.5  | 22   | 1136 | 1.5                                      | 7    | 0808 | 3.1  | 22       | 0713 | 3.4  | 7    | 1151  | 1.6  | 22  | 1142 | 1.4       | 7    | 0719 | 3.1  |     |
| W             | 1242 | 1.7  | TH   | 1754                                     | 3.8  | SA   | 1404 | 1.8      | SU   | 1310 | 1.6  | SA    | 1824 | 3.2 | SU   | 1822      | 3.5  | TU   | 1408 | 1.7 |
|               | 1906 | 3.7  |      |  |      |      | 2032 | 3.2      |      | 1949 | 3.5  |       |      |     |      |           |      | 2046 | 3.0  |     |
| 8             | 0141 | 1.3  | 23   | 0024                                     | 1.2  | 8    | 0300 | 1.8      | 23   | 0206 | 1.6  | 8     | 0021 | 1.8 | 23   | 0022      | 1.6  | 8    | 0300 | 2.1 |
| 0806          | 3.4  | 23   | 0649 | 3.5                                      | 8    | 0925 | 3.2  | 23       | 0834 | 3.3  | 8    | 0657  | 3.1  | 23  | 0649 | 3.3       | 8    | 0851 | 3.1  |     |
| TH            | 1349 | 1.7  | F    | 1232                                     | 1.7  | SU   | 1542 | 1.8      | M    | 1447 | 1.6  | SU    | 1303 | 1.8 | M    | 1302      | 1.5  | W    | 1545 | 1.6 |
| 2013          | 3.5  |      |      | 1856                                     | 3.7  |      | 2159 | 3.2      |      | 2122 | 3.5  |       | 1944 | 3.0 |      | 1952      | 3.4  |      | 2209 | 3.2 |
| 9             | 0247 | 1.5  | 24   | 0124                                     | 1.4  | 9    | 0420 | 1.8      | 24   | 0341 | 1.6  | 9     | 0145 | 2.0 | 24   | 0157      | 1.8  | 9    | 0419 | 1.9 |
| 0911          | 3.3  | 24   | 0755 | 3.4                                      | 9    | 1034 | 3.3  | 24       | 0955 | 3.5  | 9    | 0820  | 3.0  | 24  | 0816 | 3.3       | 9    | 1007 | 3.2  |     |
| F             | 1504 | 1.7  | SA   | 1344                                     | 1.7  | M    | 1657 | 1.6      | TU   | 1620 | 1.4  | M     | 1500 | 1.8 | TU   | 1450      | 1.5  | TH   | 1641 | 1.3 |
| F             | 2124 | 3.4  |      | 2009                                     | 3.6  |      | 2309 | 3.3      |      | 2247 | 3.7  |       | 2127 | 3.0 |      | 2129      | 3.4  |      | 2302 | 3.4 |
| 10            | 0350 | 1.5  | 25   | 0236                                     | 1.4  | 10   | 0518 | 1.7      | 25   | 0457 | 1.4  | 10    | 0352 | 2.0 | 25   | 0341      | 1.7  | 10   | 0504 | 1.6 |
| 1013          | 3.4  | 25   | 0905 | 3.5                                      | 10   | 1127 | 3.5  | 25       | 1102 | 3.7  | 10   | 0949  | 3.1  | 25  | 0942 | 3.4       | 10   | 1059 | 3.4  |     |
| SA            | 1614 | 1.6  | SU   | 1505                                     | 1.7  | TU   | 1747 | 1.4      | W    | 1729 | 1.0  | TU    | 1630 | 1.6 | W    | 1617      | 1.2  | F    | 1722 | 1.1 |
| SA            | 2228 | 3.4  |      | 2128                                     | 3.6  |      |      |          |      | 2350 | 3.9  |       | 2248 | 3.2 |      | 2245      | 3.7  |      | 2342 | 3.6 |
| 11            | 0447 | 1.5  | 26   | 0352                                     | 1.4  | 11   | 0000 | 3.5      | 26   | 0553 | 1.2  | 11    | 0458 | 1.8 | 26   | 0449      | 1.5  | 11   | 0539 | 1.3 |
| 1106          | 3.6  | 26   | 1014 | 3.6                                      | 11   | 0601 | 1.5  | 26       | 1157 | 4.0  | 11   | 1054  | 3.3  | 26  | 1049 | 3.7       | 11   | 1140 | 3.7  |     |
| SU            | 1713 | 1.5  | M    | 1626                                     | 1.5  | W    | 1208 | 3.7      | TH   | 1821 | 0.6  | W     | 1720 | 1.4 | TH   | 1718      | 0.8  | SA   | 1758 | 0.9 |
| SU            | 2325 | 3.5  |      | 2244                                     | 3.8  |      | 1827 | 1.2      |      |      |      |       | 2339 | 3.5 |      | 2342      | 3.9  |      | 1824 | 0.5 |
| 12            | 0533 | 1.4  | 27   | 0459                                     | 1.2  | 12   | 0041 | 3.7      | 27   | 0042 | 4.2  | 12    | 0540 | 1.6 | 27   | 0540      | 1.2  | 12   | 0015 | 3.8 |
| 1151          | 3.7  | 27   | 1115 | 3.9                                      | 12   | 0636 | 1.4  | 27       | 0639 | 0.9  | 12   | 1139  | 3.6  | 27  | 1142 | 4.0       | 12   | 0611 | 1.1  |     |
| M             | 1801 | 1.3  | TU   | 1732                                     | 1.1  | TH   | 1243 | 3.9      | F    | 1245 | 4.3  | TH    | 1800 | 1.1 | F    | 1805      | 0.5  | SU   | 1215 | 3.9 |
|               |      |      |      |  |      |      | 2350 | 4.0      |      | 1900 | 0.3  |       |      |     |      |           |      | 1831 | 0.7  |     |
| 13            | 0012 | 3.6  | 28   | 0558                                     | 1.1  | 13   | 0116 | 3.9      | 28   | 0127 | 4.3  | 13    | 0017 | 3.7 | 28   | 0027      | 4.1  | 13   | 0048 | 3.9 |
| 0614          | 1.4  | 28   | 1208 | 4.1                                      | 13   | 0709 | 1.2  | 28       | 0720 | 0.8  | 13   | 0614  | 1.3  | 28  | 0621 | 0.9       | 13   | 0642 | 0.9  |     |
| TU            | 1229 | 3.9  | W    | 1829                                     | 0.8  | F    | 1316 | 4.0      | SA   | 1327 | 4.5  | F     | 1217 | 3.8 | SA   | 1227      | 4.2  | M    | 1248 | 4.1 |
|               | 1842 | 1.2  |      |  |      | O    | 1933 | 0.8      | ●    | 1949 | 0.2  |       | 1834 | 0.9 |      | 1848      | 0.3  |      | 1904 | 0.5 |
| 14            | 0053 | 3.7  | 29   | 0048                                     | 4.2  | 14   | 0148 | 4.0      |      |      |      | 14    | 0050 | 3.9 | 29   | 0107      | 4.2  | 14   | 0119 | 4.0 |
| 0650          | 1.3  | 29   | 0649 | 1.0                                      | 14   | 0740 | 1.1  |          |      |      | 14   | 0645  | 1.1  | 29  | 0659 | 0.7       | 14   | 0714 | 0.8  |     |
| W             | 1303 | 4.0  | TH   | 1257                                     | 4.3  | SA   | 1347 | 4.2      |      |      |      | SA    | 1249 | 4.0 | SU   | 1307      | 4.4  | TU   | 1321 | 4.2 |
| W             | 1919 | 1.1  | ●    | 1920                                     | 0.5  |      | 2004 | 0.7      |      |      |      | 1904  | 0.7  | ●   | 1927 | 0.2       | ○    | 1937 | 0.5  |     |
| 15            | 0133 | 3.8  | 30   | 0140                                     | 4.4  | 15   | 0220 | 4.1      |      |      |      | 15    | 0121 | 4.0 | 30   | 0144      | 4.2  | 15   | 0151 | 4.1 |
| 0724          | 1.3  | 30   | 0735 | 0.9                                      | 15   | 0809 | 1.0  |          |      |      | 15   | 0714  | 1.0  | 30  | 0734 | 0.6       | 15   | 0748 | 0.7  |     |
| TH            | 1335 | 4.1  | F    | 1342                                     | 4.5  | SU   | 1416 | 4.2      |      |      |      | SU    | 1320 | 4.1 | M    | 1345      | 4.4  | W    | 1358 | 4.3 |
| O             | 1952 | 1.0  |      | 2006                                     | 0.3  |      | 2036 | 0.6      |      |      |      | O     | 1935 | 0.6 |      | 2002      | 0.3  |      | 2012 | 0.5 |
| 31            | 0229 | 4.4  |      |  |      |      |      |          |      |      |      | 31    | 0218 | 4.1 |      |           |      |      |      |     |
|               | 0819 | 0.8  |      |  |      |      |      |          |      |      |      | 31    | 0809 | 0.5 |      |           |      |      |      |     |
|               | SA   | 1427 | 4.6  |  |      |      |      |          |      |      |      | TU    | 1422 | 4.4 |      |           |      |      |      |     |
|               |      | 2051 | 0.2  |  |      |      |      |          |      |      |      |       | 2036 | 0.4 |      |           |      |      |      |     |



# SCOTLAND, WEST COAST - ULLAPOOL

LAT 57°54'N LONG 5°10'W

| TIME ZONE GMT |        |     |      | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |      |      |          |      |      |      |       |      |     |      | YEAR 1987 |      |        |      |      |     |
|---------------|--------|-----|------|--|------|------|------|----------|------|------|------|-------|------|-----|------|-----------|------|--------|------|------|-----|
|               |        |     |      | JANUARY                                  |      |      |      | FEBRUARY |      |      |      | MARCH |      |     |      | APRIL     |      |        |      |      |     |
|               | TIME   | M   | TIME |  | TIME | M    | TIME |          | TIME | M    | TIME | M     | TIME | M   | TIME | M         | TIME | M      | TIME | M    |     |
| 1             | 0132   | 0.8 | 16   | 0140                                     | 1.4  | 1    | 0248 | 0.6      | 16   | 0227 | 1.1  | 1     | 0149 | 0.5 | 16   | 0131      | 1.0  | 1      | 0234 | 0.7  |     |
| TH            | 0731   | 5.3 | 16   | 0741                                     | 4.9  | 1    | 0849 | 5.5      | 16   | 0818 | 5.2  | 1     | 0745 | 5.6 | 16   | 0721      | 5.2  | 1      | 0826 | 5.2  |     |
| TH            | 1400   | 0.6 | F    | 1417                                     | 1.3  | SU   | 1517 | 0.4      | M    | 1458 | 1.0  | SU    | 1414 | 0.2 | M    | 1359      | 0.8  | W      | 1451 | 0.8  |     |
|               | 2002   | 5.1 |      | 2002                                     | 4.7  |      | 2118 | 5.0      |      | 2041 | 5.0  |       | 2009 | 5.3 |      | 1942      | 5.2  |        | 2039 | 4.9  |     |
| 2             | 0218   | 0.8 | 17   | 0213                                     | 1.4  | 2    | 0329 | 0.8      | 17   | 0259 | 1.1  | 2     | 0226 | 0.5 | 17   | 0202      | 0.9  | 2      | 0309 | 1.0  |     |
| 0819          | 5.3    | 17  | 0810 | 5.0                                      | 2    | 0932 | 5.4  | 17       | 0849 | 5.2  | 2    | 0822  | 5.6  | 17  | 0750 | 5.3       | 2    | 0859   | 4.9  |      |     |
| F             | 1448   | 0.5 | SA   | 1450                                     | 1.2  | M    | 1557 | 0.6      | TU   | 1530 | 1.0  | M     | 1450 | 0.3 | TU   | 1429      | 0.8  | TH     | 1523 | 1.1  |     |
|               | 2053   | 4.9 |      | 2036                                     | 4.7  |      | 2200 | 4.8      |      | 2114 | 4.9  |       | 2044 | 5.1 |      | 2012      | 5.2  |        | 2108 | 4.6  |     |
| 3             | 0304   | 0.9 | 18   | 0246                                     | 1.4  | 3    | 0409 | 1.0      | 18   | 0334 | 1.2  | 3     | 0302 | 0.6 | 18   | 0236      | 0.9  | 3      | 0344 | 1.3  |     |
| 0908          | 5.3    | 18  | 0842 | 5.0                                      | 3    | 1015 | 5.1  | 18       | 0923 | 5.1  | 3    | 0859  | 5.4  | 18  | 0822 | 5.3       | 3    | 0934   | 4.5  |      |     |
| SA            | 1535   | 0.6 | SU   | 1524                                     | 1.3  | TU   | 1637 | 1.0      | W    | 1604 | 1.2  | TU    | 1525 | 0.6 | W    | 1501      | 0.8  | F      | 1554 | 1.5  |     |
|               | 2145   | 4.7 |      | 2109                                     | 4.6  |      | 2244 | 4.5      |      | 2151 | 4.8  |       | 2117 | 4.9 |      | 2045      | 5.1  |        | 2139 | 4.3  |     |
| 4             | 0350   | 1.0 | 19   | 0321                                     | 1.4  | 4    | 0450 | 1.4      | 19   | 0412 | 1.3  | 4     | 0338 | 0.9 | 19   | 0311      | 0.9  | 4      | 0421 | 1.6  |     |
| 1000          | 5.1    | 19  | 0915 | 4.9                                      | 4    | 1100 | 4.7  | 19       | 1001 | 4.9  | 4    | 0935  | 5.1  | 19  | 0857 | 5.1       | 4    | 1015   | 4.1  |      |     |
| SU            | 1623   | 0.8 | M    | 1558                                     | 1.3  | W    | 1717 | 1.4      | TH   | 1641 | 1.4  | W     | 1558 | 1.0 | TH   | 1536      | 1.0  | SA     | 1628 | 1.9  |     |
|               | 2241   | 4.5 |      | 2146                                     | 4.5  |      | 2333 | 4.2      |      | 2235 | 4.5  |       | 2150 | 4.6 |      | 2122      | 4.9  |        | 2219 | 4.0  |     |
| 5             | 0437   | 1.3 | 20   | 0357                                     | 1.5  | 5    | 0535 | 1.8      | 20   | 0454 | 1.6  | 5     | 0414 | 1.3 | 20   | 0349      | 1.1  | 5      | 0504 | 2.0  |     |
| 1055          | 4.9    | 20  | 0952 | 4.8                                      | 5    | 1150 | 4.3  | 20       | 1045 | 4.6  | 5    | 1011  | 4.7  | 20  | 0937 | 4.8       | 5    | 1115   | 3.7  |      |     |
| M             | 1713   | 1.1 | TU   | 1634                                     | 1.4  | TH   | 1801 | 1.8      | F    | 1724 | 1.6  | TH    | 1632 | 1.4 | F    | 1613      | 1.3  | SU     | 1708 | 2.2  |     |
|               | 2340   | 4.3 |      | 2228                                     | 4.4  |      |      |          |      | 2331 | 4.3  |       | 2225 | 4.3 |      | 2205      | 4.6  |        | 2331 | 3.7  |     |
| 6             | 0528   | 1.6 | 21   | 0438                                     | 1.6  | 6    | 0036 | 3.9      | 21   | 0542 | 1.8  | 6     | 0452 | 1.7 | 21   | 0431      | 1.4  | 6      | 0604 | 2.3  |     |
| 1152          | 4.6    | 21  | 1033 | 4.7                                      | 6    | 0627 | 2.1  | 21       | 1144 | 4.2  | 6    | 1052  | 4.3  | 21  | 1024 | 4.4       | 6    | 1256   | 3.5  |      |     |
| TU            | 1805   | 1.4 | W    | 1715                                     | 1.6  | F    | 1253 | 4.0      | SA   | 1818 | 1.9  | F     | 1708 | 1.9 | SA   | 1656      | 1.6  | M      | 1808 | 2.5  |     |
|               |        |     |      | 2318                                     | 4.3  |      | 1856 | 2.2      |      |      |      |       | 2308 | 3.9 |      | 2302      | 4.2  |        | 1925 | 2.2  |     |
| 7             | 0043   | 4.1 | 22   | 0523                                     | 1.8  | 7    | 0200 | 3.7      | 22   | 0051 | 4.0  | 7     | 0537 | 2.1 | 22   | 0521      | 1.7  | 7      | 0138 | 3.6  |     |
| 0625          | 1.9    | 22  | 1122 | 4.5                                      | 7    | 0739 | 2.4  | 22       | 0646 | 2.1  | 7    | 1151  | 3.9  | 22  | 1134 | 4.0       | 7    | 0803   | 2.4  |      |     |
| W             | 1252   | 4.4 | TH   | 1803                                     | 1.7  | SA   | 1417 | 3.8      | SU   | 1320 | 3.9  | SA    | 1751 | 2.3 | SU   | 1751      | 2.0  | TU     | 1433 | 3.5  |     |
|               | 1904   | 1.7 |      |  |      | 2014 | 2.4  |          | 1940 | 2.1  |      |       |      |     |      |           | 2022 | 2.6    |      | 2112 | 2.0 |
| 8             | 0150   | 4.0 | 23   | 0019                                     | 4.2  | 8    | 0322 | 3.8      | 23   | 0228 | 4.0  | 8     | 0039 | 3.7 | 23   | 0034      | 3.9  | 8      | 0303 | 3.7  |     |
| 0730          | 2.1    | 23  | 0618 | 2.0                                      | 8    | 0916 | 2.5  | 23       | 0823 | 2.2  | 8    | 0640  | 2.4  | 23  | 0630 | 2.0       | 8    | 0950   | 2.2  |      |     |
| TH            | 1356   | 4.2 | F    | 1222                                     | 4.3  | SU   | 1540 | 3.8      | M    | 1510 | 3.9  | SU    | 1333 | 3.6 | M    | 1333      | 3.7  | W      | 1544 | 3.7  |     |
|               | 2009   | 1.9 |      | 1904                                     | 1.9  |      | 2148 | 2.4      |      | 2130 | 2.1  |       | 1900 | 2.6 |      | 1923      | 2.3  |        | 2200 | 2.4  |     |
| 9             | 0257   | 3.9 | 24   | 0133                                     | 4.1  | 9    | 0428 | 3.9      | 24   | 0349 | 4.1  | 9     | 0236 | 3.6 | 24   | 0217      | 3.9  | 9      | 0403 | 3.9  |     |
| 0842          | 2.2    | 24  | 0726 | 2.1                                      | 9    | 1041 | 2.3  | 24       | 1009 | 2.0  | 9    | 0842  | 2.6  | 24  | 0826 | 2.1       | 9    | 1043   | 1.9  |      |     |
| F             | 1503   | 4.1 | SA   | 1343                                     | 4.2  | M    | 1645 | 3.9      | TU   | 1630 | 4.2  | M     | 1512 | 3.6 | TU   | 1515      | 3.8  | TH     | 1635 | 4.0  |     |
|               | 2117   | 2.0 |      | 2021                                     | 1.9  |      | 2256 | 2.2      |      | 2250 | 1.8  |       | 2117 | 2.6 |      | 2129      | 2.1  |        | 2247 | 2.1  |     |
| 10            | 0359   | 4.0 | 25   | 0252                                     | 4.2  | 10   | 0517 | 4.2      | 25   | 0452 | 4.5  | 10    | 0355 | 3.8 | 25   | 0336      | 4.1  | 10     | 0447 | 4.2  |     |
| 0951          | 2.2    | 25  | 0848 | 2.1                                      | 10   | 1138 | 2.0  | 25       | 1121 | 1.5  | 10   | 1027  | 2.3  | 25  | 1011 | 1.7       | 10   | 1121   | 1.6  |      |     |
| SA            | 1606   | 4.1 | SU   | 1513                                     | 4.2  | TU   | 1732 | 4.2      | W    | 1729 | 4.5  | TU    | 1622 | 3.8 | W    | 1626      | 4.1  | F      | 1713 | 4.3  |     |
|               | 2218   | 2.0 |      | 2142                                     | 1.9  |      | 2343 | 2.0      |      | 2345 | 1.4  |       | 2240 | 2.3 |      | 2241      | 1.7  |        | 2323 | 1.8  |     |
| 11            | 0451   | 4.2 | 26   | 0402                                     | 4.3  | 11   | 0555 | 4.4      | 26   | 0542 | 4.9  | 11    | 0449 | 4.0 | 26   | 0437      | 4.4  | 11     | 0521 | 4.5  |     |
| 1052          | 2.1    | 26  | 1011 | 1.9                                      | 11   | 1220 | 1.7  | 26       | 1213 | 1.0  | 11   | 1120  | 2.0  | 26  | 1111 | 1.2       | 11   | 1154   | 1.3  |      |     |
| SU            | 1700   | 4.2 | M    | 1629                                     | 4.3  | W    | 1810 | 4.4      | TH   | 1815 | 4.8  | W     | 1711 | 4.1 | TH   | 1718      | 4.5  | SA     | 1745 | 4.6  |     |
|               | 2309   | 1.9 |      | 2252                                     | 1.6  |      |      |          |      |      |      |       | 2324 | 2.0 |      | 2330      | 1.3  |        | 2356 | 1.5  |     |
| 12            | 0533   | 4.4 | 27   | 0501                                     | 4.6  | 12   | 0020 | 1.7      | 27   | 0030 | 1.0  | 12    | 0528 | 4.3 | 27   | 0525      | 4.8  | 12     | 0551 | 4.7  |     |
| 1144          | 1.9    | 27  | 1120 | 1.6                                      | 12   | 0626 | 4.7  | 27       | 0626 | 5.2  | 12   | 1158  | 1.6  | 27  | 1156 | 0.8       | 12   | 1225   | 1.0  |      |     |
| M             | 1744   | 4.3 | TU   | 1730                                     | 4.6  | TH   | 1255 | 1.5      | F    | 1256 | 0.6  | TH    | 1747 | 4.4 | F    | 1759      | 4.8  | SU     | 1814 | 4.9  |     |
|               | 2353   | 1.8 |      | 2350                                     | 1.3  |      | 1843 | 4.6      |      | 1856 | 5.1  |       | 2359 | 1.8 |      |           |      |        | M    | 1243 | 0.6 |
| 13            | 0609   | 4.5 | 28   | 0552                                     | 4.9  | 13   | 0053 | 1.5      | 28   | 0110 | 0.7  | 13    | 0600 | 4.6 | 28   | 0011      | 0.9  | 13     | 0029 | 1.2  |     |
| 1228          | 1.7    | 28  | 1218 | 1.2                                      | 13   | 0655 | 4.9  | 28       | 0707 | 5.5  | 13   | 1230  | 1.4  | 28  | 0606 | 5.2       | 13   | 0621   | 5.0  |      |     |
| TU            | 1823   | 4.5 | W    | 1822                                     | 4.9  | F    | 1327 | 1.2      | SA   | 1336 | 0.3  | F     | 1818 | 4.6 | SA   | 1235      | 0.5  | M      | 1256 | 0.8  |     |
|               |        |     |      | O 1912                                   | 4.8  |      | 1934 | 5.3      |      |      |      |       |      |     | 1835 | 5.1       |      | 1844   | 5.1  |      |     |
| 14            | 0031   | 1.7 | 29   | 0040                                     | 1.0  | 14   | 0125 | 1.3      |      |      |      |       |      |     |      |           |      | O 1913 | 5.0  |      |     |
| 0641          | 4.7    | 29  | 0639 | 5.2                                      | 14   | 0722 | 5.0  |          |      |      |      |       |      |     |      |           |      |        | 1913 | 5.0  |     |
| W             | 1307   | 1.5 | TH   | 1308                                     | 0.8  | SA   | 1358 | 1.1      |      |      |      |       |      |     |      |           |      |        |      |      |     |
|               | 1857   | 4.6 |      | 1909                                     | 5.1  |      | 1941 | 4.9      |      |      |      |       |      |     |      |           |      |        |      |      |     |
| 15            | 0107   | 1.5 | 30   | 0125                                     | 0.8  | 15   | 0155 | 1.2      |      |      |      |       |      |     |      |           |      |        |      |      |     |
| 0711          | 4.8    | 30  | 0723 | 5.4                                      | 15   | 0749 | 5.2  |          |      |      |      |       |      |     |      |           |      |        |      |      |     |
| TH            | 1343   | 1.4 | F    | 1353                                     | 0.5  | SU   | 1428 | 1.0      |      |      |      |       |      |     |      |           |      |        |      |      |     |
|               | O 1930 | 4.7 |      | 1953                                     | 5.2  |      | 2010 | 4.9      |      |      |      |       |      |     |      |           |      |        |      |      |     |
| 31            | 0207   | 0.6 |      |  |      |      |      |          |      |      |      |       |      |     |      |           |      |        |      |      |     |
| 0806          | 5.6    |     |      |  |      |      |      |          |      |      |      |       |      |     |      |           |      |        |      |      |     |
| SA            | 1436   | 0.3 |      |  |      |      |      |          |      |      |      |       |      |     |      |           |      |        |      |      |     |
|               | 2036   | 5.1 |      |  |      |      |      |          |      |      |      |       |      |     |      |           |      |        |      |      |     |

# SCOTLAND, WEST COAST - ULLAPOOL

LAT 57°54'N LONG 5°10W

TIME ZONE GMT

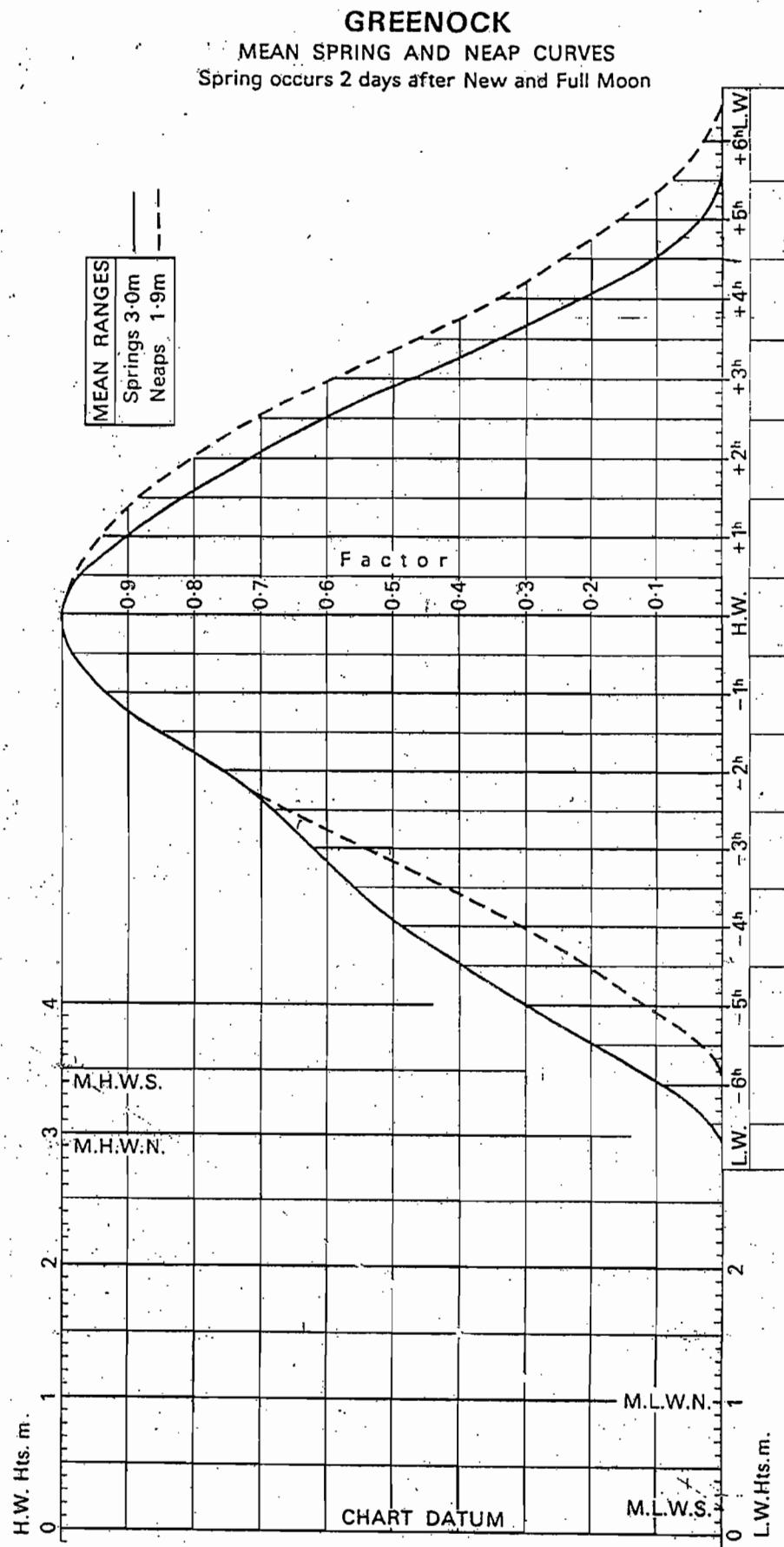
TIMES AND HEIGHTS OF HIGH AND LOW WATERS

YEAR . 1987

|    | MAY  |      | JUNE      |      | JULY |     | AUGUST |      |     |
|----|------|------|-----------|------|------|-----|--------|------|-----|
|    | TIME | M    | TIME      | M    | TIME | M   | TIME   | M    |     |
| 1  | 0245 | 1.1  | <b>16</b> | 0239 | 0.7  | 1   | 0348   | 1.5  |     |
|    | 0834 | 4.6  | <b>16</b> | 0835 | 4.8  | 1   | 0944   | 4.1  |     |
| F  | 1453 | 1.3  | SA        | 1500 | 0.9  | M   | 1545   | 1.7  |     |
|    | 2042 | 4.6  |           | 2056 | 4.9  |     | 2148   | 4.2  |     |
| 2  | 0322 | 1.3  | <b>17</b> | 0326 | 0.8  | 2   | 0431   | 1.6  |     |
|    | 0912 | 4.3  | <b>17</b> | 0931 | 4.5  | 2   | 1035   | 3.9  |     |
| SA | 1526 | 1.5  | SU        | 1546 | 1.2  | TU  | 1626   | 1.9  |     |
|    | 2116 | 4.3  |           | 2154 | 4.6  |     | 2239   | 4.1  |     |
| 3  | 0401 | 1.6  | <b>18</b> | 0418 | 1.0  | 3   | 0519   | 1.8  |     |
|    | 0957 | 4.0  | <b>18</b> | 1041 | 4.2  | 3   | 1135   | 3.7  |     |
| SU | 1602 | 1.8  | M         | 1638 | 1.5  | W   | 1715   | 2.1  |     |
|    | 2200 | 4.1  |           | 2305 | 4.3  |     | 2339   | 3.9  |     |
| 4  | 0445 | 1.8  | <b>19</b> | 0518 | 1.3  | 4   | 0618   | 1.9  |     |
|    | 1058 | 3.7  | <b>19</b> | 1204 | 3.9  | 4   | 1241   | 3.7  |     |
| M  | 1643 | 2.1  | TU        | 1744 | 1.8  | TH  | 1818   | 2.2  |     |
|    | 2306 | 3.8  |           |      |      |     | 1945   | 1.7  |     |
| 5  | 0542 | 2.1  | <b>20</b> | 0024 | 4.2  | 5   | 0043   | 3.9  |     |
|    | 1219 | 3.5  | <b>20</b> | 0634 | 1.4  | 5   | 0729   | 1.9  |     |
| TU | 1739 | 2.3  | W         | 1326 | 3.9  | F   | 1346   | 3.8  |     |
|    |      |      |           | 1909 | 1.9  |     | 1935   | 2.2  |     |
| 6  | 0035 | 3.7  | <b>21</b> | 0137 | 4.2  | 6   | 0147   | 3.9  |     |
|    | 0710 | 2.2  | <b>21</b> | 0801 | 1.4  | 6   | 0837   | 1.9  |     |
| W  | 1341 | 3.5  | TH        | 1437 | 3.9  | SA  | 1447   | 3.9  |     |
|    | 1912 | 2.5  |           | 2033 | 1.8  |     | 2047   | 2.1  |     |
| 7  | 0156 | 3.7  | <b>22</b> | 0243 | 4.2  | 7   | 0249   | 4.0  |     |
|    | 0847 | 2.1  | <b>22</b> | 0914 | 1.3  | 7   | 0934   | 1.7  |     |
| TH | 1450 | 3.7  | F         | 1538 | 4.1  | SU  | 1540   | 4.1  |     |
|    | 2053 | 2.4  |           | 2138 | 1.6  |     | 2145   | 1.9  |     |
| 8  | 0300 | 3.8  | <b>23</b> | 0341 | 4.4  | 8   | 0345   | 4.2  |     |
|    | 0947 | 1.9  | <b>23</b> | 1010 | 1.2  | 8   | 1023   | 1.5  |     |
| F  | 1545 | 3.9  | SA        | 1628 | 4.3  | M   | 1627   | 4.4  |     |
|    | 2153 | 2.1  |           | 2229 | 1.4  |     | 2236   | 1.7  |     |
| 9  | 0351 | 4.1  | <b>24</b> | 0432 | 4.5  | 9   | 0436   | 4.4  |     |
|    | 1032 | 1.6  | <b>24</b> | 1056 | 1.1  | 9   | 1109   | 1.3  |     |
| SA | 1629 | 4.2  | SU        | 1711 | 4.5  | TU  | 1711   | 4.6  |     |
|    | 2237 | 1.8  |           | 2315 | 1.3  |     | 2324   | 1.4  |     |
| 10 | 0434 | 4.3  | <b>25</b> | 0517 | 4.6  | 10  | 0524   | 4.7  |     |
|    | 1110 | 1.3  | <b>25</b> | 1137 | 1.0  | 10  | 1154   | 1.1  |     |
| SU | 1706 | 4.5  | M         | 1748 | 4.6  | W   | 1752   | 4.9  |     |
|    | 2317 | 1.5  |           | 2357 | 1.2  |     |        |      |     |
| 11 | 0512 | 4.6  | <b>26</b> | 0557 | 4.7  | 11  | 0011   | 1.1  |     |
|    | 1147 | 1.1  | <b>26</b> | 1215 | 1.0  | 11  | 0610   | 4.8  |     |
| M  | 1741 | 4.8  | TU        | 1821 | 4.7  | TH  | 1237   | 0.9  |     |
|    | 2355 | 1.3  |           |      |      | O   | 1834   | 5.0  |     |
| 12 | 0549 | 4.9  | <b>27</b> | 0036 | 1.1  | 12  | 0058   | 0.9  |     |
|    | 1223 | 0.9  | <b>27</b> | 0634 | 4.7  | 12  | 0656   | 4.9  |     |
| TU | 1815 | 5.0  | W         | 1251 | 1.0  | F   | 1322   | 0.8  |     |
|    |      |      | ●         | 1853 | 4.8  |     | 1917   | 5.1  |     |
| 13 | 0034 | 1.0  | <b>28</b> | 0115 | 1.1  | 13  | 0145   | 0.7  |     |
|    | 0627 | 5.0  | <b>28</b> | 0709 | 4.7  | 13  | 0745   | 4.9  |     |
| W  | 1300 | 0.7  | TH        | 1325 | 1.1  | SA  | 1406   | 0.8  |     |
|    | O    | 1851 | 5.2       |      | 1923 | 4.7 |        | 2003 | 5.1 |
| 14 | 0114 | 0.8  | <b>29</b> | 0153 | 1.1  | 14  | 0233   | 0.6  |     |
|    | 0706 | 5.1  | <b>29</b> | 0744 | 4.6  | 14  | 0836   | 4.8  |     |
| TH | 1338 | 0.7  | F         | 1359 | 1.2  | SU  | 1452   | 0.9  |     |
|    | 1928 | 5.2  |           | 1955 | 4.7  | M   | 1453   | 1.4  |     |
| 15 | 0155 | 0.7  | <b>30</b> | 0230 | 1.2  | 15  | 0322   | 0.6  |     |
|    | 0748 | 5.0  | <b>30</b> | 0821 | 4.4  | 15  | 0933   | 4.6  |     |
| F  | 1418 | 0.8  | SA        | 1433 | 1.4  | M   | 1540   | 1.0  |     |
|    | 2009 | 5.1  |           | 2028 | 4.6  |     | 2151   | 4.8  |     |
| 31 | 0308 | 1.3  |           |      |      | 31  | 0414   | 1.3  |     |
|    | 0900 | 4.3  |           |      |      |     | 1004   | 4.4  |     |
| SU | 1508 | 1.5  |           |      |      | F   | 1618   | 1.5  |     |
|    | 2106 | 4.4  |           |      |      |     | 2207   | 4.6  |     |

## **SCOTLAND, WEST COAST - ULLAPOOL**

LAT 57°54'N      LONG 5°10'W



# SCOTLAND, WEST COAST - GREENOCK

LAT 55°57'N LONG 4°46'W

| TIME ZONE GMT |         |         |     | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |     |         |       |         |     |         |     |         |     |         |     | YEAR | 1987 |
|---------------|---------|---------|-----|--|-----|---------|-------|---------|-----|---------|-----|---------|-----|---------|-----|------|------|
|               | JANUARY |         |     | FEBRUARY                                 |     |         | MARCH |         |     | APRIL   |     |         |     |         |     |      |      |
| TIME          | M       | TIME    | M   | TIME                                     | M   | TIME    | M     | TIME    | M   | TIME    | M   | TIME    | M   | TIME    | M   | TIME |      |
| 1 0037        | 3.5     | 16 0122 | 3.1 | 1 0219                                   | 3.4 | 0210    | 3.0   | 1 0117  | 3.3 | 0110    | 3.0 | 1 0201  | 3.4 | 0137    | 3.3 |      |      |
| 0608          | 0.7     | 0640    | 0.7 | 1 0732                                   | 0.6 | 16 0718 | 0.5   | 1 0630  | 0.5 | 16 0619 | 0.4 | 1 0717  | 0.5 | 16 0655 | 0.3 |      |      |
| TH 1258       | 3.7     | F 1301  | 3.5 | SU 1427                                  | 3.9 | M 1352  | 3.5   | SU 1330 | 3.8 | M 1255  | 3.5 | W 1422  | 3.7 | TH 1342 | 3.6 |      |      |
| 1835          | 0.4     | 1850    | 0.5 | 1956                                     | 0.3 | 1928    | 0.3   | 1850    | 0.2 | 1828    | 0.2 | 1940    | 0.4 | 1910    | 0.4 |      |      |
| 2 0133        | 3.5     | 17 0158 | 3.0 | 2 0302                                   | 3.4 | 0239    | 3.0   | 2 0159  | 3.3 | 0140    | 3.0 | 2 0231  | 3.5 | 0210    | 3.4 |      |      |
| 0658          | 0.7     | 0712    | 0.6 | 2 0816                                   | 0.7 | 17 0749 | 0.5   | 2 0708  | 0.5 | 17 0648 | 0.4 | 2 0750  | 0.5 | 17 0734 | 0.4 |      |      |
| F 1348        | 3.8     | SA 1334 | 3.5 | M 1509                                   | 3.9 | TU 1426 | 3.6   | M 1411  | 3.8 | TU 1330 | 3.6 | TH 1455 | 3.6 | F 1423  | 3.6 |      |      |
| 1925          | 0.4     | 1920    | 0.5 | 2041                                     | 0.4 | 2001    | 0.4   | 1931    | 0.3 | 1859    | 0.2 | 2017    | 0.6 | 1954    | 0.5 |      |      |
| 3 0226        | 3.4     | 18 0231 | 3.0 | 3 0340                                   | 3.4 | 0308    | 3.2   | 3 0235  | 3.4 | 0209    | 3.2 | 3 0259  | 3.5 | 18 0247 | 3.5 |      |      |
| 0748          | 0.8     | 0743    | 0.7 | 3 0857                                   | 0.7 | 0824    | 0.6   | 3 0747  | 0.5 | 0720    | 0.4 | 3 0823  | 0.6 | 18 0820 | 0.5 |      |      |
| SA 1436       | 3.9     | SU 1408 | 3.5 | TU 1550                                  | 3.8 | W 1501  | 3.7   | TU 1448 | 3.8 | W 1404  | 3.6 | F 1528  | 3.4 | SA 1508 | 3.5 |      |      |
| 2016          | 0.5     | 1952    | 0.5 | 2126                                     | 0.6 | 2038    | 0.5   | 2010    | 0.4 | 1934    | 0.3 | 2056    | 0.8 | 2043    | 0.7 |      |      |
| 4 0316        | 3.4     | 19 0303 | 3.0 | 4 0415                                   | 3.4 | 0339    | 3.3   | 4 0308  | 3.5 | 0239    | 3.3 | 4 0331  | 3.5 | 19 0327 | 3.5 |      |      |
| 0839          | 0.8     | 0818    | 0.7 | 4 0940                                   | 0.8 | 19 0902 | 0.7   | 4 0822  | 0.6 | 19 0755 | 0.5 | 4 0900  | 0.8 | 19 0914 | 0.6 |      |      |
| SU 1522       | 3.8     | M 1444  | 3.6 | W 1630                                   | 3.6 | TH 1541 | 3.7   | W 1523  | 3.7 | TH 1440 | 3.7 | SA 1606 | 3.2 | SU 1557 | 3.4 |      |      |
| 2109          | 0.5     | 2029    | 0.5 | 2215                                     | 0.7 | 2121    | 0.6   | 2050    | 0.6 | 2012    | 0.4 | 2142    | 1.0 | 2143    | 0.9 |      |      |
| 5 0403        | 3.3     | 20 0334 | 3.0 | 5 0451                                   | 3.3 | 0414    | 3.3   | 5 0338  | 3.5 | 0312    | 3.4 | 5 0407  | 3.4 | 0411    | 3.4 |      |      |
| 0931          | 0.9     | 0854    | 0.8 | 5 1024                                   | 1.0 | 20 0946 | 0.8   | 5 0858  | 0.7 | 20 0836 | 0.6 | 5 0944  | 1.0 | 20 1022 | 0.8 |      |      |
| M 1609        | 3.7     | TU 1521 | 3.6 | TH 1713                                  | 3.4 | F 1626  | 3.6   | TH 1559 | 3.6 | F 1522  | 3.7 | SU 1651 | 2.9 | M 1651  | 3.2 |      |      |
| 2204          | 0.6     | 2109    | 0.6 | 2308                                     | 0.9 | 2211    | 0.8   | 2131    | 0.8 | 2057    | 0.6 | 2245    | 1.2 | 2255    | 1.1 |      |      |
| 6 0447        | 3.2     | 21 0407 | 3.1 | 6 0531                                   | 3.1 | 21 0453 | 3.3   | 6 0410  | 3.4 | 21 0348 | 3.4 | 6 0449  | 3.2 | 21 0501 | 3.2 |      |      |
| 1023          | 1.0     | 0935    | 0.9 | 6 1120                                   | 1.2 | 21 1040 | 1.0   | 6 0935  | 0.9 | 21 0924 | 0.7 | 6 1056  | 1.2 | 21 1146 | 0.8 |      |      |
| TU 1656       | 3.5     | W 1603  | 3.6 | F 1805                                   | 3.1 | SA 1717 | 3.5   | F 1638  | 3.3 | SA 1608 | 3.6 | M 1745  | 2.7 | TU 1754 | 2.9 |      |      |
| 2301          | 0.7     | 2154    | 0.7 | 2309                                     | 1.0 | 2219    | 1.0   | 2149    | 0.8 | 2255    | 1.0 | 1859    | 2.6 | 1936    | 2.7 |      |      |
| 7 0533        | 3.1     | 22 0444 | 3.2 | 7 0015                                   | 1.1 | 22 0541 | 3.2   | 7 0445  | 3.3 | 22 0429 | 3.4 | 7 0016  | 1.3 | 22 0023 | 1.1 |      |      |
| 1119          | 1.1     | 1021    | 1.0 | 7 0619                                   | 3.0 | 22 1154 | 1.2   | 7 1022  | 1.1 | 22 1024 | 0.9 | 7 0541  | 3.0 | 22 0607 | 2.9 |      |      |
| W 1750        | 3.3     | TH 1649 | 3.6 | SA 1253                                  | 1.3 | SU 1816 | 3.3   | SA 1725 | 3.0 | SU 1700 | 3.4 | TU 1302 | 1.2 | W 1316  | 0.7 |      |      |
| 2244          | 0.8     | 1913    | 2.9 | 2326                                     | 1.2 | 2255    | 1.0   | 2211    | 2.6 | 2132    | 2.8 | 2121    | 2.6 | 2132    | 2.8 |      |      |
| 8 0001        | 0.8     | 23 0526 | 3.2 | 8 0135                                   | 1.2 | 23 0027 | 1.2   | 8 0529  | 3.1 | 0517    | 3.2 | 8 0147  | 1.3 | 23 0154 | 1.0 |      |      |
| 0624          | 3.0     | 1115    | 1.2 | 8 0724                                   | 2.9 | 23 0645 | 3.0   | 8 1150  | 1.3 | 1147    | 1.0 | 8 0646  | 2.8 | 23 0818 | 2.8 |      |      |
| TH 1226       | 1.2     | F 1742  | 3.5 | SU 1426                                  | 1.3 | M 1334  | 1.1   | SU 1823 | 2.8 | M 1800  | 3.1 | W 1422  | 1.1 | TH 1426 | 0.5 |      |      |
| 1855          | 3.1     | 2341    | 0.9 | 2039                                     | 2.8 | 1934    | 3.1   | 1952    | 2.6 | 1925    | 2.8 | 2221    | 2.7 | 2224    | 2.9 |      |      |
| 9 0106        | 0.8     | 24 0618 | 3.1 | 9 0248                                   | 1.1 | 24 0207 | 1.2   | 9 0100  | 1.3 | 0024    | 1.2 | 9 0252  | 1.2 | 24 0302 | 0.9 |      |      |
| 0729          | 2.9     | 1223    | 1.3 | 9 0852                                   | 2.9 | 24 0837 | 3.0   | 9 0624  | 2.9 | 0619    | 3.0 | 9 0827  | 2.8 | 24 0941 | 3.0 |      |      |
| F 1344        | 1.2     | SA 1844 | 3.4 | M 1529                                   | 1.2 | TU 1456 | 0.9   | M 1355  | 1.3 | TU 1329 | 0.9 | TH 1513 | 0.9 | F 1521  | 0.3 |      |      |
| 2011          | 3.0     | 2201    | 2.9 | 2210                                     | 2.9 | 2120    | 3.0   | 1952    | 2.6 | 1925    | 2.8 | 2221    | 2.7 | 2224    | 2.9 |      |      |
| 10 0211       | 0.9     | 25 0049 | 1.0 | 10 0346                                  | 1.1 | 25 0324 | 1.0   | 10 0223 | 1.3 | 25 0206 | 1.1 | 10 0340 | 1.0 | 25 0351 | 0.7 |      |      |
| 0841          | 2.9     | 0732    | 3.1 | 10 1004                                  | 3.0 | 25 1008 | 3.1   | 10 0741 | 2.8 | 25 0830 | 2.9 | 10 0945 | 2.9 | 25 1031 | 3.2 |      |      |
| SA 1453       | 1.2     | SU 1349 | 1.2 | TU 1619                                  | 1.0 | W 1555  | 0.6   | TU 1505 | 1.1 | W 1448  | 0.7 | F 1551  | 0.7 | SU 1605 | 0.2 |      |      |
| 2120          | 3.0     | 2000    | 3.3 | 2303                                     | 3.0 | 2241    | 3.1   | 2148    | 2.7 | 2138    | 2.8 | 2258    | 2.9 | 2303    | 3.0 |      |      |
| 11 0310       | 0.9     | 26 0212 | 1.1 | 11 0435                                  | 0.9 | 26 0419 | 0.8   | 11 0326 | 1.1 | 0319    | 0.9 | 11 0416 | 0.9 | 26 0432 | 0.6 |      |      |
| 0941          | 3.0     | 0902    | 3.1 | 1054                                     | 3.2 | 1106    | 3.3   | 0928    | 2.9 | 1003    | 3.0 | 1030    | 3.1 | 26 1115 | 3.3 |      |      |
| SU 1547       | 1.1     | M 1504  | 1.1 | W 1658                                   | 0.8 | TH 1643 | 0.4   | W 1554  | 0.9 | TH 1543 | 0.4 | SA 1622 | 0.5 | SU 1645 | 0.2 |      |      |
| 2219          | 3.1     | 2121    | 3.3 | 2351                                     | 3.0 | 2340    | 3.2   | 2252    | 2.8 | 2243    | 3.0 | 2329    | 3.0 | 2340    | 3.1 |      |      |
| 12 0402       | 0.9     | 27 0325 | 1.0 | 12 0515                                  | 0.8 | 27 0506 | 0.7   | 12 0413 | 1.0 | 0411    | 0.7 | 12 0447 | 0.7 | 27 0508 | 0.5 |      |      |
| 1030          | 3.2     | 1011    | 3.3 | 1134                                     | 3.3 | 27 1156 | 3.5   | 12 1030 | 3.0 | 1056    | 3.3 | 1108    | 3.2 | 27 1157 | 3.4 |      |      |
| M 1632        | 1.0     | TU 1601 | 0.8 | TH 1731                                  | 0.6 | F 1727  | 0.2   | TH 1633 | 0.7 | F 1629  | 0.2 | SU 1652 | 0.4 | M 1723  | 0.2 |      |      |
| 2312          | 3.1     | 2234    | 3.3 | 2337                                     | 3.3 | O 1801  | 0.5   | 1810    | 0.1 | 2334    | 2.9 | 2330    | 3.1 | 1723    | 0.3 |      |      |
| 13 0447       | 0.9     | 28 0422 | 0.8 | 13 0032                                  | 3.0 | 28 0030 | 3.2   | 13 0452 | 0.8 | 0452    | 0.6 | 13 0000 | 3.0 | 28 0017 | 3.2 |      |      |
| 1112          | 3.3     | 1108    | 3.4 | 0548                                     | 0.7 | 28 0549 | 0.6   | 1109    | 3.2 | 1141    | 3.5 | 0516    | 0.6 | 28 0543 | 0.5 |      |      |
| TU 1713       | 0.8     | W 1652  | 0.5 | F 1211                                   | 3.3 | SA 1244 | 3.7   | F 1703  | 0.6 | SA 1709 | 0.1 | M 1146  | 3.4 | TU 1239 | 3.5 |      |      |
| 2358          | 3.1     | 2337    | 3.3 | O 1801                                   | 0.5 | 1810    | 0.1   | 1731    | 0.4 | 1748    | 0.1 | O 1756  | 0.2 | 1800    | 0.3 |      |      |
| 14 0530       | 0.8     | 29 0513 | 0.7 | 14 0108                                  | 3.0 | 29 0619 | 0.6   | 14 0008 | 3.0 | 0011    | 3.2 | 14 0032 | 3.1 | 29 0052 | 3.3 |      |      |
| 1152          | 3.4     | 1201    | 3.6 | SA 1245                                  | 3.4 | 1828    | 0.4   | 0523    | 0.7 | 0531    | 0.5 | 0546    | 0.4 | 29 0619 | 0.5 |      |      |
| W 1748        | 0.7     | TH 1739 | 0.4 | SA 1245                                  | 3.4 | 1828    | 0.4   | 1145    | 3.3 | SU 1225 | 3.6 | TU 1225 | 3.5 | W 1318  | 3.5 |      |      |
| TH 1227       | 3.4     | F 1252  | 3.7 | SU 1319                                  | 3.5 | 1856    | 0.3   | 1731    | 0.4 | 1748    | 0.1 | O 1756  | 0.2 | 1838    | 0.4 |      |      |
| 0 1820        | 0.6     | 1825    | 0.3 | 1856                                     | 0.3 |         |       | 0551    | 0.5 | 0607    | 0.4 | 15 0618 | 0.4 | 30 0652 | 0.5 |      |      |
| 15 0042       | 3.1     | 30 0036 | 3.3 | 15 0142                                  | 3.0 |         |       | 0040    | 3.0 | 0050    | 3.2 | 15 0104 | 3.1 | 30 0125 | 3.4 |      |      |
| 0607          | 0.7     | 0601    | 0.7 | 15 0648                                  | 0.5 |         |       | 0523    | 0.7 | 0531    | 0.5 | 0546    | 0.4 | 30 0652 | 0.5 |      |      |
| TH 1227       | 3.4     | F 1252  | 3.7 | SU 1319                                  | 3.5 |         |       | 1145    | 3.3 | SU 1225 | 3.6 | TU 1225 | 3.5 | W 1318  | 3.5 |      |      |
| O 1820        | 0.6     | 1825    | 0.3 | 1856                                     | 0.3 |         |       | 1731    | 0.4 | 1748    | 0.1 | O 1756  | 0.2 | 1916    | 0.5 |      |      |
| 31 0130       | 3.3     |         |     |  |     |         |       | 0551    | 0.5 | 0607    | 0.4 | 15 0618 | 0.4 | 30 0652 | 0.5 |      |      |
| 0647          | 0.6     |         |     |  |     |         |       | 1220    | 3.4 | M 1308  | 3.7 | W 1303  | 3.5 | TH 1354 | 3.4 |      |      |
| SA 1342       | 3.8     |         |     |  |     |         |       | O 1759  | 0.3 | 1826    | 0.2 | 1832    | 0.2 | 1916    | 0.5 |      |      |
| 1910          | 0.3     |         |     |  |     |         |       | 1731    | 0.4 | 1748    | 0.1 | O 1756  | 0.2 | 1838    | 0.4 |      |      |
| 31            | 0128    | 3.3     |     |  |     |         |       | 0551    | 0.5 | 0607    | 0.4 | 15 0618 | 0.4 | 30 0652 | 0.5 |      |      |
| 0643          | 0.4     |         |     |  |     |         |       | 1220    | 3.4 | M 1308  | 3.7 | W 1303  | 3.5 | TH 1354 | 3.4 |      |      |
| SA 1342       | 3.8     |         |     |  |     |         |       | O 1759  | 0.3 | 1826    | 0.2 | 1832    | 0.2 | 1916    | 0.5 |      |      |
| 1910          | 0.3     |         |     |  |     |         |       | 1731    | 0.4 | 1748    | 0.1 | O 1756  | 0.2 | 1838    | 0.4 |      |      |

# SCOTLAND, WEST COAST - GREENOCK

LAT 55°57'N LONG 4°46'W

TIME ZONE GMT

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

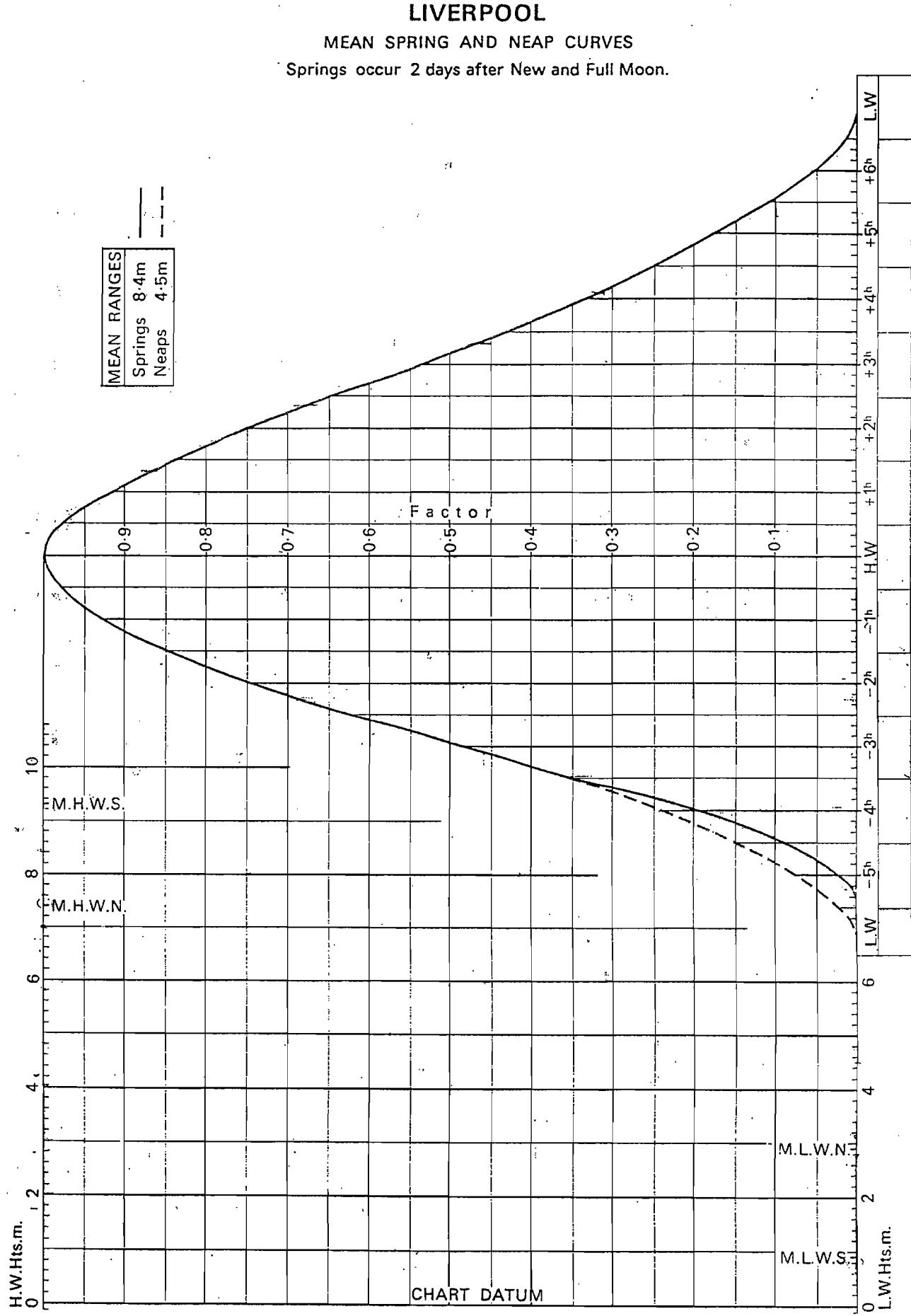
YEAR 1987

|    | MAY JUNE JULY AUGUST |     |      |      |      |    |      |      |      |      |      |    |      |     |
|----|----------------------|-----|------|------|------|----|------|------|------|------|------|----|------|-----|
|    | TIME                 | M   | TIME | M    | TIME | M  | TIME | M    | TIME | M    | TIME | M  |      |     |
| 1  | 0155                 | 3.5 | 16   | 0147 | 3.5  | 1  | 0231 | 3.4  | 16   | 0305 | 3.6  | 1  | 0249 | 3.3 |
|    | 0726                 | 0.5 |      | 0721 | 0.4  |    | 0822 | 0.6  | 16   | 0901 | 0.4  |    | 0839 | 0.5 |
| F  | 1428                 | 3.3 | SA   | 1410 | 3.4  | M  | 1525 | 2.8  | TU   | 1550 | 3.2  | W  | 1546 | 2.7 |
|    | 1952                 | 0.6 |      | 1944 | 0.6  |    | 2057 | 0.8  |      | 2128 | 0.8  |    | 2109 | 0.8 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 2153 | 0.7 |
| 2  | 0225                 | 3.5 | 17   | 0228 | 3.6  | 2  | 0308 | 3.3  | 17   | 0354 | 3.5  | 2  | 0326 | 3.3 |
|    | 0800                 | 0.6 | 17   | 0812 | 0.4  |    | 0905 | 0.7  | 17   | 1002 | 0.4  |    | 0919 | 0.6 |
| SA | 1503                 | 3.2 | SU   | 1500 | 3.4  | TU | 1606 | 2.8  | W    | 1642 | 3.0  | TH | 1621 | 2.8 |
|    | 2033                 | 0.8 |      | 2039 | 0.8  |    | 2143 | 1.0  |      | 2228 | 0.8  |    | 2150 | 0.9 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 2245 | 0.8 |
| 3  | 0257                 | 3.5 | 18   | 0312 | 3.6  | 3  | 0350 | 3.2  | 18   | 0445 | 3.4  | 3  | 0406 | 3.3 |
|    | 0837                 | 0.7 | 18   | 0911 | 0.5  |    | 0953 | 0.7  | 18   | 1104 | 0.4  |    | 1003 | 0.6 |
| SU | 1542                 | 3.0 | M    | 1553 | 3.2  | W  | 1649 | 2.7  | TH   | 1736 | 2.9  | F  | 1658 | 2.8 |
|    | 2118                 | 0.9 |      | 2140 | 0.9  |    | 2235 | 1.1  |      | 2331 | 0.9  |    | 2235 | 1.0 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 2344 | 0.9 |
| 4  | 0334                 | 3.4 | 19   | 0400 | 3.5  | 4  | 0434 | 3.1  | 19   | 0544 | 3.2  | 4  | 0451 | 3.2 |
|    | 0923                 | 0.8 | 19   | 1019 | 0.6  |    | 1048 | 0.8  | 19   | 1208 | 0.5  |    | 1051 | 0.7 |
| M  | 1626                 | 2.8 | TU   | 1648 | 3.1  | TH | 1736 | 2.6  | F    | 1837 | 2.8  | SA | 1741 | 2.8 |
|    | 2214                 | 1.1 |      | 2250 | 1.0  |    | 2332 | 1.1  |      |      |      |    | 2327 | 1.1 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    |      |     |
| 5  | 0417                 | 3.2 | 20   | 0454 | 3.3  | 5  | 0525 | 3.0  | 20   | 0038 | 0.9  | 5  | 0541 | 3.2 |
|    | 1023                 | 1.0 | 20   | 1134 | 0.6  |    | 1146 | 0.8  | 20   | 0656 | 3.0  |    | 1145 | 0.8 |
| TU | 1715                 | 2.7 | W    | 1750 | 2.8  | F  | 1832 | 2.6  | SA   | 1310 | 0.5  | SU | 1832 | 2.8 |
|    | 2324                 | 1.2 |      |      |      |    |      |      |      | 1951 | 2.7  |    |      |     |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 1950 | 2.7 |
| 6  | 0506                 | 3.0 | 21   | 0006 | 1.0  | 6  | 0033 | 1.2  | 21   | 0148 | 0.9  | 6  | 0028 | 1.2 |
|    | 1141                 | 1.0 | 21   | 0600 | 3.0  |    | 0624 | 3.0  | 21   | 0814 | 2.9  |    | 0641 | 3.1 |
| W  | 1815                 | 2.6 | TH   | 1248 | 0.5  | SA | 1245 | 0.8  | SU   | 1410 | 0.5  | M  | 1243 | 0.8 |
|    |                      |     |      | 1921 | 2.7  |    | 1950 | 2.7  |      | 2056 | 2.8  |    | 1939 | 2.8 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 2103 | 2.8 |
| 7  | 0042                 | 1.3 | 22   | 0124 | 0.9  | 7  | 0136 | 1.2  | 22   | 0250 | 0.9  | 7  | 0140 | 1.2 |
|    | 0603                 | 2.9 | 22   | 0742 | 2.9  |    | 0733 | 3.0  | 22   | 0918 | 2.9  |    | 0749 | 3.1 |
| TH | 1259                 | 1.0 | F    | 1353 | 0.4  | SU | 1342 | 0.8  | M    | 1503 | 0.6  | TU | 1350 | 0.9 |
|    | 2006                 | 2.5 |      | 2053 | 2.7  |    | 2058 | 2.8  |      | 2148 | 2.9  |    | 2053 | 2.9 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 2204 | 2.9 |
| 8  | 0152                 | 1.2 | 23   | 0231 | 0.8  | 8  | 0234 | 1.1  | 23   | 0342 | 0.8  | 8  | 0249 | 1.0 |
|    | 0718                 | 2.8 | 23   | 0903 | 3.0  |    | 0841 | 3.1  | 23   | 1012 | 3.0  |    | 0859 | 3.1 |
| F  | 1402                 | 0.9 | SA   | 1448 | 0.3  | M  | 1437 | 0.7  | TU   | 1552 | 0.6  | W  | 1458 | 0.8 |
|    | 2124                 | 2.7 |      | 2146 | 2.8  |    | 2147 | 2.9  |      | 2232 | 3.0  |    | 2155 | 3.0 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 2253 | 3.0 |
| 9  | 0247                 | 1.1 | 24   | 0324 | 0.7  | 9  | 0323 | 0.9  | 24   | 0426 | 0.7  | 9  | 0346 | 0.8 |
|    | 0841                 | 2.9 | 24   | 0956 | 3.1  |    | 0939 | 3.2  | 24   | 1103 | 3.0  |    | 1005 | 3.2 |
| SA | 1450                 | 0.8 | SU   | 1535 | 0.3  | TU | 1528 | 0.6  | W    | 1638 | 0.6  | TH | 1559 | 0.7 |
|    | 2206                 | 2.8 |      | 2227 | 3.0  |    | 2231 | 3.1  |      | 2314 | 3.1  |    | 2250 | 3.2 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 2337 | 3.1 |
| 10 | 0329                 | 1.0 | 25   | 0406 | 0.7  | 10 | 0408 | 0.7  | 25   | 0508 | 0.6  | 10 | 0436 | 0.5 |
|    | 0938                 | 3.1 | 25   | 1043 | 3.2  |    | 1031 | 3.3  | 25   | 1150 | 3.0  |    | 1107 | 3.2 |
| SU | 1531                 | 0.6 | M    | 1617 | 0.4  | W  | 1616 | 0.6  | TH   | 1723 | 0.6  | F  | 1652 | 0.6 |
|    | 2240                 | 2.9 |      | 2305 | 3.1  |    | 2314 | 3.2  |      | 2353 | 3.2  |    | 2342 | 3.3 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | O    |     |
| 11 | 0405                 | 0.8 | 26   | 0445 | 0.6  | 11 | 0452 | 0.5  | 26   | 0546 | 0.5  | 11 | 0524 | 0.3 |
|    | 1023                 | 3.2 | 26   | 1128 | 3.2  |    | 1124 | 3.3  | 26   | 1236 | 3.0  |    | 1208 | 3.1 |
| M  | 1609                 | 0.5 | TU   | 1658 | 0.4  | TH | 1704 | 0.5  | F    | 1805 | 0.6  | SA | 1743 | 0.6 |
|    | 2314                 | 3.0 |      | 2342 | 3.2  |    | O    | 2359 | 3.3  |      |      |    | O    |     |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 1826 | 0.5 |
| 12 | 0440                 | 0.6 | 27   | 0523 | 0.6  | 12 | 0536 | 0.4  | 27   | 0030 | 3.3  | 12 | 0052 | 3.5 |
|    | 1107                 | 3.3 | 27   | 1211 | 3.2  |    | 1217 | 3.3  | 27   | 0624 | 0.5  |    | 0613 | 0.2 |
| TU | 1647                 | 0.4 | W    | 1738 | 0.5  | F  | 1753 | 0.5  | SA   | 1318 | 2.9  | SU | 1306 | 3.1 |
|    | 2350                 | 3.1 |      |      |      |    |      |      |      | 1844 | 0.6  |    | 1832 | 0.6 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 1858 | 0.5 |
| 13 | 0516                 | 0.5 | 28   | 0019 | 3.3  | 13 | 0045 | 3.4  | 28   | 0106 | 3.3  | 13 | 0124 | 3.6 |
|    | 1153                 | 3.4 | 28   | 0600 | 0.5  |    | 0623 | 0.3  | 28   | 0658 | 0.4  |    | 0701 | 0.2 |
| W  | 1727                 | 0.3 | TH   | 1252 | 3.2  | SA | 1311 | 3.3  | SU   | 1358 | 2.9  | M  | 1402 | 3.2 |
| O  |                      |     |      | 1818 | 0.5  |    | 1843 | 0.6  |      | 1920 | 0.6  |    | 1923 | 0.6 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 1928 | 0.5 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 2030 | 0.6 |
| 14 | 0028                 | 3.2 | 29   | 0053 | 3.4  | 14 | 0131 | 3.5  | 29   | 0139 | 3.4  | 14 | 0213 | 3.7 |
|    | 0554                 | 0.4 | 29   | 0636 | 0.5  |    | 0712 | 0.3  | 29   | 0730 | 0.4  |    | 0750 | 0.2 |
| TH | 1237                 | 3.5 | F    | 1331 | 3.2  | SU | 1404 | 3.3  | M    | 1437 | 2.8  | TU | 1454 | 3.2 |
|    | 1808                 | 0.4 |      | 1857 | 0.6  |    | 1936 | 0.6  |      | 1955 | 0.6  |    | 2013 | 0.6 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 1959 | 0.6 |
| 15 | 0107                 | 3.4 | 30   | 0126 | 3.4  | 15 | 0218 | 3.6  | 30   | 0213 | 3.3  | 15 | 0300 | 3.7 |
|    | 0635                 | 0.3 | 30   | 0710 | 0.5  |    | 0805 | 0.3  | 30   | 0803 | 0.4  |    | 0841 | 0.3 |
| F  | 1323                 | 3.5 | SA   | 1409 | 3.1  | M  | 1457 | 3.2  | TU   | 1512 | 2.7  | W  | 1541 | 3.2 |
|    | 1853                 | 0.5 |      | 1936 | 0.6  |    | 2030 | 0.7  |      | 2031 | 0.7  |    | 2103 | 0.7 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 2032 | 0.6 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 2157 | 0.8 |
|    |                      |     |      |      |      |    |      |      |      |      |      |    | 2112 | 0.7 |
| 31 | 0158                 | 3.4 |      |      |      |    |      |      |      |      |      |    | 2203 | 0.9 |
|    | 0745                 | 0.5 |      |      |      |    |      |      |      |      |      |    |      |     |
| SU | 1446                 | 2.9 |      |      |      |    |      |      |      |      |      |    |      |     |
|    | 2016                 | 0.7 |      |      |      |    |      |      |      |      |      |    |      |     |

# SCOTLAND, WEST COAST - GREENOCK

LAT 56°57'N LONG 4°46'W

| TIME ZONE GMT |      |     |         | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |      |      |     |      |          |      |      |      |      |      | YEAR, 1987 |      |      |      |         |      |      |         |
|---------------|------|-----|---------|--|------|------|------|-----|------|----------|------|------|------|------|------|------------|------|------|------|---------|------|------|---------|
| SEPTEMBER     |      |     |         | OCTOBER                                  |      |      |      |     |      | NOVEMBER |      |      |      |      |      | DECEMBER   |      |      |      |         |      |      |         |
|               | TIME | M   | TIME    | M  | TIME | M    | TIME | M   | TIME | M        | TIME | M    | TIME | M    | TIME | M          |      |      |      |         |      |      |         |
| 1             | 0447 | 3.3 | 16      | 0601                                     | 2.7  | 1    | 0529 | 3.1 | 16   | 0043     | 1.1  | 1    | 0149 | 0.6  | 16   | 0145       | 1.0  | 1    | 0216 | 0.5     | 117  | 1.1  |         |
| TU            | 1027 | 0.9 | 1227    | 1.2                                      | 1    | 1137 | 1.2  | 16  | 0649 | 2.6      | 1    | 0846 | 2.8  | 16   | 0907 | 2.8        | 1    | 0911 | 3.0  | 0836    | 2.9  |      |         |
| TU            | 1714 | 3.1 | W 1803  | 2.9                                      | TH   | 1750 | 3.0  | F   | 1318 | 1.3      | SU   | 1421 | 1.0  | M    | 1426 | 1.3        | TU   | 1449 | 1.0  | W 1409  | 1.4  |      |         |
|               | 2311 | 1.0 |         |  |      |      |      |     | 1832 | 2.8      |      | 2104 | 3.1  |      | 2024 | 3.0        |      | 2129 | 3.2  | 2022    | 3.2  |      |         |
| 2             | 0542 | 3.2 | 17      | 0125                                     | 1.1  | 2    | 0044 | 0.9 | 17   | 0200     | 1.0  | 2    | 0248 | 0.4  | 17   | 0233       | 0.9  | 2    | 0308 | 0.5     | 0214 | 1.0  |         |
| W             | 1139 | 1.1 | 0724    | 2.6                                      | 2    | 0641 | 2.9  | 17  | 0903 | 2.6      | 2    | 0948 | 3.0  | 17   | 0950 | 2.9        | 2    | 0958 | 3.1  | 17      | 0928 | 3.0  |         |
| W             | 1809 | 3.0 | TH 1352 | 1.2                                      | F    | 1317 | 1.2  | SA  | 1427 | 1.2      | M    | 1516 | 0.8  | TU   | 1510 | 1.2        | W    | 1537 | 0.9  | TH 1503 | 1.3  |      |         |
|               | 1914 | 2.7 |         |  |      | 1919 | 2.9  |     | 2006 | 2.8      |      | 2202 | 3.3  |      | 2124 | 3.1        |      | 2220 | 3.3  | 2121    | 3.3  |      |         |
| 3             | 0047 | 1.1 | 18      | 0239                                     | 1.0  | 3    | 0210 | 0.7 | 18   | 0255     | 0.9  | 3    | 0336 | 0.3  | 18   | 0314       | 0.8  | 3    | 0353 | 0.5     | 18   | 0309 | 1.0     |
| TH            | 0649 | 3.0 | 0929    | 2.6                                      | 3    | 0848 | 2.8  | 18  | 1004 | 2.8      | 3    | 1031 | 3.1  | 18   | 1024 | 3.0        | 3    | 1038 | 3.2  | 18      | 1011 | 3.2  |         |
| TH            | 1316 | 1.2 | F 1458  | 1.1                                      | SA   | 1439 | 1.0  | SU  | 1518 | 1.1      | TU   | 1600 | 0.7  | W    | 1547 | 1.1        | TH   | 1618 | 0.8  | F 1549  | 1.1  |      |         |
|               | 1931 | 2.9 | 2103    | 2.8                                      |      | 2124 | 3.0  |     | 2131 | 2.9      |      | 2249 | 3.4  |      | 2209 | 3.3        |      | 2307 | 3.4  | 2214    | 3.4  |      |         |
| 4             | 0221 | 0.9 | 19      | 0333                                     | 0.8  | 4    | 0312 | 0.4 | 19   | 0335     | 0.7  | 4    | 0417 | 0.2  | 19   | 0351       | 0.7  | 4    | 0435 | 0.5     | 19   | 0359 | 0.8     |
| F             | 0828 | 2.8 | 1035    | 2.7                                      | 4    | 1008 | 2.9  | 19  | 1042 | 2.9      | 4    | 1109 | 3.2  | 19   | 1055 | 3.1        | 4    | 1118 | 3.3  | 19      | 1055 | 3.3  |         |
| F             | 1445 | 1.0 | SA 1550 | 0.9                                      | SU   | 1536 | 0.8  | M   | 1557 | 1.0      | W    | 1638 | 0.7  | TH   | 1620 | 0.9        | F    | 1658 | 0.8  | SA 1633 | 0.9  |      |         |
|               | 2127 | 2.9 | 2214    | 2.9                                      |      | 2226 | 3.2  |     | 2218 | 3.1      |      | 2333 | 3.5  |      | 2251 | 3.4        |      | 2354 | 3.4  | 2306    | 3.4  |      |         |
| 5             | 0325 | 0.6 | 20      | 0415                                     | 0.6  | 5    | 0359 | 0.2 | 20   | 0407     | 0.6  | 5    | 0456 | 0.3  | 20   | 0428       | 0.6  | 5    | 0518 | 0.6     | 20   | 0447 | 0.7     |
| SA            | 1004 | 2.9 | 2118    | 2.8                                      | 5    | 1056 | 3.0  | 20  | 1112 | 3.0      | 5    | 1147 | 3.3  | 20   | 1130 | 3.2        | 5    | 1157 | 3.4  | 20      | 1139 | 3.4  |         |
| SA            | 1546 | 0.8 | SU 1631 | 0.8                                      | M    | 1619 | 0.6  | TU  | 1628 | 0.9      | TH   | 1715 | 0.6  | F    | 1655 | 0.8        | SA   | 1738 | 0.7  | SU 1717 | 0.6  |      |         |
|               | 2235 | 3.2 | 2258    | 3.1                                      |      | 2313 | 3.4  |     | 2254 | 3.2      | O    | 2334 | 3.5  |      | O    |            |      | 2358 | 3.5  |         |      |      |         |
| 6             | 0416 | 0.3 | 21      | 0448                                     | 0.5  | 6    | 0440 | 0.1 | 21   | 0435     | 0.5  | 6    | 0017 | 3.6  | 21   | 0506       | 0.5  | 6    | 0037 | 3.4     | 21   | 0534 | 0.7     |
| SU            | 1106 | 3.0 | 1151    | 2.9                                      | 6    | 1138 | 3.1  | 21  | 1141 | 3.0      | 6    | 0535 | 0.4  | 21   | 1206 | 3.3        | SU   | 1235 | 3.5  | M 1802  | 0.5  |      |         |
| SU            | 1635 | 0.6 | M 1703  | 0.7                                      | TU   | 1659 | 0.5  | W   | 1656 | 0.7      | F    | 1227 | 3.4  | SA   | 1732 | 0.6        | SU   | 1818 | 0.6  | M 1802  | 0.5  |      |         |
|               | 2328 | 3.4 | 2333    | 3.2                                      |      | 2358 | 3.6  |     | 2331 | 3.3      |      | 1752 | 0.6  |      |      |            |      |      |      |         |      |      |         |
| 7             | 0500 | 0.1 | 22      | 0515                                     | 0.4  | 7    | 0519 | 0.1 | 22   | 0503     | 0.4  | 7    | 0100 | 3.6  | 22   | 0017       | 3.5  | 7    | 0119 | 3.3     | 22   | 0050 | 3.4     |
| M             | 1159 | 3.1 | 1223    | 2.9                                      | 7    | 1220 | 3.2  | 22  | 1211 | 3.0      | 7    | 0615 | 0.5  | 22   | 0547 | 0.5        | 7    | 0642 | 0.7  | 22      | 0623 | 0.7  |         |
| M             | 1717 | 0.5 | TU 1731 | 0.6                                      | W    | 1736 | 0.5  | TH  | 1724 | 0.6      | SA   | 1303 | 3.5  | SU   | 1244 | 3.4        | M    | 1311 | 3.6  | TU 1310 | 3.7  |      |         |
| O             |      |     |         |  | O    |      |      |     |      |          | 1830 | 0.6  |      | 1812 | 0.5  |            | 1856 | 0.6  |      | 1850    | 0.4  |      |         |
| 8             | 0018 | 3.5 | 23      | 0007                                     | 3.2  | 8    | 0043 | 3.6 | 23   | 0006     | 3.4  | 8    | 0138 | 3.5  | 23   | 0102       | 3.5  | 8    | 0159 | 3.3     | 23   | 0143 | 3.4     |
| TU            | 0541 | 0.0 | 23      | 0540                                     | 0.3  | 8    | 0558 | 0.2 | 23   | 0534     | 0.4  | 8    | 0654 | 0.6  | 23   | 0630       | 0.6  | 8    | 0723 | 0.7     | 23   | 0713 | 0.7     |
| TU            | 1246 | 3.1 | W 1253  | 2.9                                      | TH   | 1300 | 3.3  | F   | 1242 | 3.1      | SU   | 1338 | 3.6  | M    | 1324 | 3.5        | TU   | 1347 | 3.6  | W 1358  | 3.8  |      |         |
|               | 1758 | 0.5 | • 1757  | 0.5                                      |      | 1814 | 0.5  |     | 1754 | 0.5      |      | 1907 | 0.6  |      | 1856 | 0.5        |      | 1934 | 0.6  |         | 1940 | 0.4  |         |
| 9             | 0104 | 3.7 | 24      | 0040                                     | 3.3  | 9    | 0125 | 3.7 | 24   | 0043     | 3.5  | 9    | 0215 | 3.4  | 24   | 0148       | 3.5  | 9    | 0239 | 3.2     | 24   | 0237 | 3.4     |
| W             | 0622 | 0.0 | 24      | 0607                                     | 0.2  | 9    | 0637 | 0.3 | 24   | 0608     | 0.4  | 9    | 0735 | 0.7  | 24   | 0717       | 0.7  | 9    | 0802 | 0.8     | 24   | 0804 | 0.8     |
| W             | 1332 | 3.2 | TH 1321 | 2.9                                      | F    | 1337 | 3.4  | SA  | 1314 | 3.2      | M    | 1411 | 3.6  | TU   | 1407 | 3.6        | W    | 1422 | 3.6  | TH 1446 | 3.8  |      |         |
|               | 1839 | 0.4 | 1824    | 0.5                                      |      | 1850 | 0.5  |     | 1829 | 0.5      |      | 1944 | 0.7  |      | 1945 | 0.6        |      | 2013 | 0.7  |         | 2033 | 0.5  |         |
| 10            | 0149 | 3.7 | 25      | 0112                                     | 3.4  | 10   | 0203 | 3.7 | 25   | 0121     | 3.5  | 10   | 0252 | 3.3  | 25   | 0237       | 3.4  | 10   | 0318 | 3.1     | 25   | 0328 | 3.4     |
| TH            | 0702 | 0.2 | 0635    | 0.3                                      | 10   | 0716 | 0.4  | 25  | 0644 | 0.4      | 10   | 0816 | 0.9  | 25   | 0809 | 0.8        | 10   | 0844 | 0.9  | 25      | 0858 | 0.9  |         |
| TH            | 1411 | 3.3 | F 1349  | 3.0                                      | SA   | 1411 | 3.5  | SU  | 1348 | 3.3      | TU   | 1445 | 3.6  | W    | 1451 | 3.6        | TH   | 1501 | 3.5  | F 1535  | 3.8  |      |         |
|               | 1918 | 0.5 | 1853    | 0.5                                      |      | 1926 | 0.6  |     | 1906 | 0.5      |      | 2026 | 0.8  |      | 2041 | 0.6        |      | 2054 | 0.8  |         | 2130 | 0.5  |         |
| 11            | 0228 | 3.8 | 26      | 0145                                     | 3.4  | 11   | 0239 | 3.6 | 26   | 0200     | 3.5  | 11   | 0331 | 3.1  | 26   | 0329       | 3.4  | 11   | 0358 | 3.0     | 26   | 0417 | 3.3     |
| F             | 0743 | 0.3 | 0707    | 0.3                                      | SU   | 0755 | 0.6  | 27  | 0726 | 0.6      | 11   | 0903 | 1.0  | 27   | 0907 | 1.0        | 11   | 0928 | 1.0  | 26      | 0953 | 0.9  |         |
| F             | 1448 | 3.3 | SA 1417 | 3.1                                      | SU   | 1443 | 3.5  | M   | 1423 | 3.4      | W    | 1523 | 3.5  | TH   | 1540 | 3.6        | F    | 1541 | 3.4  | SA 1625 | 3.7  |      |         |
|               | 1955 | 0.5 | 1926    | 0.5                                      |      | 2003 | 0.7  |     | 1951 | 0.6      |      | 2116 | 0.9  |      | 2144 | 0.7        |      | 2140 | 0.9  |         | 2230 | 0.6  |         |
| 12            | 0305 | 3.7 | 27      | 0218                                     | 3.5  | 12   | 0314 | 3.4 | 27   | 0244     | 3.5  | 12   | 0416 | 2.9  | 27   | 0423       | 3.2  | 12   | 0440 | 2.9     | 27   | 0507 | 3.2     |
| SA            | 0823 | 0.5 | 0742    | 0.5                                      | 12   | 0836 | 0.8  | 27  | 0813 | 0.8      | 12   | 0959 | 1.1  | 27   | 1012 | 1.1        | 12   | 1015 | 1.2  | 27      | 1051 | 1.0  |         |
| SA            | 1519 | 3.4 | SU 1449 | 3.2                                      | M    | 1516 | 3.5  | TU  | 1503 | 3.5      | TH   | 1607 | 3.3  | F    | 1632 | 3.5        | SA   | 1626 | 3.3  | SU 1718 | 3.5  |      |         |
|               | 2034 | 0.6 | 2005    | 0.6                                      |      | 2044 | 0.8  |     | 2043 | 0.7      |      | 2216 | 1.0  |      | 2255 | 0.7        |      | 2229 | 1.0  |         | 2331 | 0.6  |         |
| 13            | 0341 | 3.5 | 28      | 0258                                     | 3.5  | 13   | 0353 | 3.2 | 28   | 0332     | 3.4  | 13   | 0506 | 2.8  | 28   | 0521       | 3.1  | 13   | 0524 | 2.8     | 28   | 0559 | 3.1     |
| SU            | 0905 | 0.7 | 0824    | 0.6                                      | 13   | 0924 | 1.0  | 29  | 0909 | 0.9      | 13   | 1105 | 1.3  | 29   | 1121 | 1.1        | 13   | 1105 | 1.3  | 29      | 1153 | 1.1  |         |
| SU            | 1552 | 3.4 | M 1524  | 3.3                                      | TU   | 1553 | 3.4  | W   | 1549 | 3.5      | F    | 1656 | 3.2  | SA   | 1733 | 3.3        | SU   | 1714 | 3.2  | M 1821  | 3.3  |      |         |
|               | 2114 | 0.8 | 2051    | 0.7                                      |      | 2134 | 1.0  |     | 2147 | 0.8      |      | 2331 | 1.1  |      |      |            |      | 2323 | 1.0  |         |      |      |         |
| 14            | 0420 | 3.3 | 29      | 0341                                     | 3.4  | 14   | 0437 | 3.0 | 29   | 0425     | 3.2  | 14   | 0608 | 2.7  | 29   | 0008       | 0.6  | 14   | 0617 | 2.8     | 29   | 0034 | 0.7     |
| M             | 0954 | 0.9 | 0914    | 0.8                                      | 14   | 1027 | 1.2  | 29  | 1016 | 1.1      | 14   | 1218 | 1.3  | 29   | 0633 | 2.9        | 14   | 1203 | 1.4  | 29      | 0704 | 3.0  |         |
| M             | 1628 | 3.3 | TU 1606 | 3.3                                      | W    | 1637 | 3.2  | TH  | 1640 | 3.3      | SA   | 1753 | 3.0  | SU   | 1236 | 1.1        | M    | 1811 | 3.1  | TU 1304 | 1.1  |      |         |
|               | 2205 | 1.0 | 2148    | 0.9                                      |      | 2253 | 1.1  |     | 2306 | 0.8      |      | 1854 | 3.1  |      |      |            |      | 1937 | 3.1  |         |      |      |         |
| 15            | 0504 | 3.0 | 30      | 0431                                     | 3.3  | 15   | 0531 | 2.7 | 30   | 0524     | 3.0  | 15   | 0045 | 1.1  | 30   | 0116       | 0.6  | 15   | 0018 | 1.1     | 30   | 0138 | 0.7</td |



# ENGLAND, WEST COAST - LIVERPOOL

LAT 53°25'N LONG 3°00'W

| TIME ZONE GMT |      |     |        | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |        |      |          |        |      |      |       |      |      |        | YEAR 1987. |      |        |      |      |        |      |     |
|---------------|------|-----|--------|--|------|--------|------|----------|--------|------|------|-------|------|------|--------|------------|------|--------|------|------|--------|------|-----|
|               |      |     |        | JANUARY                                  |      |        |      | FEBRUARY |        |      |      | MARCH |      |      |        | APRIL      |      |        |      |      |        |      |     |
|               | TIME | M   | TIME   | M  | TIME | M      | TIME | M        | TIME   | M    | TIME | M     | TIME | M    | TIME   | M          | TIME | M      | TIME | M    |        |      |     |
| 1             | 0614 | 1.0 | 16     | 0614                                     | 1.9  | 1      | 0055 | 9.5      | 16     | 0035 | 9.0  | 1     | 0638 | 0.5  | 0611   | 1.1        | 1    | 0039   | 9.3  | 0014 | 9.5    |      |     |
| TH            | 1150 | 9.7 | F      | 1204                                     | 8.9  | 1      | 0737 | 0.7      | 16     | 0707 | 1.2  | 1     | 1210 | 10.0 | 16     | 1151       | 9.3  | 1      | 0721 | 0.8  | 0657   | 0.8  |     |
| TH            | 1845 | 0.8 | F      | 1848                                     | 1.7  | SU     | 1312 | 9.9      | M      | 1249 | 9.2  | SU    | 1906 | 0.1  | M      | 1841       | 0.8  | W      | 1256 | 9.4  | TH     | 1231 | 9.5 |
|               |      |     |        |  |      |        | 2008 | 0.4      |        | 1938 | 1.1  |       |      |      |        |            |      | 1940   | 1.0  |      | 1921   | 0.9  |     |
| 2             | 0018 | 9.5 | 17     | 0022                                     | 8.7  | 2      | 0137 | 9.3      | 17     | 0107 | 9.0  | 2     | 0034 | 9.6  | 17     | 0008       | 9.3  | 2      | 0112 | 9.0  | 0050   | 9.4  |     |
| 0703          | 1.0  | 17  | 0648   | 1.8                                      | 2    | 0818   | 0.9  | 17       | 0740   | 1.2  | 2    | 0716  | 0.5  | 0645 | 0.9    | 2          | 0754 | 1.2    | 0734 | 1.0  |        |      |     |
| F             | 1239 | 9.7 | SA     | 1236                                     | 8.9  | M      | 1354 | 9.7      | TU     | 1320 | 9.2  | M     | 1249 | 9.9  | TU     | 1222       | 9.5  | TH     | 1330 | 9.0  | F      | 1310 | 9.3 |
| 1935          | 0.7  |     | 1921   | 1.6                                      |      | 2047   | 0.7  |          | 2009   | 1.2  |      | 1941  | 0.3  |      | 1913   | 0.8        |      | 2008   | 1.5  |      | 1957   | 1.2  |     |
| 3             | 0109 | 9.3 | 18     | 0056                                     | 8.7  | 3      | 0216 | 9.0      | 18     | 0140 | 8.9  | 3     | 0110 | 9.4  | 18     | 0041       | 9.3  | 3      | 0142 | 8.7  | 0131   | 9.1  |     |
| 0749          | 1.1  | 18  | 0721   | 1.7                                      | 3    | 0856   | 1.3  | 18       | 0813   | 1.4  | 3    | 0751  | 0.7  | 18   | 0719   | 0.9        | 3    | 0823   | 1.7  | 0813 | 1.3    |      |     |
| SA            | 1328 | 9.6 | SU     | 1310                                     | 8.9  | TU     | 1433 | 9.3      | W      | 1352 | 9.1  | TU    | 1326 | 9.7  | W      | 1255       | 9.5  | F      | 1404 | 8.5  | SA     | 1352 | 8.9 |
| 2025          | 0.8  |     | 1957   | 1.6                                      |      | 2124   | 1.2  |          | 2040   | 1.4  |      | 2015  | 0.7  |      | 1945   | 0.9        |      | 2034   | 2.0  |      | 2034   | 1.7  |     |
| 4             | 0157 | 9.1 | 19     | 0130                                     | 8.6  | 4      | 0256 | 8.5      | 19     | 0213 | 8.8  | 4     | 0144 | 9.1  | 19     | 0113       | 9.3  | 4      | 0215 | 8.3  | 0215   | 8.8  |     |
| 0836          | 1.4  | 19  | 0758   | 1.8                                      | 4    | 0934   | 1.8  | 19       | 0846   | 1.6  | 4    | 0825  | 1.1  | 19   | 0752   | 1.1        | 4    | 0854   | 2.3  | 0857 | 1.7    |      |     |
| SU            | 1416 | 9.4 | M      | 1342                                     | 8.8  | W      | 1514 | 8.8      | TH     | 1427 | 8.9  | W     | 1401 | 9.3  | TH     | 1328       | 9.3  | SA     | 1440 | 8.0  | SU     | 1443 | 8.4 |
| 2112          | 1.0  |     | 2032   | 1.7                                      |      | 2202   | 1.9  |          | 2112   | 1.7  |      | 2046  | 1.3  |      | 2016   | 1.2        |      | 2103   | 2.6  |      | 2119   | 2.3  |     |
| 5             | 0246 | 8.7 | 20     | 0204                                     | 8.5  | 5      | 0336 | 8.0      | 20     | 0251 | 8.5  | 5     | 0218 | 8.7  | 20     | 0148       | 9.0  | 5      | 0253 | 7.7  | 0310   | 8.2  |     |
| 0924          | 1.7  | 20  | 0833   | 1.9                                      | 5    | 1014   | 2.4  | 20       | 0922   | 2.0  | 5    | 0856  | 1.7  | 20   | 0826   | 1.4        | 5    | 0931   | 2.8  | 0953 | 2.2    |      |     |
| M             | 1504 | 9.1 | TU     | 1418                                     | 8.7  | TH     | 1557 | 8.2      | F      | 1507 | 8.6  | TH    | 1436 | 8.7  | F      | 1405       | 9.0  | SU     | 1524 | 7.3  | M      | 1546 | 7.8 |
| 2159          | 1.4  |     | 2107   | 1.8                                      |      | 2242   | 2.5  |          | 2150   | 2.2  |      | 2115  | 1.9  |      | 2049   | 1.6        |      | 2141   | 3.2  |      | 2221   | 2.8  |     |
| 6             | 0334 | 8.3 | 21     | 0242                                     | 8.3  | 6      | 0423 | 7.5      | 21     | 0336 | 8.1  | 6     | 0251 | 8.2  | 21     | 0227       | 8.7  | 6      | 0342 | 7.2  | 0420   | 7.8  |     |
| 1012          | 2.1  | 21  | 0911   | 2.1                                      | 6    | 1102   | 3.0  | 21       | 1009   | 2.4  | 6    | 0929  | 2.3  | 21   | 0904   | 1.8        | 6    | 1023   | 3.4  | 1111 | 2.5    |      |     |
| TU            | 1553 | 8.6 | W      | 1454                                     | 8.5  | F      | 1651 | 7.5      | SA     | 1559 | 8.1  | F     | 1514 | 8.1  | SA     | 1449       | 8.6  | M      | 1628 | 6.7  | TU     | 1712 | 7.4 |
| 2248          | 1.9  |     | 2145   | 2.1                                      |      | 2333   | 3.1  |          | 2244   | 2.6  |      | 2146  | 2.6  |      | 2128   | 2.2        |      | 2241   | 3.8  |      | 2353   | 3.1  |     |
| 7             | 0426 | 7.9 | 22     | 0322                                     | 8.1  | 7      | 0523 | 7.1      | 22     | 0438 | 7.7  | 7     | 0331 | 7.6  | 22     | 0315       | 8.2  | 7      | 0459 | 6.7  | 0547   | 7.6  |     |
| 1105          | 2.6  | 22  | 0952   | 2.4                                      | 7    | 1211   | 3.4  | 22       | 1113   | 2.8  | 7    | 1007  | 2.9  | 22   | 0952   | 2.3        | 7    | 1158   | 3.6  | 22   | 1245   | 2.5  |     |
| W             | 1647 | 8.2 | TH     | 1539                                     | 8.3  | SA     | 1801 | 7.0      | SU     | 1712 | 7.6  | SA    | 1602 | 7.4  | SU     | 1543       | 7.9  | TU     | 1807 | 6.5  | W      | 1845 | 7.5 |
| 2342          | 2.4  |     | 2228   | 2.3                                      |      |        |      |          |        |      |      | 2226  | 3.3  |      | 2224   | 2.8        |      |        |      |      |        |      |     |
| 8             | 0525 | 7.5 | 23     | 0413                                     | 7.9  | 8      | 0046 | 3.4      | 23     | 0004 | 3.0  | 8     | 0426 | 7.0  | 23     | 0421       | 7.6  | 8      | 0032 | 4.0  | 0127   | 2.8  |     |
| 1205          | 2.9  | 23  | 1042   | 2.7                                      | 8    | 0649   | 6.9  | 23       | 0604   | 7.4  | 8    | 1106  | 3.5  | 23   | 1102   | 2.8        | 8    | 0646   | 6.7  | 0712 | 7.9    |      |     |
| TH            | 1749 | 7.8 | F      | 1633                                     | 8.1  | SU     | 1340 | 3.5      | M      | 1248 | 2.9  | SU    | 1709 | 6.7  | M      | 1706       | 7.3  | W      | 1341 | 3.4  | TH     | 1408 | 2.0 |
|               | 2325 | 2.6 |        | 1930                                     | 6.9  |        | 1852 | 7.4      |        | 2336 | 3.8  |       | 2351 | 3.2  |        | 1942       | 6.8  |        | 2002 | 7.9  |        |      |     |
| 9             | 0042 | 2.7 | 24     | 0516                                     | 7.7  | 9      | 0211 | 3.4      | 24     | 0148 | 2.9  | 9     | 0550 | 6.6  | 24     | 0554       | 7.3  | 9      | 0206 | 3.5  | 0240   | 2.3  |     |
| 0632          | 7.3  | 24  | 1149   | 2.8                                      | 9    | 0813   | 7.1  | 24       | 0737   | 7.6  | 9    | 1252  | 3.7  | 24   | 1245   | 2.9        | 9    | 0805   | 7.2  | 0820 | 8.4    |      |     |
| F             | 1314 | 3.1 | SA     | 1743                                     | 7.8  | M      | 1500 | 3.2      | TU     | 1427 | 2.6  | M     | 1853 | 6.5  | TU     | 1852       | 7.3  | TH     | 1449 | 2.8  | F      | 1515 | 1.5 |
| 1857          | 7.6  |     |        |  |      | 2047   | 7.2  |          | 2022   | 7.8  |      |       |      |      |        |            | 2039 | 7.4    |      | 2100 | 8.4    |      |     |
| 10            | 0147 | 2.9 | 25     | 0042                                     | 2.7  | 10     | 0319 | 3.1      | 25     | 0310 | 2.4  | 10    | 0130 | 3.8  | 25     | 0141       | 3.0  | 10     | 0305 | 2.9  | 0339   | 1.7  |     |
| 0741          | 7.4  | 25  | 0634   | 7.7                                      | 10   | 0915   | 7.6  | 25       | 0854   | 8.2  | 10   | 0740  | 6.8  | 25   | 0730   | 7.6        | 10   | 0856   | 7.8  | 0914 | 8.8    |      |     |
| SA            | 1422 | 3.0 | SU     | 1312                                     | 2.8  | TU     | 1600 | 2.7      | W      | 1546 | 1.9  | TU    | 1430 | 3.4  | W      | 1425       | 2.4  | F      | 1538 | 2.2  | SA     | 1609 | 1.1 |
| 2005          | 7.6  |     | 1906   | 7.8                                      |      | 2141   | 7.7  |          | 2132   | 8.4  |      | 2025  | 6.9  |      | 2020   | 7.8        |      | 2121   | 8.0  |      | 2146   | 8.8  |     |
| 11            | 0249 | 2.8 | 26     | 0205                                     | 2.6  | 11     | 0410 | 2.7      | 26     | 0416 | 1.8  | 11    | 0253 | 3.4  | 26     | 0303       | 2.4  | 11     | 0350 | 2.3  | 0427   | 1.3  |     |
| 0842          | 7.6  | 26  | 0751   | 7.9                                      | 11   | 1002   | 8.1  | 26       | 0955   | 8.9  | 11   | 0850  | 7.3  | 26   | 0843   | 8.3        | 11   | 0935   | 8.3  | 1000 | 9.2    |      |     |
| SU            | 1524 | 2.8 | M      | 1436                                     | 2.5  | W      | 1647 | 2.3      | TH     | 1649 | 1.2  | W     | 1534 | 2.8  | TH     | 1539       | 1.6  | SA     | 1620 | 1.7  | SU     | 1654 | 0.9 |
| 2104          | 7.8  |     | 2025   | 8.1                                      |      | 2223   | 8.1  |          | 2227   | 9.0  |      | 2119  | 7.5  |      | 2122   | 8.4        |      | 2156   | 8.5  |      | 2227   | 9.0  |     |
| 12            | 0342 | 2.6 | 27     | 0318                                     | 2.2  | 12     | 0451 | 2.3      | 27     | 0509 | 1.2  | 12    | 0348 | 2.8  | 27     | 0493       | 1.7  | 12     | 0430 | 1.8  | 0508   | 1.1  |     |
| 0932          | 8.0  | 27  | 0900   | 8.4                                      | 12   | 1040   | 8.5  | 27       | 1044   | 9.4  | 12   | 0936  | 7.9  | 27   | 0939   | 8.9        | 12   | 1010   | 8.8  | 0727 | 9.3    |      |     |
| M             | 1614 | 2.5 | TU     | 1649                                     | 2.0  | TH     | 1725 | 1.9      | F      | 1742 | 0.6  | TH    | 1620 | 2.2  | F      | 1635       | 1.0  | SU     | 1658 | 1.3  | M      | 1732 | 0.8 |
| 2153          | 8.0  |     | 2132   | 8.5                                      |      | 2259   | 8.5  |          | 2313   | 9.4  |      | 2159  | 8.1  |      | 2212   | 8.9        |      | 2230   | 8.9  |      | 2304   | 9.2  |     |
| 13            | 0426 | 2.4 | 28     | 0421                                     | 1.7  | 13     | 0527 | 1.9      | 28     | 0556 | 0.8  | 13    | 0428 | 2.3  | 28     | 0452       | 1.1  | 13     | 0506 | 1.3  | 0546   | 1.0  |     |
| 1016          | 8.3  | 28  | 1000   | 8.9                                      | 13   | 1113   | 8.8  | 28       | 1129   | 9.8  | 13   | 1013  | 8.4  | 28   | 1026   | 9.4        | 13   | 1044   | 9.1  | 1119 | 9.4    |      |     |
| TU            | 1659 | 2.2 | W      | 1652                                     | 1.4  | F      | 1800 | 1.5      | SA     | 1825 | 0.2  | F     | 1659 | 1.7  | SA     | 1722       | 0.6  | M      | 1734 | 1.0  | TU     | 1805 | 0.9 |
| 2237          | 8.3  |     | 2231   | 9.0                                      |      | O 2332 | 8.7  |          | ● 2354 | 9.6  |      | 2234  | 8.5  |      | 2252   | 9.3        |      | 2304   | 9.2  |      | ● 2337 | 9.2  |     |
| 14            | 0505 | 2.2 | 29     | 0518                                     | 1.3  | 14     | 0600 | 1.6      |        |      |      | 14    | 0504 | 1.8  | 29     | 0536       | 0.8  | 14     | 0544 | 1.0  | 0621   | 1.0  |     |
| 1055          | 8.6  | 29  | 1054   | 9.4                                      | 14   | 1147   | 9.0  |          |        |      | 14   | 1047  | 8.8  | 29   | 1108   | 9.7        | 14   | 1119   | 9.4  | 1154 | 9.3    |      |     |
| W             | 1737 | 2.0 | TH     | 1750                                     | 0.8  | SA     | 1832 | 1.3      |        |      |      | SA    | 1733 | 1.3  | SU     | 1801       | 0.4  | TU     | 1811 | 0.8  | W      | 1836 | 1.1 |
| 2313          | 8.5  |     | ● 2323 | 9.3                                      |      |        |      |          |        |      |      | 2305  | 8.8  |      | ● 2330 | 9.4        |      | O 2339 | 9.4  |      |        |      |     |
| 15            | 0540 | 2.0 | 30     | 0608                                     | 0.9  | 15     | 0004 | 8.9      |        |      |      | 15    | 0537 | 1.4  | 30     | 0614       | 0.6  | 15     | 0621 | 0.8  | 0011   | 9.   |     |

**ENGLAND, WEST COAST - LIVERPOOL**

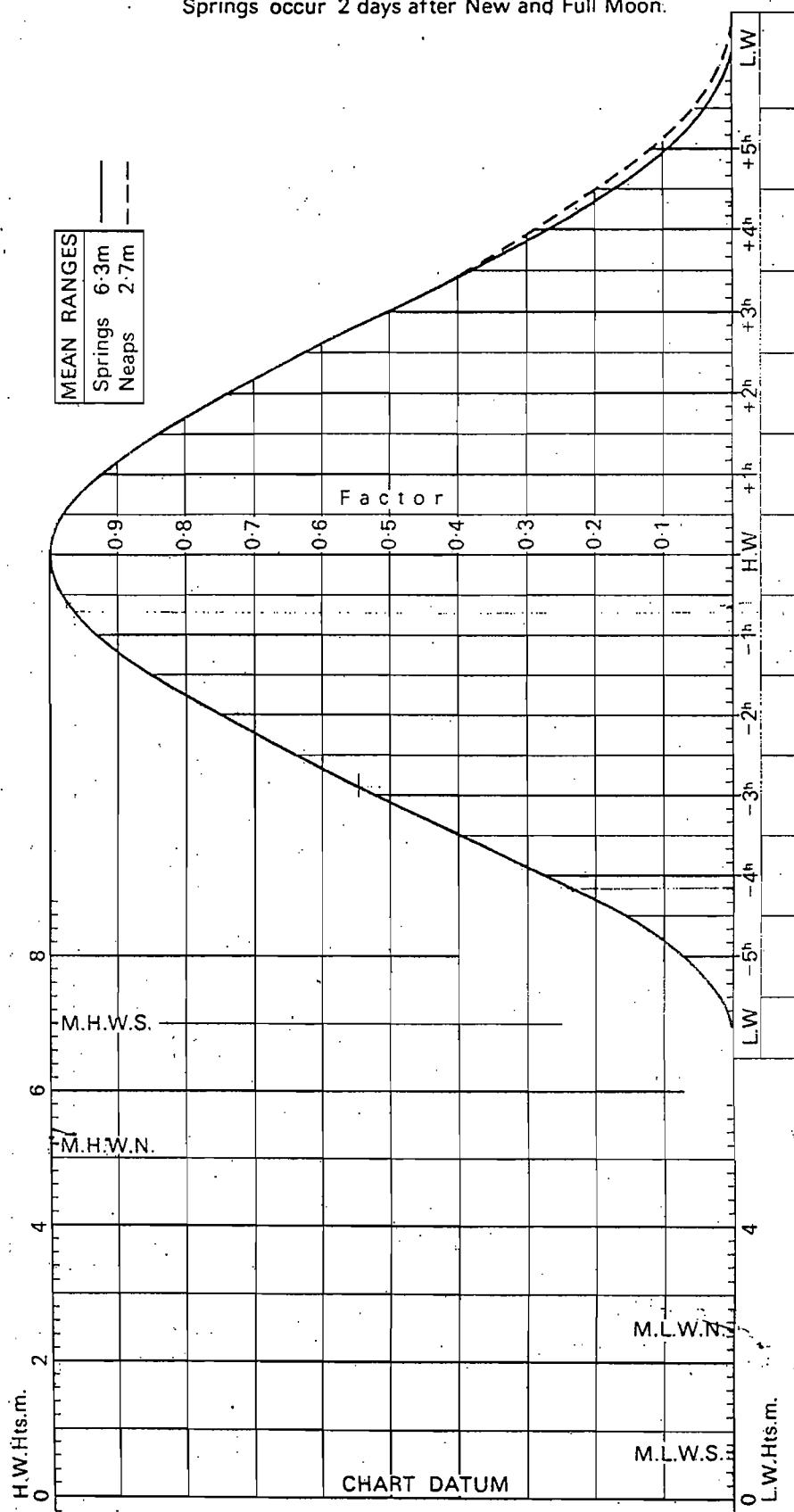
LAT 53°25'N LONG 3°00'W

| TIME ZONE GMT |      |         |     | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |     |         |     |         |     |         |     | YEAR 1987 |      |         |     |
|---------------|------|---------|-----|--|-----|---------|-----|---------|-----|---------|-----|-----------|------|---------|-----|
| MAY           |      |         |     | JUNE                                     |     |         |     | JULY    |     |         |     | AUGUST    |      |         |     |
| TIME          | M    | TIME    | M   | TIME                                     | M   | TIME    | M   | TIME    | M   | TIME    | M   | TIME      | M    | TIME    | M   |
| 1 0042        | 8.9  | 16 0035 | 9.4 | 1 0131                                   | 8.4 | 16 0208 | 9.2 | 1 0154  | 8.4 | 16 0242 | 9.4 | 1 0236    | 8.5  | 16 0338 | 8.4 |
| 1 0727        | 1.5  | 16 0724 | 0.9 | 1 0816                                   | 2.1 | 16 0903 | 1.0 | 1 0840  | 1.9 | 16 0936 | 0.9 | 1 0925    | 2.0  | 16 1023 | 2.2 |
| F 1303        | 8.7  | SA 1259 | 9.2 | M 1357                                   | 8.0 | TU 1440 | 8.7 | W 1418  | 8.1 | TH 1510 | 8.6 | SA 1501   | 8.2  | SU 1602 | 7.8 |
| 1935          | 1.8  | 1944    | 1.3 | 2016                                     | 2.5 | 2118    | 1.7 | 2040    | 2.3 | 2148    | 1.6 | 2132      | 2.3  | 2244    | 2.7 |
| 2 0114        | 8.6  | 17 0121 | 9.2 | 2 0209                                   | 8.1 | 17 0301 | 9.0 | 2 0230  | 8.3 | 17 0329 | 9.0 | 2 0314    | 8.3  | 17 0428 | 7.8 |
| 2 0758        | 1.8  | 17 0809 | 1.1 | 2 0854                                   | 2.4 | 17 0957 | 1.3 | 2 0918  | 2.1 | 17 1021 | 1.4 | 2 1004    | 2.3  | 17 1112 | 2.9 |
| SA 1337       | 8.3  | SU 1349 | 8.9 | TU 1439                                  | 7.7 | W 1536  | 8.4 | TH 1457 | 7.9 | F 1559  | 8.2 | SU 1545   | 7.9  | M 1701  | 7.3 |
| 2004          | 2.2  | 2029    | 1.7 | 2058                                     | 2.7 | 2213    | 2.0 | 2122    | 2.5 | 2237    | 2.1 | 2217      | 2.6  | 2350    | 3.2 |
| 3 0148        | 8.3  | 18 0212 | 8.9 | 3 0253                                   | 7.8 | 18 0357 | 8.7 | 3 0311  | 8.1 | 18 0419 | 8.5 | 3 0402    | 8.0  | 18 0537 | 7.2 |
| 3 0830        | 2.3  | 18 0901 | 1.5 | 3 0941                                   | 2.6 | 18 1054 | 1.5 | 3 1000  | 2.3 | 18 1111 | 1.9 | 3 1052    | 2.6  | 18 1222 | 3.4 |
| SU 1415       | 7.9  | M 1444  | 8.4 | W 1527                                   | 7.4 | TH 1637 | 8.0 | F 1541  | 7.7 | SA 1652 | 7.8 | M 1640    | 7.7  | TU 1822 | 7.0 |
| 2034          | 2.6  | 2121    | 2.1 | 2146                                     | 3.0 | 2313    | 2.3 | 2207    | 2.7 | 2332    | 2.5 | 2315      | 2.9  |         |     |
| 4 0226        | 7.9  | 19 0310 | 8.5 | 4 0345                                   | 7.6 | 19 0458 | 8.4 | 4 0356  | 7.9 | 19 0516 | 8.0 | 4 0505    | 7.7  | 19 0119 | 3.4 |
| 4 0908        | 2.7  | 19 1002 | 1.8 | 4 1035                                   | 2.7 | 19 1153 | 1.8 | 4 1048  | 2.4 | 19 1207 | 2.4 | 4 1200    | 2.8  | 19 0709 | 7.0 |
| M 1458        | 7.4  | TU 1549 | 8.0 | TH 1624                                  | 7.2 | F 1740  | 7.8 | SA 1631 | 7.6 | SU 1756 | 7.5 | TU 1754   | 7.5  | W 1349  | 3.5 |
| 2115          | 3.1  | 2224    | 2.5 | 2245                                     | 3.2 |         |     | 2301    | 2.8 |         |     |           |      | 1954    | 7.2 |
| 5 0314        | 7.4  | 20 0416 | 8.2 | 5 0445                                   | 7.4 | 20 0018 | 2.4 | 5 0449  | 7.8 | 20 0036 | 2.8 | 5 0034    | 3.0  | 20 0244 | 3.2 |
| 5 0959        | 3.0  | 20 1112 | 2.0 | 5 1137                                   | 2.8 | 20 0601 | 8.2 | 5 1144  | 2.6 | 20 0622 | 7.6 | 5 0628    | 7.6  | 20 0830 | 7.2 |
| TU 1556       | 7.0  | W 1704  | 7.7 | F 1729                                   | 7.2 | SA 1255 | 2.0 | SU 1732 | 7.6 | M 1312  | 2.8 | W 1327    | 2.8  | TH 1504 | 3.2 |
| 2210          | 3.5  | 2342    | 2.7 | 2354                                     | 3.2 | 1846    | 7.7 |         |     | 1907    | 7.4 | 1917      | 7.7  | 2100    | 7.6 |
| 6 0419        | 7.0  | 21 0529 | 8.1 | 6 0550                                   | 7.5 | 21 0123 | 2.5 | 6 0004  | 2.9 | 21 0151 | 2.9 | 6 0202    | 2.7  | 21 0348 | 2.7 |
| 6 1112        | 3.3  | 21 1227 | 2.0 | 6 1243                                   | 2.6 | 21 0707 | 8.1 | 6 0554  | 7.8 | 21 0735 | 7.5 | 6 0752    | 7.8  | 21 0928 | 7.7 |
| W 1713        | 6.8  | TH 1819 | 7.7 | SA 1834                                  | 7.4 | SU 1358 | 2.1 | M 1252  | 2.6 | TU 1420 | 2.8 | TH 1446   | 2.5  | F 1559  | 2.8 |
| 2332          | 3.7  |         |     |  |     | 1948    | 7.8 | 1839    | 7.7 | 2016    | 7.5 | 2030      | 8.1  | 2148    | 8.1 |
| 7 0542        | 6.9  | 22 0057 | 2.6 | 7 0104                                   | 2.9 | 22 0227 | 2.4 | 7 0116  | 2.8 | 22 0300 | 2.8 | 7 0318    | 2.2  | 22 0435 | 2.2 |
| 7 1238        | 3.1  | 22 0641 | 8.1 | 7 0653                                   | 7.7 | 22 0808 | 8.1 | 7 0703  | 7.9 | 22 0843 | 7.6 | 7 0905    | 8.2  | 22 1012 | 8.1 |
| TH 1836       | 6.9  | F 1337  | 1.9 | SU 1347                                  | 2.4 | M 1456  | 2.2 | TU 1402 | 2.4 | W 1522  | 2.7 | F 1553    | 2.0  | SA 1641 | 2.3 |
| 1928          | 7.9  | 1933    | 7.8 | 2044                                     | 8.0 | 1945    | 8.0 | 2114    | 7.9 | 2134    | 8.7 |           |      | 2227    | 8.6 |
| 8 0100        | 3.5  | 23 0206 | 2.3 | 8 0208                                   | 2.6 | 23 0324 | 2.3 | 8 0227  | 2.5 | 23 0400 | 2.5 | 8 0426    | 1.6  | 23 0515 | 1.8 |
| 8 0659        | 7.2  | 23 0747 | 8.3 | 8 0751                                   | 8.1 | 23 0903 | 8.2 | 8 0811  | 8.1 | 23 0939 | 7.9 | 8 1006    | 8.8  | 23 1047 | 8.5 |
| F 1347        | 2.7  | SA 1440 | 1.7 | M 1446                                   | 2.0 | TU 1548 | 2.1 | W 1507  | 2.1 | TH 1613 | 2.5 | SA 1651   | 1.5  | SU 1716 | 2.0 |
| 1941          | 7.4  | 2026    | 8.2 | 2026                                     | 8.2 | 2132    | 8.2 | 2047    | 8.4 | 2203    | 8.2 | 2228      | 9.3  | 2301    | 8.9 |
| 9 0208        | 3.0  | 24 0304 | 2.0 | 9 0305                                   | 2.2 | 24 0414 | 2.1 | 9 0332  | 2.0 | 24 0449 | 2.2 | 9 0525    | 1.0  | 24 0549 | 1.6 |
| 9 0758        | 7.7  | 24 0843 | 8.6 | 9 0844                                   | 8.4 | 24 0952 | 8.3 | 9 0914  | 8.5 | 24 1026 | 8.1 | 9 1059    | 9.2  | 24 1120 | 8.7 |
| SA 1444       | 2.3  | SU 1534 | 1.5 | TU 1539                                  | 1.7 | W 1631  | 2.1 | TH 1606 | 1.7 | F 1655  | 2.3 | SU 1744   | 1.0  | M 1749  | 1.7 |
| 2030          | 7.9  | 2115    | 8.5 | 2115                                     | 8.7 | 2216    | 8.4 | 2143    | 8.8 | 2244    | 8.5 | O 2319    | 9.7  | 2333    | 9.1 |
| 10 0300       | 2.4  | 25 0355 | 1.7 | 10 0359                                  | 1.8 | 25 0501 | 2.0 | 10 0433 | 1.6 | 25 0532 | 2.0 | 10 0617   | 0.5  | 25 0619 | 1.4 |
| 10 0844       | 8.2  | 25 0931 | 8.7 | 10 0935                                  | 8.8 | 25 1035 | 8.4 | 10 1012 | 8.9 | 25 1105 | 8.4 | 10 1147   | 9.5  | 25 1151 | 8.9 |
| SU 1534       | 1.8  | M 1620  | 1.5 | W 1630                                   | 1.4 | TH 1711 | 2.0 | F 1701  | 1.4 | SA 1733 | 2.1 | M 1832    | 0.7  | TU 1819 | 1.5 |
| 2112          | 8.4  | 2157    | 8.7 | 2202                                     | 9.0 | 2255    | 8.6 | 2237    | 9.2 | 2320    | 8.7 |           |      |         |     |
| 11 0348       | 1.9  | 26 0440 | 1.6 | 11 0449                                  | 1.4 | 26 0542 | 1.9 | 11 0530 | 1.1 | 26 0608 | 1.8 | 11 0005   | 10.0 | 26 0004 | 9.2 |
| 11 0927       | 8.6  | 1014    | 8.8 | 1024                                     | 9.1 | 26 1116 | 8.4 | 11 1105 | 9.2 | 26 1140 | 8.5 | 11 0703   | 0.2  | 26 0650 | 1.2 |
| M 1619        | 1.4  | TU 1659 | 1.5 | TH 1718                                  | 1.2 | F 1746  | 2.0 | SA 1753 | 1.1 | SU 1807 | 1.9 | TU 1232   | 9.6  | W 1221  | 9.0 |
| 2152          | 8.8  | 2237    | 8.8 | O 2249                                   | 9.3 | 2333    | 8.7 | O 2329  | 9.5 | 2354    | 8.8 | 1916      | 0.6  | 1850    | 1.4 |
| 12 0433       | 1.5  | 27 0519 | 1.5 | 12 0540                                  | 1.1 | 27 0619 | 1.8 | 12 0624 | 0.8 | 27 0642 | 1.6 | 12 0049   | 10.1 | 27 0034 | 9.2 |
| 12 1007       | 9.0  | 27 1054 | 8.8 | 12 1113                                  | 9.3 | 27 1154 | 8.5 | 12 1157 | 9.3 | 27 1214 | 8.6 | 12 0747   | 0.2  | 27 0721 | 1.2 |
| TU 1701       | 1.1  | W 1734  | 1.5 | F 1804                                   | 1.1 | SA 1819 | 1.9 | SU 1843 | 1.0 | M 1839  | 1.8 | W 1316    | 9.5  | TH 1250 | 9.0 |
| 2230          | 9.2  | 2313    | 8.8 | 2337                                     | 9.4 |         |     |         |     |         |     | 1957      | 0.7  | 1923    | 1.4 |
| 13 0515       | 1.2  | 28 0557 | 1.5 | 13 0629                                  | 0.9 | 28 0655 | 1.8 | 13 0716 | 0.5 | 28 0713 | 1.5 | 13 0827   | 0.4  | 28 0751 | 1.3 |
| 13 1048       | 9.3  | 28 1132 | 8.8 | 13 1204                                  | 9.3 | 28 1229 | 8.4 | M 1248  | 9.4 | TU 1246 | 8.7 | TH 1357   | 9.2  | F 1321  | 8.9 |
| W 1742        | 0.9  | TH 1807 | 1.6 | SA 1850                                  | 1.1 | 2002    | 1.1 | 1931    | 0.9 | 1912    | 1.7 | 2037      | 1.0  | 1955    | 1.5 |
| O 2311        | 9.4  | 2347    | 8.8 |  |     | 1853    | 2.0 |         |     |         |     |           |      |         |     |
| 14 0558       | 0.9  | 29 0632 | 1.6 | 14 0625                                  | 9.5 | 29 0728 | 1.8 | 14 0805 | 0.4 | 29 0745 | 1.5 | 14 0905   | 0.9  | 29 0822 | 1.5 |
| 1130          | 9.4  | 1207    | 8.7 | 14 0720                                  | 0.8 | 29 0804 | 1.8 | 14 0851 | 0.6 | 29 0818 | 1.5 | 14 0942   | 1.5  | 29 0853 | 1.9 |
| TH 1822       | 0.9  | F 1839  | 1.7 | SU 1255                                  | 9.2 | M 1304  | 8.4 | TU 1337 | 9.3 | W 1319  | 8.6 | F 1436    | 8.8  | SA 1352 | 8.7 |
| 2351          | 9.5  |         |     | 1938                                     | 1.2 | 1927    | 2.0 | 2018    | 1.0 | 1945    | 1.7 | 2115      | 1.5  | 2027    | 1.8 |
| 15 0641       | 0.9  | 30 0021 | 8.7 | 15 0116                                  | 9.4 | 30 0117 | 8.6 | 15 0155 | 9.6 | 30 0131 | 8.8 | 15 0254   | 9.1  | 30 0204 | 8.8 |
| 1214          | 9.4  | 30 0707 | 1.7 | 15 0811                                  | 0.8 | 30 0804 | 1.8 | 15 0851 | 0.6 | 30 0818 | 1.5 | 15 0942   | 1.5  | 30 0853 | 1.9 |
| F 1903        | 1.0  | SA 1243 | 8.5 | M 1347                                   | 9.0 | TU 1341 | 8.3 | W 1423  | 9.0 | TH 1351 | 8.5 | SA 1517   | 8.3  | SU 1426 | 8.5 |
|               |      |         |     | 2026                                     | 1.4 | 2002    | 2.1 | 2103    | 1.3 | 2019    | 1.8 | 2156      | 2.1  | 2101    | 2.2 |
| 31 0055       | 8.6  |         |     |  |     |         |     |         |     |         |     |           |      |         |     |
| 31 0740       | 1.9  |         |     |  |     |         |     |         |     |         |     |           |      |         |     |
| SU 1319       | 8.3  |         |     |  |     |         |     |         |     |         |     |           |      |         |     |
| 1941          | 2.2  |         |     |  |     |         |     |         |     |         |     |           |      |         |     |
| 31            | 0204 | 8.7     |     |  |     |         |     |         |     |         |     |           |      |         |     |
| 31            | 0851 | 1.7     |     |  |     |         |     |         |     |         |     |           |      |         |     |
| 31            | 1425 | 8.4     |     |  |     |         |     |         |     |         |     |           |      |         |     |
| 31            | 2054 | 2.0     |     |  |     |         |     |         |     |         |     |           |      |         |     |

# **ENGLAND, WEST COAST - LIVERPOOL**

LAT 53°25'N      LONG 3°00'W

**MILFORD HAVEN**  
 MEAN SPRING AND NEAP CURVES  
 Springs occur 2 days after New and Full Moon.



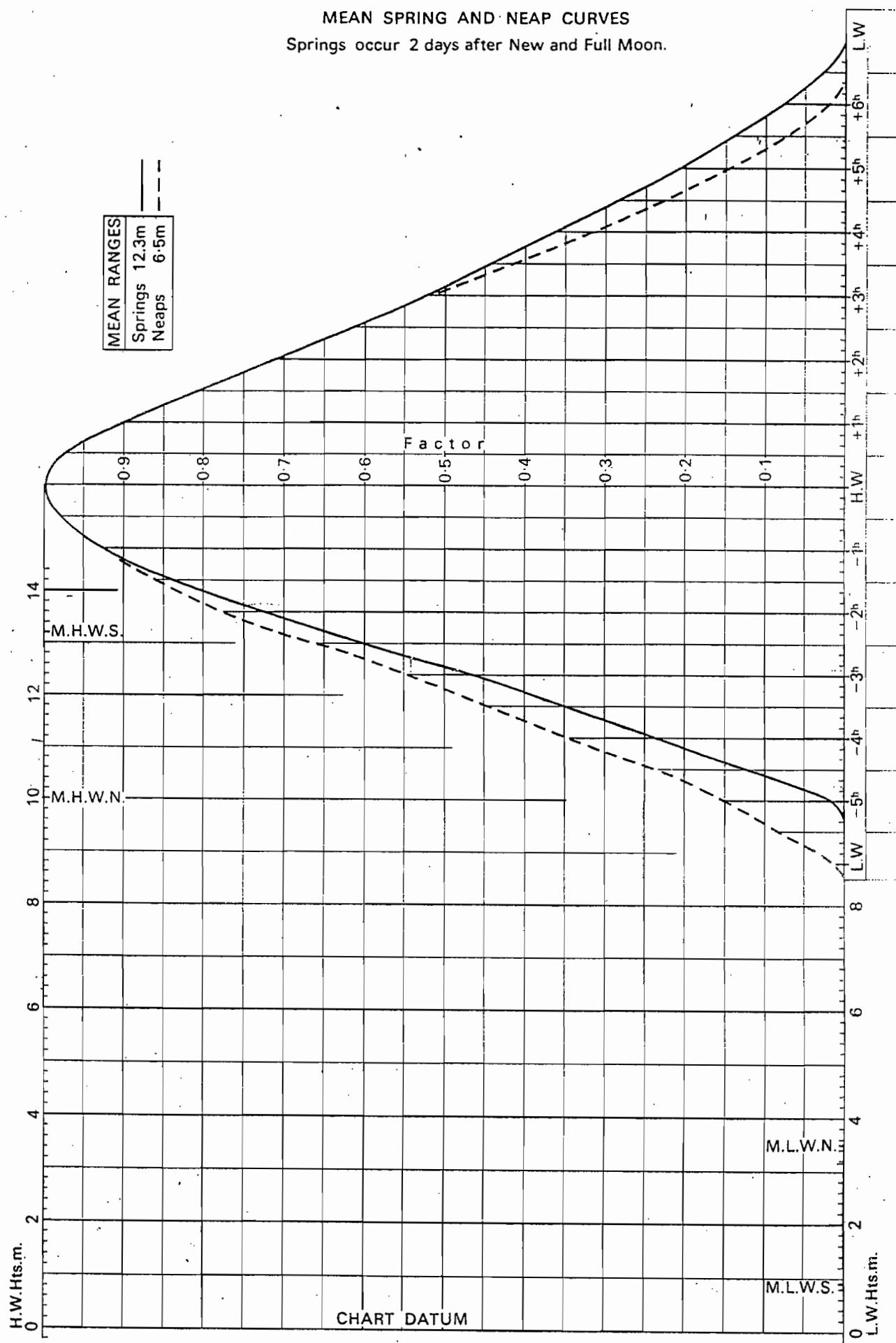
## **WALES - MILFORD HAVEN**

LAT 51°42'N

# AVONMOUTH

## MEAN SPRING AND NEAP CURVES

Springs occur 2 days after New and Full Moon.



**ENGLAND, WEST COAST - PORT OF BRISTOL (AVONMOUTH)**

LAT 51°30'N LONG 2°43'W

| TIME ZONE GMT |      | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |         |          |         |      |         |      |         |       |         |      | YEAR 1987 |      |
|---------------|------|--|------|---------|----------|---------|------|---------|------|---------|-------|---------|------|-----------|------|
|               |      | JANUARY                                  |      |         | FEBRUARY |         |      | MARCH   |      |         | APRIL |         |      |           |      |
| TIME          | M    | TIME                                     | M    | TIME    | M        | TIME    | M    | TIME    | M    | TIME    | M     | TIME    | M    | TIME      | M    |
| 1 0227        | 1.4  | 16 0223                                  | 1.8  | 1 0350  | 0.9      | 16 0322 | 1.5  | 1 0253  | 0.5  | 16 0225 | 1.3   | 1 0331  | 0.7  | 16 0312   | 0.8  |
| 0754          | 13.3 | 16 0759                                  | 12.2 | 1 0912  | 13.7     | 16 0843 | 13.0 | 1 0811  | 13.8 | 16 0744 | 13.0  | 1 0857  | 13.7 | 16 0829   | 13.4 |
| TH 1453       | 1.1  | F 1446                                   | 2.0  | SU 1612 | 0.7      | M 1541  | 1.7  | SU 1514 | 0.3  | M 1446  | 1.4   | W 1543  | 0.7  | TH 1529   | 1.0  |
| 2020          | 13.1 | 2022                                     | 12.0 | 2134    | 13.3     | 2103    | 12.8 | 2032    | 13.7 | 2005    | 13.0  | 2112    | 13.4 | 2050      | 13.2 |
| 2 0315        | 1.3  | 17 0301                                  | 1.9  | 2 0426  | 1.1      | 17 0355 | 1.5  | 2 0331  | 0.5  | 17 0301 | 1.1   | 2 0355  | 1.0  | 17 0345   | 0.9  |
| 0843          | 13.4 | 17 0830                                  | 12.2 | 2 0952  | 13.6     | 17 0915 | 13.1 | 2 0849  | 14.0 | 17 0818 | 13.3  | 2 0929  | 13.2 | 17 0908   | 13.1 |
| F 1541        | 1.1  | SA 1522                                  | 2.1  | W 1644  | 1.1      | TU 1610 | 1.6  | M 1549  | 0.4  | TU 1519 | 1.2   | TH 1606 | 1.0  | F 1559    | 1.3  |
| 2108          | 13.1 | 2053                                     | 12.0 | 2212    | 13.0     | 2135    | 12.8 | 2108    | 13.7 | 2039    | 13.2  | 2142    | 12.8 | 2128      | 12.7 |
| 3 0359        | 1.5  | 18 0335                                  | 2.0  | 3 0455  | 1.6      | 18 0423 | 1.6  | 3 0402  | 0.7  | 18 0335 | 1.0   | 3 0414  | 1.3  | 18 0414   | 1.3  |
| 0929          | 13.2 | 18 0903                                  | 12.3 | 3 1030  | 13.1     | 18 0948 | 13.0 | 3 0925  | 13.8 | 18 0851 | 13.5  | 3 0959  | 12.4 | 18 0948   | 12.4 |
| SA 1623       | 1.3  | SU 1555                                  | 2.2  | TU 1712 | 1.6      | W 1635  | 1.8  | TU 1617 | 0.8  | W 1550  | 1.2   | F 1626  | 1.5  | SA 1626   | 1.8  |
| 2153          | 12.8 | 2124                                     | 12.1 | 2248    | 12.5     | 2206    | 12.5 | 2142    | 13.4 | 2111    | 13.2  | 2207    | 12.0 | 2207      | 11.9 |
| 4 0438        | 1.8  | 19 0406                                  | 2.1  | 4 0522  | 2.0      | 19 0445 | 1.8  | 4 0427  | 1.1  | 19 0403 | 1.1   | 4 0434  | 1.8  | 19 0445   | 1.9  |
| 1014          | 12.9 | 19 0935                                  | 12.4 | 4 1108  | 12.4     | 19 1021 | 12.6 | 4 1000  | 13.4 | 19 0925 | 13.2  | 4 1027  | 11.4 | 19 1033   | 11.4 |
| SU 1702       | 1.6  | M 1624                                   | 2.3  | W 1737  | 2.1      | TH 1658 | 2.1  | W 1640  | 1.2  | TH 1616 | 1.4   | SA 1648 | 2.0  | SU 1658   | 2.4  |
| 2237          | 12.3 | 2156                                     | 12.0 | 2323    | 11.8     | 2238    | 12.0 | 2214    | 12.8 | 2143    | 12.7  | 2234    | 11.0 | 2255      | 10.9 |
| 5 0516        | 2.2  | 20 0434                                  | 2.2  | 5 0546  | 2.5      | 20 0509 | 2.2  | 5 0447  | 1.6  | 20 0428 | 1.5   | 5 0459  | 2.4  | 20 0523   | 2.5  |
| 1058          | 12.4 | 20 1009                                  | 12.3 | 5 1144  | 11.7     | 20 1055 | 11.9 | 5 1031  | 12.6 | 20 1000 | 12.6  | 5 1058  | 10.4 | 20 1127   | 10.5 |
| M 1739        | 2.1  | TU 1652                                  | 2.4  | TH 1804 | 2.6      | F 1725  | 2.5  | TH 1659 | 1.7  | F 1638  | 1.8   | SU 1716 | 2.7  | M 1740    | 3.1  |
| 2320          | 11.8 | 2228                                     | 11.8 | 2358    | 11.1     | 2312    | 11.2 | 2242    | 12.0 | 2217    | 12.0  | 2305    | 10.1 |           |      |
| 6 0551        | 2.6  | 21 0501                                  | 2.4  | 6 0614  | 3.0      | 21 0542 | 2.8  | 6 0506  | 2.0  | 21 0452 | 2.0   | 6 0533  | 3.2  | 21 0000   | 10.1 |
| 1143          | 11.9 | 21 1044                                  | 12.0 | 6 1227  | 10.9     | 21 1136 | 11.1 | 6 1102  | 11.7 | 21 1037 | 11.7  | 6 1137  | 9.4  | 21 0615   | 3.2  |
| TU 1815       | 2.5  | W 1719                                   | 2.5  | F 1838  | 3.1      | SA 1801 | 3.0  | F 1720  | 2.2  | SA 1705 | 2.3   | M 1753  | 3.6  | TU 1239   | 9.8  |
|               |      | 2304                                     | 11.5 |         |          | 2356    | 10.5 | 2312    | 11.2 | 2252    | 11.1  | 2351    | 9.2  | 1843      | 3.7  |
| 7 0004        | 11.3 | 22 0530                                  | 2.7  | 7 0043  | 10.4     | 22 0625 | 3.4  | 7 0530  | 2.6  | 22 0526 | 2.6   | 7 0618  | 4.1  | 22 0120   | 9.9  |
| 0629          | 3.0  | 22 1123                                  | 11.6 | 7 0653  | 3.6      | 22 1234 | 10.3 | 7 1136  | 10.7 | 22 1119 | 10.7  | 7 1241  | 8.6  | 22 0745   | 3.5  |
| W 1229        | 11.4 | TH 1751                                  | 2.8  | SA 1323 | 10.2     | SU 1853 | 3.7  | SA 1750 | 2.9  | SU 1743 | 3.0   | TU 1846 | 4.4  | W 1359    | 9.8  |
| 1857          | 2.9  | 2344                                     | 11.0 | 1930    | 3.7      |         |      | 2346    | 10.3 | 2342    | 10.1  |         |      | 2036      | 3.8  |
| 8 0052        | 10.8 | 23 0608                                  | 3.0  | 8 0151  | 8.8      | 23 0126 | 9.8  | 8 0605  | 3.3  | 23 0611 | 3.4   | 8 0116  | 8.5  | 23 0243   | 10.2 |
| 0714          | 3.3  | 23 1208                                  | 11.2 | 8 0806  | 4.2      | 23 0735 | 4.1  | 8 1222  | 9.7  | 23 1229 | 9.8   | 8 0735  | 4.7  | 23 0927   | 2.9  |
| TH 1324       | 11.0 | F 1834                                   | 3.1  | SU 1442 | 9.8      | M 1419  | 9.8  | SU 1831 | 3.7  | M 1838  | 3.8   | W 1450  | 8.5  | TH 1527   | 10.4 |
| 1948          | 3.2  |  |      | 2104    | 4.1      | 2042    | 4.3  |         |      |         |       | 2042    | 4.7  | 2204      | 2.9  |
| 9 0149        | 10.5 | 24 0036                                  | 10.5 | 9 0321  | 9.7      | 24 0311 | 9.9  | 9 0042  | 9.3  | 24 0120 | 9.5   | 9 0328  | 9.0  | 24 0404   | 11.1 |
| 0816          | 3.6  | 24 0659                                  | 3.5  | 9 0956  | 4.0      | 24 0959 | 3.9  | 9 0657  | 4.2  | 24 0730 | 4.0   | 9 1002  | 4.2  | 24 1042   | 2.1  |
| F 1426        | 10.7 | SA 1314                                  | 10.7 | M 1617  | 10.0     | TU 1553 | 10.2 | M 1342  | 8.9  | TU 1409 | 9.5   | TH 1609 | 9.4  | F 1642    | 11.4 |
| 2054          | 3.4  | 1933                                     | 3.6  | 2230    | 3.6      | 2241    | 3.6  | 1938    | 4.5  | 2039    | 4.3   | 2228    | 3.8  | 2322      | 2.0  |
| 10 0257       | 10.5 | 25 0206                                  | 10.2 | 10 0449 | 10.3     | 25 0438 | 10.8 | 10 0229 | 8.9  | 25 0258 | 9.8   | 10 0430 | 10.0 | 25 0509   | 12.1 |
| 0928          | 3.6  | 25 0818                                  | 3.9  | 10 1112 | 3.4      | 25 1129 | 2.9  | 10 0911 | 4.7  | 25 0948 | 3.5   | 10 1104 | 3.2  | 25 1154   | 1.4  |
| SA 1538       | 10.7 | SU 1447                                  | 10.5 | TU 1725 | 10.7     | W 1719  | 11.2 | TU 1545 | 9.0  | W 1645  | 10.1  | F 1659  | 10.4 | SA 1737   | 12.2 |
| 2159          | 3.2  | 2115                                     | 3.8  | 2339    | 2.9      |         |      | 2200    | 4.3  | 2230    | 3.3   | 2327    | 2.9  |           |      |
| 11 0410       | 10.7 | 26 0335                                  | 10.6 | 11 0547 | 11.0     | 26 0008 | 2.5  | 11 0421 | 9.5  | 26 0428 | 10.8  | 11 0515 | 11.0 | 26 0025   | 1.3  |
| 1034          | 3.2  | 26 1014                                  | 3.6  | 11 1214 | 2.7      | 26 0550 | 11.9 | 11 1048 | 3.8  | 26 1113 | 2.4   | 11 1158 | 2.5  | 26 0558   | 12.7 |
| SU 1648       | 11.0 | M 1607                                   | 10.9 | W 1814  | 11.3     | TH 1245 | 1.8  | W 1658  | 9.9  | TH 1708 | 11.2  | SA 1742 | 11.4 | SU 1250   | 1.0  |
| 2302          | 2.9  | 2254                                     | 3.3  |         |          | 1822    | 12.2 | 2313    | 3.4  | 2354    | 2.2   |         |      | 1822      | 12.8 |
| 12 0513       | 11.2 | 27 0449                                  | 11.3 | 12 0036 | 2.3      | 27 0114 | 1.5  | 12 0519 | 10.5 | 27 0534 | 12.0  | 12 0022 | 2.2  | 27 0114   | 1.0  |
| 1137          | 2.8  | 27 1139                                  | 2.8  | 12 0631 | 11.6     | 27 0645 | 12.8 | 12 1149 | 2.9  | 27 1227 | 1.4   | 12 0556 | 11.9 | 27 0641   | 13.0 |
| M 1744        | 11.5 | TU 1723                                  | 11.6 | TH 1306 | 2.2      | F 1342  | 1.0  | TH 1744 | 10.8 | F 1805  | 12.3  | SU 1250 | 2.0  | M 1335    | 0.9  |
|               |      |  |      |         | 1853     | 11.7    | 1912 | 13.0    |      |         |       |         | 1821 | 12.1      |      |
| 13 0003       | 2.4  | 28 0017                                  | 2.5  | 13 0126 | 1.9      | 28 0208 | 0.8  | 13 0011 | 2.6  | 28 0056 | 1.2   | 13 0112 | 1.7  | 28 0155   | 1.0  |
| 0605          | 11.7 | 28 0557                                  | 12.1 | 13 0707 | 12.0     | 28 0730 | 13.5 | 13 0600 | 11.3 | 28 0625 | 12.9  | 13 0635 | 12.6 | 28 0719   | 13.2 |
| TU 1235       | 2.4  | W 1253                                   | 2.0  | F 1351  | 2.0      | SA 1432 | 0.5  | F 1241  | 2.3  | SA 1321 | 0.7   | M 1337  | 1.6  | TU 1413   | 0.9  |
| 1832          | 11.8 | 1829                                     | 12.3 | O 1928  | 12.0     | • 1954  | 13.4 | 1824    | 11.5 | 1850    | 13.0  | 1900    | 12.7 | • 1937    | 13.2 |
| 14 0056       | 2.1  | 29 0124                                  | 1.8  | 14 0208 | 1.7      |         |      | 14 0100 | 2.0  | 29 0145 | 0.7   | 14 0157 | 1.2  | 29 0230   | 1.0  |
| 0649          | 12.0 | 29 0656                                  | 12.8 | 14 0740 | 12.3     |         |      | 14 0636 | 12.0 | 29 0709 | 13.4  | 14 0714 | 13.1 | 29 0755   | 13.3 |
| W 1323        | 2.1  | TH 1354                                  | 1.3  | SA 1432 | 1.9      |         |      | SA 1326 | 1.9  | SU 1408 | 0.4   | TU 1418 | 1.2  | W 1444    | 0.9  |
| 1913          | 12.0 | 1924                                     | 12.9 | 2001    | 12.3     |         |      | 1859    | 12.1 | • 1930  | 13.4  | O 1937  | 13.1 | 2011      | 13.3 |
| 15 0142       | 1.9  | 30 0220                                  | 1.2  | 15 0247 | 1.6      |         |      | 15 0144 | 1.6  | 30 0227 | 0.5   | 15 0236 | 0.9  | 30 0258   | 1.0  |
| 0727          | 12.2 | 30 0745                                  | 13.4 | 15 0811 | 12.6     |         |      | 15 0710 | 12.5 | 30 0747 | 13.7  | 15 0752 | 13.4 | 30 0830   | 13.1 |
| TH 1406       | 2.0  | F 1447                                   | 0.9  | SU 1508 | 1.8      |         |      | SU 1408 | 1.6  | M 1446  | 0.4   | W 1456  | 1.0  | TH 1511   | 1.0  |
| O 1949        | 12.0 | 2012                                     | 13.3 | 2032    | 12.6     |         |      | O 1933  | 12.6 | 2005    | 13.6  | 2013    | 13.3 | 2043      | 13.0 |
| 31 0308       | 0.9  |  |      |         |          |         |      | 31 0303 | 0.5  |         |       |         |      |           |      |
| 0830          | 13.7 |  |      |         |          |         |      | TU 1518 | 0.5  |         |       |         |      |           |      |
| SA 1532       | 0.7  |  |      |         |          |         |      | 2040    | 13.7 |         |       |         |      |           |      |
| 2054          | 13.4 |  |      |         |          |         |      |         |      |         |       |         |      |           |      |

# ENGLAND, WEST COAST - PORT OF BRISTOL (AVONMOUTH)

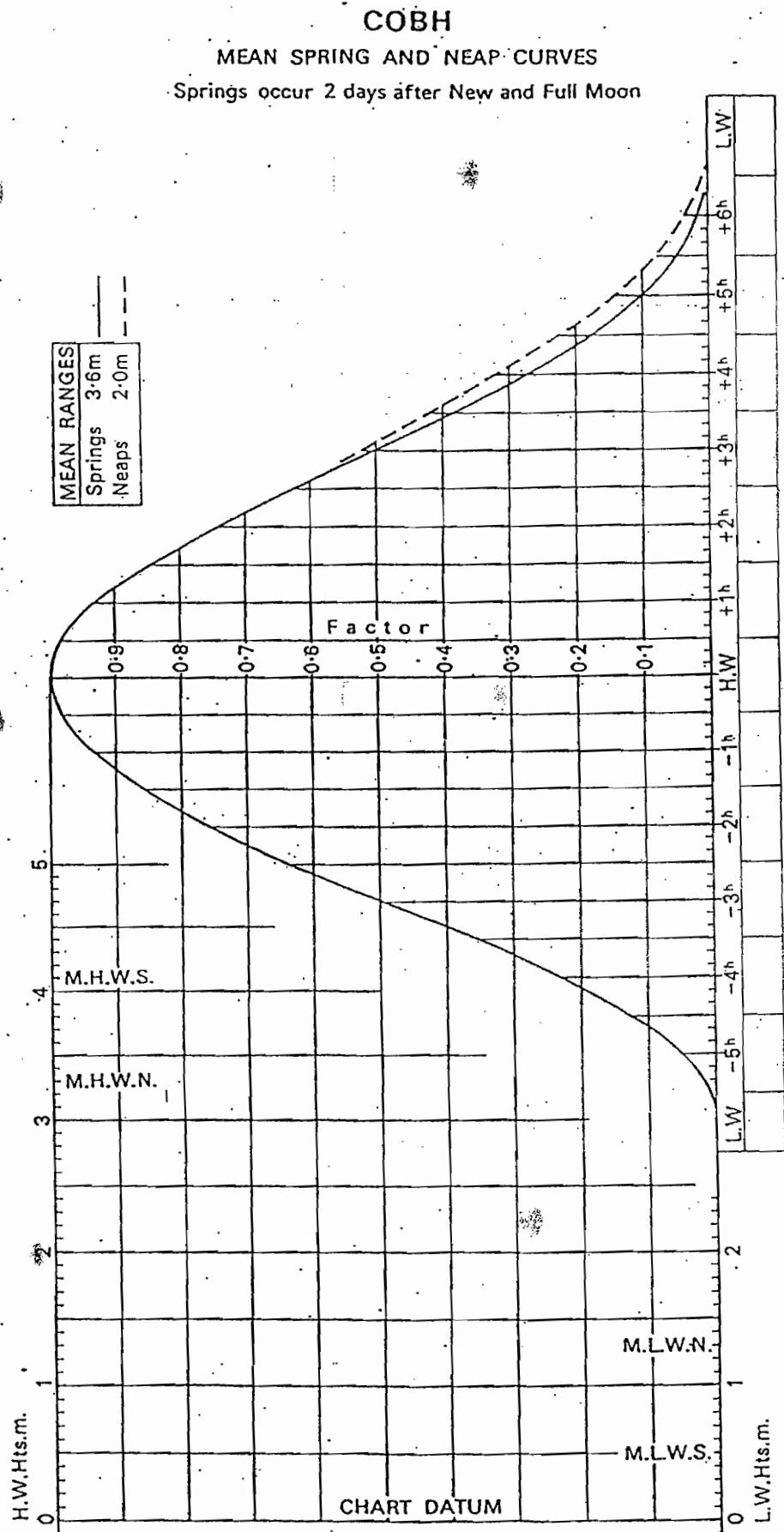
LAT 51°30'N LONG 2°43'W

| TIME ZONE GMT |      | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |      |      |      |      |      |      |      |      |      |      | YEAR 1987 |      |      |      |      |
|---------------|------|--|------|------|------|------|------|------|------|------|------|------|------|-----------|------|------|------|------|
|               |      | MAY                                      |      |      |      | JUNE |      |      |      | JULY |      |      |      | AUGUST    |      |      |      |      |
| TIME          | M    | TIME                                     | M    | TIME | M    | TIME | M    | TIME | M    | TIME | M    | TIME | M    | TIME      | M    |      |      |      |
| 1             | 0324 | 1.2                                      | 16   | 0331 | 1.0  | 1    | 0359 | 2.3  | 16   | 0452 | 1.5  | 1    | 0424 | 2.6       | 0526 | 1.4  |      |      |
|               | 0903 | 12.7                                     | 0858 | 12.8 | 1    | 0945 | 10.9 | 16   | 1034 | 12.1 | 1    | 1003 | 11.1 | 16        | 1101 | 12.4 |      |      |
| F             | 1535 | 1.2                                      | SA   | 1548 | 1.4  | M    | 1610 | 2.4  | TU   | 1709 | 2.1  | W    | 1634 | 2.6       | TH   | 1740 | 2.0  |      |
|               | 2112 | 12.4                                     |      | 2121 | 12.6 |      | 2152 | 10.9 |      | 2257 | 12.1 |      | 2213 | 11.4      |      | 2322 | 12.4 |      |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | 2259 | 11.6 |      |
| 2             | 0348 | 1.5                                      | 17   | 0409 | 1.3  | 2    | 0428 | 2.7  | 17   | 0536 | 1.9  | 2    | 0454 | 2.7       | 0600 | 1.8  |      |      |
|               | 0932 | 11.9                                     | 0946 | 12.2 | 2    | 1017 | 10.4 | 17   | 1122 | 11.7 | 2    | 1037 | 10.9 | 17        | 1143 | 11.8 |      |      |
| SA            | 1559 | 1.6                                      | SU   | 1623 | 1.8  | TU   | 1640 | 2.8  | W    | 1753 | 2.4  | TH   | 1704 | 2.7       | F    | 1814 | 2.4  |      |
|               | 2141 | 11.7                                     |      | 2210 | 12.0 |      | 2226 | 10.5 |      | 2347 | 11.7 |      | 2249 | 11.2      |      | 2337 | 11.1 |      |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | 1838 | 3.5  |      |
| 3             | 0412 | 2.0                                      | 18   | 0447 | 1.8  | 3    | 0501 | 3.0  | 18   | 0622 | 2.2  | 3    | 0526 | 2.8       | 0007 | 11.8 |      |      |
|               | 1002 | 11.0                                     | 1037 | 11.5 | 3    | 1054 | 10.0 | 18   | 1214 | 11.3 | 3    | 1113 | 10.7 | 18        | 0636 | 2.3  |      |      |
| SU            | 1623 | 2.2                                      | M    | 1702 | 2.4  | W    | 1712 | 3.1  | TH   | 1842 | 2.7  | F    | 1737 | 2.9       | SA   | 1228 | 11.3 |      |
|               | 2207 | 10.8                                     |      | 2302 | 11.3 |      | 2306 | 10.2 |      |      |      |      | 2330 | 11.0      |      | 1852 | 2.9  |      |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | 1935 | 4.1  |      |
| 4             | 0438 | 2.6                                      | 19   | 0530 | 2.3  | 4    | 0540 | 3.3  | 19   | 0041 | 11.4 | 4    | 0601 | 2.9       | 0056 | 11.2 |      |      |
|               | 1033 | 10.2                                     | 1133 | 10.9 | 4    | 1137 | 9.7  | 19   | 0716 | 2.4  | 4    | 1154 | 10.5 | 19        | 0719 | 2.8  |      |      |
| M             | 1651 | 2.8                                      | TU   | 1750 | 2.9  | TH   | 1754 | 3.4  | F    | 1309 | 11.0 | SA   | 1817 | 3.1       | SU   | 1319 | 10.8 |      |
|               | 2238 | 10.1                                     |      |      |      |      | 2358 | 10.0 |      | 1940 | 2.8  |      |      |           |      | 1941 | 3.3  |      |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | 1924 | 3.8  |      |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | 2129 | 4.2  |      |
| 5             | 0511 | 3.2                                      | 20   | 0001 | 10.8 | 5    | 0628 | 3.5  | 20   | 0140 | 11.2 | 5    | 0018 | 10.8      | 0154 | 10.7 |      |      |
|               | 1109 | 9.4                                      | 0627 | 2.8  | 5    | 1234 | 9.6  | 20   | 0813 | 2.5  | 5    | 0645 | 3.1  | 20        | 0815 | 3.2  |      |      |
| TU            | 1726 | 3.4                                      | W    | 1234 | 10.5 | F    | 1849 | 3.6  | SA   | 1409 | 10.9 | SU   | 1248 | 10.3      | M    | 1420 | 10.5 |      |
|               | 2322 | 9.4                                      |      | 1853 | 3.3  |      |      |      |      | 2042 | 2.8  |      | 1907 | 3.3       |      | 2050 | 3.6  |      |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | 2124 | 4.0  |      |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | 2255 | 3.5  |      |
| 6             | 0554 | 3.8                                      | 21   | 0106 | 10.7 | 6    | 0103 | 10.0 | 21   | 0246 | 11.2 | 6    | 0121 | 10.6      | 0303 | 10.5 |      |      |
|               | 1203 | 8.9                                      | 0741 | 2.8  | 6    | 0727 | 3.5  | 21   | 0912 | 2.5  | 6    | 0740 | 3.3  | 21        | 0924 | 3.4  |      |      |
| W             | 1814 | 4.0                                      | TU   | 1340 | 10.4 | SA   | 1349 | 9.8  | SU   | 1517 | 11.0 | M    | 1406 | 10.3      | TU   | 1535 | 10.5 |      |
|               | 2015 | 3.1                                      |      | 1955 | 3.5  |      | 2143 | 2.8  |      | 2015 | 3.5  |      | 2203 | 3.5       |      | 2257 | 3.2  |      |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | 1817 | 11.6 |      |
| 7             | 0027 | 9.0                                      | 22   | 0216 | 10.8 | 7    | 0222 | 10.4 | 22   | 0352 | 11.3 | 7    | 0243 | 10.7      | 0419 | 10.6 |      |      |
|               | 0655 | 4.2                                      | 0854 | 2.5  | 7    | 0836 | 3.3  | 22   | 1012 | 2.5  | 7    | 0900 | 3.3  | 22        | 1033 | 3.2  |      |      |
| TH            | 1327 | 8.7                                      | F    | 1453 | 10.8 | SU   | 1505 | 10.4 | M    | 1621 | 11.2 | TU   | 1527 | 10.7      | W    | 1648 | 10.8 |      |
|               | 1926 | 4.2                                      |      | 2127 | 2.6  |      | 2115 | 3.3  |      | 2247 | 2.7  |      | 2153 | 3.4       |      | 2315 | 3.1  |      |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | 1828 | 12.5 |      |
| 8             | 0209 | 9.2                                      | 23   | 0329 | 11.3 | 8    | 0331 | 11.0 | 23   | 0452 | 11.5 | 8    | 0355 | 11.2      | 0523 | 11.0 |      |      |
|               | 0823 | 4.1                                      | 0959 | 2.1  | 8    | 0953 | 2.9  | 23   | 1113 | 2.5  | 8    | 1031 | 3.0  | 23        | 1140 | 2.8  |      |      |
| F             | 1501 | 9.3                                      | SA   | 1604 | 11.3 | M    | 1607 | 11.1 | TU   | 1716 | 11.5 | W    | 1633 | 11.4      | TH   | 1746 | 11.3 |      |
|               | 2103 | 3.9                                      |      | 2233 | 2.2  |      | 2233 | 2.8  |      | 2350 | 2.5  |      | 2315 | 2.8       |      |      | 1855 | 12.0 |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | 1828 | 12.5 |      |
| 9             | 0327 | 10.0                                     | 24   | 0434 | 11.8 | 9    | 0431 | 11.7 | 24   | 0544 | 11.7 | 9    | 0501 | 11.7      | 0018 | 2.7  |      |      |
|               | 0949 | 3.4                                      | 1104 | 1.9  | 9    | 1105 | 2.5  | 24   | 1212 | 2.3  | 9    | 1149 | 2.5  | 24        | 0615 | 11.4 |      |      |
| SA            | 1603 | 10.3                                     | SU   | 1702 | 11.8 | TU   | 1704 | 11.9 | W    | 1805 | 11.8 | TH   | 1736 | 12.0      | F    | 1241 | 2.4  |      |
|               | 2220 | 3.1                                      |      | 2340 | 1.9  |      | 2344 | 2.3  |      |      |      |      |      |           |      | 1355 | 1.4  |      |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | M    | 1354 | 1.9  |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | O    | 1921 | 13.2 |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | ●    | 1927 | 12.2 |
| 10            | 0423 | 11.0                                     | 25   | 0526 | 12.2 | 10   | 0526 | 12.2 | 25   | 0043 | 2.3  | 10   | 0028 | 2.2       | 0112 | 2.3  |      |      |
|               | 1052 | 2.7                                      | 1205 | 1.7  | 10   | 1217 | 2.1  | 25   | 0631 | 11.8 | 10   | 0605 | 12.1 | 25        | 0700 | 11.7 |      |      |
| SU            | 1654 | 11.3                                     | M    | 1750 | 12.2 | W    | 1757 | 12.4 | TH   | 1303 | 2.1  | F    | 1302 | 2.0       | SA   | 1330 | 2.1  |      |
|               | 2325 | 2.5                                      |      |      |      |      |      |      |      |      |      |      |      |           |      | M    | 1447 | 1.0  |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | TU   | 1432 | 1.8  |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      |      | 2008 | 13.7 |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      |      | 1957 | 12.4 |
| 11            | 0512 | 11.9                                     | 26   | 0035 | 1.8  | 11   | 0052 | 1.8  | 26   | 0130 | 2.1  | 11   | 0134 | 1.7       | 0157 | 2.1  |      |      |
|               | 1157 | 2.2                                      | 0612 | 12.4 | 11   | 0621 | 12.6 | 26   | 0714 | 11.9 | 11   | 0706 | 12.5 | 26        | 0740 | 11.8 |      |      |
| M             | 1742 | 12.1                                     | TU   | 1256 | 1.6  | TH   | 1320 | 1.7  | F    | 1348 | 1.9  | SA   | 1402 | 1.6       | SU   | 1413 | 2.0  |      |
|               | 1832 | 12.5                                     |      | O    | 1849 | 12.8 |      |      |      |      |      |      |      |           |      | TU   | 1532 | 0.7  |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      | W    | 1507 | 1.7  |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      |      | 2027 | 12.7 |
| 12            | 0028 | 1.9                                      | 27   | 0119 | 1.7  | 12   | 0148 | 1.4  | 27   | 0211 | 2.0  | 12   | 0232 | 1.2       | 0236 | 2.1  |      |      |
|               | 0558 | 12.5                                     | 0653 | 12.5 | 12   | 0713 | 12.8 | 27   | 0754 | 11.9 | 12   | 0759 | 12.9 | 27        | 0812 | 11.8 |      |      |
| TU            | 1257 | 1.7                                      | W    | 1337 | 1.6  | F    | 1413 | 1.4  | SA   | 1427 | 1.9  | SU   | 1456 | 1.3       | M    | 1451 | 2.0  |      |
|               | 1827 | 12.7                                     |      | ●    | 1910 | 12.6 |      | 1940 | 13.0 |      | 2005 | 12.0 |      | 2020      | 13.2 |      | 2022 | 12.0 |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      |      | 2131 | 13.8 |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      |      | 2057 | 12.8 |
| 13            | 0123 | 1.4                                      | 28   | 0157 | 1.6  | 13   | 0239 | 1.2  | 28   | 0249 | 2.0  | 13   | 0322 | 1.0       | 0312 | 2.1  |      |      |
|               | 0645 | 13.0                                     | 0731 | 12.5 | 13   | 0805 | 12.8 | 28   | 0829 | 11.7 | 13   | 0849 | 13.1 | 28        | 0843 | 11.9 |      |      |
| W             | 1348 | 1.3                                      | TH   | 1412 | 1.5  | SA   | 1501 | 1.3  | SU   | 1503 | 2.0  | M    | 1543 | 1.2       | TU   | 1525 | 2.0  |      |
| O             | 1910 | 13.0                                     |      | 1947 | 12.6 |      | 2029 | 13.0 |      | 2037 | 11.8 |      | 2108 | 13.3      |      | 2051 | 12.1 |      |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      |      | 2212 | 13.4 |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      |      | 2128 | 12.7 |
| 14            | 0211 | 1.1                                      | 29   | 0230 | 1.5  | 14   | 0325 | 1.1  | 29   | 0324 | 2.2  | 14   | 0407 | 0.9       | 0345 | 2.1  |      |      |
|               | 0728 | 13.2                                     | 0808 | 12.4 | 14   | 0856 | 12.8 | 29   | 0901 | 11.5 | 14   | 0934 | 13.0 | 29        | 0912 | 11.9 |      |      |
| TH            | 1432 | 1.1                                      | F    | 1444 | 1.4  | SU   | 1545 | 1.5  | M    | 1535 | 2.2  | TU   | 1626 | 1.3       | W    | 1556 | 2.1  |      |
|               | 1954 | 13.2                                     |      | 2020 | 12.4 |      | 2118 | 12.8 |      | 2108 | 11.6 |      | 2153 | 13.3      |      | 2122 | 12.2 |      |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      |      | 2249 | 12.8 |
|               |      |  |      |      |      |      |      |      |      |      |      |      |      |           |      |      | 2159 | 12.3 |
| 15            | 0253 | 0.9                                      | 30   | 0303 | 1.6  | 15   | 0409 | 1.3  | 30   | 0355 | 2.4  | 15   | 0448 | 1.0       | 0414 | 2.2  |      |      |
|               | 0813 | 13.1                                     | 0843 | 12.0 | 15   | 0945 | 12.5 | 30   | 0932 | 11.3 | 15   | 1017 | 12.8 | 30        | 0943 | 11.9 |      |      |
| F             | 1511 | 1.1                                      | SA   | 1515 | 1.6  | M    | 1627 | 1.7  | TU   | 1606 | 2.4  |      |      |           |      |      |      |      |

## **ENGLAND, WEST COAST - PORT OF BRISTOL (AVONMOUTH)**

LAT 51°30'N      LONG 2°43'W

| TIME ZONE GMT |      |         |      | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |         |      |          |      |         |      |          |      |         |      | YEAR 1987 |      |
|---------------|------|---------|------|--|------|---------|------|----------|------|---------|------|----------|------|---------|------|-----------|------|
| SEPTEMBER     |      |         |      | OCTOBER                                  |      |         |      | NOVEMBER |      |         |      | DECEMBER |      |         |      |           |      |
| TIME          | M    | TIME    | M    | TIME                                     | M    | TIME    | M    | TIME     | M    | TIME    | M    | TIME     | M    | TIME    | M    | TIME      | M    |
| 1 0534        | 3.0  | 16 0005 | 9.6  | 1 0605                                   | 3.8  | 16 0034 | 8.5  | 1 0244   | 10.3 | 16 0246 | 9.2  | 1 0328   | 11.2 | 16 0240 | 9.9  | 1 0240    | 9.9  |
| 1120          | 10.4 | W 0615  | 3.8  | 1 1234                                   | 9.5  | 16 0634 | 4.6  | 1 0924   | 3.2  | 16 0844 | 4.3  | 1 0956   | 2.6  | 16 0842 | 4.0  | 1 0842    | 4.0  |
| TU 1756       | 3.4  | W 1224  | 9.3  | TH 1846                                  | 4.1  | F 1319  | 8.5  | SU 1527  | 11.1 | M 1511  | 9.9  | TU 1602  | 11.8 | W 1507  | 10.5 | TU 1602   | 11.8 |
| 2353          | 10.2 | 1843    | 4.4  |  |      | 1924    | 4.9  | 2202     | 2.4  | 2141    | 3.9  | 2227     | 2.2  | 2128    | 3.6  | 2128      | 3.6  |
| 2 0619        | 3.6  | 17 0126 | 8.8  | 2 0126                                   | 9.4  | 17 0239 | 8.5  | 2 0406   | 11.3 | 17 0346 | 10.0 | 2 0433   | 11.8 | 17 0345 | 10.6 | 2 0345    | 10.6 |
| 1227          | 9.7  | W 0717  | 4.6  | 2 0730                                   | 4.4  | 17 0823 | 4.9  | 2 1038   | 2.3  | 17 1010 | 3.6  | 2 1105   | 2.3  | 17 1010 | 3.5  | 2 1010    | 3.5  |
| W 1852        | 4.1  | TH 1416 | 8.8  | F 1416                                   | 9.6  | SA 1517 | 9.1  | M 1635   | 12.1 | TU 1606 | 10.8 | W 1659   | 12.2 | TH 1607 | 11.2 | W 1659    | 12.2 |
|               |      | 2049    | 4.8  | 2104                                     | 3.9  | 2156    | 4.3  | 2315     | 1.7  | 2241    | 3.1  | 2334     | 2.0  | 2244    | 3.0  | 2244      | 3.0  |
| 3 0127        | 9.6  | 18 0329 | 9.0  | 3 0301                                   | 9.9  | 18 0356 | 9.4  | 3 0506   | 12.2 | 18 0437 | 11.0 | 3 0525   | 12.2 | 18 0441 | 11.3 | 3 0441    | 11.3 |
| 0730          | 4.3  | 0943    | 4.5  | 3 0946                                   | 3.7  | 18 1020 | 4.0  | 3 1151   | 1.6  | 18 1108 | 2.9  | 3 1210   | 2.0  | 18 1119 | 2.8  | 3 1119    | 2.8  |
| TH 1427       | 9.6  | F 1607  | 9.5  | SA 1548                                  | 10.6 | SU 1617 | 10.1 | TU 1730  | 12.8 | W 1654  | 11.6 | TH 1749  | 12.5 | F 1704  | 11.8 | TH 1749   | 12.5 |
| 2110          | 4.2  | 2237    | 3.9  | 2230                                     | 2.8  | 2254    | 3.3  |          |      | 2336    | 2.5  |          |      | 2349    | 2.5  |           |      |
| 4 0310        | 9.9  | 19 0442 | 9.9  | 4 0431                                   | 11.0 | 19 0447 | 10.4 | 4 0019   | 1.2  | 19 0522 | 11.8 | 4 0034   | 1.8  | 19 0536 | 12.0 | 4 0536    | 12.0 |
| 0956          | 3.9  | 1059    | 3.5  | 4 1111                                   | 2.5  | 19 1113 | 3.0  | 4 0556   | 12.9 | 19 1204 | 2.2  | 4 0611   | 12.6 | 19 1222 | 2.2  | 4 1222    | 2.2  |
| F 1559        | 10.4 | SA 1705 | 10.5 | SU 1702                                  | 11.9 | M 1702  | 11.1 | W 1248   | 1.2  | TH 1739 | 12.3 | F 1300   | 1.9  | SA 1758 | 12.3 | F 1300    | 1.9  |
| 2245          | 3.2  | 2334    | 2.9  | 2350                                     | 1.7  | 2343    | 2.6  | 1817     | 13.3 |         |      | 1834     | 12.6 |         |      |           |      |
| 5 0441        | 10.8 | 20 0530 | 10.8 | 5 0534                                   | 12.2 | 20 0527 | 11.3 | 5 0110   | 1.0  | 20 0031 | 2.0  | 5 0119   | 1.7  | 20 0050 | 2.0  | 5 0050    | 2.0  |
| 1125          | 2.9  | 1154    | 2.6  | 5 1224                                   | 1.5  | 20 1203 | 2.3  | 5 0638   | 13.2 | 20 0607 | 12.4 | 5 0652   | 12.7 | 20 0628 | 12.6 | 5 0628    | 12.6 |
| SA 1716       | 11.7 | SU 1747 | 11.4 | M 1757                                   | 13.0 | TU 1742 | 11.9 | TH 1334  | 1.1  | F 1256  | 1.8  | SA 1342  | 1.8  | SU 1320 | 1.7  | SA 1342   | 1.8  |
|               |      |         |      |  |      |         |      | O 1857   | 13.4 | 1824    | 12.7 | O 1914   | 12.7 | • 1852  | 12.7 | O 1914    | 12.7 |
| 6 0008        | 2.1  | 21 0024 | 2.3  | 6 0053                                   | 0.9  | 21 0029 | 2.1  | 6 0152   | 1.0  | 21 0120 | 1.7  | 6 0158   | 1.6  | 21 0145 | 1.7  | 6 0145    | 1.7  |
| 0551          | 12.0 | 21 0610 | 11.5 | 6 0624                                   | 13.1 | 21 0605 | 12.0 | 6 0716   | 13.4 | 21 0649 | 12.8 | 6 0731   | 12.8 | 21 0717 | 12.9 | 6 0717    | 12.9 |
| SU 1243       | 1.8  | M 1243  | 2.0  | TU 1319                                  | 0.8  | W 1249  | 1.9  | F 1412   | 1.2  | SA 1344 | 1.5  | SU 1419  | 1.8  | M 1413  | 1.5  | SU 1419   | 1.8  |
| 1815          | 12.8 | 1824    | 12.0 | 1842                                     | 13.6 | 1818    | 12.5 | 1935     | 13.4 | • 1907  | 13.0 | 1954     | 12.6 | 1942    | 12.9 | 1942      | 12.9 |
| 7 0114        | 1.1  | 22 0109 | 1.9  | 7 0142                                   | 0.5  | 22 0114 | 1.8  | 7 0227   | 1.1  | 22 0205 | 1.5  | 7 0233   | 1.6  | 22 0236 | 1.5  | 7 0236    | 1.5  |
| 0645          | 12.9 | 22 0645 | 12.0 | 7 0706                                   | 13.6 | 22 0642 | 12.5 | 7 0752   | 13.4 | 22 0731 | 13.0 | 7 0808   | 12.7 | 22 0806 | 13.1 | 7 0806    | 13.1 |
| M 1341        | 1.0  | TU 1326 | 1.7  | W 1405                                   | 0.6  | TH 1333 | 1.5  | SA 1444  | 1.3  | SU 1427 | 1.3  | M 1453   | 1.8  | TU 1503 | 1.3  | M 1453    | 1.8  |
| O 1904        | 13.5 | 1856    | 12.4 | O 1923                                   | 13.9 | • 1855  | 12.9 | 2012     | 13.3 | 1951    | 13.0 | 2032     | 12.3 | 2032    | 12.3 | 2032      | 12.3 |
| 8 0208        | 0.5  | 23 0149 | 1.7  | 8 0225                                   | 0.4  | 23 0154 | 1.5  | 8 0258   | 1.2  | 23 0247 | 1.5  | 8 0305   | 1.8  | 23 0324 | 1.5  | 8 0324    | 1.5  |
| 0730          | 13.5 | 23 0717 | 12.4 | 8 0744                                   | 13.8 | 23 0717 | 12.9 | 8 0827   | 13.2 | 23 0813 | 12.9 | 8 0842   | 12.3 | 23 0854 | 13.1 | 8 0854    | 13.1 |
| TU 1430       | 0.6  | W 1405  | 1.5  | TH 1443                                  | 0.6  | F 1412  | 1.3  | SU 1512  | 1.5  | M 1508  | 1.4  | TU 1524  | 2.1  | W 1548  | 1.3  | TU 1524   | 2.1  |
| 1947          | 14.0 | • 1927  | 12.8 | 2001                                     | 14.0 | 1931    | 13.1 | 2047     | 12.8 | 2034    | 12.8 | 2105     | 11.8 | 2119    | 12.9 | 2119      | 12.9 |
| 9 0253        | 0.2  | 24 0226 | 1.6  | 9 0301                                   | 0.5  | 24 0232 | 1.4  | 9 0325   | 1.5  | 24 0325 | 1.7  | 9 0336   | 2.1  | 24 0407 | 1.7  | 9 0407    | 1.7  |
| 0811          | 13.8 | 24 0748 | 12.7 | 9 0819                                   | 13.8 | 24 0752 | 13.0 | 9 0900   | 12.6 | 24 0857 | 12.7 | 9 0914   | 11.8 | 24 0941 | 13.0 | 9 0941    | 13.0 |
| W 1511        | 0.5  | TH 1442 | 1.4  | F 1515                                   | 0.8  | SA 1450 | 1.2  | M 1539   | 1.8  | TU 1548 | 1.6  | W 1553   | 2.5  | TH 1633 | 1.5  | W 1553    | 2.5  |
| 2026          | 14.1 | 1959    | 13.0 | 2037                                     | 13.8 | 2008    | 13.1 | 2121     | 12.0 | 2121    | 12.4 | 2138     | 11.2 | 2206    | 12.7 | 2206      | 12.7 |
| 10 0331       | 0.3  | 25 0300 | 1.5  | 10 0329                                  | 0.8  | 25 0307 | 1.4  | 10 0350  | 1.9  | 25 0403 | 2.0  | 10 0403  | 2.6  | 25 0449 | 1.9  | 10 0449   | 1.9  |
| 0847          | 13.9 | 25 0819 | 12.9 | 10 0854                                  | 13.5 | 25 0827 | 12.9 | 10 0931  | 11.8 | 25 0943 | 12.2 | 10 0945  | 11.3 | 25 1028 | 12.7 | 10 1028   | 12.7 |
| TH 1546       | 0.6  | F 1515  | 1.4  | SA 1542                                  | 1.2  | SU 1524 | 1.4  | TU 1603  | 2.4  | W 1626  | 2.0  | TH 1623  | 2.9  | F 1715  | 1.7  | TH 1623   | 2.9  |
| 2104          | 14.0 | 2030    | 13.1 | 2112                                     | 13.3 | 2044    | 12.9 | 2152     | 11.1 | 2210    | 11.8 | 2209     | 10.7 | 2254    | 12.3 | 2254      | 12.3 |
| 11 0403       | 0.6  | 26 0331 | 1.5  | 11 0355                                  | 1.2  | 26 0336 | 1.6  | 11 0414  | 2.5  | 26 0441 | 2.5  | 11 0431  | 2.9  | 26 0532 | 2.2  | 11 0532   | 2.2  |
| 0924          | 13.6 | 26 0850 | 12.8 | 11 0927                                  | 12.9 | 26 0904 | 12.5 | 11 0959  | 11.0 | 26 1034 | 11.7 | 11 1017  | 10.8 | 26 1116 | 12.3 | 11 1116   | 12.3 |
| F 1614        | 1.1  | SA 1545 | 1.5  | SU 1604                                  | 1.6  | M 1553  | 1.7  | W 1631   | 2.9  | TH 1709 | 2.4  | F 1654   | 3.2  | SA 1758 | 2.0  | F 1654    | 3.2  |
| 2141          | 13.6 | 2103    | 12.9 | 2145                                     | 12.4 | 2122    | 12.3 | 2224     | 10.2 | 2302    | 11.3 | 2242     | 10.3 | 2342    | 11.8 | 2342      | 11.8 |
| 12 0428       | 1.1  | 27 0356 | 1.7  | 12 0416                                  | 1.8  | 27 0404 | 2.0  | 12 0442  | 3.1  | 27 0526 | 2.9  | 12 0504  | 3.3  | 27 0615 | 2.5  | 12 0615   | 2.5  |
| 0957          | 13.0 | 27 0921 | 12.5 | 12 0956                                  | 12.0 | 27 0942 | 11.9 | 12 1030  | 10.2 | 27 1130 | 11.2 | 12 1054  | 10.5 | 27 1208 | 11.9 | 12 1208   | 11.9 |
| SA 1638       | 1.6  | SU 1609 | 1.8  | M 1626                                   | 2.2  | TU 1623 | 2.2  | TH 1704  | 3.5  | F 1800  | 2.8  | SA 1729  | 3.5  | SU 1845 | 2.4  | SU 1845   | 2.4  |
| 2216          | 12.7 | 2136    | 12.4 | 2216                                     | 11.4 | 2204    | 11.5 | 2301     | 9.5  |         |      | 2322     | 9.9  |         |      |           |      |
| 13 0449       | 1.7  | 28 0419 | 2.1  | 13 0438                                  | 2.4  | 28 0435 | 2.6  | 13 0518  | 3.7  | 28 0000 | 10.9 | 13 0542  | 3.6  | 28 0034 | 11.3 | 13 0034   | 11.3 |
| 1028          | 12.1 | 28 0952 | 11.8 | 13 1023                                  | 11.0 | 28 1026 | 11.1 | 13 1112  | 3.3  | 28 0622 | 3.3  | 13 1139  | 10.2 | 28 0706 | 2.9  | 13 0706   | 2.9  |
| SU 1658       | 2.2  | M 1633  | 2.3  | TU 1649                                  | 2.9  | W 1658  | 2.8  | F 1746   | 4.1  | SA 1231 | 11.0 | SU 1811  | 3.7  | M 1304  | 11.5 | SU 1811   | 3.7  |
| 2248          | 11.7 | 2210    | 11.6 | 2247                                     | 10.3 | 2257    | 10.6 | 2353     | 8.9  | 1906    | 3.0  |          |      | 1938    | 2.7  |           |      |
| 14 0511       | 2.4  | 29 0442 | 2.5  | 14 0505                                  | 3.1  | 29 0515 | 3.2  | 14 0604  | 4.2  | 29 0103 | 10.7 | 14 0011  | 9.6  | 29 0133 | 11.0 | 14 0133   | 11.0 |
| 1058          | 11.2 | 29 1024 | 11.0 | 14 1052                                  | 10.0 | 29 1126 | 10.3 | 14 1217  | 9.1  | 29 0735 | 3.3  | 14 0628  | 3.8  | 29 0804 | 3.1  | 14 0804   | 3.1  |
| M 1720        | 2.8  | TU 1701 | 2.8  | W 1723                                   | 3.6  | TH 1747 | 3.3  | SA 1843  | 4.5  | SU 1338 | 11.0 | M 1238   | 10.0 | TU 1408 | 11.2 | M 1408    | 11.2 |
| 2322          | 10.6 | 2249    | 10.7 | 2325                                     | 9.3  |         |      | 2004     | 4.4  | 2122    | 2.4  | 2018     | 2.8  | 1902    | 3.9  | 2037      | 2.9  |
| 15 0537       | 3.0  | 30 0516 | 3.1  | 15 0540                                  | 3.9  | 30 0003 | 10.0 | 15 0119  | 8.7  | 30 0213 | 10.8 | 15 0120  | 9.6  | 30 0240 | 10.9 | 15 0240   | 10.9 |
| 1132          | 10.2 | SU 1743 | 3.5  | TH 1808                                  | 4.4  | F 1242  | 10.0 | SU 1358  | 9.2  | M 1451  | 11.3 | TU 1354  | 10.0 | W 1518  | 11.1 | TU 1354   | 10.0 |
| TU 1753       | 3.5  | W 1743  | 3.5  |  |      | 1903    | 3.7  | 2004     | 4.4  | 2122    | 2.4  | 2005     | 3.9  | 2141    | 3.0  | 2141      | 3.0  |



## **IRELAND, SOUTH COAST - COBH (RINGASKIDDY)**

LAT 51°50'N LONG 8°19'W

**IRELAND, SOUTH COAST - COBH (RINGASKIDDY)**

LAT 51°50'N LONG 8°19'W

| TIME ZONE GMT |       |     |           | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |           |           |         |           |           |      |           | YEAR 1987 |         |           |           |      |           |           |      |           |           |      |     |  |
|---------------|-------|-----|-----------|--|-----------|-----------|---------|-----------|-----------|------|-----------|-----------|---------|-----------|-----------|------|-----------|-----------|------|-----------|-----------|------|-----|--|
|               |       |     |           | MAY                                      |           |           |         | JUNE      |           |      |           | JULY      |         | AUGUST    |           |      |           |           |      |           |           |      |     |  |
|               | TIME  | M   | TIME      | M  | TIME      | M         | TIME    | M         | TIME      | M    | TIME      | M         | TIME    | M         |           |      |           |           |      |           |           |      |     |  |
| <b>1</b>      | 0123  | 0.7 | <b>16</b> | 0116                                     | 0.5       | <b>1</b>  | 0215    | 1.0       | 0300      | 0.6  | <b>1</b>  | 0237      | 0.9     | <b>16</b> | 0341      | 0.5  | <b>1</b>  | 0319      | 0.9  | <b>16</b> | 0440      | 1.0  |     |  |
| F             | 0710  | 3.9 | 0700      | 4.2                                      | <b>1</b>  | 0802      | 3.6     | <b>16</b> | 0844      | 3.9  | <b>1</b>  | 0826      | 3.7     | <b>16</b> | 0925      | 3.9  | <b>1</b>  | 0911      | 3.7  | <b>16</b> | 1026      | 3.6  |     |  |
| F             | 1334  | 0.8 | SA 1340   | 0.6                                      | M         | 1427      | 1.0     | TU 1525   | 0.6       | W    | 1451      | 0.9       | TH 1603 | 0.5       | SA 1536   | 0.9  | SU 1708   | 1.1       |      |           |           |      |     |  |
|               | 1926  | 3.9 | 1924      | 4.2                                      |           | 2026      | 3.7     | 2115      | 4.0       |      | 2049      | 3.7       | 2153    | 4.0       | 2132      | 3.7  | 2255      | 3.5       |      |           |           |      |     |  |
| <b>2</b>      | 0155  | 0.9 | <b>17</b> | 0205                                     | 0.7       | <b>2</b>  | 0257    | 1.1       | 0356      | 0.7  | <b>2</b>  | 0317      | 0.9     | <b>17</b> | 0431      | 0.7  | <b>2</b>  | 0359      | 1.0  | <b>17</b> | 0530      | 1.2  |     |  |
| SU            | 0741  | 3.8 | 0747      | 4.0                                      | <b>2</b>  | 0844      | 3.5     | <b>17</b> | 0942      | 3.7  | <b>2</b>  | 0905      | 3.6     | <b>17</b> | 1016      | 3.7  | <b>2</b>  | 0955      | 3.6  | <b>17</b> | 1122      | 3.4  |     |  |
| SA            | 1405  | 0.9 | SU 1430   | 0.8                                      | TU        | 1512      | 1.1     | W 1623    | 0.7       | TH   | 1532      | 0.9       | F 1657  | 0.7       | SU 1621   | 1.0  | M 1805    | 1.3       |      |           |           |      |     |  |
|               | 1959  | 3.8 | 2016      | 4.1                                      |           | 2111      | 3.5     | 2214      | 3.8       |      | 2129      | 3.6       | 2245    | 3.7       | 2219      | 3.6  | 2356      | 3.3       |      |           |           |      |     |  |
| <b>3</b>      | 0232  | 1.0 | <b>18</b> | 0258                                     | 0.8       | <b>3</b>  | 0343    | 1.1       | <b>18</b> | 0455 | 0.8       | <b>3</b>  | 0357    | 1.0       | <b>18</b> | 0525 | 0.9       | <b>3</b>  | 0448 | 1.1       | <b>18</b> | 0631 | 1.4 |  |
| SU            | 0818  | 3.6 | 0842      | 3.8                                      | <b>3</b>  | 0934      | 3.4     | <b>18</b> | 1042      | 3.6  | <b>3</b>  | 0950      | 3.5     | <b>18</b> | 1111      | 3.6  | <b>3</b>  | 1047      | 3.5  | <b>18</b> | 1231      | 3.3  |     |  |
| SU            | 1444  | 1.1 | M 1527    | 0.9                                      | W 1603    | 1.1       | TH 1725 | 0.8       | F 1617    | 1.0  | SA 1751   | 0.9       | M 1718  | 1.2       | TU 1914   | 1.4  |           |           |      |           |           |      |     |  |
|               | 2040  | 3.6 | 2114      | 3.8                                      |           | 2203      | 3.4     | 2316      | 3.7       |      | 2216      | 3.5       | 2342    | 3.5       | 2316      | 3.5  |           |           |      |           |           |      |     |  |
| <b>4</b>      | 0315  | 1.2 | <b>19</b> | 0359                                     | 0.9       | <b>4</b>  | 0437    | 1.2       | <b>19</b> | 0558 | 0.9       | <b>4</b>  | 0444    | 1.1       | <b>19</b> | 0621 | 1.0       | <b>4</b>  | 0550 | 1.3       | <b>19</b> | 0107 | 3.2 |  |
| M             | 0901  | 3.4 | 0945      | 3.6                                      | <b>4</b>  | 1028      | 3.3     | <b>19</b> | 1147      | 3.5  | <b>4</b>  | 1040      | 3.4     | <b>19</b> | 1210      | 3.4  | <b>4</b>  | 1151      | 3.4  | <b>19</b> | 0742      | 1.5  |     |  |
| M             | 1534  | 1.2 | TU 1630   | 1.0                                      | TH 1701   | 1.2       | F 1829  | 0.8       | SA 1708   | 1.1  | SU 1853   | 1.0       | TU 1828 | 1.3       | W 1348    | 3.3  |           |           |      |           |           |      |     |  |
|               | 2131  | 3.4 | 2221      | 3.7                                      |           | 2301      | 3.3     |           |           |      | 2308      | 3.5       |         |           |           |      |           |           |      |           |           | 2032 | 1.4 |  |
| <b>5</b>      | 0409  | 1.3 | <b>20</b> | 0505                                     | 1.0       | <b>5</b>  | 0534    | 1.2       | <b>20</b> | 0021 | 3.6       | <b>5</b>  | 0537    | 1.1       | <b>20</b> | 0042 | 3.4       | <b>5</b>  | 0027 | 3.4       | <b>20</b> | 0222 | 3.2 |  |
| SU            | 0957  | 3.2 | 1057      | 3.4                                      | <b>5</b>  | 1130      | 3.3     | <b>20</b> | 0703      | 0.9  | <b>5</b>  | 1136      | 3.4     | <b>20</b> | 0723      | 1.1  | <b>5</b>  | 0706      | 1.3  | <b>20</b> | 0900      | 1.4  |     |  |
| TU            | 1633  | 1.3 | W 1739    | 1.0                                      | F 1801    | 1.2       | SA 1250 | 3.5       | SU 1805   | 1.1  | M 1314    | 3.4       | W 1309  | 3.4       | TH 1501   | 3.4  |           |           |      |           |           |      |     |  |
|               | 2235  | 3.2 | 2336      | 3.5                                      |           |           |         |           | 1934      | 0.8  |           | 1959      | 1.1     |           |           | 1947 | 1.3       |           |      |           |           | 2141 | 1.3 |  |
| <b>6</b>      | 0512  | 1.4 | <b>21</b> | 0619                                     | 1.0       | <b>6</b>  | 0003    | 3.3       | <b>21</b> | 0123 | 3.6       | <b>6</b>  | 0007    | 3.4       | <b>21</b> | 0147 | 3.4       | <b>6</b>  | 0148 | 3.4       | <b>21</b> | 0328 | 3.4 |  |
| W             | 1106  | 3.1 | 1212      | 3.4                                      | <b>6</b>  | 0635      | 1.2     | <b>21</b> | 0806      | 0.9  | <b>6</b>  | 0638      | 1.2     | <b>21</b> | 0827      | 1.2  | <b>6</b>  | 0827      | 1.3  | <b>21</b> | 1002      | 1.2  |     |  |
| W             | 1740  | 1.4 | TH 1855   | 0.9                                      | SA 1232   | 3.3       | SU 1352 | 3.5       | M 1238    | 3.4  | TU 1419   | 3.4       | TH 1432 | 3.6       | F 1559    | 3.6  |           |           |      |           |           |      |     |  |
|               | 2347  | 3.2 |           |  | 1903      | 1.1       | 2036    | 0.8       | 1910      | 1.1  | 2103      | 1.1       | 2108    | 1.1       |           |      |           |           |      |           |           | 2234 | 1.1 |  |
| <b>7</b>      | 0621  | 1.4 | <b>22</b> | 0050                                     | 3.6       | <b>7</b>  | 0103    | 3.4       | <b>22</b> | 0222 | 3.6       | <b>7</b>  | 0110    | 3.5       | <b>22</b> | 0249 | 3.4       | <b>7</b>  | 0311 | 3.6       | <b>22</b> | 0419 | 3.6 |  |
| TH            | 1221  | 3.1 | 0735      | 1.0                                      | <b>7</b>  | 0737      | 1.1     | <b>22</b> | 0904      | 0.9  | <b>7</b>  | 0745      | 1.1     | <b>22</b> | 0928      | 1.1  | <b>7</b>  | 0945      | 1.1  | <b>22</b> | 1049      | 1.0  |     |  |
| TH            | 1852  | 1.3 | F 1327    | 3.5                                      | SU 1333   | 3.4       | M 1450  | 3.6       | TU 1345   | 3.5  | W 1519    | 3.5       | F 1546  | 3.8       | SA 1645   | 3.8  |           |           |      |           |           |      |     |  |
|               |       |     | 2006      | 0.8                                      | 2004      | 1.0       | 2131    | 0.8       | 2019      | 1.1  | 2202      | 1.1       | 2220    | 0.9       | 2315      | 0.9  |           |           |      |           |           |      |     |  |
| <b>8</b>      | 0059  | 3.2 | <b>23</b> | 0159                                     | 3.7       | <b>8</b>  | 0201    | 3.6       | <b>23</b> | 0315 | 3.7       | <b>8</b>  | 0216    | 3.6       | <b>23</b> | 0345 | 3.5       | <b>8</b>  | 0420 | 3.8       | <b>23</b> | 0502 | 3.8 |  |
| F             | 0731  | 1.3 | 0842      | 0.8                                      | <b>8</b>  | 0834      | 1.0     | <b>23</b> | 0955      | 0.9  | <b>8</b>  | 0853      | 1.1     | <b>23</b> | 1021      | 1.1  | <b>8</b>  | 1049      | 0.8  | <b>23</b> | 1129      | 0.9  |     |  |
| F             | 1330  | 3.2 | SA 1429   | 3.6                                      | M 1429    | 3.6       | TU 1541 | 3.7       | W 1451    | 3.7  | TH 1613   | 3.7       | SA 1648 | 4.1       | SU 1725   | 4.0  |           |           |      |           |           |      |     |  |
|               | 1959  | 1.2 | 2107      | 0.7                                      | 2101      | 0.9       | 2221    | 0.8       | 2125      | 1.0  | 2251      | 1.0       | 2320    | 0.6       | 2351      | 0.8  |           |           |      |           |           |      |     |  |
| <b>9</b>      | 0201  | 3.4 | <b>24</b> | 0257                                     | 3.8       | <b>9</b>  | 0254    | 3.7       | <b>24</b> | 0403 | 3.7       | <b>9</b>  | 0321    | 3.7       | <b>24</b> | 0434 | 3.7       | <b>9</b>  | 0516 | 4.1       | <b>24</b> | 0539 | 3.9 |  |
| SU            | 0833  | 1.1 | 0936      | 0.7                                      | <b>9</b>  | 0929      | 0.9     | <b>24</b> | 1040      | 0.9  | <b>9</b>  | 0957      | 0.9     | <b>24</b> | 1106      | 1.0  | <b>9</b>  | 1144      | 0.5  | <b>24</b> | 1203      | 0.7  |     |  |
| SA            | 1427  | 3.5 | SU 1522   | 3.8                                      | TU 1522   | 3.8       | W 1627  | 3.8       | TH 1553   | 3.9  | F 1659    | 3.8       | SU 1742 | 4.3       | M 1758    | 4.1  |           |           |      |           |           |      |     |  |
|               | 2057  | 1.0 | 2159      | 0.6                                      | 2153      | 0.8       | 2305    | 0.8       | 2228      | 0.8  | 2332      | 0.9       | O       |           |           |      |           |           |      |           |           |      |     |  |
| <b>10</b>     | 0253  | 3.6 | <b>25</b> | 0346                                     | 3.9       | <b>10</b> | 0346    | 3.9       | <b>25</b> | 0448 | 3.8       | <b>10</b> | 0423    | 3.9       | <b>25</b> | 0518 | 3.8       | <b>10</b> | 0012 | 0.4       | <b>25</b> | 0022 | 0.7 |  |
| SU            | 0925  | 0.9 | 1023      | 0.6                                      | <b>10</b> | 1020      | 0.8     | <b>25</b> | 1120      | 0.8  | <b>10</b> | 1057      | 0.7     | <b>25</b> | 1146      | 0.9  | <b>10</b> | 0605      | 4.3  | <b>25</b> | 0611      | 4.0  |     |  |
| SU            | 1517  | 3.7 | M 1607    | 3.9                                      | W 1612    | 4.0       | TH 1711 | 3.9       | F 1651    | 4.1  | SA 1742   | 3.9       | M 1234  | 0.3       | TU 1221   | 0.8  | W 1300    | 0.2       |      |           |           |      |     |  |
|               | 2145  | 0.8 | 2244      | 0.5                                      |           | 2244      | 0.7     |           | 2343      | 0.8  |           | 2325      | 0.6     |           |           |      |           | 1829      | 4.5  |           |           | 1828 | 4.1 |  |
| <b>11</b>     | 0338  | 3.8 | <b>26</b> | 0428                                     | 4.0       | <b>11</b> | 0434    | 4.1       | <b>26</b> | 0527 | 3.8       | <b>11</b> | 0518    | 4.1       | <b>26</b> | 0010 | 0.8       | <b>11</b> | 0100 | 0.3       | <b>26</b> | 0050 | 0.7 |  |
| M             | 1009  | 0.7 | 1104      | 0.6                                      | <b>11</b> | 1109      | 0.7     | <b>26</b> | 1156      | 0.8  | <b>11</b> | 1151      | 0.6     | <b>26</b> | 0556      | 3.9  | <b>11</b> | 0650      | 4.4  | <b>26</b> | 0639      | 4.1  |     |  |
| M             | 1600  | 3.9 | TU 1648   | 4.0                                      | TH 1659   | 4.2       | F 1750  | 4.2       | SA 1744   | 4.3  | SU 1221   | 0.8       | TU 1320 | 0.2       | W 1300    | 0.7  |           |           |      |           |           |      |     |  |
|               | 2228  | 0.6 | 2323      | 0.6                                      | O 2333    | 0.6       | ●       |           | O         |      | 1818      | 4.0       | 1913    | 4.5       |           |      |           |           | 1855 | 4.1       |           |      |     |  |
| <b>12</b>     | 0420  | 4.0 | <b>27</b> | 0508                                     | 4.0       | <b>12</b> | 0522    | 4.2       | <b>27</b> | 0019 | 0.8       | <b>12</b> | 0019    | 0.5       | <b>27</b> | 0042 | 0.8       | <b>12</b> | 0145 | 0.3       | <b>27</b> | 0117 | 0.7 |  |
| TU            | 1049  | 0.6 | 1139      | 0.7                                      | <b>12</b> | 1158      | 0.6     | <b>27</b> | 0605      | 3.8  | <b>12</b> | 0611      | 4.2     | <b>27</b> | 0631      | 3.9  | <b>12</b> | 0734      | 4.3  | <b>27</b> | 0706      | 4.1  |     |  |
| TU            | 1640  | 4.1 | W 1727    | 4.0                                      | F 1747    | 4.3       | SA 1229 | 0.8       | SU 1243   | 0.4  | M 1253    | 0.7       | W 1405  | 0.2       | TH 1328   | 0.7  |           |           |      |           |           |      |     |  |
|               | 2309  | 0.5 | ● 2358    | 0.7                                      |           |           |         |           | 1827      | 3.9  | 1836      | 4.4       | 1850    | 4.0       | 1957      | 4.4  |           |           |      |           |           | 1920 | 4.1 |  |
| <b>13</b>     | 0458  | 4.2 | <b>28</b> | 0544                                     | 4.0       | <b>13</b> | 0022    | 0.5       | <b>28</b> | 0053 | 0.9       | <b>13</b> | 0110    | 0.4       | <b>28</b> | 0113 | 0.8       | <b>13</b> | 0229 | 0.3       | <b>28</b> | 0145 | 0.7 |  |
| W             | 1130  | 0.6 | 1211      | 0.7                                      | <b>13</b> | 0611      | 4.2     | <b>28</b> | 0641      | 3.8  | <b>13</b> | 0700      | 4.2     | <b>28</b> | 0702      | 3.9  | <b>13</b> | 0815      | 4.2  | <b>28</b> | 0733      | 4.0  |     |  |
| W             | 1719  | 4.2 | TH 1803   | 4.0                                      | SA 1248   | 0.5       | SU 1303 | 0.8       | M 1334    | 0.3  | TU 1324   | 0.7       | TH 1449 | 0.3       | F 1357    | 0.7  |           |           |      |           |           |      |     |  |
|               | 02349 | 0.5 | 1836      | 4.3                                      | 1902      | 4.3       | 1926    | 3.9       | 1920      | 4.4  | 2037      | 4.2       | 1948    | 4.1       |           |      |           |           |      |           |           |      |     |  |
| <b>14</b>     | 0537  | 4.3 | <b>29</b> | 0031                                     | 0.7       | <b>14</b> | 0113    | 0.5       | <         |      |           |           |         |           |           |      |           |           |      |           |           |      |     |  |

## **IRELAND, SOUTH COAST - COBH (RINGASKIDDY)**

LAT 51°50'N

## **SECTION TWO**

### **TIDAL PREDICTIONS FOR SECONDARY PORTS (EUROPEAN)**

( B L A N K )

| No.     | PLACE                    | Lat.<br>N.<br>Long.<br>W. | TIME DIFFERENCES                  |                                  |                             |                             | HEIGHT DIFFERENCES (IN METRES) |             |                       |                       | M.L.<br>Z <sub>o</sub><br>m. |
|---------|--------------------------|---------------------------|-----------------------------------|----------------------------------|-----------------------------|-----------------------------|--------------------------------|-------------|-----------------------|-----------------------|------------------------------|
|         |                          |                           | High Water<br>0000<br>and<br>1200 | Low Water<br>0600<br>and<br>1800 | MHWS<br>0000<br>and<br>1200 | MHWN<br>0600<br>and<br>1800 | MLWN<br>5.5                    | MLWS<br>4.4 | Z <sub>o</sub><br>2.2 | Z <sub>o</sub><br>0.8 |                              |
| 14      | PLYMOUTH<br>(DEVONPORT)  | (see pag. 22)             |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
| England |                          |                           |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
|         | Isles of Scilly          |                           |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
| 1       | St. Mary's               | 49 55 6 19                | -0030                             | -0110                            | -0100                       | -0020                       | +0.2                           | -0.1        | -0.2                  | -0.1                  | 3.13                         |
| 2       | Penzance (Newlyn)        | 50 06 5 33                | -0040                             | -0105                            | -0045                       | -0020                       | +0.1                           | 0.0         | -0.2                  | 0.0                   | 3.08                         |
| 2a      | Porthleven               | 50 05 5 19                | -0045                             | -0105                            | -0035                       | -0025                       | 0.0                            | -0.1        | -0.2                  | 0.0                   | 3.08                         |
| 3       | Lizard Point             | 49 57 5 12                | -0045                             | -0055                            | -0040                       | -0030                       | -0.2                           | -0.2        | -0.3                  | -0.2                  | 2.99                         |
| 4       | Coverack                 | 50 01 5 05                | -0030                             | -0040                            | -0020                       | -0010                       | -0.2                           | -0.2        | -0.3                  | -0.2                  | 2.99                         |
| 4a      | Helford River (Entrance) | 50 05 5 05                | -0030                             | -0035                            | -0015                       | -0010                       | -0.2                           | -0.2        | -0.3                  | -0.2                  | 0                            |
|         | River Fal                |                           |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
| 5       | Falmouth                 | 50 09 5 03                | -0030                             | -0030                            | -0010                       | -0010                       | -0.2                           | -0.2        | -0.3                  | -0.2                  | 3.00                         |
| 5a      | Truro                    | 50 16 5 03                | -0020                             | -0025                            | §                           | §                           | -2.0                           | -2.0        | §                     | §                     | 0                            |
| 7       | Mevagissey               | 50 16 4 47                | -0010                             | -0015                            | -0005                       | +0005                       | -0.1                           | -0.1        | -0.2                  | -0.1                  | 3.14                         |
| 7a      | Par                      | 50 21 4 42                | -0005                             | -0015                            | 0000                        | -0010                       | -0.4                           | -0.4        | -0.4                  | -0.2                  | 3.12                         |
|         | River Fowey              |                           |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
| 8       | Fowey                    | 50 20 4 38                | -0010                             | -0015                            | -0010                       | -0005                       | -0.1                           | -0.1        | -0.2                  | -0.2                  | 3.14                         |
| 8a      | Lostwithiel              | 50 24 4 40                | +0005                             | -0010                            | §                           | §                           | -4.1                           | -4.1        | §                     | §                     | 0                            |
| 11      | Looe                     | 50 21 4 27                | -0010                             | -0010                            | -0005                       | -0005                       | -0.1                           | -0.2        | -0.2                  | -0.2                  | 0                            |
| 12      | Whitsand Bay             | 50 20 4 15                | 0000                              | 0000                             | 0000                        | 0000                        | 0.0                            | +0.1        | -0.1                  | +0.2                  | 0                            |
|         | River Tamar              |                           |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
| 14      | PLYMOUTH<br>(DEVONPORT)  | 50 22 4 11                |                                   |                                  | STANDARD PORT               |                             |                                |             | See Table V           |                       | 3.35                         |
| 14a     | Jupiter Point            | 50 23 4 14                | +0010                             | +0005                            | 0000                        | -0005                       | 0.0                            | 0.0         | +0.1                  | 0.0                   | 3.35                         |
| 14b     | Saltash                  | 50 24 4 12                | 0000                              | +0010                            | 0000                        | -0005                       | +0.1                           | +0.1        | +0.1                  | +0.1                  | 3.36                         |
| 14c     | Cargreen                 | 50 26 4 12                | 0000                              | +0010                            | +0020                       | +0020                       | 0.0                            | 0.0         | -0.1                  | 0.0                   | 3.39                         |
| 14d     | Cotehele Quay            | 50 29 4 13                | 0000                              | +0020                            | +0045                       | +0045                       | -0.9                           | -0.9        | -0.8                  | -0.4                  | 2.40                         |
|         | River Tavy               |                           |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
| 14e     | Lopwell                  | 50 28 4 09                | 0                                 | 0                                | §                           | §                           | -2.6                           | -2.7        | §                     | §                     | 0                            |
|         | River Lynher             |                           |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
| 14f     | St. Germans              | 50 23 4 18                | 0000                              | 0000                             | +0020                       | +0020                       | -0.3                           | -0.1        | 0.0                   | +0.2                  | 3.34                         |
| 15      | Turnchapel               | 50 22 4 07                | 0000                              | 0000                             | +0010                       | -0015                       | 0.0                            | +0.1        | +0.2                  | +0.1                  | 3.32                         |
| 15a     | Bovisand Pier            | 50 20 4 08                | 0000                              | -0020                            | 0000                        | -0010                       | -0.2                           | -0.1        | 0.0                   | +0.1                  | 3.30                         |
|         | River Yealm              |                           |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
| 17      | Entrance                 | 50 18 4 04                | +0006                             | +0006                            | +0002                       | +0002                       | -0.1                           | -0.1        | -0.1                  | -0.1                  | 3.18                         |
|         |                          |                           | 0100<br>and<br>1300               | 0600<br>and<br>1800              | 0100<br>and<br>1300         | 0600<br>and<br>1800         | 5.5                            | 4.4         | 2.2                   | 0.8                   |                              |
| 14      | PLYMOUTH<br>(DEVONPORT)  | (see pag. 22)             |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
|         | Salcombe River           |                           |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
| 20      | Salcombe                 | 50 13 3 47                | 0000                              | +0010                            | +0005                       | -0005                       | -0.2                           | -0.3        | -0.1                  | -0.1                  | 3.10                         |
| 21      | Start Point              | 50 13 3 39                | +0005                             | +0030                            | -0005                       | +0005                       | -0.2                           | -0.4        | -0.1                  | -0.1                  | 3.20                         |
|         | River Dart               |                           |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
| 23      | Dartmouth                | 50 21 3 34                | +0025                             | +0040                            | +0015                       | 0000                        | -0.8                           | -0.6        | -0.1                  | -0.2                  | 2.80                         |
| 23a     | Greenway Quay            | 50 23 3 35                | +0030                             | +0045                            | +0025                       | +0005                       | -0.6                           | -0.6        | -0.2                  | -0.2                  | 2.84                         |
| 23b     | Totnes                   | 50 26 3 41                | +0025                             | +0040                            | +0115                       | +0030                       | -2.0                           | -2.1        | §                     | §                     | 1.36                         |
| 25      | Torquay                  | 50 28 3 31                | +0025                             | +0045                            | +0010                       | 0000                        | -0.6                           | -0.7        | -0.2                  | -0.1                  | 2.89                         |
| 26      | Teignmouth (Approaches)  | 50 33 3 30                | +0025                             | +0040                            | 0000                        | 0000                        | -0.7                           | -0.8        | -0.3                  | -0.2                  | 2.74                         |
| 26a     | Exmouth (Approaches)     | 50 36 3 23                | +0030                             | +0050                            | +0015                       | +0005                       | -0.9                           | -1.0        | -0.5                  | -0.3                  | 0                            |
|         | River Exe                |                           |                                   |                                  |                             |                             |                                |             |                       |                       |                              |
| 27      | Exmouth Dock             | 50 37 3 25                | +0040                             | +0100                            | +0050                       | +0020                       | -1.5                           | -1.6        | -0.9                  | -0.6                  | 0                            |
| 27a     | Starcross                | 50 38 3 27                | +0040                             | +0100                            | 0                           | 0                           | -1.4                           | -1.5        | 0                     | 0                     | 0                            |
| 27b     | Topsham                  | 50 54 3 28                | +0045                             | +0105                            | 0                           | 0                           | -1.5                           | -1.6        | 0                     | 0                     | 0                            |
| 28      | Lyme Regis               | 50 43 2 56                | +0040                             | +0100                            | +0005                       | -0005                       | -1.2                           | -1.3        | -0.5                  | -0.2                  | 2.44                         |
| 29      | Bridport (West Bay)      | 50 42 2 45                | +0025                             | +0040                            | 0000                        | 0000                        | -1.4                           | -1.4        | -0.6                  | -0.2                  | 2.43                         |
| 30      | Chesil Beach             | 50 37 2 33                | +0040                             | +0055                            | -0005                       | +0010                       | -1.6                           | -1.5        | -0.5                  | 0.0                   | 2.28                         |
| 31      | Chesil Cove              | 50 34 2 28                | +0035                             | +0050                            | -0010                       | +0005                       | -1.5                           | -1.6        | -0.5                  | -0.2                  | 2.27                         |

○ No data.

§ Dries out except for river water.

\* See notes on page 344.

c For intermediate heights, use harmonic constants (see Part III) and N.P. 159.

j For intermediate heights, see pages xxii to xxiv.

x M.L. inferred.

## **ENGLAND, SOUTH COAST**

| No. | PLACE                     | Lat.<br>N. | Long.<br>W. | High<br>Water<br>(Zone<br>G.M.T.) | TIME DIFFERENCES     |                     |                     |                     | HEIGHT DIFFERENCES (IN METRES) |      |      |      | M.L.<br>Zo<br>m. |
|-----|---------------------------|------------|-------------|-----------------------------------|----------------------|---------------------|---------------------|---------------------|--------------------------------|------|------|------|------------------|
|     |                           |            |             |                                   | Water<br>and<br>1300 | 0700<br>and<br>1900 | 0100<br>and<br>1300 | 0700<br>and<br>1900 | MHWS                           | MHWN | MLWN | MLWS |                  |
| 33  | PORTRLAND                 | .          | .           | (see page 28)                     | 0100<br>and<br>1300  | 0700<br>and<br>1900 | 0100<br>and<br>1300 | 0700<br>and<br>1900 | 2.1                            | 1.4  | 0.7  | 0.2  | 1.00             |
| 34  | Lulworth Cove             | .          | .           | 50 37 2 15                        | -0015                | -0005               | -0005               | +0005               | +0.2                           | +0.1 | +0.2 | +0.1 | 0                |
| 65  | PORTSMOUTH                | .          | .           | (see page 14)                     | 0000<br>and<br>1200  | 0600<br>and<br>1800 | 0500<br>and<br>1700 | 1100<br>and<br>2300 | 4.7                            | 3.8  | 1.8  | 0.6  |                  |
| 35  | Swanage                   | .          | .           | 50 37 1 57                        | -0250                | +0105               | -0105               | -0105               | -2.7                           | -2.2 | -0.7 | -0.3 | 1.49             |
|     | <i>Poole Harbour</i>      |            |             |                                   |                      |                     |                     |                     |                                |      |      |      | *                |
| 36  | Entrance                  | .          | .           | 50 40 1 56                        | -0240                | +0105               | -0100               | -0030               | -2.7                           | -2.2 | -0.7 | -0.3 | 1.49             |
| 36a | Town Quay                 | .          | .           | 50 43 1 59                        | -0210                | +0140               | -0015               | -0005               | -2.6                           | -2.2 | -0.7 | -0.2 | 1.49             |
| 36b | Pottery Pier              | .          | .           | 50 42 1 59                        | -0150                | +0200               | -0010               | 0000                | -2.7                           | -2.1 | -0.6 | 0.0  | 1.49             |
| 36c | Wareham (River Frome)     | .          | .           | 50 41 2 06                        | -0140                | +0205               | +0110               | +0035               | -2.5                           | -2.1 | -0.7 | +0.1 | 0                |
| 36d | Cleavel Point             | .          | .           | 50 40 2 00                        | -0220                | +0130               | -0025               | -0015               | -2.6                           | -2.3 | -0.7 | -0.3 | 0                |
| 37  | Bournemouth               | .          | .           | 50 43 1 52                        | -0240                | +0055               | -0050               | -0030               | -2.7                           | -2.2 | -0.8 | -0.3 | 1.49             |
| 38  | Christchurch (Entrance)   | .          | .           | 50 43 1 45                        | -0230                | +0030               | -0035               | -0035               | -2.9                           | -2.4 | -1.2 | -0.2 | 1.17             |
| 38a | Christchurch (Tuckton)    | .          | .           | 50 44 1 47                        | -0205                | +0110               | +0110               | +0105               | -3.0                           | -2.5 | -1.0 | +0.1 | 1.14             |
| 39  | Hurst Point               | .          | .           | 50 42 1 33                        | -0115                | -0005               | -0030               | -0025               | -2.0                           | -1.5 | -0.5 | -0.1 | 1.97             |
| 40  | Lymington                 | .          | .           | 50 46 1 32                        | -0110                | +0005               | -0020               | -0020               | -1.7                           | -1.2 | -0.5 | -0.1 | 2.04             |
| 42  | Bucklers Hard             | .          | .           | 50 48 1 25                        | -0040                | -0010               | +0010               | -0010               | -1.0                           | -0.8 | -0.2 | -0.3 | 2.40             |
| 43  | Stansore Point            | .          | .           | 50 47 1 21                        | -0050                | -0010               | -0005               | -0010               | -0.9                           | -0.6 | -0.2 | 0.0  | 2.39             |
|     | <i>Isle of Wight</i>      |            |             |                                   |                      |                     |                     |                     |                                |      |      |      | *                |
| 45  | Yarmouth                  | .          | .           | 50 42 1 30                        | -0105                | +0005               | -0025               | -0030               | -1.6                           | -1.3 | -0.4 | 0.0  | 2.03             |
| 46  | Totland Bay               | .          | .           | 50 41 1 33                        | -0130                | -0045               | -0040               | -0040               | -2.0                           | -1.5 | -0.5 | -0.1 | 1.88             |
| 48  | Freshwater                | .          | .           | 50 40 1 31                        | -0210                | +0025               | -0040               | -0020               | -2.1                           | -1.5 | -0.4 | 0.0  | 1.62             |
| 51  | Ventnor                   | .          | .           | 50 36 1 12                        | -0025                | -0030               | -0025               | -0030               | -0.8                           | -0.6 | -0.2 | +0.2 | 2.33             |
| 53  | Sandown                   | .          | .           | 50 39 1 09                        | 0000                 | +0005               | +0010               | +0025               | -0.6                           | -0.5 | -0.2 | 0.0  | 2.41             |
| 54  | Bembridge Harbour         | .          | .           | 50 42 1 06                        | -0010                | +0005               | +0020               | 0000                | -1.6                           | -1.5 | -1.4 | -0.6 | 0                |
| 58  | Ryde                      | .          | .           | 50 44 1 07                        | -0010                | +0010               | -0005               | -0010               | -0.2                           | -0.1 | 0.0  | +0.1 | 2.76             |
|     | <i>Medina River</i>       |            |             |                                   |                      |                     |                     |                     |                                |      |      |      | *                |
| 60  | Cowes                     | .          | .           | 50 46 1 18                        | -0015                | +0015               | 0000                | -0020               | -0.5                           | -0.3 | -0.1 | 0.0  | 2.67             |
| 60a | Folly Inn                 | .          | .           | 50 44 1 17                        | -0015                | +0015               | 0000                | -0020               | -0.6                           | -0.4 | -0.1 | +0.2 | 0                |
| 60b | Newport                   | .          | .           | 50 42 1 17                        | 0                    | 0                   | 0                   | 0                   | -0.6                           | -0.4 | +0.1 | +1.3 | 0                |
| 62  | SOUTHAMPTON               | .          | .           | (see page 16)                     | 0400<br>and<br>1600  | 1100<br>and<br>2300 | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 4.5                            | 3.7  | 1.8  | 0.5  |                  |
| 61  | Calshot Castle            | .          | .           | 50 49 1 18                        | +0015                | +0030               | +0015               | +0005               | 0.0                            | 0.0  | +0.2 | +0.3 | 2.96             |
| 62  | SOUTHAMPTON               | .          | .           | 50 54 1 24                        |                      |                     |                     |                     |                                |      |      |      | 2.87             |
| 62a | Redbridge                 | .          | .           | 50 55 1 28                        | -0020                | +0005               | 0000                | -0005               | -0.1                           | -0.1 | -0.1 | -0.1 | 2.82             |
|     | <i>River Hamble</i>       |            |             |                                   |                      |                     |                     |                     |                                |      |      |      | *                |
| 63  | Warsash                   | .          | .           | 50 51 1 18                        | +0020                | +0010               | +0010               | 0000                | 0.0                            | +0.1 | +0.1 | +0.3 | 2.95             |
| 63a | Bursledon                 | .          | .           | 50 53 1 18                        | +0020                | +0020               | +0010               | +0010               | +0.1                           | +0.1 | +0.2 | +0.2 | 3.05             |
| 65  | PORTSMOUTH                | .          | .           | (see page 30)                     | 0500<br>and<br>1700  | 1000<br>and<br>2200 | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 4.7                            | 3.8  | 1.8  | 0.6  |                  |
| 64  | Lee-on-the-Solent         | .          | .           | 50 48 1 12                        | -0005                | +0005               | -0015               | -0010               | -0.2                           | -0.1 | +0.1 | +0.2 | 0                |
| 65  | PORTSMOUTH                | .          | .           | 50 48 1 07                        |                      |                     |                     |                     |                                |      |      |      | 2.84             |
|     | <i>Chichester Harbour</i> |            |             |                                   |                      |                     |                     |                     |                                |      |      |      | *                |
| 68  | Entrance                  | .          | .           | 50 47 0 56                        | -0010                | +0005               | +0015               | +0020               | +0.2                           | +0.2 | 0.0  | +0.1 | 2.83             |
| 68a | Northney                  | .          | .           | 50 50 0 58                        | +0010                | +0015               | +0015               | +0025               | +0.2                           | 0.0  | -0.2 | -0.3 | 2.73             |
| 68b | Bosham                    | .          | .           | 50 50 0 52                        | 0000                 | +0010               | 0                   | 0                   | +0.2                           | +0.1 | 0    | 0    | 0                |
| 68c | Itchenor                  | .          | .           | 50 48 0 52                        | -0005                | +0005               | +0005               | +0025               | +0.1                           | 0.0  | -0.2 | -0.2 | 2.00             |
| 68d | Dell Quay                 | .          | .           | 50 49 0 49                        | +0005                | +0015               | 0                   | 0                   | +0.2                           | +0.1 | 0    | 0    | 0                |
| 69  | Selsey Bill               | .          | .           | 50 43 0 47                        | -0005                | -0005               | +0035               | +0035               | +0.6                           | +0.6 | 0.0  | 0.0  | 2.94             |
| 70  | Nab Tower                 | .          | .           | 50 40 0 57                        | +0015                | 0000                | +0015               | +0015               | -0.2                           | 0.0  | +0.2 | 0.0  | 2.58             |

## SEASONAL CHANGES IN MEAN LEVEL

| No.    | Jan. | Feb. | Mar. | Apr. | May | June | July       | Aug. | Sep. | Oct. | Nov. | Dec. | Jan. |
|--------|------|------|------|------|-----|------|------------|------|------|------|------|------|------|
| 1-60b  |      |      |      |      |     |      | Negligible |      |      |      |      |      |      |
| 61-63a | +0.1 | 0.0  | -0.1 | -0.1 | 1.0 | 1.0  | 0.0        | 0.0  | 0.0  | 0.0  | +0.1 | +0.1 | +0.1 |
| 64-70  |      |      |      |      |     |      | Negligible |      |      |      |      |      |      |

**ENGLAND, SOUTH AND EAST COASTS**

| No.  | PLACE                           | Lat.<br>N.<br>Long.<br>W. | High<br>Water<br>(Zone G.M.T.) | TIME DIFFERENCES    |                     |                     |                     | HEIGHT DIFFERENCES (IN METRES) |             |      |      | M.L.<br>Zo.<br>m. |  |
|------|---------------------------------|---------------------------|--------------------------------|---------------------|---------------------|---------------------|---------------------|--------------------------------|-------------|------|------|-------------------|--|
|      |                                 |                           |                                | 0500<br>and<br>1700 | 1000<br>and<br>2200 | 0000<br>and<br>1200 | 0600<br>and<br>1800 | MHWS                           | MHWN        | MLWN | MLWS |                   |  |
| 81   | SHOREHAM                        | .                         | .                              | (see page 32)       |                     |                     |                     | 6.2                            | 5.0         | 1.9  | 0.7  |                   |  |
| 72   | Pagham                          | 50 46                     | 0 43                           | +0015               | 0000                | -0015               | -0025               | -0.7                           | -0.5        | -0.1 | -0.1 | 0                 |  |
| 73   | Bognor Regis                    | 50 47                     | 0 40                           | +0010               | -0005               | -0005               | -0020               | -0.6                           | -0.5        | -0.2 | -0.1 | 3.14              |  |
|      | River Arun                      |                           |                                |                     |                     |                     |                     |                                |             |      |      |                   |  |
| 74   | Littlehampton (Entrance)        | 50 48                     | 0 32                           | +0010               | 0000                | -0005               | -0010               | -0.4                           | -0.4        | -0.2 | -0.2 | 0                 |  |
| 74a  | Littlehampton (Norfolk Wharf)   | 50 48                     | 0 33                           | +0015               | +0005               | 0000                | +0045               | -0.7                           | -0.7        | -0.3 | +0.2 | 2.83              |  |
| 74b  | Arundel                         | 50 51                     | 0 33                           | 0                   | +0120               | 0                   | 0                   | -3.1                           | -2.8        | 0    | 0    | 0                 |  |
| 75   | Worthing                        | 50 48                     | 0 22                           | +0010               | 0000                | -0005               | -0010               | -0.1                           | -0.2        | 0.0  | 0.0  | 0                 |  |
| 81   | SHOREHAM                        | 50 50                     | 0 15                           |                     | STANDARD PORT       |                     |                     |                                | See Table V |      |      |                   |  |
| 82   | Brighton                        | 50 49                     | 0 08                           | -0010               | -0005               | -0005               | -0005               | +0.3                           | +0.1        | 0.0  | -0.1 | 3.49              |  |
|      | N. E.                           |                           |                                |                     |                     |                     |                     |                                |             |      |      |                   |  |
| 83   | Newhaven                        | 50 47                     | 0 04                           | -0015               | -0010               | 0000                | 0000                | +0.4                           | +0.2        | 0.0  | -0.2 | 3.61              |  |
| 84   | Eastbourne                      | 50 46                     | 0 17                           | -0010               | -0005               | +0015               | +0020               | +1.1                           | +0.6        | +0.2 | +0.1 | 3.77              |  |
| 89   | DOVER                           | .                         | .                              | (see page 32)       | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 0100<br>and<br>1300 | 0700<br>and<br>1900            | 6.7         | 5.3  | 2.0  | 0.8               |  |
| 85   | Hastings                        | 50 51                     | 0 35                           | 0000                | -0010               | -0030               | -0030               | +0.8                           | +0.5        | +0.1 | -0.1 | 3.85              |  |
| 86   | Rye (Approaches)                | 50 55                     | 0 47                           | +0005               | -0010               | 0                   | 0                   | +1.0                           | +0.7        | 0    | 0    | 0                 |  |
| 86a  | Rye (Harbour)                   | 50 56                     | 0 46                           | +0005               | -0010               | 0                   | 0                   | -1.4                           | -1.7        | 0    | 0    | 1.97              |  |
| 87   | Dungeness                       | 50 54                     | 0 58                           | -0010               | -0015               | -0020               | -0010               | +1.0                           | +0.6        | +0.4 | +0.1 | 4.13              |  |
| 88   | Folkestone                      | 51 05                     | 1 12                           | -0020               | -0005               | -0010               | -0010               | +0.4                           | +0.4        | 0.0  | -0.1 | 3.74              |  |
| 89   | DOVER                           | 51 07                     | 1 19                           |                     | STANDARD PORT       |                     |                     |                                | See Table V |      |      |                   |  |
| 98   | Deal                            | 51 13                     | 1 25                           | +0010               | +0020               | +0010               | +0005               | -0.6                           | -0.3        | 0.0  | 0.0  | 3.54              |  |
| 99   | Richborough                     | 51 18                     | 1 21                           | +0015               | +0015               | +0030               | +0030               | -3.4                           | -2.6        | -1.7 | -0.7 | 1.42              |  |
| 102  | Ramsgate                        | 51 20                     | 1 25                           | +0020               | +0020               | -0007               | -0007               | -1.8                           | -1.5        | -0.8 | -0.4 | 2.56              |  |
| 103  | MARGATE                         | .                         | .                              | (see page 32)       | 0100<br>and<br>1300 | 0700<br>and<br>1900 | 0100<br>and<br>1300 | 0700<br>and<br>1900            | 4.8         | 3.9  | 1.4  | 0.5               |  |
| 102a | Broadstairs                     | 51 21                     | 1 27                           | -0020               | -0008               | +0007               | +0010               | -0.2                           | -0.2        | -0.1 | -0.1 | 0                 |  |
| 103  | MARGATE                         | 51 24                     | 1 23                           |                     | STANDARD PORT       |                     |                     |                                | See Table V |      |      |                   |  |
| 104  | Herne Bay                       | 51 23                     | 1 07                           | +0034               | +0022               | +0015               | +0032               | +0.4                           | +0.4        | 0.0  | 0.0  | 2.73              |  |
| 105  | Whitstable Approaches           | 51 22                     | 1 02                           | +0042               | +0029               | +0025               | +0050               | +0.6                           | +0.6        | +0.1 | 0.0  | 0                 |  |
| 108  | SHEERNESS                       | .                         | .                              | (see page 32)       | 0200<br>and<br>1400 | 0800<br>and<br>2000 | 0200<br>and<br>1400 | 0700<br>and<br>1900            | 5.7         | 4.8  | 1.5  | 0.6               |  |
| 106  | River Swale<br>Grovehurst Jetty | 51 22                     | 0 46                           | -0007               | 0000                | 0000                | +0016               | 0.0                            | 0.0         | 0.0  | -0.1 | 0                 |  |
| 108  | River Medway<br>SHEERNESS       | 51 27                     | 0 45                           |                     | STANDARD PORT       |                     |                     |                                | See Table V |      |      |                   |  |
| 108a | Bee Ness                        | 51 25                     | 0 39                           | +0002               | +0002               | 0000                | +0005               | +0.2                           | +0.1        | 0.0  | 0.0  | 0                 |  |
| 108b | Bartlett Creek                  | 51 23                     | 0 38                           | +0016               | +0008               | 0                   | 0                   | +0.1                           | +0.0        | 0    | 0    | 0                 |  |
| 108c | Darnett Ness                    | 51 24                     | 0 36                           | +0004               | +0004               | 0000                | +0010               | +0.2                           | +0.1        | 0.0  | -0.1 | 0                 |  |
| 109  | Chatham (Lock Approaches)       | 51 24                     | 0 33                           | +0010               | +0012               | +0012               | +0018               | +0.3                           | +0.1        | 0.0  | -0.2 | 2.95              |  |
| 109a | Upnor                           | 51 25                     | 0 32                           | +0015               | +0015               | +0015               | +0025               | +0.2                           | +0.2        | -0.1 | -0.1 | 0                 |  |
| 109b | Rochester<br>(Strood Pier)      | 51 24                     | 0 30                           | +0018               | +0018               | +0018               | +0028               | +0.2                           | +0.2        | -0.2 | -0.3 | 2.91              |  |
| 109c | Woolham                         | 51 21                     | 0 27                           | +0030               | +0025               | +0035               | +0120               | -0.2                           | -0.3        | -1.0 | -0.3 | 2.69              |  |
| 109d | New Hythe                       | 51 19                     | 0 28                           | +0035               | +0035               | +0220               | +0240               | -1.6                           | -1.7        | -1.2 | -0.3 | 2.03              |  |
| 109e | Allington Lock                  | 51 17                     | 0 30                           | +0050               | +0035               | 0                   | 0                   | -2.1                           | -2.2        | -1.3 | -0.4 | 0.96              |  |
|      | River Thames                    |                           |                                |                     |                     |                     |                     |                                |             |      |      |                   |  |
| 110  | Southend                        | 51 31                     | 0 43                           | -0005               | -0005               | -0005               | -0005               | 0.0                            | 0.0         | -0.1 | -0.1 | 3.02              |  |
| 110a | Thames Haven                    | 51 30                     | 0 31                           | +0010               | +0010               | 0000                | +0010               | +0.5                           | +0.4        | -0.1 | -0.1 | 3.15              |  |

0 No data.

\* See Notes on page 344.

§ Dries out except for river water.

c For intermediate heights, use harmonic constants (see Part III) and N.P. 159.

x M.L. inferred.

## ENGLAND, EAST COAST

324

| No.  | PLACE                                  | Lat.<br>N. | Long.<br>E. | TIME DIFFERENCES               |                     |                     |                     | HEIGHT DIFFERENCES (IN METRES) |             |             |      | M.L.<br>Z.<br>m. |      |
|------|--|------------|-------------|--------------------------------|---------------------|---------------------|---------------------|--------------------------------|-------------|-------------|------|------------------|------|
|      |  |            |             | High<br>Water<br>(Zone G.M.T.) | Low Water           | MHWS                | MHWN                | MLWN                           | MLWS        |             |      |                  |      |
| 113  | LONDON BRIDGE                          | .          | .           | (see pag.)                     | 0300<br>and<br>1500 | 0900<br>and<br>2100 | 0400<br>and<br>1600 | 1100<br>and<br>2300            | 7.1         | 5.8         | 1.6  | 0.5              |      |
| 111  | Tilbury                                | 51 28      | 0 22        | -0055                          | -0040               | -0045               | -0110               | -0.7                           | -0.5        | 0.0         | 0.0  | 3.33 *           |      |
| 112  | Woolwich<br>(Gallion's Point).         | 51 30      | 0 05        | -0020                          | -0020               | -0025               | -0040               | -0.1                           | -0.1        | +0.1        | 0.0  | 3.67 *           |      |
| 113  | LONDON BRIDGE                          | 51 30      | 0 05        | N.                             | W.                  | STANDARD PORT       |                     |                                |             | See Table V |      | 3.70 *           |      |
| 114  | Chelsea Bridge                         | 51 29      | 0 09        | +0020                          | +0015               | +0055               | +0100               | -0.8                           | -0.7        | -0.6        | -0.3 | ◎ *              |      |
| 115  | Barnes Bridge                          | 51 28      | 0 15        | +0045                          | +0040               | +0220               | +0210               | -1.6                           | -1.7        | -1.1        | -0.5 | ◎ *              |      |
| 116  | Richmond Lock                          | 51 28      | 0 19        | +0100                          | +0055               | +0325               | +0305               | -2.1                           | -2.2        | -1.4        | -0.3 | ◎ *              |      |
| 108  | SHEERNESS                              | .          | .           | (see pag.)                     | 0200<br>and<br>1400 | 0700<br>and<br>1900 | 0100<br>and<br>1300 | 0700<br>and<br>1900            | 5.7         | 4.8         | 1.5  | 0.6              |      |
| 116a | Thames Estuary<br>Shivering Sand Tower | 51 30      | 1 05        | -0025                          | -0019               | -0008               | -0026               | -0.6                           | -0.6        | -0.1        | -0.1 | 2.75             |      |
| 103  | MARGATE                                | .          | .           | (see pag.)                     | 0100<br>and<br>1300 | 0700<br>and<br>1900 | 0100<br>and<br>1300 | 0700<br>and<br>1900            | 4.8         | 3.9         | 1.4  | 0.5              |      |
| 117  | S.E. Longsand                          | 51 32      | 1 21        | -0006                          | -0003               | -0004               | -0004               | 0.0                            | +0.1        | 0.0         | -0.1 | 2.5              |      |
| 129  | WALTON-ON-THE-NAZE                     | .          | .           | (see pag.)                     | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 0500<br>and<br>1700 | 1100<br>and<br>2300            | 4.2         | 3.4         | 1.2  | 0.4              |      |
| 121  | Whitaker Beacon                        | 51 40      | 1 06        | +0022                          | +0024               | +0033               | +0027               | +0.6                           | +0.5        | +0.2        | +0.1 | 2.5 **           |      |
| 121a | Holliswell Point                       | 51 38      | 0 56        | +0034                          | +0037               | +0100               | +0037               | +1.1                           | +0.9        | +0.3        | +0.1 | ◎ 0.5            |      |
| 121b | River Roach<br>Rochford                | 51 35      | 0 43        | +0050                          | +0040               | §                   | §                   | -0.8                           | -1.1        | §           | §    | ◎                |      |
| 122  | River Crouch<br>Burnham-on-Crouch      | 51 37      | 0 48        | +0050                          | +0035               | +0115               | +0050               | +1.0                           | +0.8        | -0.1        | -0.2 | 2.50 c           |      |
| 122a | North Fambridge                        | 51 38      | 0 41        | +0115                          | +0050               | +0130               | +0100               | +1.1                           | +0.8        | 0.0         | -0.1 | 2.55 c           |      |
| 122b | Hullbridge                             | 51 38      | 0 38        | +0115                          | +0050               | +0135               | +0105               | +1.1                           | +0.8        | 0.0         | -0.1 | 2.55 c           |      |
| 122c | Battlesbridge                          | 51 37      | 0 34        | +0120                          | +0110               | §                   | §                   | -1.8                           | -2.0        | §           | §    | ◎                |      |
| 123  | River Blackwater<br>Bradwell-on-Sea    | 51 45      | 0 53        | +0035                          | +0023               | +0047               | +0004               | +1.1                           | +0.8        | +0.2        | +0.1 | 2.85 c           |      |
| 123a | Osea Island                            | 51 43      | 0 46        | +0057                          | +0045               | +0050               | +0007               | +1.1                           | +0.9        | +0.1        | 0.0  | 2.68 c           |      |
| 123b | Maldon                                 | 51 44      | 0 42        | +0107                          | +0055               | ◎                   | ◎                   | -1.3                           | -1.1        | ◎           | ◎    | c                |      |
| 124  | West Mersea                            | 51 47      | 0 54        | +0035                          | +0015               | +0055               | +0010               | +0.9                           | +0.4        | +0.1        | +0.1 | 2.7 cx           |      |
| 126  | River Colne<br>Brightlingssea          | 51 48      | 1 00        | +0025                          | +0021               | +0040               | +0004               | +0.8                           | +0.4        | 0.0         | 0.0  | 2.84             |      |
| 127  | Colchester                             | 51 53      | 0 56        | +0035                          | +0025               | §                   | §                   | 0.0                            | -0.3        | §           | §    | ◎                |      |
| 128  | Clacton                                | 51 47      | 1 09        | +0012                          | +0010               | +0025               | +0008               | +0.3                           | +0.1        | 0.0         | 0.0  | 2.38             |      |
| 129  | WALTON-ON-THE-NAZE                     | 51 51      | 1 16        | .                              | STANDARD PORT       |                     |                     |                                | See Table V |             |      | 2.23             |      |
| 129a | Bramble Creek                          | 51 53      | 1 14        | +0010                          | -0007               | -0005               | +0010               | +0.3                           | +0.3        | +0.3        | +0.3 | 2.38             |      |
| 130  | Sunk Head Tower                        | 51 46      | 1 30        | 0000                           | +0002               | -0002               | +0002               | -0.3                           | -0.3        | -0.1        | -0.1 | 2.08             |      |
| 131  | HARWICH                                | .          | .           | (see pag.)                     | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 0000<br>and<br>1200 | 0600<br>and<br>1800            | 4.0         | 3.4         | 1.1  | 0.4              | 2.10 |
| 132  | River Stour<br>Mistley                 | 51 57      | 1 05        | +0025                          | +0025               | 0000                | +0020               | +0.2                           | 0.0         | -0.1        | -0.1 | ◎                |      |
| 133  | River Orwell<br>Ipswich                | 52 03      | 1 10        | +0015                          | +0025               | 0000                | +0010               | +0.2                           | 0.0         | -0.1        | -0.1 | 2.44 c           |      |

## SEASONAL CHANGES IN MEAN LEVEL

| No.    | Jan. 1     | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1 | Aug. 1 | Sep. 1 | Oct. 1 | Nov. 1 | Dec. 1 | Jan. 1 |
|--------|------------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| 72-133 | Negligible |        |        |        |       |        |        |        |        |        |        |        |        |

ENGLAND, EAST COAST

| No.   | PLACE                     | Lat.<br>N. | Long.<br>E.   | TIME DIFFERENCES<br>(Zone G.M.T.) |                     |                     |                     | HEIGHT DIFFERENCES (IN METRES) |      |       |       | M.L.<br>Z <sub>0</sub><br>m. |
|-------|---------------------------|------------|---------------|-----------------------------------|---------------------|---------------------|---------------------|--------------------------------|------|-------|-------|------------------------------|
|       |                           |            |               | 0700<br>and<br>1300               | 0700<br>and<br>1900 | 0700<br>and<br>1300 | 0700<br>and<br>1900 | MHWS                           | MHWN | MLWN  | MLWS  |                              |
| 129   | WALTON-ON-THE-NAZE        |            | (see page 18) |                                   |                     |                     |                     | 4.2                            | 3.4  | 1.1   | 0.4   |                              |
| 133a  | Felixstowe Pier           | 51 57      | 1 21          | -0005                             | -0007               | -0018               | -0020               | -0.5                           | -0.4 | 0.0   | 0.0   | 2.09                         |
|       | River Deben               |            |               |                                   |                     |                     |                     |                                |      |       |       |                              |
| 134   | Woodbridge Haven          | 51 59      | 1 24          | 0000                              | -0005               | -0020               | -0025               | -0.5                           | -0.5 | -0.1  | +0.1  | 0                            |
| 134a  | Woodbridge                | 52 05      | 1 19          | +0045                             | +0025               | +0025               | -0020               | -0.2                           | -0.3 | -0.2  | 0.0   | 0                            |
| 135   | Bawdsey                   | 52 00      | 1 26          | -0010                             | -0012               | -0028               | -0032               | -0.8                           | -0.7 | -0.2  | -0.2  | 1.86                         |
|       | Orford Haven              |            |               |                                   |                     |                     |                     |                                |      |       |       |                              |
| 136   | Bar                       | 52 03      | 1 29          | -0015                             | -0017               | -0038               | -0042               | -1.0                           | -0.8 | -0.2  | -0.1  | 1.79                         |
| 136a  | Orford Quay               | 52 05      | 1 32          | +0040                             | +0040               | +0055               | +0055               | -1.6                           | -1.3 | +0.2  | 0.0   | 1.6                          |
| 136b  | Slaughden                 | 52 08      | 1 36          | +0100                             | +0100               | +0115               | +0115               | -1.3                           | -1.0 | +0.2  | 0.0   | 1.6                          |
| 136c  | Iken Cliff                | 52 09      | 1 31          | +0130                             | +0130               | +0155               | +0155               | -1.3                           | -1.0 | +0.2  | 0.0   | 1.6                          |
| 136d  | Snape                     | 52 10      | 1 30          | +0200                             | +0200               | 0                   | 0                   | -1.3                           | -1.0 | -0.3  | +0.4  | 1.6                          |
| 141   | LOWESTOFT                 |            | (see page 18) | 0300<br>and<br>1500               | 0900<br>and<br>2100 | 0200<br>and<br>1400 | 0800<br>and<br>2000 | 2.4                            | 2.1  | 1.0   | 0.5   |                              |
| 137   | Orfordness                | 52 05      | 1 35          | +0135                             | +0135               | +0135               | +0125               | +0.4                           | +0.6 | -0.1  | 0.0   | 0                            |
| 139   | Aldeburgh                 | 52 09      | 1 36          | +0120                             | +0120               | +0120               | +0110               | +0.4                           | +0.6 | 0.0   | 0.0   | 1.52                         |
| 139a  | Sizewell                  | 52 13      | 1 37          | +0047                             | +0047               | +0032               | +0032               | 0.0                            | -0.1 | -0.2  | -0.2  | 1.4                          |
| 140   | Southwold                 | 52 19      | 1 41          | +0035                             | +0035               | +0040               | +0030               | +0.1                           | +0.1 | -0.1  | -0.1  | 1.32                         |
| 141   | LOWESTOFT                 | 52 28      | 1 45          |                                   |                     |                     |                     |                                |      |       |       | 1.56                         |
|       | Great Yarmouth            |            |               |                                   |                     |                     |                     |                                |      |       |       |                              |
| 142   | Gorleston                 | 52 34      | 1 44          | -0035                             | -0035               | -0030               | -0030               | 0.0                            | -0.1 | 0.0   | 0.0   | 1.46                         |
| 143   | Caister                   | 52 39      | 1 44          | -0130                             | -0130               | -0100               | -0100               | 0.0                            | -0.1 | 0.0   | 0.0   | 1.64                         |
| 144   | Winterton                 | 52 43      | 1 42          | -0225                             | -0215               | -0135               | -0135               | +0.8                           | +0.5 | +0.2  | +0.1  | 1.81                         |
| 173   | IMMINGHAM                 |            | (see page 5)  | 0100<br>and<br>1300               | 0700<br>and<br>1900 | 0100<br>and<br>1300 | 0700<br>and<br>1900 | 7.3                            | 5.8  | 2.6   | 0.9   |                              |
| 154   | Cromer                    | 52 56      | 1 18          | +0056                             | +0056               | +0104               | +0104               | -2.0                           | -1.6 | -0.7  | -0.3  | 2.97                         |
| 155   | Blakeney Bar              | 52 59      | 0 59          | +0031                             | +0031               | +0031               | +0031               | -1.6                           | -1.3 | 0     | 0     | 0                            |
| 155a  | Blakeney                  | 52 57      | 1 01          | +0050                             | +0050               | +0130               | +0130               | -4.2                           | -3.7 | 0     | 0     | 0                            |
| 157   | Wells Bar                 | 52 59      | 0 49          | +0022                             | +0022               | +0022               | +0022               | -1.3                           | -1.0 | 0     | 0     | 0                            |
| 157a  | Wells                     | 52 57      | 0 51          | +0102                             | +0102               | +0130               | +0130               | -3.7                           | -3.5 | 0     | 0     | 0                            |
|       | The Wash                  |            |               |                                   |                     |                     |                     |                                |      |       |       |                              |
| 161   | Hunstanton                | 52 56      | 0 29          | +0020                             | +0020               | +0105               | +0025               | 0.0                            | -0.1 | 0.1   | 0.0   | 3.80                         |
| 161a  | West Stones               | 52 50      | 0 21          | +0025                             | +0025               | +0115               | +0040               | -0.3                           | -0.4 | -0.3  | +0.2  | 3.8                          |
| 162   | King's Lynn               | 52 45      | 0 24          | +0030                             | +0030               | +0305               | +0140               | -0.5                           | -0.8 | +0.1† | +0.1† | 3.56                         |
| 164   | Wisbech Cut               | 52 48      | 0 13          | +0020                             | +0025               | +0200               | +0030               | -0.3                           | -0.7 | -0.4  | 0     | 0                            |
| 164a  | Lawyers Sluice            | 52 53      | 0 05          | +0010                             | +0020               | 0                   | 0                   | -0.3                           | -0.6 | 0     | 0     | 0                            |
| 165   | Tabs Head                 | 52 56      | 0 05          | 0000                              | +0005               | +0125               | +0020               | +0.2                           | -0.2 | -0.2  | -0.2  | 3.82                         |
| X 166 | Boston                    | 52 58      | 0 01          | 0000                              | +0010               | +0140               | +0050               | -0.5                           | -1.0 | -0.9  | -0.5  | 3.31                         |
|       | N. W.                     |            |               |                                   |                     |                     |                     |                                |      |       |       |                              |
| 167   | Skegness                  | 53 09      | 0 21          | +0010                             | +0015               | +0030               | +0020               | -0.4                           | -0.5 | -0.1  | 0.0   | 4.11                         |
| 168   | Inner Dowsing Light Tower | 53 20      | 0 34          | 0000                              | 0000                | +0010               | +0010               | -0.9                           | -0.7 | -0.1  | +0.3  | 3.8                          |
|       | N. E.                     |            |               |                                   |                     |                     |                     |                                |      |       |       |                              |
| 171   | River Humber              |            |               |                                   |                     |                     |                     |                                |      |       |       |                              |
| 171   | Bull Sand Fort            | 53 34      | 0 04          | -0020                             | -0030               | -0035               | -0015               | -0.4                           | -0.3 | +0.1  | +0.2  | 4.03                         |
|       | N. W.                     |            |               |                                   |                     |                     |                     |                                |      |       |       |                              |
| 172   | Grimsby                   | 53 35      | 0 04          | -0003                             | -0011               | -0015               | -0002               | -0.3                           | -0.2 | 0.0   | +0.1  | 0                            |
| 173   | IMMINGHAM                 | 53 38      | 0 11          |                                   |                     |                     |                     |                                |      |       |       | 4.17                         |
| 174   | Kingston upon Hull        | 53 44      | 0 21          | +0005                             | +0015               | +0010               | +0020               | +0.2                           | 0.0  | -0.2  | -0.2  | 4.16                         |
|       | River Trent               |            |               |                                   |                     |                     |                     |                                |      |       |       |                              |
| 174a  | Burton Stather            | 53 39      | 0 42          | +0105                             | +0045               | +0335               | +0305               | -2.1                           | -2.3 | -2.3  | 6     | 1.97                         |
| 174b  | Keadby                    | 53 36      | 0 44          | +0135                             | +0125               | +0415               | +0355               | -2.7                           | -3.1 | 6     | 6     | 0                            |
|       | River Ouse                |            |               |                                   |                     |                     |                     |                                |      |       |       |                              |
| 175   | Blacktoft                 | 53 42      | 0 43          | +0055                             | +0050               | +0310               | +0255               | -1.6                           | -1.9 | -2.0  | -0.9  | 2.27                         |
| 176   | Goole                     | 53 42      | 0 52          | +0130                             | +0115               | +0355               | +0350               | -1.6                           | -2.1 | -1.9  | -0.6  | 2.41                         |

○ No data.

† The tide does not normally fall below this level.

‡ The tide does not normally fall below Chart Datum.

\* See notes on page 344.

§ Dries out except for river water.

a Data approximate.

c For intermediate heights, use harmonic constants (see Part III) and N.P.159.

x M.L. inferred.

## ENGLAND, EAST COAST; AND SCOTLAND, EAST COAST

| No.      | PLACE                                | Lat.<br>N. | Long.<br>W.   | TIME DIFFERENCES<br>High Water<br>and<br>1200 |                     |                     |                     | TIME DIFFERENCES<br>Low Water<br>and<br>1200 |        |        |        | HEIGHT DIFFERENCES (IN METRES) |        |      |      | M.L.<br>Z <sub>o</sub><br>m. |
|----------|--------------------------------------|------------|---------------|---|---------------------|---------------------|---------------------|--|--------|--------|--------|--------------------------------|--------|------|------|------------------------------|
|          |                                      |            |               | 0000  | 0600                | 0000                | 0600                | MHWS   | MHWN   | MLWN   | MLWS   |                                |        |      |      |                              |
| 185      | RIVER TEES<br>ENTRANCE               |            | (see page 3)  |   |                     |                     |                     | 5.5  | 4.3    | 2.0    | 0.9    |                                |        |      |      |                              |
| 181      | Bridlington                          | 54 05      | 0 11          | +0010   | +0050               | +0055               | +0050               | +0.6   | +0.4   | +0.3   | +0.2   | 3.56                           |        |      |      |                              |
| 182      | Filey Bay                            | 54 13      | 0 16          | +0042   | +0042               | +0047               | +0034               | +0.3   | +0.6   | +0.4   | +0.1   | 0                              |        |      |      |                              |
| 183      | Scarborough                          | 54 17      | 0 23          | +0040   | +0040               | +0030               | +0030               | +0.2   | +0.3   | +0.3   | 0.0    | 3.47                           |        |      |      |                              |
| 184      | Whitby                               | 54 29      | 0 37          | +0014   | +0014               | +0011               | +0011               | -0.1   | 0.0    | 0.0    | -0.1   | 3.13                           |        |      |      |                              |
| 185      | RIVER TEES ENTRANCE                  | 54 38      | 1 09          |   |                     |                     |                     |  |        |        |        | See Table V                    |        |      |      | 3.17                         |
|          | <i>River Tees</i>                    |            |               |   |                     |                     |                     |  |        |        |        |                                |        |      |      |                              |
| 186      | Middlesbrough<br>(Dock Entrance)     | 54 35      | 1 13          | 0000  | +0002               | 0000                | -0003               | +0.1   | +0.2   | +0.1   | -0.1   | 0                              |        |      |      |                              |
| 187      | Tees Bridge (Newport)                | 54 34      | 1 16          | -0002   | +0004               | +0005               | -0003               | +0.1   | +0.2   | 0.0    | -0.1   | 0                              |        |      |      |                              |
| 188      | Hartlepool                           | 54 41      | 1 11          | -0010   | -0010               | -0007               | -0007               | -0.4   | -0.3   | -0.2   | -0.1   | 2.08                           |        |      |      |                              |
| 189      | Seaham                               | 54 50      | 1 19          | -0015   | -0015               | -0015               | -0015               | -0.3   | -0.2   | 0.0    | -0.2   | 0                              |        |      |      |                              |
| 190      | Sunderland                           | 54 55      | 1 21          | -0017   | -0017               | -0016               | -0016               | -0.3   | -0.1   | 0.0    | -0.1   | 2.94                           |        |      |      |                              |
| 202      | RIVER TYNE<br>(NORTH SHIELDS)        |            | (see page 20) | 0200<br>and<br>1400                           | 0800<br>and<br>2000 | 0100<br>and<br>1300 | 0800<br>and<br>2000 | 5.0  | 3.9    | 2.8    | 0.7    |                                |        |      |      |                              |
|          | <i>River Tyne</i>                    |            |               |   |                     |                     |                     |  |        |        |        |                                |        |      |      |                              |
| 201      | Entrance                             | 55 00      | 1 24          | +0005   | +0005               | -0005               | -0005               | +0.1   | 0.0    | 0.0    | +0.1   | 2.85                           |        |      |      |                              |
| 202      | NORTH SHIELDS                        | 55 00      | 1 26          |   |                     |                     |                     |  |        |        |        | See Table V                    |        |      |      | 2.91                         |
| 203      | Newcastle-upon-Tyne                  | 54 58      | 1 36          | +0003   | +0003               | +0008               | +0008               | +0.3   | +0.2   | +0.1   | +0.1   | 0                              |        |      |      |                              |
| 204      | Blyth                                | 55 07      | 1 29          | +0005   | -0007               | -0001               | +0009               | 0.0  | 0.0    | -0.1   | +0.1   | 2.80                           |        |      |      |                              |
| 205      | Coquet Road                          | 55 20      | 1 32          | -0010   | -0010               | -0020               | -0020               | +0.1   | +0.1   | 0.0    | +0.1   | 0                              |        |      |      |                              |
| 206      | Amble                                | 55 20      | 1 34          | -0023   | -0015               | -0023               | -0014               | 0.0  | +0.2   | +0.2   | +0.1   | 3.10                           |        |      |      |                              |
| 207      | North Sunderland<br>(Northumberland) | 55 34      | 1 38          | -0048   | -0044               | -0058               | -0102               | -0.2   | -0.2   | -0.2   | 0.0    | 0                              |        |      |      |                              |
| 208      | Holy Island                          | 55 40      | 1 47          | -0043   | -0039               | -0105               | -0110               | -0.2   | -0.2   | -0.3   | -0.1   | 0                              |        |      |      |                              |
| 209      | Berwick                              | 55 47      | 2 00          | -0053   | -0053               | -0109               | -0109               | -0.3   | -0.1   | -0.5   | -0.1   | 2.53                           |        |      |      |                              |
| 225      | LEITH                                |            | (see page 4)  | 0300<br>and<br>1500                           | 0900<br>and<br>2100 | 0300<br>and<br>1500 | 0900<br>and<br>2100 | 5.6  | 4.5    | 2.1    | 0.8    |                                |        |      |      |                              |
|          | <i>Scotland</i>                      |            |               |   |                     |                     |                     |  |        |        |        |                                |        |      |      |                              |
| 221      | Eyemouth                             | 55 52      | 2 05          | -0015   | -0025               | -0014               | -0004               | -0.9   | -0.8   | 0      | 0      | 0                              |        |      |      |                              |
| 222      | Dunbar                               | 56 00      | 2 31          | -0005   | -0010               | +0010               | +0017               | -0.4   | -0.3   | -0.1   | -0.1   | 3.00                           |        |      |      |                              |
| 223      | Fidra                                | 56 04      | 2 47          | -0005   | -0005               | -0010               | -0010               | -0.4   | -0.1   | 0.0    | -0.2   | 3.01                           |        |      |      |                              |
| 224      | Cockenzie                            | 55 58      | 2 57          | -0007   | -0015               | -0013               | -0005               | -0.2   | 0.0    | 0      | 0      | 0                              |        |      |      |                              |
| 225      | LEITH                                | 55 59      | 3 10          |   |                     |                     |                     |  |        |        |        | See Table V                    |        |      |      | 3.02                         |
| 226      | Granton                              | 55 59      | 3 13          | 0000  | 0000                | 0000                | 0000                | 0.0  | 0.0    | 0.0    | 0.0    | 0                              |        |      |      |                              |
| 227      | ROSYTH                               |            | (see page 4)  | 0300<br>and<br>1500                           | 1000<br>and<br>2200 | 0300<br>and<br>1500 | 0900<br>and<br>2100 | 5.8  | 4.7    | 2.2    | 0.8    | 3.30                           |        |      |      |                              |
|          | <i>River Forth</i>                   |            |               |   |                     |                     |                     |  |        |        |        |                                |        |      |      |                              |
| 228      | Grangemouth                          | 56 02      | 3 41          | +0025   | +0010               | -0052               | -0015               | -0.1   | -0.2   | -0.3   | -0.3   | 2.91                           |        |      |      |                              |
| 229      | Kincardine                           | 56 04      | 3 43          | +0015   | +0030               | -0030               | -0030               | 0.0  | -0.2   | -0.5   | -0.3   | 3.10                           |        |      |      |                              |
| 229a     | Alloa                                | 56 07      | 3 47          | +0040   | +0040               | +0025               | +0025               | -0.2   | -0.5   | 0      | -0.7   | 2.8                            | x      |      |      |                              |
| 229b     | Stirling                             | 56 07      | 3 56          | +0101   | +0111               | +0438               | +0438               | -2.9   | -3.1   | -2.3   | -0.7   | 1.06                           | c      |      |      |                              |
| 225      | LEITH                                |            | (see page 4)  | 0300<br>and<br>1500                           | 0900<br>and<br>2100 | 0300<br>and<br>1500 | 0900<br>and<br>2100 | 5.6  | 4.5    | 2.1    | 0.8    |                                |        |      |      |                              |
|          | <i>Firth of Forth</i>                |            |               |   |                     |                     |                     |  |        |        |        |                                |        |      |      |                              |
| 230      | Burntisland                          | 56 03      | 3 14          | +0002   | -0002               | -0002               | -0004               | 0.0  | 0.0    | 0.0    | 0.0    | 2.94                           |        |      |      |                              |
| 232      | Methil                               | 56 11      | 3 00          | -0006   | -0012               | -0007               | -0001               | -0.1   | -0.1   | -0.1   | -0.1   | 3.0                            | x      |      |      |                              |
| 233      | Anstruther Easter                    | 56 13      | 2 42          | -0010   | -0035               | -0020               | -0020               | -0.1   | -0.1   | -0.1   | -0.1   | 3.05                           |        |      |      |                              |
|          | SEASONAL CHANGES IN MEAN LEVEL       |            |               |   |                     |                     |                     |  |        |        |        |                                |        |      |      |                              |
| No.      | Jan. 1                               | Feb. 1     | Mar. 1        | Apr. 1  | May 1               | June 1              | July 1              | Aug. 1                                       | Sep. 1 | Oct. 1 | Nov. 1 | Dec. 1                         | Jan. 1 |      |      |                              |
| 129-137  |                                      |            |               |   |                     |                     |                     |  |        |        |        |                                |        |      |      |                              |
| 139-144  | 0.0                                  | -0.1       | -0.1          | -0.1  | 0.0                 | 0.0                 | 0.0                 | 0.0  | 0.0    | 0.0    | 0.0    | 0.0                            | 0.0    | 0.0  | 0.0  | 0.0                          |
| 154-174  | 0.0                                  | 0.0        | 0.0           | 0.0   | -0.1                | -0.1                | 0.0                 | 0.0  | 0.0    | 0.0    | 0.0    | 0.0                            | 0.0    | 0.0  | 0.0  | 0.0                          |
| 174a-176 | +0.1                                 | +0.1       | 0.0           | 0.0   | -0.1                | -0.1                | -0.1                | -0.1   | 0.0    | 0.0    | 0.0    | +0.1                           | +0.1   | +0.1 | +0.1 | +0.1                         |
| 181-233  | +0.1                                 | 0.0        | 0.0           | -0.1  | -0.1                | -0.1                | 0.0                 | 0.0  | 0.0    | 0.0    | 0.0    | +0.1                           | +0.1   | +0.1 | +0.1 | +0.1                         |

SCOTLAND, EAST COAST; ORKNEY ISLANDS

| No.                    | PLACE            | Lat.<br>N. | Long.<br>W.   | TIME DIFFERENCES                     |                     |                     |                     | HEIGHT DIFFERENCES (IN METRES) |             |      |      | M.L.<br>Z.<br>m. |
|------------------------|------------------|------------|---------------|--------------------------------------|---------------------|---------------------|---------------------|--------------------------------|-------------|------|------|------------------|
|                        |                  |            |               | High<br>Water<br>(Zone G.M.T.)       | Low Water           | MHWs                | MHWN                | MLWN                           | MLWS        |      |      |                  |
| 244                    | ABERDEEN         | .          | .             | 0000<br>(see page 36)<br>and<br>1200 | 0600<br>and<br>1800 | 0100<br>and<br>1300 | 0700<br>and<br>1900 | 4'3                            | 3'4         | 1'6  | 0'6  |                  |
| <i>River Tay</i>       |                  |            |               |                                      |                     |                     |                     |                                |             |      |      |                  |
| 235                    | Bar              | .          | 56 27         | 2 38                                 | +0100               | +0057               | +0100               | +0110                          | +0'9        | +0'8 | +0'3 | +0'1             |
| 236                    | Dundee           | .          | 56 27         | 2 58                                 | +0132               | +0129               | +0125               | +0150                          | +1'0        | +0'9 | +0'3 | +0'1             |
| 236a                   | Newburgh         | .          | 56 21         | 3 14                                 | +0212               | +0203               | +0249               | +0337                          | -0'2        | -0'4 | -1'1 | -0'5             |
| 236b                   | Perth            | .          | 56 24         | 3 27                                 | +0217               | +0225               | +0512               | +0528                          | -0'9        | -1'4 | -1'2 | -0'3             |
| 241                    | Arbroath         | .          | 56 33         | 2 35                                 | +0056               | +0037               | +0034               | +0055                          | +0'7        | +0'7 | +0'2 | +0'1             |
| 242                    | Montrose         | .          | 56 42         | 2 27                                 | +0100               | +0100               | +0030               | +0040                          | +0'5        | +0'5 | +0'3 | +0'1             |
| 243                    | Stonehaven       | .          | 56 58         | 2 12                                 | +0013               | +0008               | +0013               | +0009                          | +0'2        | +0'2 | +0'1 | 0'0              |
| 244                    | ABERDEEN         | .          | 57 09         | 2 05                                 | STANDARD PORT       |                     |                     |                                | See Table V |      |      | 2'51             |
| 245                    | Peterhead        | .          | 57 30         | 1 46                                 | -0035               | -0045               | -0035               | -0040                          | -0'5        | -0'3 | -0'1 | -0'1             |
| 246                    | Fraserburgh      | .          | 57 41         | 2 00                                 | -0045               | -0115               | -0110               | -0045                          | -0'4        | -0'3 | -0'1 | 0'0              |
| 244                    | ABERDEEN         | .          | (see page 36) | 0200<br>and<br>1400                  | 0900<br>and<br>2100 | 0400<br>and<br>1600 | 0900<br>and<br>2100 | 4'3                            | 3'4         | 1'6  | 0'6  |                  |
| 247                    | Banff            | .          |               | 57 40                                | 2 31                | -0100               | -0150               | -0150                          | -0050       | -0'8 | -0'6 | -0'5             |
| 247a                   | Whitehills       | .          |               | 57 41                                | 2 35                | -0122               | -0137               | -0117                          | -0127       | -0'4 | -0'3 | +0'1             |
| 248                    | Buckie           | .          |               | 57 40                                | 2 58                | -0130               | -0145               | -0125                          | -0140       | -0'2 | -0'2 | +0'1             |
| 249                    | Lossiemouth      | .          | 57 43         | 3 18                                 | -0125               | -0200               | -0130               | -0130                          | -0'2        | -0'2 | 0'0  | 0'0              |
| 250                    | Burghead         | .          | 57 42         | 3 29                                 | -0120               | -0150               | -0135               | -0120                          | -0'2        | -0'2 | 0'0  | 0'0              |
| 253                    | Nairn            | .          | 57 36         | 3 52                                 | -0120               | -0150               | -0135               | -0130                          | 0'0         | -0'1 | 0'0  | +0'1             |
| 254                    | McDermott Base   | .          | 57 36         | 3 59                                 | -0110               | -0140               | -0120               | -0115                          | -0'1        | -0'1 | +0'1 | +0'3             |
| 244                    | ABERDEEN         | .          | (see page 36) | 0300<br>and<br>1500                  | 1000<br>and<br>2200 | 0000<br>and<br>1200 | 0700<br>and<br>1900 | 4'3                            | 3'4         | 1'6  | 0'6  |                  |
| <i>Inverness Firth</i> |                  |            |               |                                      |                     |                     |                     |                                |             |      |      |                  |
| 255                    | Fortrose         | .          | 57 35         | 4 08                                 | -0125               | -0125               | -0125               | -0125                          | 0'0         | 0'0  | 0'0  | 0'0              |
| 256                    | Inverness        | .          | 57 30         | 4 15                                 | -0050               | -0150               | -0200               | -0105                          | +0'5        | +0'3 | +0'2 | +0'1             |
| <i>Cromarty Firth</i>  |                  |            |               |                                      |                     |                     |                     |                                |             |      |      |                  |
| 258                    | Cromarty         | .          | 57 41         | 4 02                                 | -0120               | -0155               | -0155               | -0120                          | 0'0         | 0'0  | +0'1 | +0'2             |
| 259                    | Invergordon      | .          | 57 41         | 4 10                                 | -0105               | -0200               | -0200               | -0110                          | +0'1        | +0'1 | +0'1 | 2'41             |
| 260                    | Dingwall         | .          | 57 36         | 4 25                                 | -0045               | -0145               | 0'0                 | 0'0                            | +0'1        | +0'2 | 0'0  | 0'0              |
| 244                    | ABERDEEN         | .          | (see page 36) | 0300<br>and<br>1500                  | 0800<br>and<br>2000 | 0200<br>and<br>1400 | 0800<br>and<br>2000 | 4'3                            | 3'4         | 1'6  | 0'6  |                  |
| <i>Dornoch Firth</i>   |                  |            |               |                                      |                     |                     |                     |                                |             |      |      |                  |
| 261                    | Portmahomack     | .          | 57 50         | 3 50                                 | -0120               | -0210               | -0140               | -0110                          | -0'2        | -0'1 | +0'1 | +0'1             |
| 262                    | Meikle Ferry     | .          | 57 51         | 4 08                                 | -0100               | -0140               | -0120               | -0055                          | 0'0         | -0'1 | 0'0  | 0'0              |
| 264                    | Golspie          | .          | 57 58         | 3 59                                 | -0130               | -0215               | -0155               | -0130                          | -0'3        | -0'3 | 0'0  | 0'0              |
| 267                    | Wick             | .          | 58 26         | 3 05                                 | -0155               | -0220               | -0210               | -0220                          | -0'9        | -0'7 | -0'2 | -0'1             |
| 268                    | Duncansby Head   | .          | 58 39         | 3 03                                 | -0320               | -0320               | -0320               | -0320                          | -1'2        | -1'0 | 0'0  | 0'0              |
| 244                    | ABERDEEN         | .          | (see page 36) | 0300<br>and<br>1500                  | 1100<br>and<br>2300 | 0200<br>and<br>1400 | 0900<br>and<br>2100 | 4'3                            | 3'4         | 1'6  | 0'6  |                  |
| <i>Orkney Islands</i>  |                  |            |               |                                      |                     |                     |                     |                                |             |      |      |                  |
| 270                    | Muckle Skerry    | .          | 58 41         | 2 55                                 | -0230               | -0230               | -0230               | -0230                          | -1'7        | -1'4 | -0'6 | -0'2             |
| 271                    | Burravness       | .          | 58 51         | 2 52                                 | -0200               | -0200               | -0155               | -0155                          | -1'0        | -0'9 | -0'3 | 0'0              |
| 272                    | Deer Sound       | .          | 58 58         | 2 50                                 | -0245               | -0245               | -0245               | -0245                          | -1'1        | -0'9 | -0'3 | 0'0              |
| 273                    | Kirkwall         | .          | 58 59         | 2 58                                 | -0305               | -0245               | -0305               | -0250                          | -1'4        | -1'2 | -0'5 | -0'2             |
| 275                    | Kettletorff Pier | .          | 59 14         | 2 36                                 | -0230               | -0230               | -0225               | -0225                          | -1'1        | -0'9 | -0'3 | 0'0              |
| 277                    | Pierowall        | .          | 59 19         | 2 58                                 | -0355               | -0355               | -0355               | -0355                          | -0'6        | -0'6 | -0'2 | 0'0              |
| 279                    | Eynhallow Sound  | .          | 59 08         | 3 05                                 | -0400               | -0400               | -0355               | -0355                          | -0'6        | -0'6 | -0'2 | -0'1             |
| 280                    | Stromness        | .          | 58 58         | 3 18                                 | -0430               | -0355               | -0415               | -0420                          | -0'7        | -0'8 | -0'1 | -0'1             |
| 282                    | Widewall Bay     | .          | 58 49         | 3 01                                 | -0400               | -0400               | -0400               | -0400                          | -0'7        | -0'7 | -0'3 | -0'2             |

⊕ No data.

\* See notes on page 344.

c For intermediate heights, use harmonic constants (see Part III) and N.P. 159.

x M.L. inferred.

SHETLAND ISLANDS; SCOTLAND, NORTH COAST; OUTER HEBRIDES

| No.  | PLACE                               | Lat.<br>N. | Long.<br>W. | TIME DIFFERENCES               |                             |                     |                     | HEIGHT DIFFERENCES (IN METRES) |       |             |      | M.L.<br>Zo<br>m. |      |      |
|------|-------------------------------------|------------|-------------|--------------------------------|-----------------------------|---------------------|---------------------|--------------------------------|-------|-------------|------|------------------|------|------|
|      |                                     |            |             | High<br>Water<br>(Zone G.M.T.) | Low<br>Water<br>and<br>1800 | 0100<br>and<br>1300 | 0800<br>and<br>2000 | MHWS                           | MHWN  | MLWN        | MLWS |                  |      |      |
| 287  | LERWICK                             | .          | .           | (see page 286)                 | 0000<br>and<br>1200         | 0600<br>and<br>1800 | 0100<br>and<br>1300 | 0800<br>and<br>2000            | 2.2   | 1.6         | 0.9  | 0.5              |      |      |
| 285  | Fair Isle                           | .          | .           | 59 33                          | 1 38                        | -0020               | -0025               | -0020                          | -0035 | 0.0         | +0.1 | 0.0              | -0.1 | 1.40 |
| 285a | <i>Shetland Islands</i><br>Sumburgh | .          | .           | 59 53                          | 1 16                        | +0002               | +0002               | +0005                          | +0005 | -0.5        | -0.3 | -0.2             | -0.2 | 1.0  |
| 287  | LERWICK                             | .          | .           | 60 09                          | 1 08                        | STANDARD PORT       |                     |                                |       | See Table V |      |                  |      | 1.29 |
| 288  | Dury Voe                            | .          | .           | 60 21                          | 1 10                        | -0015               | -0015               | -0010                          | -0010 | +0.1        | +0.2 | 0.0              | 0.0  | 1.24 |
| 289  | Out Skerries                        | .          | .           | 60 25                          | 0 45                        | -0025               | -0025               | -0010                          | -0010 | +0.1        | +0.1 | 0.0              | 0.0  | 1.28 |
| 289a | Toft Pier                           | .          | .           | 60 28                          | 1 12                        | -0105               | -0100               | -0125                          | -0115 | +0.1        | +0.1 | -0.2             | -0.2 | 1.23 |
| 290  | Burra Voe (Yell Sound)              | .          | .           | 60 30                          | 1 03                        | -0025               | -0025               | -0025                          | -0025 | +0.2        | +0.2 | 0.0              | 0.0  | 1.31 |
| 290a | Mid Yell                            | .          | .           | 60 36                          | 1 03                        | -0030               | -0020               | -0035                          | -0025 | +0.2        | +0.2 | +0.1             | 0.0  | 1.52 |
| 290b | Balta Sound                         | .          | .           | 60 45                          | 0 50                        | -0055               | -0055               | -0045                          | -0045 | +0.1        | +0.2 | 0.0              | -0.1 | 1.32 |
| 291  | Burra Firth                         | .          | .           | 60 48                          | 0 52                        | -0110               | -0110               | -0115                          | -0115 | +0.3        | +0.3 | 0.0              | 0.0  | 0    |
| 292  | Bluemull Sound                      | .          | .           | 60 42                          | 1 00                        | -0135               | -0135               | -0155                          | -0155 | +0.4        | +0.3 | +0.1             | 0.0  | 0    |
| 293  | Sullom Voe                          | .          | .           | 60 27                          | 1 18                        | -0135               | -0125               | -0135                          | -0120 | +0.1        | +0.3 | 0.0              | -0.2 | 1.32 |
| 294  | Hillswick                           | .          | .           | 60 29                          | 1 29                        | -0220               | -0220               | -0200                          | -0200 | 0.0         | 0.0  | -0.1             | 0.0  | 0    |
| 295  | Scalloway                           | .          | .           | 60 08                          | 1 16                        | -0150               | -0150               | -0150                          | -0150 | -0.6        | -0.3 | -0.3             | 0.0  | 0    |
| 296  | Quendale Bay                        | .          | .           | 59 54                          | 1 20                        | -0025               | -0025               | -0030                          | -0030 | -0.4        | -0.1 | -0.2             | 0.0  | 1.14 |
| 296a | Foula                               | .          | .           | 60 07                          | 2 03                        | -0140               | -0130               | -0140                          | -0120 | -0.2        | -0.1 | -0.1             | -0.1 | 1.23 |
| 244  | ABERDEEN                            | .          | .           | (see page 26)                  | 0300<br>and<br>1500         | 1000<br>and<br>2200 | 0100<br>and<br>1300 | 0800<br>and<br>2000            | 4.3   | 3.4         | 1.6  | 0.6              |      |      |
| 297  | Stroma                              | .          | .           | 58 40                          | 3 08                        | -0320               | -0320               | -0320                          | -0320 | -1.2        | -1.1 | -0.3             | -0.1 | 0    |
| 298  | Scrabster                           | .          | .           | 58 37                          | 3 33                        | -0455               | -0510               | -0500                          | -0445 | +0.7        | +0.3 | +0.5             | +0.2 | 2.94 |
| 334  | ULLAPOOL                            | .          | .           | (see page 36)                  | 0100<br>and<br>1300         | 0700<br>and<br>1900 | 0300<br>and<br>1500 | 0900<br>and<br>2100            | 5.2   | 3.9         | 2.1  | 0.7              |      |      |
| 299  | Sule Skerry                         | .          | .           | 59 05                          | 4 24                        | +0100               | +0120               | +0110                          | +0100 | -1.2        | -0.9 | -0.4             | -0.1 | 2.3  |
| 300  | <i>Loch Eriboll</i><br>Portnancon   | .          | .           | 58 30                          | 4 42                        | +0055               | +0105               | +0055                          | +0100 | 0.0         | +0.1 | +0.1             | +0.2 | 3.02 |
| 301  | Kyle of Durness                     | .          | .           | 58 36                          | 4 47                        | +0030               | +0030               | +0050                          | +0050 | -0.6        | -0.4 | -0.3             | -0.1 | 0    |
| 304  | Rona                                | .          | .           | 59 08                          | 5 49                        | +0010               | +0030               | +0010                          | +0030 | -1.8        | -1.4 | -0.8             | -0.3 | 1.73 |
|      | <i>Hebrides</i>                     |            |             |                                |                             |                     |                     |                                |       |             |      |                  |      |      |
| 308  | Stornoway                           | .          | .           | 58 12                          | 6 23                        | -0010               | -0010               | -0010                          | -0010 | -0.4        | -0.2 | -0.1             | 0.0  | 2.86 |
| 309  | Loch Shell                          | .          | .           | 58 00                          | 6 25                        | -0023               | -0010               | -0010                          | -0027 | -0.4        | -0.3 | -0.2             | 0.0  | 2.75 |
| 310  | E. Loch Tarbert                     | .          | .           | 57 54                          | 6 48                        | -0035               | -0020               | -0020                          | -0030 | -0.2        | -0.2 | 0.0              | +0.1 | 2.93 |
| 311  | Loch Maddy                          | .          | .           | 57 36                          | 7 06                        | -0054               | -0024               | -0026                          | -0040 | -0.4        | -0.3 | -0.2             | 0.0  | 0    |
| 311a | Loch Carnan                         | .          | .           | 57 22                          | 7 16                        | -0100               | -0020               | -0030                          | -0050 | -0.7        | -0.7 | -0.2             | -0.1 | 2.5  |
| 312  | Loch Skiport                        | .          | .           | 57 20                          | 7 16                        | -0110               | -0035               | -0034                          | -0034 | -0.6        | -0.6 | -0.4             | -0.2 | 0    |
| 313  | Loch Boisdale                       | .          | .           | 57 09                          | 7 16                        | -0105               | -0030               | -0035                          | -0045 | -0.9        | -0.9 | -0.5             | -0.2 | 0    |
| 314  | Barra (North Bay)                   | .          | .           | 57 00                          | 7 24                        | -0113               | -0041               | -0044                          | -0058 | -1.0        | -0.7 | -0.3             | -0.1 | 0    |
| 314a | Castle Bay                          | .          | .           | 56 57                          | 7 29                        | -0125               | -0050               | -0055                          | -0110 | -0.9        | -0.8 | -0.4             | -0.1 | 2.35 |
| 316  | Barra Head                          | .          | .           | 56 47                          | 7 38                        | -0125               | -0050               | -0055                          | -0105 | -1.2        | -0.9 | -0.3             | +0.1 | 0    |
| 317  | Shillay                             | .          | .           | 57 31                          | 7 41                        | -0113               | -0053               | -0057                          | -0117 | -1.0        | -0.9 | -0.8             | -0.3 | 0    |
| 318  | Balivanich                          | .          | .           | 57 29                          | 7 23                        | -0113               | -0027               | -0041                          | -0055 | -1.1        | -0.8 | -0.6             | -0.2 | 0    |
| 318a | Scolpaig                            | .          | .           | 57 39                          | 7 29                        | -0046               | -0046               | -0049                          | -0049 | -1.3        | -0.9 | -0.5             | 0.0  | 2.3  |
| 319  | Leverburgh                          | .          | .           | 57 46                          | 7 01                        | -0051               | -0030               | -0025                          | -0035 | -0.6        | -0.4 | -0.2             | -0.1 | 2.59 |
| 320  | W. Loch Tarbert                     | .          | .           | 57 55                          | 6 55                        | -0103               | -0043               | -0024                          | -0044 | -1.0        | -0.7 | -0.8             | -0.3 | 2.13 |
| 321  | Little Bernera                      | .          | .           | 58 16                          | 6 52                        | -0031               | -0021               | -0027                          | -0037 | -0.9        | -0.8 | -0.5             | -0.2 | 0    |
| 321a | Carloway                            | .          | .           | 58 17                          | 6 47                        | -0050               | +0010               | -0045                          | -0025 | -1.0        | -0.7 | -0.5             | -0.1 | 2.33 |

SEASONAL CHANGES IN MEAN LEVEL

| No.     | Jan. 1 | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1 | Aug. 1 | Sept. 1 | Oct. 1 | Nov. 1 | Dec. 1 | Jan. 1 |
|---------|--------|--------|--------|--------|-------|--------|--------|--------|---------|--------|--------|--------|--------|
| 235-246 | +0.1   | 0.0    | 0.0    | -0.1   | -0.1  | -0.1   | 0.0    | 0.0    | 0.0     | 0.0    | +0.1   | +0.1   | +0.1   |
| 247-260 | +0.1   | 0.0    | -0.1   | -0.1   | -0.1  | -0.1   | 0.0    | 0.0    | 0.0     | 0.0    | +0.1   | +0.1   | +0.1   |
| 261-298 | +0.1   | 0.0    | 0.0    | -0.1   | -0.1  | -0.1   | 0.0    | 0.0    | 0.0     | 0.0    | +0.1   | +0.1   | +0.1   |
| 299-334 | +0.1   | 0.0    | 0.0    | 0.0    | -0.1  | -0.1   | 0.0    | 0.0    | 0.0     | 0.0    | 0.0    | +0.1   | +0.1   |

✓

OUTLYING ISLANDS; SCOTLAND, WEST COAST

| No.  | PLACE                           | Lat.<br>N.<br>Long.<br>W. | TIME DIFFERENCES                         |                             |                     |                     | HEIGHT DIFFERENCES (IN METRES) |                     |             |      | M.L.<br>Z.<br>m. |            |
|------|---------------------------------|---------------------------|--|-----------------------------|---------------------|---------------------|--------------------------------|---------------------|-------------|------|------------------|------------|
|      |                                 |                           | High<br>Water<br>(Zone<br>U.T. (G.M.T.)) | Low<br>Water<br>and<br>1800 | 0300<br>and<br>1500 | 0900<br>and<br>2100 | MHWS                           | MHWN                | MLWN        | MLWS |                  |            |
| 334  | ULLAPOOL                        | .                         | .  | (see page 33)               | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 0300<br>and<br>1500            | 0900<br>and<br>2100 | 5.2         | 3.9  | 2.1              | 0.7        |
| 322  | St. Kilda<br>Village Bay        | .                         | .  | 57 48 8 34                  | -0110               | -0040               | -0100                          | -0100               | -1.9        | -1.4 | -0.9             | -0.3 1.91  |
| 323  | Flannan Isles                   | .                         | .  | 58 16 7 36                  | -0036               | -0026               | -0026                          | -0036               | -1.3        | -0.9 | -0.7             | -0.2 ⊖     |
| 324  | Rockall                         | .                         | .  | 57 36 13 41                 | -0241               | -0231               | -0231                          | -0241               | -3.2        | -2.4 | ⊖                | ⊖ 1.6 x    |
| 327  | Loch Bervie                     | .                         | .  | 58 27 5 03                  | +0030               | +0010               | +0010                          | +0020               | -0.3        | -0.3 | -0.2             | 0.0 2.70   |
| 328  | Loch Laxford                    | .                         | .  | 58 24 5 05                  | +0015               | +0015               | +0005                          | +0005               | -0.3        | -0.4 | -0.2             | 0.0 2.7 x  |
| 329  | Eddrachillis Bay<br>Badcall Bay | .                         | .  | 58 19 5 08                  | +0005               | +0005               | +0005                          | +0005               | -0.7        | -0.5 | -0.5             | +0.2 ⊖     |
| 330  | Loch Nedd                       | .                         | .  | 58 14 5 10                  | 0000                | 0000                | 0000                           | 0000                | -0.3        | -0.2 | -0.2             | 0.0 ⊖      |
| 332  | Loch Inver                      | .                         | .  | 58 09 5 18                  | -0005               | -0005               | -0005                          | -0005               | -0.2        | 0.0  | 0.0              | +0.1 3.05  |
| 333  | Summer Isles<br>Tanera Mor      | .                         | .  | 58 01 5 24                  | -0005               | -0005               | -0010                          | -0010               | -0.1        | +0.1 | 0.0              | +0.1 ⊖     |
| 334  | Loch Broom<br>ULLAPOOL          | .                         | .  | 57 54 5 10                  | STANDARD PORT       |                     |                                |                     | See Table V |      |                  | 3.02       |
| 336  | Loch Ewe<br>Mellon Charles      | .                         | .  | 57 51 5 38                  | -0010               | -0010               | -0010                          | -0010               | -0.1        | 1.0  | 1.0              | 0.0 2.94   |
| 337  | Loch Gairloch<br>Gairloch       | .                         | .  | 57 43 5 41                  | -0020               | -0020               | -0010                          | -0010               | 0.0         | +0.1 | -0.3             | -0.1 ⊖     |
| 338  | Loch Torridon<br>Sheildag       | .                         | .  | 57 31 5 39                  | -0020               | -0020               | -0015                          | -0015               | +0.4        | +0.3 | +0.1             | 0.0 ⊖      |
| 338a | Inner Sound<br>Applecross       | .                         | .  | 57 26 5 48                  | -0020               | -0015               | -0005                          | -0025               | +0.1        | +0.1 | +0.1             | 0.0 3.06   |
| 339  | Loch Carron<br>Plockton         | .                         | .  | 57 20 5 39                  | -0020               | -0020               | -0010                          | -0010               | +0.3        | +0.2 | +0.1             | +0.1 ⊖     |
| 341  | Skye<br>Broadford Bay           | .                         | .  | 57 15 5 54                  | -0035               | -0020               | -0025                          | -0030               | +0.3        | +0.2 | +0.1             | -0.1 3.20  |
| 342  | Portree                         | .                         | .  | 57 24 6 11                  | -0025               | -0025               | -0025                          | -0025               | +0.1        | -0.2 | -0.2             | 0.0 ⊖      |
| 343  | Loch Snizort (Uig Bay)          | .                         | .  | 57 35 6 22                  | -0045               | -0020               | -0005                          | -0025               | +0.1        | -0.4 | -0.2             | 0.0 3.03   |
| 344  | Loch Dunvegan                   | .                         | .  | 57 27 6 38                  | -0105               | -0030               | -0020                          | -0040               | 0.0         | -0.1 | 0.0              | 0.0 ⊖      |
| 345  | Loch Harport                    | .                         | .  | 57 20 6 25                  | -0115               | -0035               | -0020                          | -0100               | -0.1        | -0.1 | 0.0              | +0.1 ⊖     |
| 346  | Soay<br>Camus nan Gall          | .                         | .  | 57 09 6 13                  | -0055               | -0025               | -0025                          | -0045               | -0.4        | -0.2 | ⊖                | ⊖ ⊖        |
| 349  | Loch Alsh<br>Kyle of Lochalsh   | .                         | .  | 57 17 5 43                  | -0040               | -0020               | -0005                          | -0025               | +0.1        | 0.0  | +0.1             | +0.1 3.06  |
| 349a | Dornie Bridge                   | .                         | .  | 57 17 5 31                  | -0040               | -0010               | -0005                          | -0020               | +0.1        | -0.1 | 0.0              | 0.0 2.98 c |
| 351  | Kyle Rhea<br>Glenelg Bay        | .                         | .  | 57 13 5 38                  | -0105               | -0034               | -0034                          | -0054               | -0.4        | -0.4 | -0.9             | -0.1 ⊖     |
| 352  | Loch Hourn                      | .                         | .  | 57 06 5 34                  | -0125               | -0050               | -0040                          | -0110               | -0.2        | -0.1 | -0.1             | +0.1 2.93  |
| 372  | OBAN                            | .                         | .  |                             | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 0100<br>and<br>1300            | 0700<br>and<br>1900 | 4.0         | 2.9  | 1.8              | 0.7        |
| 353  | Loch Nevis<br>Inverie Bay       | .                         | .  | 57 02 5 41                  | +0030               | +0020               | +0035                          | +0020               | +1.0        | +0.9 | +0.2             | 0.0 ⊖      |
| 353a | Mallaig                         | .                         | .  | 57 00 5 50                  | +0040               | +0020               | +0035                          | +0030               | +1.0        | +0.9 | +0.3             | 0.0 ⊖      |
| 354  | Eigg<br>Bay of Laig             | .                         | .  | 56 55 6 10                  | +0015               | +0030               | +0040                          | +0005               | +0.7        | +0.6 | -0.2             | -0.2 ⊖     |
| 355  | Loch Moidart                    | .                         | .  | 56 47 5 53                  | +0015               | +0015               | +0040                          | +0020               | +0.8        | +0.6 | -0.2             | -0.2 ⊖     |
| 356  | Coll<br>Loch Eatharna           | .                         | .  | 56 37 6 31                  | +0025               | +0010               | +0015                          | +0025               | +0.4        | +0.3 | ⊖                | ⊖ ⊖        |
| 357  | Tiree<br>Gott Bay               | .                         | .  | 56 31 6 48                  | +0015               | 0000                | 0000                           | +0015               | +0.1        | +0.1 | -0.1             | -0.1 2.42  |

⊖ No data.

\* See notes on page 344.

c For intermediate heights, use harmonic constants (see Part III) and N.P. 159.

x M.L. inferred.

SCOTLAND, WEST COAST

| No.                  | PLACE              | Lat.<br>N. | Long.<br>W. | TIME DIFFERENCES    |                     |                     |                     | HEIGHT DIFFERENCES (IN METRES) |                       |      |      | M.L.<br>Z.<br>m. |      |
|----------------------|--------------------|------------|-------------|---------------------|---------------------|---------------------|---------------------|--------------------------------|-----------------------|------|------|------------------|------|
|                      |                    |            |             | 0100<br>and<br>1300 | 0700<br>and<br>1900 | 0900<br>and<br>1300 | 0800<br>and<br>2000 | MHWS                           | MHWN                  | MLWN | MLWS |                  |      |
| 372                  | OBAN               |            |             |                     |                     |                     |                     | 4.0                            | 2.9                   | 1.8  | 0.7  |                  |      |
| <i>Mull</i>          |                    |            |             |                     |                     |                     |                     |                                |                       |      |      |                  |      |
| 359                  | Carsaig Bay        | . . .      | 56 19       | 5 59                | -0015               | -0005               | -0030               | +0020                          | +0.1                  | +0.2 | 0.0  | -0.1             | 0    |
| 360                  | Iona               | . . .      | 56 19       | 6 23                | -0010               | -0005               | -0020               | +0015                          | 0.0                   | +0.1 | -0.3 | -0.2             | 2.36 |
| 361                  | Bunessan           | . . .      | 56 19       | 6 14                | -0015               | -0015               | -0010               | -0015                          | +0.3                  | +0.1 | 0.0  | -0.1             | 0    |
| 362                  | Ulva Sound         | . . .      | 56 29       | 6 08                | -0010               | -0015               | 0000                | -0005                          | +0.4                  | +0.3 | 0.0  | -0.1             | 0    |
| <i>Loch Sunart</i>   |                    |            |             |                     |                     |                     |                     |                                |                       |      |      |                  |      |
| 363                  | Salen              | . . .      | 56 42       | 5 47                | -0015               | +0015               | +0010               | +0005                          | +0.6                  | +0.5 | -0.1 | -0.1             | 2.53 |
| <i>Sound of Mull</i> |                    |            |             |                     |                     |                     |                     |                                |                       |      |      |                  |      |
| 364                  | Tobermory          | . . .      | 56 37       | 6 04                | +0025               | +0010               | +0015               | +0025                          | +0.4                  | +0.4 | 0.0  | 0.0              | 2.55 |
| 364a                 | Salen              | . . .      | 56 32       | 5 56                | +0045               | +0015               | +0020               | +0030                          | +0.2                  | +0.2 | -0.1 | 0.0              | 2.43 |
| 365                  | Loch Aline         | . . .      | 56 32       | 5 46                | 0                   | +0012               | +0012               | 0                              | +0.5                  | +0.3 | 0    | 0                | 0    |
| 365a                 | Craignure          | . . .      | 56 28       | 5 42                | +0030               | +0005               | +0010               | +0015                          | 0.0                   | +0.1 | -0.1 | -0.1             | 2.38 |
| <i>Loch Linnhe</i>   |                    |            |             |                     |                     |                     |                     |                                |                       |      |      |                  |      |
| 367                  | Corran             | . . .      | 56 43       | 5 14                | +0007               | +0007               | +0004               | +0004                          | +0.4                  | +0.4 | -0.1 | 0.0              | 0    |
| 368                  | Corpach            | . . .      | 56 50       | 5 07                | +0022               | +0022               | +0020               | +0020                          | +0.1                  | +0.2 | +0.1 | +0.2             | 2.5  |
| 368a                 | Loch Eil Head      | . . .      | 56 51       | 5 20                | +0046               | +0046               | +0045               | +0045                          | 0                     | 0    | 0    | 0                | 0    |
| 369                  | Loch Leven Head    | . . .      | 56 43       | 5 00                | +0045               | +0045               | +0045               | +0045                          | 0                     | 0    | 0    | 0                | 0    |
| <i>Loch Linnhe</i>   |                    |            |             |                     |                     |                     |                     |                                |                       |      |      |                  |      |
| 370                  | Port Appin         | . . .      | 56 33       | 5 25                | -0005               | -0005               | -0030               | 0000                           | +0.2                  | +0.2 | +0.1 | +0.1             | 2.35 |
| <i>Loch Creran</i>   |                    |            |             |                     |                     |                     |                     |                                |                       |      |      |                  |      |
| 370a                 | Barcaldine Pier    | . . .      | 56 32       | 5 19                | +0010               | +0020               | +0040               | +0015                          | +0.1                  | +0.1 | 0.0  | +0.1             | 0    |
| 370b                 | Loch Creran Head   | . . .      | 56 33       | 5 16                | +0015               | +0025               | +0120               | +0020                          | -0.3                  | -0.3 | -0.4 | -0.3             | 0    |
| <i>Loch Etive</i>    |                    |            |             |                     |                     |                     |                     |                                |                       |      |      |                  |      |
| 371                  | Dunstaffnage Bay   | . . .      | 56 27       | 5 26                | +0005               | 0000                | 0000                | +0005                          | +0.1                  | +0.1 | +0.1 | +0.1             | 0    |
| 371a                 | Connel             | . . .      | 56 27       | 5 24                | +0020               | +0005               | +0010               | +0015                          | -0.3                  | -0.2 | -0.1 | +0.1             | 0    |
| 371b                 | Bonawe             | . . .      | 57 27       | 5 13                | +0150               | +0205               | +0240               | +0210                          | -2.0                  | -1.7 | -1.3 | -0.5             | 1.2  |
| 372                  | OBAN               | . . .      | 56 25       | 5 29                | STANDARD PORT       |                     |                     |                                | See Table V           |      |      |                  | 2.40 |
| 373                  | Seil Sound         | . . .      | 56 18       | 5 35                | -0035               | -0015               | -0040               | -0015                          | -1.3                  | -0.9 | -0.7 | -0.3             | 1.39 |
| <i>Colonsay</i>      |                    |            |             |                     |                     |                     |                     |                                |                       |      |      |                  |      |
| 374                  | Scalasaig          | . . .      | 56 04       | 6 10                | -0020               | -0005               | -0015               | +0005                          | -0.1                  | -0.2 | -0.2 | -0.2             | 0    |
| <i>Jura</i>          |                    |            |             |                     |                     |                     |                     |                                |                       |      |      |                  |      |
| 375                  | Glengarrisdale Bay | . . .      | 56 06       | 5 47                | -0020               | 0000                | -0010               | 0000                           | -0.4                  | -0.2 | 0.0  | -0.2             | 2.13 |
| 372                  | OBAN               |            |             |                     |                     |                     |                     | 4.0                            | 2.9                   | 1.8  | 0.7  |                  |      |
| <i>Islay</i>         |                    |            |             |                     |                     |                     |                     |                                |                       |      |      |                  |      |
| 377                  | Rubha A'Mhail      | . . .      | 55 56       | 6 07                | -0020               | 0000                | +0005               | -0015                          | -0.3                  | -0.1 | -0.3 | -0.1             | 2.11 |
| 378                  | Ardnave Point      | . . .      | 55 52       | 6 20                | -0035               | +0010               | 0000                | -0025                          | -0.4                  | -0.2 | -0.3 | -0.1             | 2.02 |
| 379                  | Orsay Island       | . . .      | 55 41       | 6 31                | -0110               | -0110               | -0040               | -0040                          | -1.4                  | -0.6 | -0.5 | -0.2             | 1.37 |
| 380                  | Bruichladdich      | . . .      | 55 48       | 6 22                | -0100               | -0005               | -0110               | -0040                          | -1.7                  | -1.4 | -0.4 | +0.1             | 1.53 |
| 381                  | Port Ellen         | . . .      | 55 38       | 6 11                | -0530               | -0050               | -0045               | -0530                          | -3.1                  | -2.1 | -1.3 | -0.4             | 0.57 |
| 382                  | Port Askaig        | . . .      | 55 51       | 6 06                | -0110               | -0030               | -0020               | -0020                          | -1.9                  | -1.4 | -0.8 | -0.3             | 1.16 |
| <i>Sound of Jura</i> |                    |            |             |                     |                     |                     |                     |                                |                       |      |      |                  |      |
| 383                  | Craighouse         | . . .      | 55 50       | 5 57                | -0430               | -0130               | -0050               | -0500                          | -2.8                  | -2.0 | -1.4 | -0.4             | 0.42 |
| 384                  | Loch Beag          | . . .      | 56 09       | 5 36                | -0110               | -0045               | -0035               | -0045                          | -1.6                  | -1.2 | -0.8 | -0.4             | 1.20 |
| 387                  | Carsaig Bay        | . . .      | 56 02       | 5 38                | -0105               | -0040               | -0050               | -0050                          | -2.1                  | -1.6 | -1.0 | -0.4             | 0.91 |
| 389                  | Gigha Sound        | . . .      | 55 41       | 5 44                | -0450               | -0210               | -0130               | -0410                          | -2.5                  | -1.6 | -1.0 | -0.1             | 0.93 |
| 390                  | Machrihanish       | . . .      | 55 25       | 5 45                | -0520               | -0350               | -0340               | -0540                          | Mean range 0.5 metres |      |      |                  | 1.02 |

SEASONAL CHANGES IN MEAN LEVEL

| No.     | Jan. 1 | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1 | Aug. 1 | Sep. 1 | Oct. 1 | Nov. 1 | Dec. 1 | Jan. 1 |
|---------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| 322-390 | +0.1   | 0.0    | 0.0    | 0.0    | -0.1  | -0.1   | -0.1   | 0.0    | 0.0    | 0.0    | 0.0    | +0.1   | +0.1   |

SCOTLAND, WEST COAST

| No.                           | PLACE               | Lat.<br>N. | Long.<br>W. | TIME DIFFERENCES               |                     |                     |                     | HEIGHT DIFFERENCES (IN METRES) |      |      |      | M.L.<br>Z.<br>m. |
|-------------------------------|---------------------|------------|-------------|--------------------------------|---------------------|---------------------|---------------------|--------------------------------|------|------|------|------------------|
|                               |                     |            |             | High<br>Water<br>(Zone G.M.T.) | Low Water           | MHWs                | MHWN                | MLWN                           | MLWS |      |      |                  |
| 404                           | GREENOCK            |            |             | (see page 42)                  | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 0000<br>and<br>1200 | 0600<br>and<br>1800            | 3.4  | 2.9  | 1.0  | 0.4              |
| <i>Firth of Clyde</i>         |                     |            |             |                                |                     |                     |                     |                                |      |      |      |                  |
| 391                           | Southend, Kintyre   | 55 19      | 5 38        | -0020                          | -0040               | +0040               | +0035               | -1.3                           | -1.2 | -0.5 | -0.2 | 1.17             |
| 392                           | Sanda Island        | 55 17      | 5 35        | -0040                          | -0040               | 0                   | 0                   | -1.0                           | -0.9 | 0    | 0    | 1.37             |
| 393                           | Campbeltown         | 55 25      | 5 36        | +0010                          | +0005               | +0005               | +0020               | -0.5                           | -0.3 | +0.1 | +0.2 | 1.80             |
| 393a                          | Loch Ranza          | 55 43      | 5 18        | -0015                          | -0005               | -0005               | -0010               | -0.4                           | -0.3 | -0.1 | 0.0  | 1.15             |
| <i>Loch Fyne</i>              |                     |            |             |                                |                     |                     |                     |                                |      |      |      |                  |
| 394                           | East Loch Tarbert   | 55 52      | 5 24        | +0005                          | +0005               | -0020               | +0015               | 0.0                            | 0.0  | +0.1 | -0.1 | 1.02             |
| 395                           | Inverary            | 56 14      | 5 04        | +0011                          | +0011               | +0034               | +0034               | -0.1                           | +0.1 | -0.5 | -0.2 | 0                |
| <i>Kyles of Bute</i>          |                     |            |             |                                |                     |                     |                     |                                |      |      |      |                  |
| 396                           | Rubha Bodach        | 55 55      | 5 09        | -0020                          | -0010               | -0007               | -0007               | -0.2                           | -0.1 | +0.2 | +0.2 | 1.78             |
| 396a                          | Tighnabruich        | 55 55      | 5 13        | +0007                          | -0010               | -0002               | -0015               | 0.0                            | +0.2 | +0.4 | +0.5 | 2.08             |
| <i>Firth of Clyde (cont.)</i> |                     |            |             |                                |                     |                     |                     |                                |      |      |      |                  |
| 398                           | Millport            | 55 45      | 4 56        | -0005                          | -0025               | -0025               | -0005               | 0.0                            | -0.1 | 0.0  | +0.1 | 1.94             |
| 399                           | Rothesay Bay        | 55 51      | 5 03        | -0020                          | -0015               | -0010               | -0002               | +0.2                           | +0.2 | +0.2 | +0.2 | 1.90             |
| 399a                          | Wemyss Bay          | 55 53      | 4 53        | -0005                          | -0005               | -0005               | -0005               | 0.0                            | +0.1 | +0.1 | +0.1 | 0                |
| <i>Loch Long</i>              |                     |            |             |                                |                     |                     |                     |                                |      |      |      |                  |
| 399b                          | Couplport           | 56 03      | 4 53        | -0005                          | -0005               | -0005               | -0005               | 0.0                            | 0.0  | -0.1 | -0.1 | 1.82             |
| 399c                          | Lochgoilhead        | 56 10      | 4 54        | +0015                          | 0000                | -0005               | -0005               | -0.2                           | -0.3 | -0.3 | -0.3 | 1.71             |
| 401                           | Arrochar            | 56 12      | 4 45        | -0005                          | -0005               | -0005               | -0005               | 0.0                            | 0.0  | -0.1 | -0.1 | 0                |
| <i>Care Loch</i>              |                     |            |             |                                |                     |                     |                     |                                |      |      |      |                  |
| 402                           | Rosneath (Rhu Pier) | 56 01      | 4 46        | -0005                          | -0005               | -0005               | -0005               | 0.0                            | -0.1 | 0.0  | 0.0  | 2.02             |
| 402a                          | Shandon             | 56 03      | 4 49        | -0005                          | -0005               | -0005               | -0005               | 0.0                            | 0.0  | 0.0  | -0.1 | 0                |
| 402b                          | Garelochhead        | 56 05      | 4 50        | 0000                           | 0000                | 0000                | 0000                | 0.0                            | 0.0  | 0.0  | -0.1 | 0                |
| <i>River Clyde</i>            |                     |            |             |                                |                     |                     |                     |                                |      |      |      |                  |
| 403                           | Helensburgh         | 56 00      | 4 44        | 0000                           | 0000                | 0000                | 0000                | 0.0                            | 0.0  | 0.0  | 0.0  | 0                |
| 404                           | GREENOCK            | 55 57      | 4 46        | STANDARD PORT                  |                     |                     |                     | See Table V                    |      |      |      | 2.00             |
| 405                           | Port Glasgow        | 55 56      | 4 41        | +0010                          | +0005               | +0010               | +0020               | +0.2                           | +0.1 | 0.0  | 0.0  | 0                |
| 406                           | Bowling             | 55 56      | 4 29        | +0020                          | +0010               | +0030               | +0055               | +0.6                           | +0.5 | +0.3 | +0.1 | 0                |
| 406a                          | Renfrew             | 55 53      | 4 23        | +0025                          | +0015               | +0035               | +0100               | +0.9                           | +0.8 | +0.5 | +0.2 | 0                |
| 407                           | Glasgow             | 55 51      | 4 17        | +0025                          | +0015               | +0035               | +0105               | +1.3                           | +1.2 | +0.6 | +0.4 | 2.77             |
| <i>Firth of Clyde (cont.)</i> |                     |            |             |                                |                     |                     |                     |                                |      |      |      |                  |
| 408                           | Brodick Bay         | 55 35      | 5 08        | 0000                           | 0000                | +0005               | +0005               | -0.2                           | -0.2 | 0.0  | 0.0  | 1.86             |
| 409                           | Lamlash             | 55 32      | 5 07        | -0016                          | -0036               | -0024               | -0004               | -0.2                           | -0.2 | 0    | 0    | 0                |
| 410                           | Ardrossan           | 55 38      | 4 49        | -0020                          | -0010               | -0010               | -0010               | -0.2                           | -0.2 | +0.1 | +0.1 | 1.86             |
| 411                           | Irvine              | 55 36      | 4 41        | -0020                          | -0020               | -0030               | -0010               | -0.3                           | -0.3 | -0.1 | 0.0  | 0                |
| 412                           | Troon               | 55 33      | 4 41        | -0025                          | -0025               | -0020               | -0020               | -0.2                           | -0.2 | 0.0  | 0.0  | 1.91             |
| 413                           | Ayr                 | 55 28      | 4 39        | -0025                          | -0025               | -0030               | -0015               | -0.4                           | -0.3 | +0.1 | +0.1 | 0                |
| 414                           | Girvan              | 55 15      | 4 52        | -0025                          | -0040               | -0035               | -0010               | -0.3                           | -0.3 | -0.1 | 0.0  | 1.82             |
| <i>Loch Ryan</i>              |                     |            |             |                                |                     |                     |                     |                                |      |      |      |                  |
| 414a                          | Stranraer           | 54 55      | 5 03        | -0020                          | -0020               | -0017               | -0017               | -0.4                           | -0.4 | -0.4 | -0.2 | 0                |
| 452                           | LIVERPOOL           |            |             | (see page 46)                  | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 0200<br>and<br>1400 | 0800<br>and<br>2000            | 9.3  | 7.4  | 2.9  | 0.9              |
| 415                           | Portpatrick         | 54 50      | 5 07        | +0018                          | +0026               | 0000                | -0035               | -5.5                           | -4.4 | -2.0 | -0.6 | 2.08             |
| <i>Wigtown Bay</i>            |                     |            |             |                                |                     |                     |                     |                                |      |      |      |                  |
| 420                           | Drummore            | 54 41      | 4 53        | +0030                          | +0040               | +0015               | +0020               | -3.4                           | -2.5 | -0.9 | -0.3 | 3.32             |
| 420a                          | Port William        | 54 43      | 4 40        | +0030                          | +0030               | +0025               | +0000               | -2.9                           | -2.2 | -0.8 | 0    | 0                |
| 421                           | Isle of Whithorn    | 54 42      | 4 22        | +0020                          | +0025               | +0025               | +0005               | -2.4                           | -2.0 | -0.8 | -0.2 | 3.74             |
| 422                           | Garliestown         | 54 47      | 4 21        | +0025                          | +0035               | +0030               | +0005               | -2.3                           | -1.7 | -0.5 | 0    | 0                |
| <i>Solway Firth</i>           |                     |            |             |                                |                     |                     |                     |                                |      |      |      |                  |
| 422a                          | Kirkcudbright Bay   | 54 48      | 4 04        | +0015                          | +0015               | +0010               | 0000                | -1.8                           | -1.5 | -0.5 | -0.1 | 0                |
| 424                           | Hestan Islet        | 54 50      | 3 48        | +0025                          | +0025               | +0020               | +0025               | -1.0                           | -1.1 | -0.5 | 0.0  | 4.21             |
| 425                           | Southerness Point   | 54 52      | 3 36        | +0030                          | +0030               | +0030               | +0010               | -0.7                           | -0.7 | 0    | 0    | 0                |
| 426                           | Annan Waterfoot     | 54 58      | 3 16        | +0050                          | +0105               | +0220               | +0110               | -2.2                           | -2.6 | -2.7 | +    | *                |
| 430                           | Torduff Point       | 54 58      | 3 09        | +0105                          | +0140               | +0520               | +0410               | -4.1                           | -4.9 | +    | +    | *                |
| 431                           | Redkirk             | 54 59      | 3 06        | +0110                          | +0215               | +0715               | +0445               | -5.5                           | -6.2 | +    | +    | *                |

① No data.

§ Dries out except for river water.

† The tide does not normally fall below Chart Datum.

\* See notes on page 344.

c For intermediate heights, use harmonic constants (see Part III) and N.P. 159.

x M.L. inferred.

## ENGLAND, WEST COAST; ISLE OF MAN; WALES

| No.                            | PLACE                 | Lat.<br>N. | Long.<br>W. | TIME DIFFERENCES               |                             |                     |                              | HEIGHT DIFFERENCES (IN METRES) |             |        |        | M.L.<br>m. |        |
|--------------------------------|-----------------------|------------|-------------|--------------------------------|-----------------------------|---------------------|------------------------------|--------------------------------|-------------|--------|--------|------------|--------|
|                                |                       |            |             | High<br>Water<br>(Zone G.M.T.) | Low<br>Water<br>and<br>1400 | 0700<br>and<br>1900 | MHWS<br>MHWN<br>MLWN<br>MLWS | Z <sub>0</sub>                 |             |        |        |            |        |
| 452                            | LIVERPOOL             | .          | .           | (see pag. 46)                  | 0000<br>and<br>1200         | 0600<br>and<br>1800 | 0200<br>and<br>1400          | 0700<br>and<br>1900            | 9.3         | 7.4    | 2.9    | 0.9        |        |
| <b>England</b>                 |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| <i>Solway Firth</i>            |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| 432                            | Silloth               | .          | 54 52       | 3 24                           | +0030                       | +0040               | +0045                        | +0055                          | -0.1        | -0.3   | -0.6   | -0.1       |        |
| 433                            | Maryport              | .          | 54 43       | 3 30                           | +0017                       | +0032               | +0020                        | +0005                          | -0.7        | -0.8   | -0.4   | 0.0        |        |
| 434                            | Workington            | .          | 54 39       | 3 34                           | +0020                       | +0020               | +0020                        | +0010                          | -1.1        | -1.0   | -0.1   | +0.3       |        |
| 435                            | Whitchaven            | .          | 54 33       | 3 36                           | +0005                       | +0015               | +0010                        | +0005                          | -1.3        | -1.1   | -0.5   | +0.1       |        |
| 436                            | Tarn Point            | .          | 54 17       | 3 25                           | +0005                       | +0005               | +0010                        | 0000                           | -1.0        | -1.0   | -0.4   | 0.0        |        |
| 437                            | Duddon Bar            | .          | 54 09       | 3 20                           | +0003                       | +0003               | +0008                        | +0002                          | -0.8        | -0.8   | -0.3   | 0.0        |        |
| <i>Morecambe Bay</i>           |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| 440                            | Barrow (Ramsden Dock) | .          | 54 06       | 3 12                           | +0015                       | +0015               | +0020                        | +0020                          | -0.2        | -0.3   | -0.1   | +0.1       |        |
| 440a                           | Haws Point            | .          | 54 03       | 3 10                           | +0010                       | +0010               | +0010                        | +0010                          | -0.1        | -0.3   | -0.1   | +0.1       |        |
| 440b                           | Ulverston             | .          | 54 11       | 3 04                           | +0020                       | +0040               | ○                            | ○                              | 0.0         | -0.1   | ○      | ○          |        |
| 440c                           | Arnside               | .          | 54 12       | 2 51                           | +0100                       | +0135               | ○                            | ○                              | +0.5        | +0.2   | ○      | ○          |        |
| 440d                           | Morecambe             | .          | 54 04       | 2 52                           | +0005                       | +0010               | +0030                        | +0015                          | +0.2        | 0.0    | 0.0    | +0.2       |        |
| 441                            | Heysham               | .          | 54 02       | 2 55                           | +0005                       | +0005               | +0015                        | 0000                           | +0.1        | 0.0    | 0.0    | +0.2       |        |
| <i>River Lune</i>              |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| 442                            | Glasson Dock          | .          | 54 00       | 2 51                           | +0020                       | +0030               | +0220                        | +0240                          | -2.7        | -3.0   | ○      | ○          |        |
| 442a                           | Lancaster             | .          | 54 03       | 2 49                           | +0110                       | +0030               | ○                            | ○                              | -5.0        | -4.9   | §      | §          |        |
| <i>River Wyre</i>              |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| 443                            | Wyre Lighthouse       | .          | 53 57       | 3 02                           | -0010                       | -0010               | +0005                        | 0000                           | -0.1        | -0.1   | ○      | ○          |        |
| 444                            | Fleetwood             | .          | 53 56       | 3 00                           | 0000                        | 0000                | +0005                        | 0000                           | -0.1        | -0.1   | +0.1   | +0.3       |        |
| 445                            | Blackpool             | .          | 53 49       | 3 04                           | -0015                       | -0005               | -0005                        | -0015                          | -0.4        | -0.4   | -0.1   | +0.1       |        |
| <i>River Ribble</i>            |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| 446                            | Preston               | .          | 53 46       | 2 45                           | +0010                       | +0010               | +0335                        | +0310                          | -4.0        | -4.1   | -2.8   | -0.8       |        |
| <i>Liverpool Bay</i>           |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| 447                            | Southport             | .          | 53 39       | 3 01                           | -0020                       | -0010               | ○                            | ○                              | -0.3        | -0.3   | ○      | ○          |        |
| 448                            | Formby                | .          | 53 32       | 3 07                           | -0015                       | -0010               | -0020                        | -0020                          | -0.3        | -0.1   | 0.0    | +0.1       |        |
| 450                            | Rock Channel          | .          | 53 27       | 3 07                           | -0030                       | -0030               | -0030                        | -0030                          | -0.4        | -0.2   | 0.0    | 0.0        |        |
| <i>River Mersey</i>            |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| 452                            | LIVERPOOL             | .          | 53 25       | 3 00                           | STANDARD PORT               |                     |                              |                                | See Table V |        |        |            |        |
| 453                            | Eastham               | .          | 53 19       | 2 57                           | +0003                       | +0006               | +0015                        | +0030                          | +0.4        | +0.3   | -0.1   | -0.1       |        |
| 455                            | Hale Head             | .          | 53 19       | 2 48                           | +0030                       | +0025               | ○                            | ○                              | -2.4        | -2.5   | ○      | ○          |        |
| 456                            | Widnes                | .          | 53 21       | 2 44                           | +0040                       | +0045               | +0400                        | +0345                          | -4.2        | -4.4   | -2.5   | -0.3       |        |
| 456a                           | Fiddler's Ferry       | .          | 53 22       | 2 39                           | +0100                       | +0115               | +0540                        | +0450                          | -5.9        | -6.3   | -2.4   | -0.4       |        |
| <i>River Dee</i>               |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| 461                            | Hilbre Island         | .          | 53 23       | 3 13                           | -0015                       | -0012               | -0010                        | -0015                          | -0.3        | -0.2   | +0.2   | +0.4       |        |
| 462                            | Mostyn Quay           | .          | 53 19       | 3 16                           | -0020                       | -0015               | -0020                        | -0020                          | -0.8        | -0.7   | ○      | ○          |        |
| 463                            | Connah's Quay         | .          | 53 13       | 3 03                           | 0000                        | +0015               | +0355                        | +0340                          | -4.6        | -4.4   | §      | ○          |        |
| 464                            | Chester               | .          | 53 12       | 2 54                           | +0105                       | +0105               | +0500                        | +0500                          | -5.3        | -5.4   | §      | *          |        |
| <i>Isle of Man</i>             |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| 466                            | Peel                  | .          | 54 14       | 4 42                           | -0015                       | +0010               | 0009                         | -0010                          | -4.0        | -3.2   | -1.4   | -0.4       |        |
| 467                            | Ramsey                | .          | 54 19       | 4 22                           | -0003                       | +0012               | 0000                         | -0015                          | -2.1        | -1.7   | -0.3   | +0.1       |        |
| 468                            | Douglas               | .          | 54 09       | 4 28                           | -0004                       | -0004               | -0022                        | -0032                          | -2.4        | -2.0   | -0.5   | -0.1       |        |
| 468a                           | Port St. Mary         | .          | 54 04       | 4 44                           | +0005                       | +0015               | -0010                        | -0030                          | -3.4        | -2.7   | -1.2   | -0.3       |        |
| 469                            | Calf Sound            | .          | 54 04       | 4 48                           | +0005                       | +0005               | -0015                        | -0025                          | -3.2        | -2.6   | -0.9   | -0.3       |        |
| 469a                           | Port Erin             | .          | 54 05       | 4 46                           | -0005                       | +0015               | -0010                        | -0050                          | -4.1        | -3.2   | -1.3   | -0.5       |        |
| <i>Wales</i>                   |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| 470                            | Colwyn Bay            | .          | 53 18       | 3 43                           | -0035                       | -0025               | ○                            | ○                              | -1.5        | -1.3   | ○      | ○          |        |
| 471                            | Llandudno             | .          | 53 20       | 3 50                           | -0035                       | -0025               | -0025                        | -0035                          | -1.9        | -1.5   | -0.5   | -0.2       |        |
| 478                            | HOLYHEAD              | .          | .           | (see pag. 46)                  | 0000<br>and<br>1200         | 0600<br>and<br>1800 | 0500<br>and<br>1700          | 1100<br>and<br>2300            | 5.7         | 4.5    | 2.0    | 0.7        |        |
| 471a                           | Conwy                 | .          | .           | 53 17                          | 3 50                        | +0020               | +0020                        | ○                              | +0050       | +2.1   | +1.6   | +0.3       | ○      |
| <i>Menai Strait</i>            |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| 472                            | Beaumaris             | .          | 53 16       | 4 05                           | +0025                       | +0010               | +0055                        | +0035                          | +2.0        | +1.6   | +0.5   | +0.1       |        |
| 473                            | Menai Bridge          | .          | 53 13       | 4 09                           | +0030                       | +0010               | +0100                        | +0035                          | +1.7        | +1.4   | +0.3   | 0.0        |        |
| 474                            | Port Dinorwic         | .          | 53 11       | 4 13                           | -0015                       | -0025               | +0030                        | 0000                           | 0.0         | 0.0    | 0.0    | 3.38       |        |
| SEASONAL CHANGES IN MEAN LEVEL |                       |            |             |                                |                             |                     |                              |                                |             |        |        |            |        |
| No.                            | Jan. 1                | Feb. 1     | Mar. 1      | Apr. 1                         | May 1                       | June 1              | July 1                       | Aug. 1                         | Sep. 1      | Oct. 1 | Nov. 1 | Dec. 1     | Jan. 1 |
| 391-398                        | +0.1                  | 0.0        | -0.1        | -0.1                           | -0.1                        | -0.1                | 0.0                          | 0.0                            | 0.0         | 0.0    | +0.1   | +0.1       | +0.1   |
| 399-407                        | +0.2                  | +0.1       | 0.0         | -0.1                           | -0.1                        | -0.1                | -0.1                         | -0.1                           | 0.0         | 0.0    | +0.1   | +0.2       | +0.2   |
| 408-414a                       | +0.1                  | 0.0        | -0.1        | -0.1                           | -0.1                        | -0.1                | 0.0                          | 0.0                            | 0.0         | 0.0    | +0.1   | +0.1       | +0.1   |
| 415-444                        | 0.0                   | 0.0        | 0.0         | -0.1                           | -0.1                        | 0.0                 | 0.0                          | 0.0                            | 0.0         | 0.0    | +0.1   | +0.1       | 0.0    |
| 445-464                        | 0.0                   | 0.0        | -0.1        | -0.1                           | 0.0                         | 0.0                 | 0.0                          | 0.0                            | 0.0         | 0.0    | +0.1   | +0.1       | 0.0    |
| 466-478                        | +0.1                  | 0.0        | 0.0         | -0.1                           | -0.1                        | -0.1                | 0.0                          | 0.0                            | 0.0         | 0.0    | +0.1   | +0.1       | +0.1   |

| No.                  | PLACE              | Lat.<br>N. | Long.<br>W.   | TIME DIFFERENCES                   |                          |                     |                     | HEIGHT DIFFERENCES (IN METRES) |             |      |      | M.L.<br>Z <sub>m</sub><br>m. |       |
|----------------------|--------------------|------------|---------------|------------------------------------|--------------------------|---------------------|---------------------|--------------------------------|-------------|------|------|------------------------------|-------|
|                      |                    |            |               | High Water<br>(Zone U.T. (G.M.T.)) | Low Water<br>and<br>1800 | 0500<br>and<br>1700 | 1100<br>and<br>2300 | MHWS                           | MHWN        | MLWN | MLWS |                              |       |
| 478                  | HOLYHEAD           |            |               | 0000<br>and<br>1200                | 0600<br>and<br>1800      | 0500<br>and<br>1700 | 1100<br>and<br>2300 | 5.7                            | 4.5         | 2.0  | 0.7  |                              |       |
| 475                  | Caernarvon         | . . .      | 53 09         | 4 16                               | -0030                    | -0030               | +0015               | -0005                          | -0.4        | -0.4 | -0.1 | 3.04                         |       |
| 475a                 | Fort Belan         | . . .      | 53 07         | 4 20                               | -0040                    | -0015               | -0025               | -0005                          | -1.0        | -0.9 | -0.2 | 2.83                         |       |
| 476                  | Trwyn Dinmor       | . . .      | 53 19         | 4 03                               | +0025                    | +0015               | +0050               | +0035                          | +1.9        | +1.5 | +0.5 | 4.23                         |       |
| 476a                 | Moelfre            | . . .      | 53 20         | 4 14                               | +0025                    | +0020               | +0050               | +0035                          | +1.9        | +1.4 | +0.5 | 4.17                         |       |
| 477                  | Amlwch             | . . .      | 53 25         | 4 20                               | +0020                    | +0010               | +0035               | +0025                          | +1.6        | +1.3 | +0.5 | 4.08                         |       |
| 477a                 | Cemaes Bay         | . . .      | 53 25         | 4 27                               | +0020                    | +0025               | +0040               | +0035                          | +1.0        | +0.7 | +0.3 | 3.67                         |       |
| 478                  | HOLYHEAD           | . . .      | 53 19         | 4 37                               | STANDARD PORT            |                     |                     |                                | See Table V |      |      | 3.21                         |       |
| 479                  | Trearddur Bay      | . . .      | 53 16         | 4 37                               | -0045                    | -0025               | -0015               | -0015                          | -0.4        | -0.4 | 0.0  | +0.1                         | 3.08  |
| 479a                 | Porth Trecastell   | . . .      | 53 12         | 4 30                               | -0045                    | -0025               | -0005               | -0015                          | -0.6        | -0.6 | 0.0  | 0.0                          | 2.97  |
| 480                  | Llanddwyn Island   | . . .      | 53 08         | 4 25                               | -0115                    | -0055               | -0030               | -0020                          | -0.7        | -0.5 | -0.1 | 0.0                          | 2.95  |
| 480a                 | Trevor             | . . .      | 53 00         | 4 25                               | -0115                    | -0100               | -0030               | -0020                          | -0.8        | -0.9 | -0.2 | -0.1                         | 2.55  |
| 481                  | Porth Dinllaen     | . . .      | 52 57         | 4 34                               | -0120                    | -0105               | -0035               | -0025                          | -1.0        | -1.0 | -0.2 | -0.2                         | 2.51  |
| 481a                 | Porth Ysgaden      | . . .      | 52 54         | 4 39                               | -0125                    | -0110               | -0040               | -0035                          | -1.1        | -1.0 | -0.1 | -0.1                         | 2.45  |
| 482                  | Bardsey Island     | . . .      | 52 46         | 4 47                               | -0220                    | -0240               | -0145               | -0140                          | -1.2        | -1.2 | -0.5 | -0.1                         | 0.    |
| 496                  | MILFORD HAVEN      | . . .      | (see page 50) |                                    | 0100<br>and<br>1300      | 0800<br>and<br>2000 | 0100<br>and<br>1300 | 0700<br>and<br>1900            | 7.0         | 5.2  | 2.5  | 0.7                          |       |
| <i>Cardigan Bay</i>  |                    |            |               |                                    |                          |                     |                     |                                |             |      |      |                              |       |
| 482a                 | Aberdaron          | . . .      | 52 48         | 4 43                               | +0210                    | +0200               | +0240               | +0310                          | -2.4        | -1.9 | -0.6 | -0.2                         | 2.55  |
| 482b                 | St. Tudwal's Roads | . . .      | 52 49         | 4 29                               | +0155                    | +0145               | +0240               | +0310                          | -2.2        | -1.9 | -0.7 | -0.2                         | 2.52  |
| 483                  | Pwllheli           | . . .      | 52 53         | 4 24                               | +0210                    | +0150               | +0245               | +0320                          | -2.0        | -1.8 | -0.6 | -0.2                         | 2.59  |
| 483a                 | Criccieth          | . . .      | 52 55         | 4 14                               | +0210                    | +0155               | +0255               | +0320                          | -2.0        | -1.8 | -0.7 | -0.3                         | 2.56  |
| 484                  | Porthmadog         | . . .      | 52 55         | 4 08                               | +0235                    | +0210               | 0                   | 0                              | -1.9        | -1.8 | 0    | 0                            | c     |
| 485                  | Barmouth           | . . .      | 52 43         | 4 03                               | +0215                    | +0205               | +0310               | +0320                          | -2.0        | -1.7 | -0.7 | 0.0                          | 2.64  |
| 486                  | Aberdovey          | . . .      | 52 32         | 4 03                               | +0215                    | +0200               | +0230               | +0305                          | -2.0        | -1.7 | -0.5 | 0.0                          | 2.61  |
| 487                  | Aberystwyth        | . . .      | 52 24         | 4 05                               | +0145                    | +0130               | +0210               | +0245                          | -2.0        | -1.7 | -0.7 | 0.0                          | c     |
| 488                  | New Quay           | . . .      | 52 13         | 4 21                               | +0150                    | +0125               | +0155               | +0230                          | -2.1        | -1.8 | -0.6 | -0.1                         | 0.    |
| 488a                 | Aberporth          | . . .      | 52 08         | 4 33                               | +0135                    | +0120               | +0150               | +0220                          | -2.1        | -1.8 | -0.6 | -0.1                         | 2.6   |
| 489                  | Port Cardigan      | . . .      | 52 07         | 4 42                               | +0140                    | +0120               | +0220               | +0130                          | -2.3        | -1.8 | -0.5 | 0.0                          | 2.39  |
| 489a                 | Cardigan (Town)    | . . .      | 52 05         | 4 40                               | +0220                    | +0150               | 0                   | 0                              | -2.2        | -1.6 | 0    | 0                            | 0.    |
| 490                  | Fishguard          | . . .      | 52 00         | 4 58                               | +0115                    | +0100               | +0110               | +0135                          | -2.2        | -1.8 | -0.5 | +0.1                         | 2.52  |
| 491                  | Porthgain          | . . .      | 51 57         | 5 11                               | +0055                    | +0045               | +0100               | +0100                          | -2.5        | -1.8 | -0.6 | 0.0                          | 2.65  |
| 492                  | Ramsey Sound       | . . .      | 51 53         | 5 19                               | +0030                    | +0030               | +0030               | +0030                          | -1.9        | -1.3 | -0.3 | 0.0                          | 2.89  |
| 492a                 | Solva              | . . .      | 51 52         | 5 12                               | +0015                    | +0010               | +0035               | +0015                          | -1.5        | -1.0 | -0.2 | 0.0                          | 3.18  |
| 492b                 | Little Haven       | . . .      | 51 46         | 5 06                               | +0010                    | +0010               | +0025               | +0015                          | -1.1        | -0.8 | -0.2 | 0.0                          | 3.32  |
| 493                  | Martin's Haven     | . . .      | 51 44         | 5 15                               | +0010                    | +0010               | +0015               | +0015                          | -0.8        | -0.5 | +0.1 | +0.1                         | 3.54  |
| 494                  | Skomer Island      | . . .      | 51 44         | 5 17                               | -0005                    | -0005               | +0005               | +0005                          | -0.4        | -0.1 | 0.0  | 0.0                          | 0.    |
| 495                  | Dale Roads         | . . .      | 51 42         | 5 09                               | -0005                    | -0005               | -0008               | -0008                          | 0.0         | 0.0  | 0.0  | -0.1                         | 0.    |
| 496                  | MILFORD HAVEN      | . . .      | 51 42         | 5 01                               | STANDARD PORT            |                     |                     |                                | See Table V |      |      | 3.83                         |       |
| <i>Cleddau River</i> |                    |            |               |                                    |                          |                     |                     |                                |             |      |      |                              |       |
| 497                  | Neyland            | . . .      | 51 42         | 4 57                               | +0002                    | +0010               | 0000                | 0000                           | 0.0         | 0.0  | 0.0  | 0.0                          | 0.    |
| 498                  | Black Tar          | . . .      | 51 45         | 4 54                               | +0010                    | +0020               | +0005               | 0000                           | +0.1        | +0.1 | 0.0  | -0.1                         | 0.    |
| 499                  | Haverfordwest      | . . .      | 51 48         | 4 58                               | +0010                    | +0025               | 0                   | 0                              | -4.8        | -4.9 | §    | §                            | 0.    |
| 501                  | Stackpole Quay     | . . .      | 51 37         | 4 54                               | -0005                    | +0025               | -0010               | -0010                          | +0.9        | +0.7 | +0.2 | +0.3                         | 4.28  |
| 502                  | Tenby              | . . .      | 51 40         | 4 42                               | -0015                    | -0010               | -0015               | -0020                          | +1.4        | +1.1 | +0.5 | +0.2                         | 4.49  |
| <i>Towy River</i>    |                    |            |               |                                    |                          |                     |                     |                                |             |      |      |                              |       |
| 504                  | Ferryside          | . . .      | 51 46         | 4 22                               | 0000                     | -0010               | +0220               | 0000                           | -0.3        | -0.7 | -1.7 | -0.6                         | 0.    |
| 504a                 | Carmarthen         | . . .      | 51 51         | 4 18                               | +0010                    | 0000                | 0                   | 0                              | -4.4        | -4.8 | §    | §                            | 0.    |
| <i>Burry Inlet</i>   |                    |            |               |                                    |                          |                     |                     |                                |             |      |      |                              |       |
| 505                  | Burry Port         | . . .      | 51 41         | 4 15                               | +0003                    | +0003               | +0007               | +0007                          | +1.6        | +1.4 | +0.5 | +0.4                         | 4.75  |
| 505a                 | Llanelli           | . . .      | 51 40         | 4 10                               | -0003                    | -0003               | +0150               | +0020                          | +0.8        | +0.6 | 0    | 0                            | 0.    |
| 508                  | Mumbles            | . . .      | 51 34         | 3 58                               | +0005                    | +0010               | -0020               | -0015                          | +2.3        | +1.7 | +0.6 | +0.2                         | 5.1 x |
| 509                  | SWANSEA            | . . .      | 51 37         | 3 55                               | STANDARD PORT            |                     |                     |                                | See Table V |      |      | 5.24                         |       |
| 510                  | Port Talbot        | . . .      | 51 35         | 3 49                               | -0005                    | +0005               | -0015               | -0030                          | +2.6        | +2.1 | +0.8 | +0.3                         | 5.33  |
| 512                  | Porthcawl          | . . .      | 51 28         | 3 42                               | 0000                     | 0000                | 0000                | -0015                          | +2.9        | +2.3 | +0.8 | +0.3                         | 5.31  |

○ No data.

\* See notes on page 344.

§ Dries out except for river water.

a Data approximate.

c For intermediate heights, use harmonic constants (see Part III) and N.P.159.

x M.L. inferred.

## WALES; ENGLAND, WEST COAST

| No.                     | PLACE                          | Lat.<br>N. | Long.<br>W.   | TIME DIFFERENCES          |                          |                     |                     | HEIGHT DIFFERENCES (IN METRES) |      |      |      | M.L.<br>Z.<br>m. |
|-------------------------|--------------------------------|------------|---------------|---------------------------|--------------------------|---------------------|---------------------|--------------------------------|------|------|------|------------------|
|                         |                                |            |               | High Water<br>and<br>1800 | Low Water<br>and<br>2300 | 0300<br>and<br>1500 | 0800<br>and<br>2000 | MHWS                           | MHWN | MLWN | MLWS |                  |
| 523                     | PORT OF BRISTOL<br>(AVONMOUTH) |            | (see page 52) | 0600<br>and<br>1800       | 1100<br>and<br>2300      | 0300<br>and<br>1500 | 0800<br>and<br>2000 | 13.2                           | 10.0 | 3.5  | 0.9  |                  |
| 513                     | Barry                          | 51 23      | 3 16          | -0030                     | -0015                    | -0125               | -0030               | -1.8                           | -1.3 | +0.2 | 0.0  | 6.11             |
| 513a                    | Flatholm                       | 51 23      | 3 07          | -0015                     | -0015                    | -0045               | -0045               | -1.4                           | -1.2 | +0.2 | +0.1 | 6.2              |
| 513b                    | Steepleholm                    | 51 20      | 3 06          | -0020                     | -0020                    | -0050               | -0050               | -1.6                           | -1.4 | +0.1 | -0.1 | 6.1              |
| 514                     | Cardiff                        | 51 27      | 3 09          | -0015                     | -0015                    | -0100               | -0030               | -1.0                           | -0.6 | +0.1 | 0.0  | 6.45             |
| 515                     | Newport                        | 51 33      | 2 59          | -0020                     | -0010                    | 0000                | -0020               | -1.1                           | -1.0 | -0.6 | -0.7 | 6.04             |
| River Wye               |                                |            |               |                           |                          |                     |                     |                                |      |      |      |                  |
| 516                     | Chepstow                       | 51 39      | 2 40          | +0020                     | +0020                    | 0                   | 0                   | 0                              | 0    | 0    | 0    |                  |
| 523                     | PORT OF BRISTOL<br>(AVONMOUTH) |            | (see page 52) | 0000<br>and<br>1200       | 0600<br>and<br>1800      | 0000<br>and<br>1200 | 0700<br>and<br>1900 | 13.2                           | 10.0 | 3.5  | 0.9  |                  |
| England                 |                                |            |               |                           |                          |                     |                     |                                |      |      |      |                  |
| River Severn            |                                |            |               |                           |                          |                     |                     |                                |      |      |      |                  |
| 517                     | Sudbrook                       | 51 35      | 2 43          | +0010                     | +0010                    | +0025               | +0015               | +0.2                           | +0.1 | -0.1 | +0.1 | 0                |
| 518                     | Beachley (Aust.)               | 51 36      | 2 38          | +0010                     | +0015                    | +0040               | +0025               | -0.2                           | -0.2 | -0.5 | -0.3 | 6.43             |
| 519                     | Inward Rocks                   | 51 39      | 2 37          | +0020                     | +0020                    | +0105               | +0045               | -1.0                           | -1.1 | -1.4 | -0.6 | 5.66             |
| 520                     | Narlwood Rocks                 | 51 39      | 2 36          | +0025                     | +0025                    | +0120               | +0100               | -1.9                           | -2.0 | -2.3 | -0.8 | 0                |
| 521                     | White House                    | 51 40      | 2 33          | +0025                     | +0025                    | +0145               | +0120               | -3.0                           | -3.1 | -3.6 | -1.0 | 3.93             |
| 522                     | Berkeley                       | 51 42      | 2 30          | +0030                     | +0045                    | +0245               | +0220               | -3.8                           | -3.9 | -3.4 | -0.5 | 3.43             |
| 522a                    | Sharpness Dock                 | 51 43      | 2 29          | +0035                     | +0050                    | +0305               | +0245               | -3.9                           | -4.2 | -3.3 | -0.4 | 0                |
| 522b                    | Wellhouse Rock                 | 51 44      | 2 29          | +0040                     | +0055                    | +0320               | +0305               | -4.1                           | -4.4 | -3.1 | -0.2 | 3.26             |
| 522c                    | Epney                          | 51 42      | 2 24          | +0130                     | 0                        | 0                   | 0                   | -9.4                           | 0    | 0    | 0    | *                |
| 522d                    | Minsterworth                   | 51 50      | 2 23          | +0140                     | 0                        | 0                   | 0                   | -10.1                          | 0    | 0    | 0    | *                |
| 522e                    | Llanthony                      | 51 51      | 2 21          | +0215                     | 0                        | 0                   | 0                   | -10.7                          | 0    | 0    | 0    | *                |
| 523                     | PORT OF BRISTOL<br>(AVONMOUTH) |            | (see page 52) | 0200<br>and<br>1400       | 0800<br>and<br>2000      | 0300<br>and<br>1500 | 0800<br>and<br>2000 | 13.2                           | 10.0 | 3.5  | 0.9  | 6.92             |
| River Avon              |                                |            |               |                           |                          |                     |                     |                                |      |      |      |                  |
| 523a                    | Shirehampton                   | 51 29      | 2 41          | 0000                      | 0000                     | +0035               | +0010               | -0.7                           | -0.7 | -0.8 | 0.0  | 0                |
| 523b                    | Sea Mills                      | 51 29      | 2 39          | +0005                     | +0005                    | +0105               | +0030               | -1.4                           | -1.5 | -1.7 | -0.1 | 0                |
| 524                     | Bristol (Cumberland Basin)     | 51 27      | 2 37          | +0010                     | +0010                    | §                   | §                   | -2.9                           | -3.0 | §    | 0    | 0                |
| 524a                    | Portishead                     | 51 30      | 2 45          | -0002                     | 0000                     | 0                   | 0                   | -0.1                           | -0.1 | 0    | 0    | 0                |
| 525                     | Clevedon                       | 51 27      | 2 52          | -0010                     | -0020                    | -0025               | -0015               | -0.4                           | -0.2 | +0.2 | 0.0  | 6.8              |
| 526                     | English and Welsh Grounds      | 51 28      | 2 59          | -0008                     | -0008                    | -0030               | -0030               | -0.5                           | -0.8 | -0.3 | 0.0  | 6.5              |
| 527                     | Weston-super-Mare              | 51 21      | 2 59          | -0020                     | -0030                    | -0130               | -0030               | -1.2                           | -1.0 | -0.8 | -0.2 | 6.1              |
| River Parrett           |                                |            |               |                           |                          |                     |                     |                                |      |      |      |                  |
| 528                     | Burnham                        | 51 14      | 3 00          | -0020                     | -0025                    | -0030               | 0000                | -2.3                           | -1.9 | -1.4 | -1.1 | 0                |
| 529                     | Bridgwater                     | 51 08      | 3 00          | -0015                     | -0030                    | +0305               | +0455               | -8.6                           | -8.1 | §    | 0    | *                |
| 530                     | Hinkley Point                  | 51 13      | 3 08          | -0020                     | -0025                    | -0100               | -0040               | -1.7                           | -1.6 | +0.1 | -0.1 | 5.0              |
| 531                     | Watchet                        | 51 11      | 3 20          | -0035                     | -0050                    | -0145               | -0040               | -1.9                           | -1.5 | +0.1 | +0.1 | 5.88             |
| 532                     | Minehead                       | 51 13      | 3 28          | -0035                     | -0045                    | -0100               | -0100               | -2.6                           | -1.9 | -0.1 | 0.0  | 5.71             |
| 533                     | Porlock Bay                    | 51 13      | 3 38          | -0045                     | -0055                    | -0205               | -0050               | -3.0                           | -2.2 | -0.1 | -0.1 | 5.62             |
| 534                     | Lynmouth                       | 51 14      | 3 49          | -0055                     | -0115                    | 0                   | 0                   | -3.6                           | -2.7 | 0    | 0    | 0                |
| 496                     | MILFORD HAVEN                  |            | (see page 50) | 0100<br>and<br>1300       | 0700<br>and<br>1900      | 0100<br>and<br>1300 | 0700<br>and<br>1900 | 7.0                            | 5.2  | 2.5  | 0.7  |                  |
| 535                     | Ilfracombe                     | 51 13      | 4 07          | -0030                     | -0015                    | -0035               | -0055               | +2.2                           | +1.7 | +0.5 | 0.0  | 4.98             |
| Rivers Taw and Torridge |                                |            |               |                           |                          |                     |                     |                                |      |      |      |                  |
| 536                     | Appledore                      | 51 03      | 4 12          | -0020                     | -0025                    | +0015               | -0045               | +0.5                           | 0.0  | -0.9 | -0.5 | 3.64             |
| 537                     | Yelland Marsh                  | 51 04      | 4 10          | -0010                     | -0015                    | +0100               | -0015               | -0.4                           | -0.9 | -1.1 | 2.52 | *c               |
| 538                     | Fremington                     | 51 05      | 4 07          | -0010                     | -0015                    | +0300               | -0030               | -0.5                           | -1.2 | -1.6 | +0.1 | 0                |
| 539                     | Barnstaple                     | 51 05      | 4 04          | 0000                      | -0015                    | -0155               | -0245               | -2.9                           | -3.8 | -2.2 | -0.4 | 0                |
| 540                     | Bideford                       | 51 01      | 4 12          | -0020                     | -0025                    | 0000                | 0000                | -1.1                           | -1.6 | -2.5 | -0.7 | 0                |
| 541                     | Clovelly                       | 51 00      | 4 24          | -0030                     | -0030                    | -0020               | -0040               | +1.3                           | +1.1 | +0.2 | +0.2 | 0                |
| 542                     | Lundy Island                   | 51 10      | 4 40          | -0030                     | -0030                    | -0020               | -0040               | +1.0                           | +0.7 | +0.2 | +0.1 | 4.2              |
| 543                     | Bude                           | 50 50      | 4 33          | -0040                     | -0040                    | -0035               | -0045               | +0.7                           | +0.6 | 0    | 0    | 0                |
| 544                     | Boscastle                      | 50 41      | 4 42          | -0045                     | -0010                    | -0110               | -0100               | +0.3                           | +0.4 | +0.2 | +0.2 | 4.02             |

## SEASONAL CHANGES IN MEAN LEVEL

| No.      | Jan. 1 | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1 | Aug. 1 | Sep. 1 | Oct. 1 | Nov. 1 | Dec. 1 | Jan. 1 |
|----------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| 475-482  | +0.1   | 0.0    | 0.0    | -0.1   | -0.1  | -0.1   | 0.0    | 0.0    | 0.0    | 0.0    | +0.1   | +0.1   | +0.1   |
| 482a-512 | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | -0.1   | 0.0    | 0.0    | 0.0    | 0.0    | +0.1   | +0.1   | 0.0    |
| 513-534  | 0.0    | 0.0    | 0.0    | 0.0    | -0.1  | -0.1   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 535-544  | +0.1   | 0.0    | 0.0    | -0.1   | -0.1  | -0.1   | 0.0    | 0.0    | 0.0    | 0.0    | +0.1   | +0.1   | +0.1   |

IRELAND, WEST COAST

| No.  | PLACE                       | Lat.<br>N. | Long.<br>W. | TIME DIFFERENCES                     |                     |                     |                     | HEIGHT DIFFERENCES (IN METRES) |      |             |      | M.L.<br>m. |
|------|-----------------------------|------------|-------------|--------------------------------------|---------------------|---------------------|---------------------|--------------------------------|------|-------------|------|------------|
|      |                             |            |             | High<br>Water<br>(Zone G.M.T.)       | Low<br>Water        | MHWs                | MHWN                | MLWN                           | MLWS | Z.<br>m.    |      |            |
| 709  | GALWAY                      | .          | .           | (see page 11)<br>0600<br>and<br>1800 | 1100<br>and<br>2300 | 0000<br>and<br>1200 | 0700<br>and<br>1900 | 5.1                            | 3.9  | 2.0         | 0.6  |            |
| 696  | Clare Island                | 53 48      | 9 57        | +0019                                | +0013               | +0029               | +0023               | -1.0                           | -0.7 | -0.4        | -0.1 | 0          |
| 697  | Westport Bay<br>Inishraher  | 53 48      | 9 38        | +0030                                | +0012               | +0058               | +0026               | -0.6                           | -0.5 | -0.3        | -0.1 | 0          |
| 701  | Killary Harbour             | 53 38      | 9 53        | +0021                                | +0015               | +0035               | +0029               | -1.0                           | -0.8 | -0.4        | -0.1 | 0          |
| 702  | Inishbofin<br>Bofin Harbour | 53 37      | 10 13       | +0013                                | +0009               | +0021               | +0017               | -1.0                           | -0.8 | -0.4        | -0.1 | 1.9        |
| 703  | Clifden Bay                 | 53 29      | 10 04       | +0005                                | +0005               | +0016               | +0016               | -0.7                           | -0.5 | 0           | 0    | 0          |
| 704  | Slyne Head                  | 53 24      | 10 14       | +0002                                | +0002               | +0010               | +0010               | -0.7                           | -0.5 | 0           | 0    | 0          |
| 705  | Roundstone Bay              | 53 23      | 9 55        | +0003                                | +0003               | +0008               | +0008               | -0.7                           | -0.5 | -0.3        | -0.1 | 0          |
| 706  | Kilkieran Cove              | 53 20      | 9 44        | +0005                                | +0005               | +0016               | +0016               | -0.3                           | -0.2 | -0.1        | 0.0  | 0          |
|      | Aran Islands                |            |             |                                      |                     |                     |                     |                                |      |             |      |            |
| 707  | Kilcannay Bay               | 53 07      | 9 39        | -0008                                | -0008               | +0003               | +0003               | -0.4                           | -0.3 | -0.2        | -0.1 | 0          |
| 709  | GALWAY                      | 53 16      | 9 03        |                                      |                     | STANDARD PORT       |                     |                                |      | See Table V |      | 2.90       |
| 711  | Liscannor                   | 52 56      | 9 23        | -0003                                | -0007               | +0006               | +0002               | -0.4                           | -0.3 | 0           | 0    | 0          |
| 712  | Seafield Point              | 52 48      | 9 30        | -0006                                | -0014               | +0004               | -0004               | -0.5                           | -0.4 | 0           | 0    | 0          |
| 715  | TARBERT ISLAND              | .          | .           | (sec page 11)<br>0500<br>and<br>1700 | 1000<br>and<br>2200 | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 5.0                            | 3.8  | 2.7         | 0.5  |            |
|      | River Shannon               |            |             |                                      |                     |                     |                     |                                |      |             |      |            |
| 713  | Kilbaha Bay                 | 52 34      | 9 51        | -0045                                | -0025               | -0100               | +0005               | -0.7                           | -0.5 | -0.2        | 0.0  | 0          |
| 713a | Carrigaholt                 | 52 36      | 9 42        | -0030                                | -0040               | -0030               | -0030               | -0.1                           | -0.1 | +0.2        | +0.2 | 0          |
| 714  | Kilrush                     | 52 38      | 9 30        | -0010                                | -0010               | -0005               | -0005               | 0.0                            | -0.1 | 0.0         | 0.0  | 0          |
| 715  | TARBERT ISLAND              | 52 35      | 9 22        |                                      |                     | STANDARD PORT       |                     |                                |      | See Table V |      | 2.79       |
| 716  | Foynes Island               | 52 37      | 9 07        | +0030                                | +0025               | +0020               | +0020               | +0.2                           | +0.2 | +0.1        | -0.2 | 0          |
| 717  | Mellon Point                | 52 40      | 8 50        | +0055                                | +0045               | +0025               | +0140               | +0.9                           | +0.7 | +0.2        | -0.1 | 0          |
| 718  | Limerick Dock               | 52 40      | 8 38        | +0100                                | +0120               | +0050               | +0200               | +0.9                           | +0.7 | -0.5        | -0.1 | 0          |
|      | River Fergus                |            |             |                                      |                     |                     |                     |                                |      |             |      |            |
| 719  | Coney Island                | 52 43      | 8 59        | +0050                                | +0045               | +0015               | +0130               | +0.2                           | +0.1 | 0           | 0    | 0          |
| 751  | COBH<br>(RINGASKIDDY)       | .          | .           | (sec page 56)<br>0500<br>and<br>1700 | 1100<br>and<br>2300 | 0500<br>and<br>1700 | 1100<br>and<br>2300 | 4.2                            | 3.3  | 2.4         | 0.5  |            |
|      | Tralee Bay                  |            |             |                                      |                     |                     |                     |                                |      |             |      |            |
| 721  | Fenit Pier                  | 52 16      | 9 52        | -0057                                | -0017               | -0029               | -0109               | +0.5                           | +0.2 | +0.3        | +0.1 | 0          |
| 722  | Smerwick Harbour            | 52 12      | 10 24       | -0107                                | -0027               | -0041               | -0121               | -0.3                           | -0.4 | 0           | 0    | 0          |
| 723  | Dingle Harbour              | 52 07      | 10 15       | -0111                                | -0041               | -0049               | -0119               | -0.3                           | -0.4 | 0.0         | 0.0  | 0          |
|      | Castlemaine Harbour         |            |             |                                      |                     |                     |                     |                                |      |             |      |            |
| 724  | Cromane Point               | 52 09      | 9 54        | -0026                                | -0006               | -0017               | -0037               | +0.4                           | +0.2 | +0.4        | +0.2 | 0          |
|      | Valentia Harbour            |            |             |                                      |                     |                     |                     |                                |      |             |      |            |
| 725  | Knights Town                | 51 56      | 10 18       | -0118                                | -0038               | -0056               | -0136               | -0.3                           | -0.3 | 0.0         | 0.0  | 2.0        |
|      | Ballinskelligs Bay          |            |             |                                      |                     |                     |                     |                                |      |             |      | x          |
| 726  | Castle                      | 51 49      | 10 16       | -0119                                | -0039               | -0054               | -0134               | -0.5                           | -0.5 | -0.1        | 0.0  | 0          |
|      | Kenmare River               |            |             |                                      |                     |                     |                     |                                |      |             |      |            |
| 727  | West Cove                   | 51 46      | 10 03       | -0113                                | -0033               | -0049               | -0129               | -0.6                           | -0.5 | -0.1        | 0.0  | 0          |
| 728  | Dunkerron Harbour           | 51 52      | 9 38        | -0117                                | -0027               | -0050               | -0140               | -0.2                           | -0.3 | +0.1        | 0.0  | 0          |
|      | Coulagh Bay                 |            |             |                                      |                     |                     |                     |                                |      |             |      |            |
| 731  | Ballycrovane Harbour        | 51 43      | 9 57        | -0116                                | -0036               | -0053               | -0133               | -0.6                           | -0.5 | -0.1        | 0.0  | 0          |
| 732  | Black Ball Harbour          | 51 36      | 10 02       | -0115                                | -0035               | -0047               | -0127               | -0.7                           | -0.6 | -0.1        | +0.1 | 0          |
|      | Bantry Bay                  |            |             |                                      |                     |                     |                     |                                |      |             |      |            |
| 733  | Castletown Bearhaven        | 51 39      | 9 54        | -0048                                | -0012               | -0025               | -0101               | -0.6                           | -0.6 | -0.1        | 0.0  | 1.9        |
| 734  | Bantry                      | 51 41      | 9 28        | -0045                                | -0025               | -0040               | -0105               | -0.7                           | -0.7 | -0.1        | 0.0  | 1.78       |
|      | Dunmanus Bay                |            |             |                                      |                     |                     |                     |                                |      |             |      | x          |
| 736  | Dunbeacon Harbour           | 51 37      | 9 33        | -0057                                | -0025               | -0032               | -0104               | -0.8                           | -0.7 | -0.3        | -0.2 | 0          |
| 737  | Dunmanus Harbour            | 51 32      | 9 40        | -0107                                | -0031               | -0044               | -0120               | -0.7                           | -0.6 | -0.2        | 0.0  | 0          |

0 No data.

x M.L. inferred.

IRELAND, SOUTH COAST, FÆROE ISLANDS

| No.  | PLACE                    | Lat.<br>N. | Long.<br>W. | High<br>Water  | TIME DIFFERENCES       |                       |                     |                       | HEIGHT DIFFERENCES (IN METRES) |      |      |      | M.L.<br>Z <sub>o</sub><br>m. |
|------|--------------------------|------------|-------------|----------------|------------------------|-----------------------|---------------------|-----------------------|--------------------------------|------|------|------|------------------------------|
|      |                          |            |             |                | Water<br>(Zone G.M.T.) | Low Water<br>and 1700 | Water<br>and 2300   | Low Water<br>and 1700 | MHWS                           | MHWN | MLWN | MLWS |                              |
| 751  | COBH<br>(RINGASKIDDY)    |            |             | (see page 56)  | 0500<br>and<br>1700    | 1100<br>and<br>2300   | 0500<br>and<br>1700 | 1100<br>and<br>2300   | 4.2                            | 3.3  | 1.4  | 0.5  |                              |
| 741  | Crookhaven               | 51 28      | 9 43        | -0057          | -0033                  | -0048                 | -0112               | -0.8                  | -0.6                           | -0.4 | -0.1 | 0    |                              |
| 742  | Skull                    | 51 31      | 9 32        | -0040          | -0015                  | -0015                 | -0110               | -0.9                  | -0.6                           | -0.2 | -0.1 | 1.85 |                              |
| 743  | Baltimore                | 51 29      | 9 23        | -0025          | -0005                  | -0010                 | -0050               | -0.5                  | -0.3                           | +0.1 | +0.1 | 2.12 |                              |
| 744  | Castletownshend          | 51 32      | 9 10        | -0012          | -0025                  | -0010                 | -0040               | -0.6                  | -0.4                           | -0.2 | 0.0  | 2.2  |                              |
| 745  | Clonakilty Bay           | 51 35      | 8 50        | -0033          | -0011                  | -0019                 | -0041               | -0.3                  | -0.2                           | 0    | 0    | 0    |                              |
| 746  | Courtmacasherry          | 51 38      | 8 42        | -0029          | -0007                  | +0005                 | -0017               | -0.4                  | -0.3                           | -0.2 | -0.1 | 0    |                              |
| 747  | Kinsale                  | 51 42      | 8 31        | -0019          | -0005                  | -0009                 | -0023               | -0.1                  | +0.1                           | 0.0  | 0.0  | 2.25 |                              |
|      | <i>Cork Harbour</i>      |            |             |                |                        |                       |                     |                       |                                |      |      |      |                              |
| 751  | COBH (RINGASKIDDY)       | 51 50      | 8 18        |                |                        |                       |                     |                       |                                |      |      |      | 2.35                         |
| 752  | Passage West             | 51 52      | 8 20        | +0005          | +0005                  | +0005                 | +0005               | +0.3                  | +0.3                           | +0.2 | +0.2 | 0    |                              |
| 753  | Cork                     | 51 54      | 8 27        | +0020          | +0020                  | +0020                 | +0020               | +0.3                  | +0.1                           | 0.0  | 0.0  | 0    |                              |
| 754  | Ballycotton              | 51 50      | 8 01        | -0011          | +0001                  | +0003                 | -0009               | 0.0                   | 0.0                            | -0.1 | 0.0  | 0    |                              |
| 755  | Youghal                  | 51 57      | 7 50        | -0002          | +0014                  | +0016                 | 0000                | 0.0                   | 0.0                            | -0.1 | 0.0  | 0    |                              |
| 756  | Dungarvan Harbour        | 52 05      | 7 34        | +0004          | +0012                  | +0007                 | -0001               | 0.0                   | +0.1                           | -0.2 | 0.0  | 0    |                              |
|      | <i>Waterford Harbour</i> |            |             |                |                        |                       |                     |                       |                                |      |      |      |                              |
| 761  | Dunmore East             | 52 09      | 6 59        | +0013          | +0013                  | +0001                 | +0001               | 0.0                   | 0.0                            | -0.2 | 0.0  | 0    |                              |
| 761a | Cheekpoint               | 52 16      | 7 00        | +0022          | +0022                  | +0022                 | +0022               | +0.4                  | +0.2                           | +0.2 | 0.0  | 2.49 |                              |
| 762  | Waterford                | 52 16      | 7 07        | +0057          | +0057                  | +0046                 | +0046               | +0.4                  | +0.3                           | -0.1 | 0.0  | 0    |                              |
| 763  | New Ross                 | 52 24      | 6 57        | +0100          | +0030                  | +0055                 | +0130               | +0.5                  | +0.1                           | +0.1 | +0.1 | 2.59 |                              |
| 765  | Great Saltee             | 52 07      | 6 38        | +0019          | +0009                  | -0004                 | +0006               | -0.3                  | -0.4                           | 0    | 0    | 0    |                              |
| 766  | Carnsore Point           | 52 10      | 6 22        | +0029          | +0019                  | -0002                 | +0008               | -1.1                  | -1.0                           | 0    | 0    | 0    |                              |
| 819  | REYKJAVIK                |            |             | (see page 819) | —                      | —                     | —                   | —                     | 4.0                            | 2.9  | 1.3  | 0.2  |                              |
|      | <i>Færoe Islands</i>     |            |             |                |                        |                       |                     |                       |                                |      |      |      |                              |
|      | <i>Vidoy</i>             |            |             |                |                        |                       |                     |                       |                                |      |      |      |                              |
| 780  | Hvannesund               | 62 18      | 6 31        | 0              | 0                      | 0                     | 0                   | -2.7                  | -2.1                           | -0.8 | -0.2 | 0    |                              |
|      | <i>Bordoy</i>            |            |             |                |                        |                       |                     |                       |                                |      |      |      |                              |
| 782  | Klaksvik                 | 62 14      | 6 35        | +0345          | +0345                  | +0345                 | +0345               | -2.6                  | -2.1                           | -0.8 | -0.2 | 0    |                              |
|      | <i>Eysturoy</i>          |            |             |                |                        |                       |                     |                       |                                |      |      |      |                              |
| 784  | Nordskali                | 62 13      | 7 00        | 0              | 0                      | 0                     | 0                   | -2.0                  | -1.5                           | -0.7 | -0.2 | 0    |                              |
| 785  | Oyndarfjordur            | 62 17      | 6 50        | 0              | 0                      | 0                     | 0                   | -2.3                  | -1.9                           | -0.6 | -0.2 | 0    |                              |
| 786  | Fuglafjordur             | 62 14      | 6 48        | 0              | 0                      | 0                     | 0                   | -2.3                  | -1.9                           | -0.6 | -0.2 | 0    |                              |
| 787  | Gotuvik (Nordragota)     | 62 12      | 6 44        | 0              | 0                      | 0                     | 0                   | -3.0                  | -2.3                           | -1.0 | -0.2 | 0    |                              |
| 788  | Skalafjordur             | 62 06      | 6 43        |                |                        |                       | No appreciable tide |                       |                                |      |      | 0    |                              |
|      | <i>Streymoy</i>          |            |             |                |                        |                       |                     |                       |                                |      |      |      |                              |
| 790  | Hvalvik                  | 62 12      | 7 01        |                |                        |                       | No appreciable tide |                       |                                |      |      | 0    |                              |
| 791  | Kollafjordur             | 62 06      | 6 56        |                |                        |                       |                     |                       |                                |      |      | 0    |                              |
| 792  | Torshavn                 | 62 00      | 6 45        | -0035          | -0035                  | +0149                 | +0149               | -3.7                  | -2.7                           | -1.2 | -0.2 | 0.16 |                              |
| 793  | Vestmanna                | 62 09      | 7 10        | +0145          | +0145                  | +0145                 | +0145               | -2.0                  | -1.5                           | -0.7 | -0.2 | 0    |                              |
|      | <i>Vagar</i>             |            |             |                |                        |                       |                     |                       |                                |      |      |      |                              |
| 795  | Sorvagur                 | 62 04      | 7 18        | +0058          | +0058                  | +0058                 | +0058               | -2.2                  | -1.6                           | -0.8 | -0.2 | 0.01 |                              |
| 796  | Midvagur                 | 62 03      | 7 11        | 0              | 0                      | 0                     | 0                   | -2.3                  | -1.7                           | -0.9 | -0.2 | 0    |                              |
|      | <i>Sandoy</i>            |            |             |                |                        |                       |                     |                       |                                |      |      |      |                              |
| 798  | Skopun                   | 61 54      | 6 52        | 0              | 0                      | 0                     | 0                   | -2.2                  | -1.7                           | -0.7 | -0.2 | 0    |                              |
| 799  | Sandur                   | 61 50      | 6 48        | +0100          | +0100                  | +0100                 | +0100               | -1.8                  | -1.5                           | -0.5 | -0.2 | 0    |                              |
|      | <i>Suduroy</i>           |            |             |                |                        |                       |                     |                       |                                |      |      |      |                              |
| 800  | Trongisvagur             | 61 33      | 6 49        | +0040          | +0040                  | +0040                 | +0040               | -2.7                  | -2.1                           | -0.9 | -0.2 | 0    |                              |
| 801  | Vagur                    | 61 28      | 6 48        | +0050          | +0050                  | +0050                 | +0050               | -3.0                  | -2.3                           | -0.9 | -0.2 | 0    |                              |

SEASONAL CHANGES IN MEAN LEVEL

| No.     | Jan. ± | Feb. ± | Mar. ± | Apr. ± | May ± | June ± | July ± | Aug. ± | Sep. ± | Oct. ± | Nov. ± | Dec. ± | Jan. ± |
|---------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| 696-712 | +0.1   | 0.0    | -0.1   | -0.1   | 0.0   | 0.0    | 0.0    | -1.0   | 1.0    | 0.0    | +0.1   | +0.1   | +0.1   |
| 713-719 |        |        |        |        |       |        |        |        |        |        |        |        |        |
| 721-737 | +0.1   | 0.0    | 0.0    | -0.1   | -0.1  | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | +0.1   | +0.1   | +0.1   |
| 741-766 | 0.0    | 0.0    | 0.0    | -0.1   | -0.1  | -0.1   | -0.1   | 0.0    | 0.0    | 0.0    | +0.1   | +0.1   | 0.0    |
| 780-801 | +0.1   | +0.1   | 0.0    | 0.0    | 0.0   | 0.0    | -0.1   | -0.1   | -0.1   | 0.0    | 0.0    | 0.0    | +0.1   |
| 819     | +0.1   | +0.1   | +0.1   | 0.0    | 0.0   | -0.1   | -0.1   | -0.1   | -0.1   | 0.0    | 0.0    | 0.0    | +0.1   |

## BELGIUM; FRANCE, NORTH COAST

| No.             | PLACE                      | Lat.<br>N. | Long.<br>E.  | TIME DIFFERENCES           |                           |                     |                     | HEIGHT DIFFERENCES (IN METRES) |      |             |      | M.L.<br>Z <sub>o</sub><br>m. |
|-----------------|----------------------------|------------|--------------|----------------------------|---------------------------|---------------------|---------------------|--------------------------------|------|-------------|------|------------------------------|
|                 |                            |            |              | High Water<br>(Zone -0100) | Low Water<br>(Zone -0100) | MHWs                | MHWn                | MLWn                           | MLWs |             |      |                              |
| 1539            | ANTWERP<br>(PROSPERPOLDER) |            | (see pag 24) | 0000<br>and<br>1200        | 0500<br>and<br>1700       | 0000<br>and<br>1200 | 0600<br>and<br>1800 | 5.8                            | 4.2  | 1.0         | 0.0  | 2.66                         |
| <b>Belgium</b>  |                            |            |              |                            |                           |                     |                     |                                |      |             |      |                              |
| 1539a           | Boudewijnsluis             |            | 51 17        | 4 20                       | +0013                     | +0005               | +0025               | +0020                          | 0.0  | +0.1        | 0.0  | 0.0                          |
| 1539b           | Royerluis                  |            | B 51 14      | 4 24                       | +0030                     | +0015               | +0045               | +0041                          | +0.3 | +0.3        | 0.0  | 0.0                          |
| 1539c           | Boom                       |            | 51 05        | 4 22                       | +0125                     | +0110               | +0155               | +0150                          | -0.2 | +0.6        | -0.4 | +0.6                         |
| 1539d           | Ghent                      |            | 51 03        | 3 44                       | +0430                     | +0415               | +0630               | +0600                          | -3.5 | -2.4        | -0.8 | +0.1                         |
| 1534            | VLISSINGEN<br>(FLUSHING)   |            |              | 0300<br>and<br>1500        | 0900<br>and<br>2100       | 0400<br>and<br>1600 | 1000<br>and<br>2200 | 4.9                            | 4.0  | 1.0         | 0.5  |                              |
| 1540            | Cadzand (Wielingen Sluis)  |            | 51 23        | 3 23                       | -0030                     | -0025               | -0020               | -0025                          | -0.2 | -0.2        | -0.1 | -0.1                         |
| 1562            | Zeebrugge                  |            | BN 51 21     | 3 12                       | -0035                     | -0015               | -0020               | -0035                          | -0.1 | -0.2        | +0.1 | -0.1                         |
| 1564            | Oostende                   |            | B 51 14      | 2 55                       | -0055                     | -0040               | -0030               | -0045                          | +0.2 | +0.2        | +0.1 | -0.1                         |
| 1565            | Nieuwpoort                 |            | 51 09        | 2 43                       | -0110                     | -0050               | -0035               | -0045                          | +0.4 | +0.3        | +0.2 | -0.1                         |
| 1568            | DUNKERQUE                  |            |              | 0200<br>and<br>1400        | 0800<br>and<br>2000       | 0200<br>and<br>1400 | 0900<br>and<br>2100 | 5.8                            | 4.8  | 1.5         | 0.6  | 3.20                         |
| <b>France</b>   |                            |            |              |                            |                           |                     |                     |                                |      |             |      |                              |
| 1569            | Gravelines                 |            | 51 01        | 2 06                       | -0010                     | -0010               | -0020               | 0000                           | +0.1 | +0.1        | -0.1 | 3.19                         |
| 1570            | CALAIS                     |            | 50 58        | 1 51                       |                           |                     | STANDARD PORT       |                                |      | See Table V |      | 4.02                         |
| 1571            | Wissant                    |            | 50 53        | 1 40                       | -0030                     | ⊖                   | ⊖                   | ⊖                              | +1.7 | +1.5        | +0.6 | ⊖                            |
| 1572            | BOULOGNE                   |            | 50 44        | 1 35                       |                           |                     | STANDARD PORT       |                                |      | See Table V |      | 5.01                         |
| 1579            | DIEPPE                     |            |              | 0100<br>and<br>1300        | 0600<br>and<br>1800       | 0000<br>and<br>1200 | 0700<br>and<br>1900 | 9.3                            | 7.2  | 2.6         | 0.7  |                              |
| 1573            | Le Touquet, Étaples        |            | 50 31        | 1 35                       | +0012                     | ⊖                   | ⊖                   | ⊖                              | -0.3 | 0.0         | +0.2 | 0.3                          |
| 1574            | Berck                      |            | 50 24        | 1 34                       | +0008                     | ⊖                   | ⊖                   | ⊖                              | +0.1 | +0.3        | +0.3 | ⊖                            |
| <i>La Somme</i> |                            |            |              |                            |                           |                     |                     |                                |      |             |      |                              |
| 1575            | Le Hourdel                 |            | 50 13        | 1 34                       | +0021                     | +0026               | ⊖                   | ⊖                              | +0.7 | +0.7        | ⊖    | ⊖                            |
| 1576            | St. Valéry                 |            | 50 11        | 1 37                       | +0028                     | +0040               | ⊖                   | ⊖                              | +0.7 | +0.8        | ⊖    | ⊖                            |
| 1577            | Cayeux                     |            | 50 11        | 1 29                       | +0007                     | +0010               | -0008               | +0013                          | +0.9 | +0.7        | +0.2 | +0.3                         |
| 1578            | Le Treport                 |            | 50 04        | 1 22                       | +0001                     | +0005               | +0005               | +0011                          | +0.1 | +0.2        | -0.1 | 0.0                          |
| 1579            | DIEPPE                     |            | 49 56        | 1 05                       |                           |                     | STANDARD PORT       |                                |      | See Table V |      | 4.97                         |
| 1580            | St. Valery-en-Caux         |            | 49 52        | 0 42                       | -0018                     | -0016               | -0007               | -0013                          | -0.4 | -0.1        | -0.1 | +0.3                         |
| 1581            | Fecamp                     |            | F 49 46      | 0 22                       | -0022                     | -0018               | -0034               | -0043                          | -1.4 | -0.7        | 0.0  | +0.1                         |
| 1581a           | Antifer                    |            | 49 39        | 0 09                       | -0046                     | -0039               | -0051               | -0100                          | -1.3 | -0.6        | +0.4 | +0.5                         |
| 1582            | LE HAVRE                   |            | (see pag 26) | 0000<br>and<br>1200        | 0500<br>and<br>1700       | 0000<br>and<br>1200 | 0700<br>and<br>1900 | 7.9                            | 6.6  | 3.0         | 1.2  | 4.87                         |
| <i>La Seine</i> |                            |            |              |                            |                           |                     |                     |                                |      |             |      |                              |
| 1583            | Honfleur                   |            | 49 25        | 0 14                       | -0140                     | -0015               | +0005               | +0040                          | +0.2 | +0.1        | 0.0  | 0.0                          |
| 1584            | Tancarville                |            | 49 28        | 0 28                       | -0105                     | +0025               | +0105               | +0140                          | 0.0  | 0.0         | +0.3 | +1.0                         |
| 1585            | Quillebeuf                 |            | 49 28        | 0 32                       | -0045                     | +0030               | +0120               | +0200                          | 0.0  | +0.1        | +0.5 | +1.4                         |
| 1586            | Vatteville                 |            | 49 29        | 0 40                       | +0004                     | +0100               | +0225               | +0250                          | +0.1 | 0.0         | +1.1 | +2.4                         |
| 1587            | Caudebec                   |            | 49 32        | 0 44                       | +0020                     | +0115               | +0230               | +0300                          | -0.2 | 0.0         | +1.2 | +2.5                         |
| 1588            | Ducclair                   |            | 49 29        | 0 53                       | +0225                     | +0300               | +0355               | +0410                          | -0.2 | -0.1        | +1.7 | +3.3                         |
| 1589            | Rouen                      |            | 49 27        | 1 06                       | +0440                     | +0415               | +0525               | +0525                          | -0.1 | 0.0         | +1.9 | +3.6                         |
| 1590            | Trouville                  |            | 49 22        | 0 05                       | -0035                     | -0015               | 0000                | -0010                          | -0.1 | -0.2        | -0.2 | -0.1                         |
| N. W.           |                            |            |              |                            |                           |                     |                     |                                |      |             |      |                              |
| 1591            | Dives                      |            | 49 18        | 0 06                       | -0055                     | ⊖                   | ⊖                   | -0115                          | -0.4 | -0.5        | -0.6 | -0.3                         |
| 1592            | Ouistreham                 |            | 49 17        | 0 15                       | -0020                     | -0010               | -0005               | -0010                          | -0.2 | -0.2        | -0.2 | -0.2                         |
| 1593            | Courseulles                |            | 49 20        | 0 27                       | -0100                     | ⊖                   | ⊖                   | -0040                          | -0.8 | -1.0        | -0.7 | -0.3                         |
| 1594            | Port-en-Bessin             |            | 49 21        | 0 45                       | -0045                     | -0040               | -0040               | -0045                          | -0.7 | -0.6        | -0.3 | -0.1                         |

⊖ No data.

\* See notes on page 344.

B Tides predicted in Belgian Tide Tables.

F Tides predicted in French Tide Tables.

N Tides predicted in Netherlands Tide Tables.

x M.L. inferred.

FRANCE, NORTH COAST; CHANNEL ISLANDS

| No.                            | PLACE               | Lat.<br>N. | Long.<br>W. | TIME DIFFERENCES                 |                             |                     |                     | HEIGHT DIFFERENCES (IN METRES) |            |        |        | M.L.<br>Z.<br>m.     |        |
|--------------------------------|---------------------|------------|-------------|----------------------------------|-----------------------------|---------------------|---------------------|--------------------------------|------------|--------|--------|----------------------|--------|
|                                |                     |            |             | High<br>Water<br>(Zone<br>-0100) | Low<br>Water<br>and<br>1600 | 1000<br>and<br>2200 | 0400<br>and<br>1600 | 1000<br>and<br>2200            | MHWS       | MHWN   | MLWN   | MLWS                 |        |
| 1600                           | CHERBOURG           |            |             | 0300<br>and<br>1500              | 1000<br>and<br>2200         | 0400<br>and<br>1600 | 1000<br>and<br>2200 | 6.3                            | 5.0        | 2.5    | 1.1    |                      |        |
| 1598                           | St. Vaast           | .          | .           | 49 35                            | 1 16                        | +0105               | +0055               | +0120                          | +0100      | +0.3   | +0.3   | -0.2                 |        |
| 1599                           | Barfleur            | .          | .           | 49 40                            | 1 15                        | +0100               | +0100               | +0050                          | +0040      | +0.2   | +0.3   | 0.0                  |        |
| 1600                           | CHERBOURG           | .          | .           | 49 39                            | 1 38                        |                     |                     |                                |            |        |        | 3.78                 |        |
| 1601                           | Omonville           | .          | .           | 49 43                            | 1 50                        | -0015               | -0010               | -0020                          | -0025      | -0.1   | -0.1   | +0.1                 |        |
| 1602                           | Goury               | .          | .           | 49 43                            | 1 56                        | -0100               | -0045               | -0110                          | -0120      | +1.6   | +1.5   | +0.9                 |        |
| 1605                           | ST. HELIER          |            |             | 0300<br>and<br>1500              | 0900<br>and<br>2100         | 0200<br>and<br>1400 | 0900<br>and<br>2100 | 11.1                           | 8.1        | 4.1    | 1.3    |                      |        |
| Channel Islands                |                     |            |             |                                  |                             |                     |                     |                                |            |        |        |                      |        |
|                                |                     |            |             |                                  |                             |                     |                     |                                |            |        |        | (Zone U.T. (G.M.T.)) |        |
| <i>Alderney</i>                |                     |            |             |                                  |                             |                     |                     |                                |            |        |        |                      |        |
| 1603                           | Braye               | .          | .           | 49 43                            | 2 12                        | +0050               | +0040               | +0025                          | +0105      | -4.8   | -3.4   | -1.5                 |        |
| <i>Sark</i>                    |                     |            |             |                                  |                             |                     |                     |                                |            |        |        |                      |        |
| 1603a                          | Maseline Pier       | .          | .           | 49 26                            | 2 21                        | +0005               | +0015               | +0005                          | +0010      | -2.1   | -1.5   | -0.6                 |        |
| <i>Guernsey</i>                |                     |            |             |                                  |                             |                     |                     |                                |            |        |        |                      |        |
| 1604                           | St. Peter Port      | .          | .           | 49 27                            | 2 31                        | 0000                | +0012               | -0008                          | +0002      | -2.1   | -1.4   | -0.6                 |        |
| <i>Jersey</i>                  |                     |            |             |                                  |                             |                     |                     |                                |            |        |        |                      |        |
| 1605                           | ST. HELIER          | .          | .           | 49 11                            | 2 07                        |                     |                     |                                |            |        |        | 6.06                 |        |
| 1606                           | St. Catherine Bay   | .          | .           | 49 13                            | 2 01                        | 0000                | +0010               | +0010                          | +0010      | 0.0    | -0.1   | 0.0                  |        |
| 1606a                          | Bouley Bay          | .          | .           | 49 14                            | 2 05                        | +0002               | +0002               | +0004                          | +0004      | -0.3   | -0.3   | -0.1                 |        |
| 1607                           | Les Ecrehou         | .          | .           | 49 17                            | 1 56                        | +0004               | +0012               | +0010                          | +0020      | -0.2   | +0.3   | -0.3                 |        |
| 1608                           | Les Minquiers       | .          | .           | 48 58                            | 2 08                        | +0007               | 0000                | -0008                          | +0013      | +0.5   | +0.8   | -0.1                 |        |
| 1605                           | ST. HELIER          |            |             | 0100<br>and<br>1300              | 0800<br>and<br>2000         | 0200<br>and<br>1400 | 0700<br>and<br>1900 | 11.1                           | 8.1        | 4.1    | 1.3    |                      |        |
| France                         |                     |            |             |                                  |                             |                     |                     |                                |            |        |        |                      |        |
|                                |                     |            |             |                                  |                             |                     |                     |                                |            |        |        | (Zone -0100)         |        |
| 1609                           | Iles Chausey        | .          | .           | 48 52                            | 1 49                        | +0044               | +0048               | +0104                          | +0058      | +1.9   | +1.8   | +0.8                 |        |
| 1610                           | Diellette           | .          | .           | 49 33                            | 1 52                        | +0116               | +0119               | +0115                          | +0120      | -1.4   | -0.7   | -0.5                 |        |
| 1611                           | Carteret            | .          | .           | 49 22                            | 1 47                        | +0100               | +0110               | +0120                          | +0115      | +0.1   | +0.4   | 0.0                  |        |
| 1612                           | Granville           | .          | .           | 48 50                            | 1 36                        | +0040               | +0049               | +0115                          | +0053      | +1.9   | +1.7   | +0.5                 |        |
| 1613                           | Cancale             | .          | .           | 48 40                            | 1 51                        | +0035               | +0050               | +0115                          | +0100      | +2.4   | +2.2   | +1.0                 |        |
| 1614                           | St. Malo            | .          | .           | F 48 38                          | 2 02                        | +0034               | +0044               | +0105                          | +0050      | +1.1   | +1.1   | +0.3                 |        |
| 1615                           | Erquy               | .          | .           | 48 38                            | 2 28                        | +0030               | +0040               | +0035                          | +0032      | +0.3   | +0.6   | 0.0                  |        |
| 1616                           | Dahouet             | .          | .           | 48 35                            | 2 34                        | +0031               | +0038               | +0027                          | +0036      | +0.2   | +0.6   | -0.2                 |        |
| 1617                           | Le Légué            | .          | .           | 48 32                            | 2 44                        | +0030               | +0045               | +0035                          | +0031      | +0.3   | +0.6   | 0.0                  |        |
| 1618                           | Binic               | .          | .           | 48 36                            | 2 49                        | +0030               | +0045               | +0035                          | +0031      | +0.3   | +0.6   | 0.0                  |        |
| 1619                           | Portrieux           | .          | .           | 48 38                            | 2 49                        | +0030               | +0045               | +0030                          | +0030      | +0.3   | +0.5   | 0.0                  |        |
| 1620                           | Paimpol             | .          | .           | 48 47                            | 3 02                        | +0025               | +0038               | +0025                          | +0040      | -0.6   | -0.3   | -0.9                 |        |
| 1621                           | Île de Bréhat       | .          | .           | 48 51                            | 3 00                        | +0020               | +0040               | +0010                          | +0015      | -0.6   | -0.1   | -0.4                 |        |
| 1622                           | Les Heaux de Brehat | .          | .           | F 48 55                          | 3 05                        | +0031               | +0030               | -0011                          | +0042      | -1.2   | -0.5   | -0.7                 |        |
| 1623                           | Lezardrieux         | .          | .           | 48 47                            | 3 06                        | +0026               | +0038               | +0015                          | +0035      | -0.9   | -0.5   | -0.6                 |        |
| 1624                           | Plougescant         | .          | .           | 48 51                            | 3 13                        | -0005               | +0004               | -0005                          | +0010      | -1.4   | -0.6   | +0.1                 |        |
| 1625                           | Tréguier            | .          | .           | 48 47                            | 3 13                        | -0004               | +0012               | -0025                          | +0015      | -1.3   | -0.6   | -0.8                 |        |
| 1626                           | Ploumanac'h         | .          | .           | 48 50                            | 3 29                        | 0000                | +0005               | -0025                          | 0000       | -2.1   | -1.0   | -0.7                 |        |
| SEASONAL CHANGES IN MEAN LEVEL |                     |            |             |                                  |                             |                     |                     |                                |            |        |        |                      |        |
| No.                            | Jan. 1              | Feb. 1     | Mar. 1      | Apr. 1                           | May 1                       | June 1              | July 1              | Aug. 1                         | Sep. 1     | Oct. 1 | Nov. 1 | Dec. 1               | Jan. 1 |
| 1534-1571                      | 0.0                 | 0.0        | -0.1        | -0.1                             | -0.1                        | -0.1                | 0.0                 | 0.0                            | 0.0        | +0.1   | +0.1   | +0.1                 | 0.0    |
| 1572-1581a                     | 0.0                 | -0.1       | -0.1        | -0.1                             | 0.0                         | 0.0                 | 0.0                 | 0.0                            | +0.1       | +0.1   | 0.0    | 0.0                  | 0.0    |
| 1582-1602                      | 0.0                 | 0.0        | -0.1        | -0.1                             | 0.0                         | 0.0                 | 0.0                 | 0.0                            | 0.0        | +0.1   | 0.0    | 0.0                  | 0.0    |
| 1603-1626                      |                     |            |             |                                  |                             |                     |                     |                                | Negligible |        |        |                      |        |

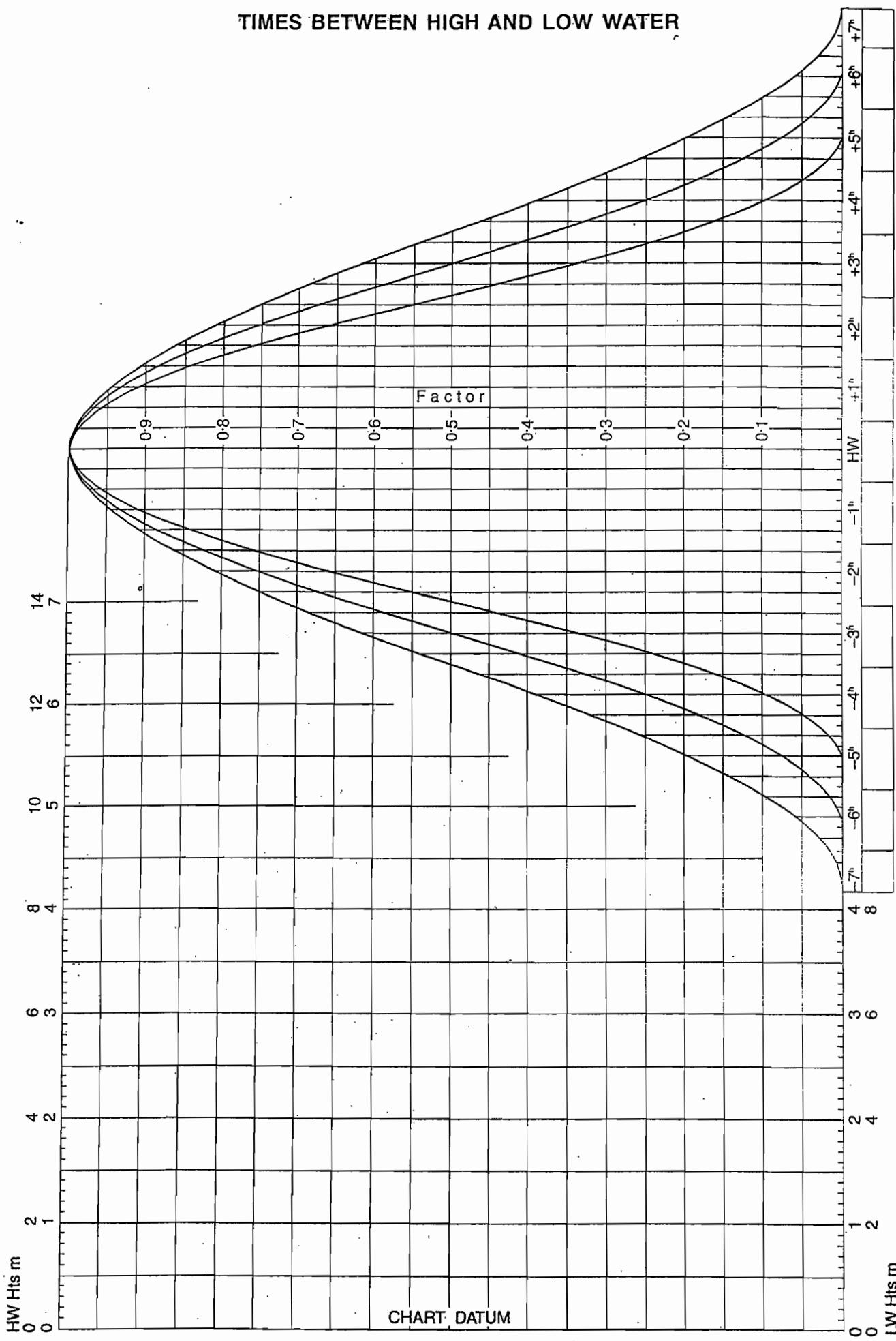
## **SECTION FOUR**

### **TIDAL PREDICTIONS FOR STANDARD PORTS (PACIFIC)**

## **Index to Pacific Ports**

|                          |         |
|--------------------------|---------|
| Borneo- Balik Papan      | 84      |
| Australia-Brisbane Bar   | 85      |
| Australia- Torres Strait | 87      |
| Australia-Darwin         | 88      |
| New Zealand-Auckland     | 89      |
| China- Beihai            | 91      |
| China-Hong Kong          | 92      |
| Korea-Inch'on            | 93      |
| Japan- Tomogasima        | 94      |
| Newfoundland-St Johns    | 95      |
| Canada-Br Col-Seymour    | 96      |
| Canada-Halifax           | 97      |
| Canada-Vancouver Hbr.    | 98      |
| Canada-Prince Rupert     | 99      |
| Panama-Balboa            | 101     |
| Chile-Puerto Montt       | 102     |
| USA-Admiralty Inlet      | 103/106 |
| USA-Boston               | 104     |
| USA-San Fran             | 105     |
| USA-Sandy Hook           | 107     |

FOR FINDING THE HEIGHT OF THE TIDE AT  
TIMES BETWEEN HIGH AND LOW WATER



**TABLE V - Part 1**  
**TIDAL LEVELS IN METRES AT STANDARD PORT**

| Standard Port                     | LAT  | MLWS | MLWN | MSL  | MHWN | MHWS  | HAT   |
|-----------------------------------|------|------|------|------|------|-------|-------|
| Townsville                        | 0.0  | +0.4 | +1.2 | +1.6 | +2.0 | +2.9  | +3.7  |
| Mackay                            | 0.0  | +0.7 | +2.0 | +3.0 | +4.1 | +5.3  | +6.4  |
| Brisbane Bar                      | 0.0  | +0.3 | +0.7 | +1.2 | +1.7 | +2.1  | +2.6  |
| Exmouth                           | 0.0  | +0.5 | +1.1 | +1.5 | +1.7 | +2.3  | +2.8  |
| Port Hedland                      | 0.0  | +1.2 | +3.3 | +3.9 | +4.6 | +6.7  | +7.5  |
| Darwin                            | 0.0  | +1.4 | +3.3 | +4.2 | +5.1 | +7.0  | +8.1  |
| Auckland                          | 0.0  | +0.4 | +0.8 | +1.8 | +2.8 | +3.1  | +3.6  |
| Wellington                        | +0.4 | +0.4 | +0.5 | +1.0 | +1.3 | +1.4  | +1.7  |
| Lyttelton                         | +0.1 | +0.3 | +0.4 | +1.4 | +2.1 | +2.2  | +2.7  |
| Bluff                             | +0.3 | +0.6 | +0.9 | +1.7 | +2.3 | +2.6  | +3.1  |
| Westport                          | -0.1 | +0.3 | +0.9 | +1.8 | +2.6 | +3.2  | +3.6  |
| Pago Pago                         | -0.2 | 0.0  | +0.1 | +0.4 | +0.7 | +0.9  | +1.1  |
| Suva                              | +0.1 | +0.3 | +0.5 | +1.1 | +1.4 | +1.6  | +2.1  |
| Kwajalein Atoll                   | -0.4 | -0.2 | +0.4 | +0.6 | +0.8 | +1.3  | +1.7  |
| Minjiang Kou (Chuanshi Dao)       | +0.2 | +0.8 | +2.2 | +3.5 | +4.9 | +6.2  | +6.9  |
| Luhuashan                         | +0.3 | +0.9 | +2.0 | +2.6 | +3.3 | +4.3  | +5.1  |
| Wusong                            | +0.1 | +1.0 | +1.4 | +2.0 | +2.5 | +3.5  | +4.6  |
| Inch'on (Chemulpho)               | -0.8 | +0.4 | +2.8 | +4.5 | +6.5 | +8.6  | +9.6  |
| Naha Ko                           | -0.3 | +0.4 | +0.8 | +1.2 | +1.5 | +2.0  | +2.4  |
| Moji                              | -0.4 | +0.3 | +0.9 | +1.3 | +1.7 | +2.3  | +2.6  |
| Prince Rupert                     | -0.1 | +1.2 | +2.5 | +3.8 | +5.2 | +6.5  | +7.5  |
| La Union                          | -0.6 | -0.1 | +0.6 | +1.5 | +2.5 | +3.0  | +3.5  |
| Balboa                            | -0.9 | -0.1 | +1.1 | +2.6 | +3.8 | +4.9  | +5.8  |
| Puerto Montt                      | -0.1 | +0.7 | +2.4 | +3.6 | +4.7 | +6.5  | +7.3  |
| Davao                             | +0.3 | -0.2 | +0.5 | +0.8 | +1.0 | +1.6  | +1.9  |
| Punta Loyola                      | 0.0  | +1.6 | +3.8 | +6.8 | +9.5 | +12.0 | +13.6 |
| Charleston                        | -0.5 | 0.0  | +0.2 | +0.9 | +1.5 | +1.7  | +2.2  |
| Hampton Roads                     | -0.2 | 0.0  | +0.1 | +0.4 | +0.7 | +0.8  | +1.1  |
| Baltimore                         | -0.2 | 0.0  | +0.1 | +0.2 | +0.4 | +0.4  | +0.7  |
| Sandy Hook (New York Bay)         | -0.4 | 0.0  | +0.3 | +0.8 | +1.3 | +1.6  | +2.0  |
| Boston                            | -0.7 | 0.0  | +0.4 | +1.6 | +2.7 | +3.1  | +3.8  |
| Saint John NB                     | -0.2 | +0.6 | +1.7 | +4.4 | +6.9 | +8.0  | +9.0  |
| Halifax                           | -0.1 | +0.3 | +0.5 | +1.0 | +1.5 | +1.8  | +2.1  |
| Pointe-au-Pere                    | -0.1 | +0.6 | +1.4 | +2.3 | +3.1 | +3.9  | +4.9  |
| Quebec                            | -0.2 | +0.3 | +1.0 | +2.6 | +3.9 | +5.2  | +6.0  |
| Harrington Harbour                | 0.0  | +0.3 | +0.7 | +1.1 | +1.4 | +1.8  | +2.3  |
| Argentia                          | +0.1 | +0.3 | +0.7 | +1.2 | +1.7 | +2.2  | +2.7  |
| St. John's Harbour (Newfoundland) | 0.0  | +0.3 | +0.5 | +0.8 | +0.9 | +1.3  | +1.6  |

Notes

- (a) The above levels, in metres, are referred to Chart Datum, which is same as the zero of the tidal predictions in all cases.
- (b) For definitions of tidal levels see page 4

TABLE V - Part 1  
TIDAL LEVELS IN METRES AT STANDARD PORT

| Standard Port                       | LAT  | MLLW | MHLW | MSL  | MLHW | MHHW | HAT  |
|-------------------------------------|------|------|------|------|------|------|------|
| Port Moresby                        | 0.0  | +0.5 | +1.4 | +1.4 | +1.5 | +2.3 | +2.9 |
| Dreger Harbour                      | 0.0  | +0.4 | Δ    | +0.7 | Δ    | +1.0 | +1.3 |
| Seeadler Harbour                    | 0.0  | +0.4 | Δ    | +0.7 | Δ    | +0.9 | +1.2 |
| Vila Harbour                        | 0.0  | +0.2 | +0.5 | +0.8 | +1.1 | +1.2 | +1.6 |
| Twin Island                         | 0.0  | +0.9 | +1.1 | +1.4 | +1.6 | +2.5 | +3.0 |
| Thursday Island                     | 0.0  | +0.6 | +1.2 | +1.4 | +1.7 | +2.5 | +3.0 |
| Goods Island                        | 0.0  | +1.3 | +2.6 | +2.6 | +3.0 | +3.2 | +3.6 |
| Booby Island                        | 0.0  | +0.6 | +2.0 | +2.4 | +2.8 | +4.2 | +4.3 |
| Newcastle                           | 0.0  | +0.4 | +0.6 | +1.0 | +1.4 | +1.6 | +2.1 |
| Sydney                              | 0.0  | +0.3 | +0.6 | +1.0 | +1.3 | +1.6 | +2.1 |
| Port Phillip Heads (Point Lonsdale) | -0.1 | +0.4 | +0.6 | +0.9 | +1.3 | +1.5 | +1.8 |
| Melbourne                           | +0.1 | +0.2 | +0.5 | +0.6 | +0.6 | +1.0 | +1.0 |
| Mersey River                        | 0.0  | +0.7 | +0.9 | +2.0 | +3.0 | +3.3 | +3.6 |
| Port Adelaide (outer harbour)       | 0.0  | +0.3 | +1.3 | +1.3 | +1.3 | +2.3 | +2.8 |
| Wallaroo                            | 0.0  | +0.2 | +0.6 | +1.0 | +1.3 | +1.7 | +2.0 |
| Whyalla                             | -0.1 | +0.5 | +1.3 | +1.6 | +1.9 | +2.7 | +3.3 |
| Port Lincoln                        | +0.1 | +0.2 | +0.7 | +0.9 | +1.0 | +1.5 | +2.0 |
| Albany                              | 0.0  | +0.5 | Δ    | +0.7 | Δ    | +1.0 | +1.4 |
| Camarvon                            | -0.1 | +0.6 | +0.8 | +1.0 | +1.3 | +1.5 | +2.0 |
| Gove                                | 0.0  | +0.7 | +1.2 | +1.8 | +2.4 | +2.9 | +3.7 |
| Karumba                             | 0.0  | +1.2 | Δ    | +2.1 | Δ    | +3.2 | +4.8 |
| Weipa                               | 0.0  | +0.7 | +1.5 | +1.8 | +2.2 | +2.9 | +3.4 |
| Honolulu                            | -0.2 | 0.0  | +0.1 | +0.2 | +0.3 | +0.6 | +0.8 |
| Beihai Gang                         | -0.1 | +1.3 | Δ    | +2.5 | Δ    | +4.1 | +5.9 |
| Naozhou Dao                         | -0.2 | +0.7 | +1.3 | +1.8 | +2.1 | +3.0 | +4.1 |
| Hong Kong                           | 0.0  | +0.6 | +1.1 | +1.4 | +1.6 | +2.2 | +2.8 |
| Tianjin Gang                        | -0.2 | +0.7 | +1.7 | +2.4 | +3.6 | +3.7 | +4.3 |
| Qinhuangdao                         | -0.1 | +0.5 | Δ    | +0.9 | Δ    | +1.2 | +1.9 |
| Yokohama                            | -0.1 | +0.3 | +0.9 | +1.1 | +1.6 | +1.7 | +2.1 |
| Kamaishi                            | -0.2 | +0.3 | +0.8 | +0.9 | +1.1 | +1.3 | +1.6 |
| Zaitiv Tukharka                     | -0.2 | +0.3 | +1.2 | +1.2 | +1.5 | +1.7 | +1.9 |
| Tofino                              | -0.1 | +0.7 | +1.4 | +2.1 | +3.0 | +3.4 | +4.1 |
| Victoria, BC                        | -0.2 | +0.8 | +2.0 | +1.9 | +2.3 | +2.6 | +3.2 |
| Vancouver                           | -0.2 | +1.1 | +2.9 | +3.1 | +3.9 | +4.4 | +5.0 |
| San Francisco                       | -0.6 | 0.0  | +0.7 | +1.0 | +1.4 | +1.7 | +2.2 |
| San Diego                           | -0.6 | 0.0  | +0.6 | +0.9 | +1.2 | +1.7 | +2.4 |
| Valparaiso                          | +0.1 | +0.4 | +0.5 | +0.9 | +1.2 | +1.5 | +2.0 |
| Cape Horn (Orange Bay)              | +0.2 | +0.5 | +0.9 | +1.3 | +1.7 | +2.2 | +2.7 |

Δ Tide is usually diurnal

#### Notes:

The above levels, in metres, are referred to Chart Datum, which is same as the zero of the tidal predictions in all cases.

TABLE V - Part 1

TIDAL LEVELS

The preceding tables give average tidal levels of all Standard Ports in this volume.

In general the levels are computed from at least a year's predictions. The values of Lowest Astronomical Tide (LAT) and Highest Astronomical Tide (HAT) are noted over a span of years and are defined below.

The table is in two parts. The first part on page xxvi covers those Standard Ports where the tide is mainly semi-diurnal. For those ports the levels of MHWS, MHWN, MLWN and MLWS are given. The second part on page xxvii covers those Standard Ports where the diurnal inequality is relatively large. For these ports the level of MHHW, MLHW, MHLW and MLLW are given. For details of the criteria used to establish the character of the tide at any port see page iv.

All levels in this table and all predictions in this volume are referred to Chart Datum of the largest scale Admiralty Chart of the area.

Tidal levels

*HAT (Highest Astronomical Tide), LAT (Lowest Astronomical Tide).* The highest and lowest levels respectively which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions; these levels will not be reached every year. HAT and LAT are not the extreme levels which can be reached, as storm surges (see page i) may cause considerably higher and lower levels to occur.

*MHWS (Mean High Water Springs), MLWS (Mean Low Water Springs).* The height of mean high water springs is the average, throughout a year when the average maximum declination of the moon is  $23\frac{1}{2}$ °, of the heights of two successive high waters during those periods of 24 hrs (approximately once a fortnight) when the range of the tide is greatest. The height of mean low water springs is the average height obtained by the two successive low waters during the same periods.

*MHWN (Mean High Water Neaps), MLWN (Mean Low Water Neaps).* The height of mean high water neaps is the average, throughout a year as defined above, of the heights of two successive high waters during those periods (approximately once a fortnight) when the range of the tide is least. The height of mean low water neaps is the average height obtained from the two successive low waters during the same periods.

*Note:* - The average value of MHWS, etc, varies from year to year in a cycle of approximately 18.6 years. The tidal levels given in Table V are average values for the whole cycle, obtained by computing values of a year or more and correcting the results by the value of  $f$  of  $M_2$ .

*MSL (Mean Sea Level).* Mean sea level is the average level of the sea surface over a long period, preferably 18.6 years, or the average level which would exist in the absence of tides.

*MHHW (Mean Higher High Water).* The height of mean higher high water is the mean of the higher of the two daily high waters over a long period of time. When only one high water occurs on a day this is taken as the higher high water.

*MLHW (Mean Lower High Water).* The height of mean lower high water is the mean of the lower of the two daily high waters over a long period of time. When only one high water occurs on some days " $\Delta$ " is printed in the MLHW column indicating that the tide is usually diurnal.

*MHLW (Mean Higher Low Water).* The height of mean higher low water is the mean of the higher of the two daily low waters over a long period of time. When only one low water occurs on some days " $\Delta$ " is printed in the MHLW column indicating that the tide is usually diurnal.

*MLLW (Mean Lower Low Water).* The height of mean lower low water is the mean of the lower of the two daily low waters over a long period of time. When only one low water occurs on a day this is taken as the lower low water.

*Note:* - The average value of MHHW, etc, varies from year to year in a cycle of approximately 18.6 years. The tidal levels given in Table V are usually computed from a year when the levels are expected to be average that is when  $f$  of  $M_2$  is 1.00.

TABLE V - Part 2  
HIGHEST ASTRONOMICAL TIDE (HAT) IN METRES AT SECONDARY PORTS

| No.   | Standard Port              | HAT(m) | No.   | Standard Port         | HAT(m) |
|-------|----------------------------|--------|-------|-----------------------|--------|
| 2762  | Plum Island                | 1.2    | 2833  | Bangor                | 5.4    |
| 2764  | Herod Point                | 2.1    | 2835  | Centre Harbour        | 4.1    |
| 2765  | Port Jefferson             | 2.6    | 2837  | Blue Hill Harbour     | 3.8    |
| 2767  | Lloyd Harbour              | 2.5    | 2838  | Bar Harbour           | 4.1    |
| 2768  | Kings Point                | 2.9    | 2840  | Prospect Harbour      | 4.1    |
| 2769  | Willets Point              | 2.9    | 2842  | Jonesport             | 4.3    |
|       |                            |        | 2843  | Cutler (Little River) | 5.2    |
| 2771  | Stamford                   | 2.9    | 2845  | West Quoddy Head      | 7.3    |
| 2772  | Bridgeport                 | 2.7    | 2846  | Eastport              | 7.9    |
| 2773  | New Haven Harbour          | 2.5    | 2847  | Outer Wood Island     | 6.0    |
| 2773a | Hoadley Point              | 1.9    | 2849  | North Head            | 7.2    |
| 2774  | Falkner Island             | 1.9    | 2853  | Welshpool             | 7.7    |
| 2775  | Saybrook Jetty             | 1.5    | 2858  | St. Andrews           | 8.0    |
| 2776  | New London                 | 1.2    | 2860  | Back Bay              | 7.7    |
| 2777  | Watch Hill Point           | 1.4    | 2862  | Lepreau Bay           | 8.0    |
| 2779  | Block Island (Old Harbour) | 1.3    | 2866  | St. Martins           | 10.7   |
|       |                            |        | 2869  | Herring Cove          | 11.6   |
| 2780  | Point Judith               | 1.4    |       |                       |        |
| 2781  | Newport (Rhode Island)     | 1.6    | 2871  | Grindstone Island     | 13.5   |
| 2783  | Providence                 | 2.0    | 2872  | Hopewell Cape         | 14.2   |
| 2784  | Bristol                    | 1.7    | 2874  | Moncton               | ①      |
| 2785  | Sakonnet                   | 1.4    | 2875  | Salisbury             | ①      |
| 2786  | New Bedford                | 1.7    | 2877  | Arnherst Harbour      | 15.4   |
| 2787  | Cape Cod Canal W. Entrance | 1.7    | 2878  | Joggins Wharf         | 13.2   |
|       |                            |        | 2880  | Cape Capstan          | 11.6   |
| 2790  | Woods Hole (Great Harbour) | 1.0    | 2881  | Ile Haute             | 11.4   |
| 2791  | Hyannis Port               | 1.1    | 2883  | West Advocate         | 11.7   |
| 2792  | Monomoy Point              | 1.7    | 2884  | Fort Greville         | 12.8   |
| 2793  | Vineyard Haven             | 0.9    | 2885  | Parrsboro             | 13.9   |
| 2794  | Gay Head                   | 1.5    | 2886  | Five Islands          | 14.8   |
| 2797  | Siaconset                  | 0.7    | 2888  | Truro                 | 9.9    |
| 2798  | Great Point                | 1.2    | 2891  | Burntcoat Head        | 15.6   |
| 2799  | Nantucket Harbour          | 1.3    |       |                       |        |
| 2800  | Muskeget Island            | 0.9    | 3156  | Tacks Beach           | 2.3    |
|       |                            |        | 3157  | Woody Island          | 2.5    |
| 2802  | Chatham (Cape Cod)         | 1.8    | 3158  | Come By Chance        | 2.6    |
| 2803  | Race Point                 | 3.4    | 3161  | St. Bride's           | 2.4    |
| 2805  | Cape Cod Canal E. Entrance | 3.4    | 3162  | Trepassey Harbour     | 1.9    |
| 2806  | Gurnet Point               | 3.9    | 3163  | Fermeuse Harbour      | 1.6    |
| 2807  | Cohasset Harbour           | 3.6    | 3164  | Bay Bulls             | 1.6    |
|       |                            |        | 3167  | Holyrood              | 1.4    |
| 2811  | Salem                      | 3.6    | 3168  | Harbour Grace         | 1.5    |
| 2813  | Merrimack River Entrance   | 3.3    | 3169  | Heart's Content       | 1.4    |
| 2814  | Portsmouth                 | 3.2    |       |                       |        |
| 2815  | Cape Porpoise              | 3.6    | 3170  | Bull Island           | 1.4    |
| 2816  | Portland (Casco Bay)       | 3.6    | 3171  | Randomhead Harbour    | 1.3    |
| 2818  | Potts Harbour              | 3.8    | 3171a | Clarenville           | 1.6    |
| 2819  | Fort Popham                | 3.5    | 3172  | Port Union            | 1.3    |
|       |                            |        | 3173  | King's Cove           | 1.2    |
| 2820  | Bath (Kennebec River)      | 2.6    | 3174  | Newman Sound          | 1.2    |
| 2821  | Richmond                   | 2.0    |       |                       |        |
| 2824  | Monhegan Island            | 3.6    | 3177  | Freshwater Bay        | 1.5    |
| 2825  | Tenants Harbour            | 3.8    | 3178  | Valleyfield           | 1.2    |
| 2827  | Matinicus Harbour          | 3.8    | 3180  | Funk Island           | 1.0    |
| 2828  | Vinalhaven                 | 3.7    | 3181  | Carmanville           | 1.4    |
| 2829  | Pulpit Harbour             | 3.9    |       |                       |        |
|       |                            |        | 3182  | Fogo Harbour          | 1.8    |
| 2831  | Rockland                   | 3.9    | 3183  | Twillingate Harbour   | 1.7    |
| 2832  | Belfast                    | 4.2    | 3185  | Botwood               | 1.9    |

TABLE V - Part 2  
HIGHEST ASTRONOMICAL TIDE (HAT) IN METRES AT SECONDARY PORTS

| No.   | Standard Port            | HAT(m) | No.   | Standard Port                        | HAT(m) |
|-------|--------------------------|--------|-------|--------------------------------------|--------|
| 3186  | Exploits Burnt Islands   | 1.4    | 3266a | Innetalling Island                   | 1.7    |
| 3189  | Little Bay Arm           | 1.4    | 3267  | Great Whale Island                   | 1.9    |
|       |                          |        | 3267a | Cape Jones                           | 2.3    |
| 3191  | Tilt Cove                | 1.5    | 3268  | Fort George                          | 2.2    |
| 3192  | La Scie                  | 1.3    |       |                                      |        |
| 3193  | Baie Verte               | 1.5    | 3270  | Eastmain River                       | 1.1    |
| 3194  | Seal Cove                | 1.4    | 3271  | Stag Island                          | 3.0    |
| 3194a | Hampden                  | 1.6    |       |                                      |        |
|       |                          |        | 5737  | Uvea (Uea) Island                    | 1.7    |
| 3195  | Sops Island              | 1.3    | 5738  | Lifu Island                          | 1.2    |
| 3196  | Orange Bay               | 1.9    | 5739  | Mare Island                          | 1.4    |
| 3197  | Wild Cove                | 1.9    |       |                                      |        |
| 3198  | Croque Harbour           | 1.8    | 5741  | Huon Island                          | 1.0    |
| 3199  | Ariege Bay               | 1.9    | 5745  | Pam Bay                              | 2.0    |
|       |                          |        | 5746  | Port Pueblo                          | 1.9    |
| 3200  | St. Anthony              | 1.6    | 5747  | Port Hyengen                         | 1.3    |
| 3200a | Quirpon Harbour          | 1.5    | 5748  | Tuo Bay                              | 1.7    |
| 3201  | Ship Cove                | 1.1    | 5749  | Baie De Poro                         | 1.4    |
| 3202  | South Point              | 1.1    | 5749a | Baie De Kouaoua                      | 1.5    |
| 3204  | Battle Harbour           | 1.7    |       |                                      |        |
| 3205  | Port Marnham             | 1.6    | 5750  | Baie D'Amata                         | 1.0    |
| 3206  | Port Hope Simpson        | 1.7    | 5750a | Thio                                 | 1.5    |
| 3214  | Cartwright               | 2.1    | 5751  | Uinne Bay                            | 1.7    |
| 3216  | Cabot Point              | 0.8    | 5752  | Port Yate                            | 1.6    |
| 3217  | Jordans Point            | 2.6    | 5754  | Kuto                                 | 1.4    |
|       |                          |        | 5755  | Goro                                 | 1.2    |
| 3220  | Terrington Basin         | 0.9    |       |                                      |        |
| 3220a | North West River         | 1.0    | 5756  | Baie Du Prony                        | 1.5    |
| 3221  | Smokey                   | 1.9    | 5756a | Ouara                                | 1.5    |
| 3225  | Makkovik                 | 2.2    | 5757  | Ire                                  | 1.4    |
| 3226  | Hopedale                 | 2.4    | 5757a | La Tortue                            | 1.6    |
| 3228  | Davis Inlet              | 2.5    | 5758  | Amedee Lighthouse                    | 1.7    |
|       |                          |        | 5759  | Noumea                               | 1.7    |
| 3231  | Nain                     | 2.9    | 5760  | Baie St. Vincent                     | 2.1    |
| 3242  | Williams Harbour         | 3.7    | 5761  | Isie Pass                            | 1.0    |
| 3244  | Button Islands           | 5.5    | 5762  | Uarai Bay                            | 2.0    |
| 3245  | Port Burwell             | 6.5    | 5763  | Burail Bay                           | 1.6    |
| 3248  | Riviere Koksoak Entrance | 13.2   | 5764  | Poya Bay                             | 1.8    |
| 3249  | Fort Chimo               | 6.7    |       |                                      |        |
|       |                          |        | 5765  | Gomen Bay                            | 1.8    |
| 3250  | Lac Aux Feuilles         | 15.7   | 5766  | Paagoumene Bay                       | 1.8    |
| 3251  | Hopes Advance Bay        | 13.1   | 5767  | Banare                               | 1.6    |
| 3252  | Basking Island           | 10.8   | 5768  | Aue Bay                              | 1.0    |
| 3252a | Pikylulik Island         | 10.5   | 5770  | Norfolk Island                       | 1.9    |
| 3252b | Agvik Island             | 12.2   | 5772  | Lord Howe Island                     | 2.3    |
| 3254  | Diana Bay                | 10.4   | 5774  | Middleton Reef                       | 2.2    |
|       |                          |        | 5775  | Cato Island                          | 2.2    |
| 3256  | Stupart Bay              | 8.9    |       |                                      |        |
| 3256a | Doctor Island            | 9.0    | 5778  | Observatory Cay ( <i>Fred. Is.</i> ) | 1.0    |
| 3257  | Wakeham Bay              | 11.0   | 5779  | Middle Bellona-Reef                  | 1.0    |
| 3258  | Douglas Harbour          | 8.6    | 5780  | Long Island                          | 1.0    |
| 3260  | Deception Bay            | 5.8    | 5781  | Marion Reef                          | 2.3    |
| 3260a | Sugluk                   | 5.5    | 5782  | Mellish Reef                         | 1.7    |
| 3261  | Digges Harbour           | 3.6    | 5783  | Observatory Cay ( <i>Lihou Rf.</i> ) | 1.0    |
| 3262  | Port De Boucherville     | 4.7    | 5785  | Willis Islands                       | 2.7    |
| 3263  | Cape Acadia              | 1.4    | 5788  | Osprey Reef                          | 1.0    |
|       |                          |        |       |                                      |        |
| 3265  | Inoudjouac               | 0.7    | 5790  | Murray Islands                       | 3.0    |
| 3266  | Tukarak Island           | 1.3    | 5793  | Bramble Cay                          | 3.4    |

**TABLE V - Part 2**  
**HIGHEST ASTRONOMICAL TIDE (HAT) IN METRES AT SECONDARY PORTS**

| No.   | Standard Port                 | HAT(m) | No.   | Standard Port             | HAT(m) |
|-------|-------------------------------|--------|-------|---------------------------|--------|
| 5794  | Darnley Island                | 3.8    | 6436  | Castlepoint               | 1.4    |
| 5798  | Rennel Island                 | 4.1    | 6438  | Cape Palliser             | 1.5    |
| 5800  | Dungeness Reef                | 3.8    |       |                           |        |
| 5802  | Saibai Island                 | 4.1    | 6441  | Oteranga Bay              | 1.0    |
| 5807  | Coconut Island                | 4.1    | 6442  | Makara Beach              | 1.4    |
| 5808  | Suarji Island                 | 3.8    | 6443  | Porirua Harbour           | 1.6    |
| 5808a | Moa Island (Banks Island)     | 3.4    | 6445  | Manawatu River Entrance   | 2.8    |
| 5809  | Hawkesbury Island             | 3.7    | 6447  | Wanganui River Entrance   | 3.3    |
|       |                               |        | 6449  | Patea                     | 2.9    |
| 5811  | East Strait Island            | 3.8    |       |                           |        |
| 5813  | Tuesday Island (No. 1)        | 3.7    | 6451  | Opunake Bay               | 3.7    |
| 5814  | Wednesday Island (Ince Point) | 3.7    | 6453  | Collingwood               | 5.2    |
| 5818  | Hammond Rock                  | 3.7    | 6454  | Motupipi River            | 5.5    |
| 5819  | Round Island                  | 3.3    | 6455  | Astrolabe Road            | 5.4    |
| 6388  | Scheigis Beacon               | 2.2    | 6458  | Nelson                    | 4.7    |
| 6388a | Omaia Island                  | 2.5    | 6460  | Croiselles Harbour        | 4.9    |
| 6388b | Dairy Factory Wharf           | 2.4    | 6462  | Greville Harbour          | 4.1    |
| 6389  | Mangonui                      | 2.7    |       |                           |        |
|       |                               |        | 6464  | Stephens Island           | 3.1    |
| 6390  | Whangaroa                     | 2.5    | 6466  | Elmslie Bay               | 2.8    |
| 6390a | Waiti Bay                     | 2.3    | 6467  | Pelorus Sound Entrance    | 3.2    |
| 6391  | Russell                       | 2.7    | 6471  | Havelock                  | 3.3    |
| 6391a | Opua                          | 2.7    | 6474  | Long Island (New Zealand) | 1.6    |
| 6391b | Whangamumu Harbour            | 2.2    | 6476  | East Bay                  | 1.5    |
| 6392  | Whangaruru Harbour            | 2.3    | 6477  | Pirotu                    | 1.6    |
| 6393  | Tutukaka Harbour              | 2.5    | 6478  | Okiwa Bay                 | 1.6    |
| 6394  | Marsden Point                 | 3.0    | 6478a | Whekenui                  | 1.5    |
|       |                               |        | 6479  | Te Iro Bay                | 1.5    |
| 6395  | Port Whangarei                | 3.4    |       |                           |        |
| 6396  | Mokohinai Island              | 2.4    | 6481  | Lucky Bay                 | 1.5    |
| 6397  | Bon Accord Harbour            | 2.6    | 6482  | Port Underwood            | 1.7    |
| 6397a | Matakana River                | 2.9    | 6482  | Lake Grassmere Entrance   | 1.8    |
| 6398  | Mahurangi Harbour             | 0      | 6485  | Cape Campbell             | 1.9    |
| 6398a | Tiritiri Matangi Island       | 3.0    | 6487  | Kaikoura Peninsula        | 2.0    |
| 6399  | Weiti River Entrance          | 3.0    |       |                           |        |
|       |                               |        | 6491  | Akaroa                    | 2.8    |
| 6401  | Man o'War Bay                 | 3.1    | 6492  | Timaru                    | 2.7    |
| 6401a | Matiata Bay                   | 2.9    | 6494  | Oamaru                    | 2.4    |
| 6404  | Rocky Point (Thames)          | 3.5    | 6496  | Otago Harbour Entrance    | 2.2    |
| 6405  | Coromandel Harbour            | 3.1    | 6497  | Port Chalmers             | 2.4    |
| 6406  | Nagle Cove                    | 2.6    | 6498  | Dunedin                   | 2.4    |
| 6408  | Port Jackson                  | 2.8    |       |                           |        |
| 6411  | Mercury Bay (Whitianga)       | 2.2    | 6500  | Nugget Point              | 2.5    |
| 6412  | Tairua                        | 2.1    | 6502  | Waipapa Point             | 3.0    |
| 6412a | Slipper Island                | 2.3    | 6505  | New River Entrance        | 3.0    |
| 6415  | Tauranga                      | 2.1    | 6506  | Colac Bay                 | 2.6    |
| 6417  | Whale Island                  | 2.2    | 6507  | Paterson Inlet            | 2.8    |
| 6418  | Ohiwa                         | 2.2    | 6728  | Wailagilala Island        | 1.8    |
| 6419  | Motunui Island                | 2.4    | 6729  | Vanuabalavu Island        | 1.6    |
|       |                               |        | 6730  | Tumbou                    | 1.9    |
| 6421  | Hicks Bay                     | 2.2    | 6730a | Wainiyabia                | 1.6    |
| 6422  | East Cape                     | 2.2    |       |                           |        |
| 6423  | Waipiro Bay                   | 2.2    | 6732  | Herald Sound              | 1.4    |
| 6424  | Tolaga Bay                    | 1.8    | 6733  | Naroi                     | 1.9    |
| 6425  | Gisborne                      | 2.2    | 6734  | Matuku Harbour            | 2.0    |
| 6428  | Portland Island               | 0      | 6735  | Ngaloa Harbour            | 1.9    |
| 6429  | Waikokopu                     | 1.7    | 6735a | Namalata Bay              | 1.8    |
| 6430  | Clyde                         | 1.7    | 6739  | Iles Wallis (Ile Urea)    | 2.0    |
| 6432  | Napier No. 3 Wharf            | 2.0    |       |                           |        |

TABLE V - Part 2  
HIGHEST ASTRONOMICAL TIDE (HAT) IN METRES AT SECONDARY PORTS

| No.   | Standard Port                 | HAT(m) | No.  | Standard Port           | HAT(m) |
|-------|-------------------------------|--------|------|-------------------------|--------|
| 6740  | Rotuma Island                 | 2.0    | 7388 | Huludao Gang            | 3.4    |
| 6744  | Funafuti                      | 2.2    |      |                         |        |
| 6750  | Arorae                        | 2.1    | 7392 | Bar (Liao he)           | 4.0    |
| 6752  | North Beru                    | 1.6    | 7393 | Bar Signal Station      | 4.6    |
| 6754  | Tabiteua                      | 2.5    | 7394 | Yingkou                 | 4.5    |
| 6755  | Nonouti                       | 2.4    | 7397 | Daitze Shan             | 4.5    |
| 6756  | Abemama                       | 2.2    |      |                         |        |
| 6759  | Tarawa (Betio)                | 2.2    | 7401 | Changxing Dao           | 2.4    |
|       |                               |        | 7403 | Xizhong Dao             | 2.3    |
| 6760  | Abaiang Atoll                 | 2.2    | 1405 | Boji Dao                | 2.8    |
| 6761  | Butaritari (Makin)            | 2.2    | 7407 | Hulu Dao                | 2.6    |
| 6763  | Banaba                        | 2.0    |      |                         |        |
| 6764  | Nauru                         | 2.4    | 7411 | Yingzhengzi Wan         | 2.3    |
| 6766  | Port Rhin                     | 2.0    | 7414 | Chang Zui               | 2.1    |
| 6767  | Dodo Passage                  | 1.9    | 7416 | Lushun Gang             | 3.5    |
| 6768  | Djarrit                       | 2.2    | 7417 | Xiaobing Dao            | 3.1    |
| 6769  | South East Pass, Jaluit Atoll | 2.0    | 7418 | Yu Yan                  | 3.2    |
| 6771  | Ailinglapalap Atoll           | 1.8    | 7421 | Dalian Gang (Dairen Ko) | 3.8    |
| 6772  | Maloelap Atoll                | 1.8    | 7424 | Changjiang Ao           | 4.0    |
| 6775  | Wotje Atoll                   | 1.7    | 7427 | Dachangshan Dao         | 4.7    |
| 6776  | Kwajalein Atoll               | 1.8    | 7429 | Haiyang Dao             | 4.7    |
| 6776a | Namuru To                     | 1.8    |      |                         |        |
| 6777  | Likiep Atoll                  | 1.8    | 7432 | Dawangjla Dao           | 5.3    |
|       |                               |        | 7435 | Dalu Dao                | 6.4    |
| 6782  | Rongerik Atoll                | 1.8    | 7436 | Takushan                | 5.9    |
| 6783  | Rongelap Atoll                | 1.7    | 7439 | Sin Do                  | 7.1    |
| 6786  | Bikini Atoll                  | 1.8    |      |                         |        |
| 6787  | Enewetak Atoll                | 1.6    | 7440 | Chao-Shih-Kou           | 6.3    |
| 6787a | Runit Island                  | 1.6    | 7441 | Tuyup'o                 | 5.5    |
| 6788  | Ujelang Atoll                 | 1.6    | 7442 | San-Tao-Lang-Tou        | ◎      |
|       |                               |        | 7443 | An-tung                 | 5.1    |
| 6790  | Wake Island                   | 1.0    | 7445 | Suum Do                 | 6.9    |
| 6792  | Kusae Island                  | 1.9    | 7448 | Tan Do                  | 6.9    |
| 6795  | Ponape Harbour                | 1.6    |      |                         |        |
| 6795a | Matalanim Harbour             | 1.7    | 7450 | Nap Do                  | 6.6    |
| 6797  | Oroluk Island                 | 1.2    | 7452 | Unmu Do                 | 7.5    |
| 6798  | Nomoi Islands                 | 1.3    | 7457 | Sok Do                  | 5.4    |
| 6798a | Moro Tu                       | 1.3    | 7458 | P'i Do                  | 6.4    |
| 6800  | Hall Islands                  | 1.1    | 7468 | Monggum P'o             | 4.3    |
| 6800a | Nomuuin To                    | 1.0    | 7469 | Wollae Do (Getsnai Tau) | 4.1    |
| 6801  | Truk Islands                  | 0.8    | 7470 | Taeryonggi Bong         | 4.0    |
| 6802  | Namonuito Islands             | 0.8    | 7471 | Taechong Do             | 4.0    |
| 6802a | Onari To                      | 0.8    | 7474 | Sunwi Do                | 5.6    |
| 6803  | Pulap Island                  | 0.9    | 7475 | Mu Do                   | 7.0    |
| 6804  | Puluwat Island                | 0.8    | 7477 | Taeyonpyong Do          | 7.5    |
| 6807  | Lamotrek                      | 0.8    | 7479 | Chumun Do               | 8.9    |
| 6811  | Woleai Island                 | 0.8    | 7480 | Oep'on                  | 9.2    |
| 6814  | Ulithi Islands                | 1.4    | 7482 | Seoul                   | ◎      |
| 6814a | Yasoru To                     | 1.4    | 7484 | Sun Tol Mok             | ◎      |
| 6815  | Yap Island                    | 1.6    | 7487 | Taemui Do               | 9.0    |
| 6816  | Ngulu Islet                   | 1.5    | 7489 | Tokchok To              | 8.4    |
| 6818  | Garukoru (Ngaregur)           | 1.9    | 7492 | Asan Myoji              | 9.7    |
| 6819  | Toagel Mlungui                | 2.0    | 7494 | Umu Do                  | 8.4    |
| 6820  | Malakal Harbour               | 2.1    | 7497 | Manli Po                | 7.2    |
| 6821  | Ngesebus                      | 1.8    |      |                         |        |
| 6825  | Helen Reef                    | 1.9    | 7500 | Sachang-Po              | 8.0    |

**TABLE V - Part 2**  
**HIGHEST ASTRONOMICAL TIDE (HAT) IN METRES AT SECONDARY PORTS**

| No.   | Standard Port        | HAT(m) | No.  | Standard Port           | HAT(m) |
|-------|----------------------|--------|------|-------------------------|--------|
| 7501  | Taech'on             | 7.2    | 8655 | Windham Bay             | 6.1    |
| 7503  | Daecheon Hang        | 6.2    | 8656 | Cleveland Passage       | 6.0    |
| 7504  | Kunsan (Outer Port)  | 7.6    | 8658 | Slocum Arm (Falcon Ann) | 3.8    |
| 7505  | Kunsan               | 7.6    | 8659 | Kimshan Cove            | 3.8    |
| 7507  | Gogunso Gundo        | 6.6    | 8661 | Lisianski Inlet         | 3.8    |
| 7510  | Amma Do              | 5.7    | 8662 | Takanis Bay             | 3.7    |
| 7512  | Hampyeong Man        | 6.2    | 8664 | Port Althorp            | 3.9    |
| 7515  | Buggang Sudo         | 4.9    | 8665 | Granite Cove            | 4.1    |
| 7517  | Mokp'o Hang          | 4.9    | 8668 | Lemesurier Island       | 4.3    |
| 7519  | Siha Do              | 4.3    | 8670 | Hoonah                  | 5.5    |
| 7521  | Hatae Do             | 4.0    | 8673 | Freshwater Bay, Alaska  | 5.8    |
| 7523  | Bigeum Do            | 4.3    | 8679 | Sergius Narrows         | 4.8    |
| 7525  | Daeheungsan Do       | 4.0    | 8680 | Kakul Narrows           | 3.7    |
| 7529  | Usuyong              | 4.1    | 8681 | Nismeni Cove            | 6.0    |
| 7530  | Hajo Do              | 3.5    | 8684 | Fairway Island          | 5.8    |
| 7531  | Pyokpajin            | 4.3    | 8686 | Kasnyku Bay             | 5.7    |
| 7532  | Sangma Do (Joma To)  | 4.2    | 8690 | Port Walter             | 4.1    |
| 7533  | Oran Jin             | 4.0    | 8692 | Cape Ommaney            | 3.7    |
| 7534  | Chuk-To(Shaki To)    | 3.0    | 8695 | Port Banks              | 3.7    |
| 7535  | Hoasgumpo            | 3.0    | 8698 | Biorka Island           | 3.7    |
| 7536  | Sogwi-Po (Selkho Ko) | 3.3    | 8700 | Sitka                   | 3.9    |
| 7538  | U Do                 | 2.6    | 8703 | Whitestone Narrows      | 3.7    |
| 7539  | Jeju Hang            | 3.1    | 8706 | Gilmer Bay              | 3.8    |
| 7541  | Sangchuja Do         | 3.6    | 8710 | Point Thatcher          | 5.8    |
| 7542  | Soan Do              | 3.8    | 8711 | Favorite Bay            | 5.4    |
| 7543  | Wan Do               | 4.4    | 8714 | Funter Bay              | 6.1    |
| 7543a | Cheongsan Do         | 3.5    | 8716 | Barlow Cove             | 6.2    |
| 7544  | Geumdang Do          | 4.0    | 8722 | Windfall Harbour        | 6.2    |
| 7545  | Geomun Do            | 3.7    | 8723 | Gambler Bay             | 6.0    |
| 7548  | Nogdong              | 4.1    | 8724 | Pybus Bay               | 5.8    |
| 8604  | Rocky Point          | 4.2    | 8728 | Security Bay            | 4.8    |
| 8605  | Valdez               | 4.6    | 8732 | Table Bay               | 4.0    |
| 8608  | Windy Bay            | 4.5    | 8734 | Port McArthur           | 3.8    |
| 8610  | Port Etches          | 4.2    | 8738 | Seclusion Harbour       | 6.0    |
| 8612  | Whitshead Point      | 4.6    | 8743 | Hamilton Bay            | 5.4    |
| 8613  | Cordova              | 4.8    | 9453 | Puerto Corinto          | 2.5    |
| 8614  | Middleton Island     | 3.9    | 9455 | San Juan Del Sur        | 2.7    |
| 8617  | Controller Bay       | 3.7    | 9456 | Bahia Elena             | 3.5    |
| 8622  | Yakutat Bay          | 4.0    | 9457 | Puerto Culebra          | 3.5    |
| 8626  | Lituya Bay           | 3.6    | 9460 | Puntarenas              | 3.3    |
| 8628  | Cape Spencer         | 3.8    | 9462 | Puerto Herradura        | 3.5    |
| 8629  | Surveyor Seamount    | 3.5    | 9464 | Bahia Uvita             | 3.5    |
| 8633  | Bartlett Cove        | 5.9    | 9467 | Bahia Del Rincon        | 3.5    |
| 8636  | Swanson Harbour      | 6.1    | 9470 | Chatham Bay             | 3.1    |
| 8639  | William Henry Bay    | 6.3    | 9471 | Puerto Armuelles        | 3.4    |
| 8641  | Pyramid Harbour      | 6.4    | 9474 | Isla Parida             | 3.9    |
| 8643  | Skagway              | 6.4    | 9477 | Bahia Honda (Panama)    | 3.9    |
| 8648  | Fritz Cove           | 6.3    | 9478 | Isla Coiba              | 4.1    |
| 8649  | Juneau               | 6.3    | 9480 | Isla Cebaco             | 3.9    |
| 8651  | Taku Point           | 6.5    | 9484 | Cabo Maia               | 4.1    |
| 8652  | Taku Harbour         | 6.1    | 9488 | Rio Chepo               | 5.6    |

TABLE V - Part 2  
HIGHEST ASTRONOMICAL TIDE (HAT) IN METRES AT SECONDARY PORTS

| No.   | Standard Port                | HAT(m) | No.  | Standard Port       | HAT(m) |
|-------|------------------------------|--------|------|---------------------|--------|
| 9492  | Punta Garachine              | 5.0    | 9544 | Guayaquil           | 4.7    |
| 9493  | St Elmo Bay                  | 5.0    | 9545 | Puerto Bolivar      | 3.3    |
| 9496  | Bahia Pinas                  | 4.9    | 9547 | Caleta Zorritos     | 2.0    |
| 9498  | Bahia Octavia                | 4.8    | 9548 | Lobitos             | 1.9    |
|       |                              |        | 9549 | Bahia De Talara     | 1.8    |
| 9501  | Puerto Utria                 | 4.7    | 9551 | Puerto De Paita     | 1.7    |
| 9503  | Puerto Cuevita               | 4.7    | 9553 | Puerto Bayovar      | 1.6    |
| 9505  | Punta Chirambira             | 4.5    | 9554 | Lobos De Afuera     | 1.5    |
| 9507  | Buenaventura                 | 4.6    | 9557 | Puerto Eten         | 1.5    |
|       |                              |        | 9560 | Puerto Chicama      | 1.3    |
| 9510  | Rio Sanguanga                | 4.7    | 9562 | Salaverry           | 1.3    |
| 9511  | Puerto Tumaco                | 3.7    | 9563 | Chimbote            | 1.3    |
| 9517  | Bahia Darwin                 | 2.6    | 9564 | Bahia Ferrol        | 1.4    |
| 9519  | Caleta Iguana                | ◎      | 9566 | Bahia Huarmey       | 1.2    |
|       |                              |        | 9568 | Bahia Barnejo       | ◎      |
| 9521  | Caleta Aeolian               | 2.1    | 9570 | Puerto Huacho       | 1.1    |
| 9522  | Bahia Post Office            | 1.9    | 9573 | Callao              | 1.2    |
| 9524  | Bahia Agua Dulce             | 2.3    | 9575 | Caletta Pucusana    | ◎      |
| 9525  | San Lorenzo                  | 4.4    | 9577 | Pearto Cerro Azul   | ◎      |
| 9527  | Esmerealdas                  | 3.7    | 9579 | Pisco               | 1.0    |
| 9528  | Bahia Atacames               | 4.6    |      |                     |        |
| 9530  | Muisne                       | 3.5    | 9580 | Bahia Independencia | ◎      |
| 9533  | Cabo Pasado                  | 3.6    | 9583 | San Juan            | 1.1    |
| 9534  | Bahia De Caraquez            | 3.3    | 9584 | Punta Lomas         | ◎      |
| 9535  | Manta                        | 3.1    | 9586 | Rada Atico          | ◎      |
| 9538  | Puerto Lopez                 | 3.4    | 9588 | Caleta Quiica       | ◎      |
| 9539  | La Libertad                  | 2.5    | 9589 | Matarami            | 1.2    |
|       |                              |        | 9591 | Puerto Ilo          | 1.3    |
| 9540  | Posorja                      | 2.8    | 9594 | Arica               | 1.7    |
| 9540a | Puerto Maritimo De Guayaquil | 4.8    | 9597 | Caleta Junin        | 1.7    |
| 9541  | Isla Santa Clara             | 2.3    | 9599 | Iquique             | 1.7    |
| 9543  | Puna                         | 4.1    |      |                     |        |

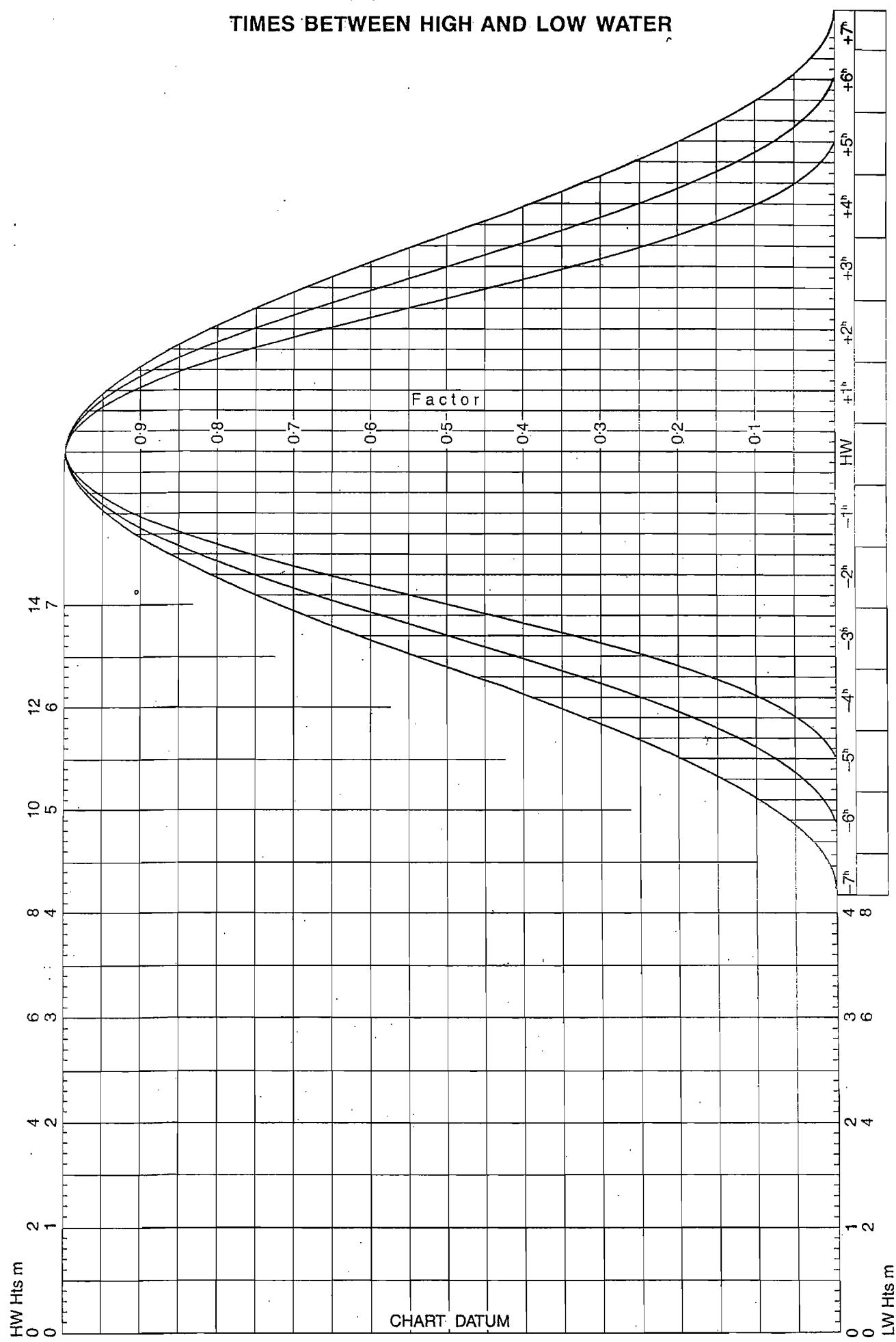
The preceding table gives HAT tidal levels of all Secondary Ports in this volume, and are referred to Chart Datum, which is the same as the zero of the tidal predictions in all cases.

*Notes:*

◎ No data



FOR FINDING THE HEIGHT OF THE TIDE AT  
TIMES BETWEEN HIGH AND LOW WATER



**BORNEO, EAST COAST - BALIK PAPAN**

LAT 1°16'S LONG 116°48'E

| TIME ZONE -0800 |         |         |      | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |         |      |         |      |         |      |         |        |         |      | YEAR 1988 |     |  |  |  |  |
|-----------------|---------|---------|------|--|------|---------|------|---------|------|---------|------|---------|--------|---------|------|-----------|-----|--|--|--|--|
| JANUARY         |         |         |      | FEBRUARY                                 |      |         |      | MARCH   |      |         |      | APRIL   |        |         |      |           |     |  |  |  |  |
| TIME            | M       | TIME    | M    | TIME                                     | M    | TIME    | M    | TIME    | M    | TIME    | M    | TIME    | M      | TIME    | M    | TIME      | M   |  |  |  |  |
| 1 0527          | 1.5     | 16 0043 | 1.1  | 1 0031                                   | 0.8  | 0013    | 0.8  | 1 0019  | 0.8  | 0527    | 1.9  | 1 0002  | 0.7    | 0545    | 2.6  |           |     |  |  |  |  |
| 1027            | 1.1     | 0558    | 1.4  | 1 0613                                   | 1.8  | 0549    | 1.8  | 1 0601  | 1.9  | 1115    | 0.7  | 1 0557  | 2.3    | 1202    | 0.3  |           |     |  |  |  |  |
| F 1712          | 2.3     | SA 1006 | 1.3  | M 1143                                   | 0.8  | TU 1124 | 0.7  | TU 1140 | 0.8  | W 1741  | 2.5  | F 1202  | 0.5    | SA 1811 | 2.5  |           |     |  |  |  |  |
|                 |         | 1710    | 2.2  | 1811                                     | 2.6  | 1755    | 2.7  | 1802    | 2.5  | 2357    | 0.7  | 1814    | 2.5    | *       |      |           |     |  |  |  |  |
| 2 0005          | 0.8     | 17 0011 | 0.9  | 2 0042                                   | 0.6  | 0023    | 0.6  | 2 0024  | 0.7  | 0645    | 2.2  | 2 0016  | 0.6    | 17 0006 | 0.5  |           |     |  |  |  |  |
| 0547            | 1.7     | 0542    | 1.6  | 2 0626                                   | 2.0  | 17 0606 | 2.1  | 2 0610  | 2.1  | 1144    | 0.4  | 2 0614  | 2.5    | 17 0612 | 2.8  |           |     |  |  |  |  |
| SA 1107         | 0.9     | SU 1052 | 1.0  | TU 1206                                  | 0.6  | W 1154  | 0.4  | W 1159  | 0.6  | TH 1805 | 2.7  | SA 1223 | 0.3    | SU 1232 | 0.2  |           |     |  |  |  |  |
|                 |         | 1742    | 2.5  | 1733                                     | 2.5  | O 1831  | 2.7  | *       | 1820 | 2.9     | 1818 | 2.6     | O 1832 | 2.6     | 1837 | 2.5       |     |  |  |  |  |
| 3 0024          | 0.7     | 18 0018 | 0.7  | 3 0055                                   | 0.5  | 0041    | 0.4  | 3 0034  | 0.6  | 18 0015 | 0.5  | 3 0031  | 0.5    | 18 0029 | 0.4  |           |     |  |  |  |  |
| 0608            | 1.8     | 0556    | 1.8  | 3 0642                                   | 2.2  | 18 0628 | 2.4  | 3 0623  | 2.3  | 0608    | 2.5  | 3 0632  | 2.6    | 18 0640 | 2.9  |           |     |  |  |  |  |
| SU 1138         | 0.7     | M 1126  | 0.7  | W 1228                                   | 0.5  | TH 1223 | 0.2  | TH 1218 | 0.4  | F 1214  | 0.2  | SU 1244 | 0.2    | M 1300  | 0.1  |           |     |  |  |  |  |
|                 |         | 1808    | 2.7  | 1800                                     | 2.7  | 1850    | 2.8  | O 1836  | 2.7  | *       | 1830 | 2.8     | 1851   | 2.6     | 1901 | 2.3       |     |  |  |  |  |
| 4 0043          | 0.5     | 19 0035 | 0.5  | 4 0110                                   | 0.4  | 0101    | 0.3  | 4 0047  | 0.5  | 19 0035 | 0.4  | 4 0048  | 0.4    | 19 0053 | 0.3  |           |     |  |  |  |  |
| 0628            | 2.0     | 0617    | 2.0  | 4 0659                                   | 2.3  | 19 0653 | 2.6  | 4 0639  | 2.4  | 0633    | 2.7  | 4 0652  | 2.7    | 19 0707 | 2.8  |           |     |  |  |  |  |
| M 1205          | 0.6     | TU 1157 | 0.5  | TH 1250                                  | 0.3  | F 1253  | 0.1  | F 1238  | 0.3  | SA 1242 | 0.1  | M 1306  | 0.2    | TU 1327 | 0.2  |           |     |  |  |  |  |
| O 1832          | 2.8     | *       | 1827 | 2.9                                      | 1909 | 2.9     | 1911 | 3.0     | 1853 | 2.8     | 1855 | 2.8     | 1910   | 2.5     | 1925 | 2.1       |     |  |  |  |  |
| 5 0103          | 0.5     | 20 0056 | 0.4  | 5 0126                                   | 0.4  | 0123    | 0.2  | 5 0102  | 0.4  | 20 0057 | 0.3  | 5 0105  | 0.4    | 20 0116 | 0.3  |           |     |  |  |  |  |
| 0648            | 2.1     | 0641    | 2.2  | 5 0717                                   | 2.4  | 20 0718 | 2.7  | 5 0656  | 2.5  | 0659    | 2.8  | 5 0713  | 2.8    | 20 0733 | 2.9  |           |     |  |  |  |  |
| TU 1230         | 0.5     | W 1228  | 0.3  | F 1312                                   | 0.3  | SA 1322 | 0.0  | SA 1259 | 0.2  | SU 1310 | 0.0  | TU 1328 | 0.3    | W 1353  | 0.3  |           |     |  |  |  |  |
|                 |         | 1856    | 2.9  | 1855                                     | 3.1  | 1928    | 2.9  | 1936    | 3.0  | 1911    | 2.8  | 1919    | 2.8    | 1928    | 2.5  | 1947      | 2.3 |  |  |  |  |
| 6 0122          | 0.4     | 21 0119 | 0.3  | 6 0142                                   | 0.3  | 21 0144 | 0.2  | 6 0117  | 0.3  | 21 0118 | 0.2  | 6 0123  | 0.4    | 21 0138 | 0.4  |           |     |  |  |  |  |
| 0709            | 2.2     | 0707    | 2.4  | 6 0736                                   | 2.5  | 21 0744 | 2.8  | 6 0715  | 2.6  | 21 0724 | 2.9  | 6 0735  | 2.8    | 21 0758 | 2.7  |           |     |  |  |  |  |
| W 1255          | 0.4     | TH 1259 | 0.2  | SA 1333                                  | 0.3  | SU 1350 | 0.1  | SU 1319 | 0.2  | M 1337  | 0.1  | W 1351  | 0.3    | TH 1418 | 0.5  |           |     |  |  |  |  |
|                 |         | 1918    | 2.9  | 1923                                     | 3.1  | 1947    | 2.8  | 2000    | 2.8  | 1929    | 2.7  | 1941    | 2.7    | 1947    | 2.4  | 2007      | 2.2 |  |  |  |  |
| 7 0141          | 0.4     | 22 0143 | 0.2  | 7 0159                                   | 0.3  | 22 0206 | 0.2  | 7 0133  | 0.3  | 22 0140 | 0.3  | 7 0142  | 0.4    | 22 0200 | 0.5  |           |     |  |  |  |  |
| 0730            | 2.3     | 0734    | 2.5  | 7 0755                                   | 2.5  | 22 0810 | 2.7  | 7 0734  | 2.7  | 22 0750 | 2.9  | 7 0759  | 2.7    | 22 0823 | 2.6  |           |     |  |  |  |  |
| TH 1318         | 0.4     | F 1330  | 0.1  | SU 1354                                  | 0.3  | M 1417  | 0.3  | M 1340  | 0.2  | TU 1403 | 0.3  | TH 1414 | 0.5    | F 1441  | 0.7  |           |     |  |  |  |  |
|                 |         | 1939    | 2.8  | 1950                                     | 3.0  | 2005    | 2.7  | 2022    | 2.6  | 1946    | 2.7  | 2002    | 2.5    | 2006    | 2.2  | 2026      | 2.0 |  |  |  |  |
| 8 0200          | 0.4     | 23 0206 | 0.3  | 8 0215                                   | 0.4  | 226     | 0.3  | 8 0149  | 0.3  | 200     | 0.3  | 8 0202  | 0.5    | 23 0220 | 0.7  |           |     |  |  |  |  |
| 0751            | 2.3     | 0801    | 2.5  | 8 0815                                   | 2.5  | 23 0836 | 2.6  | 8 0754  | 2.7  | 0814    | 2.7  | 8 0824  | 2.6    | 23 0846 | 2.3  |           |     |  |  |  |  |
| F 1342          | 0.4     | SA 1400 | 0.2  | M 1415                                   | 0.4  | TU 1442 | 0.5  | TU 1401 | 0.4  | W 1427  | 0.5  | F 1439  | 0.7    | SA 1503 | 0.9  |           |     |  |  |  |  |
|                 |         | 2000    | 2.8  | 2017                                     | 2.9  | 2022    | 2.6  | 2039    | 2.4  | .2003   | 2.5  | 2020    | 2.3    | 2024    | 2.1  | 2042      | 1.9 |  |  |  |  |
| 9 0219          | 0.4     | 24 0230 | 0.3  | 9 0231                                   | 0.5  | 24 0244 | 0.5  | 9 0205  | 0.4  | 24 0218 | 0.5  | 9 0223  | 0.6    | 24 0238 | 0.3  |           |     |  |  |  |  |
| 0812            | 2.3     | 0829    | 2.5  | 9 0836                                   | 2.4  | 24 0900 | 2.4  | 9 0815  | 2.6  | 24 0838 | 2.5  | 9 0851  | 2.4    | 24 0907 | 2.3  |           |     |  |  |  |  |
| SA 1405         | 0.5     | SU 1430 | 0.4  | TU 1436                                  | 0.6  | W 1504  | 0.8  | W 1422  | 0.5  | TH 1448 | 0.7  | SA 1504 | 0.9    | SU 1521 | 1.1  |           |     |  |  |  |  |
|                 |         | 2021    | 2.6  | 2041                                     | 2.6  | 2037    | 2.4  | 2051    | 2.1  | 2019    | 2.4  | 2033    | 2.1    | 2040    | 1.9  | 2052      | 1.7 |  |  |  |  |
| 10 0237         | 0.5     | 25 0252 | 0.4  | 10 0247                                  | 0.5  | 25 0257 | 0.7  | 10 0221 | 0.5  | 25 0234 | 0.6  | 10 0244 | 0.8    | 25 0249 | 0.3  |           |     |  |  |  |  |
| 0834            | 2.2     | 0857    | 2.4  | 10 0858                                  | 2.3  | 25 0922 | 2.2  | 10 0837 | 2.5  | 25 0859 | 2.3  | 10 0922 | 2.1    | 25 0923 | 1.8  |           |     |  |  |  |  |
| SU 1428         | 0.6     | M 1458  | 0.6  | W 1456                                   | 0.8  | TH 1518 | 1.1  | TH 1443 | 0.7  | F 1504  | 1.0  | SU 1531 | 1.2    | M 1530  | 1.2  |           |     |  |  |  |  |
|                 |         | 2040    | 2.5  | 2102                                     | 2.4  | 2049    | 2.2  | 2047    | 1.9  | 2032    | 2.2  | 2037    | 1.9    | 2047    | 1.7  | 2028      | 2.1 |  |  |  |  |
| 11 0256         | 0.6     | 26 0312 | 0.6  | 11 0301                                  | 0.7  | 26 0301 | 0.8  | 11 0237 | 0.6  | 243     | 0.8  | 11 0300 | 1.0    | 26 0217 | 1.3  |           |     |  |  |  |  |
| 0857            | 2.2     | 0925    | 2.3  | 11 0921                                  | 2.2  | 26 0938 | 1.9  | 11 0901 | 2.3  | 26 0914 | 2.0  | 11 1003 | 1.8    | 26 0838 | 1.5  |           |     |  |  |  |  |
| M 1450          | 0.8     | TU 1525 | 0.9  | TH 1514                                  | 1.1  | F 1508  | 1.4  | F 1502  | 1.0  | SA 1506 | 1.3  | M 1559  | 1.5    | TU 1240 | 1.5  |           |     |  |  |  |  |
|                 |         | 2057    | 2.3  | 2115                                     | 2.1  | 2052    | 2.0  | 2003    | 1.8  | 2039    | 2.0  | 2017    | 1.7    | 1912    | 1.5  | 2322      | 1.1 |  |  |  |  |
| 12 0313         | 0.7     | 27 0328 | 0.8  | 12 0311                                  | 0.8  | 27 0237 | 1.0  | 12 0251 | 0.8  | 27 0232 | 1.0  | 12 0205 | 1.3    | 27 0508 | 1.6  |           |     |  |  |  |  |
| 0922            | 2.1     | 0955    | 2.1  | 12 0947                                  | 1.9  | 27 0924 | 1.7  | 12 0926 | 2.1  | 27 0909 | 1.7  | 12 1623 | 1.8    | 27 1051 | 1.2  |           |     |  |  |  |  |
| TU 1512         | 1.0     | W 1546  | 1.2  | F 1520                                   | 1.4  | SA 1303 | 1.6  | SA 1515 | 1.3  | SU 1403 | 1.5  | TU 2304 | 1.2    | W 1654  | 1.1  |           |     |  |  |  |  |
|                 |         | 2109    | 2.1  | 2109                                     | 1.8  | 2023    | 1.8  | 1818    | 1.8  | 2024    | 1.8  | 1848    | 1.7    | 2256    | 1.1  |           |     |  |  |  |  |
| 13 0329         | 0.9     | 28 0332 | 1.0  | 13 0304                                  | 1.0  | 28 0120 | 1.1  | 13 0252 | 1.0  | 28 0123 | 1.2  | 13 0438 | 1.6    | 28 0455 | 1.8  |           |     |  |  |  |  |
| 0950            | 1.9     | 1029    | 1.8  | 13 1025                                  | 1.7  | 28 0707 | 1.5  | 13 0952 | 1.8  | 28 0715 | 1.5  | 13 1025 | 1.1    | 28 1103 | 1.0  |           |     |  |  |  |  |
| W 1533          | 1.2     | TH 1537 | 1.6  | SA 1323                                  | 1.6  | SU 1119 | 1.3  | SU 1420 | 1.6  | M 1132  | 1.4  | W 1651  | 2.0    | TH 1710 | 1.9  |           |     |  |  |  |  |
|                 |         | 2108    | 1.8  | 1934                                     | 1.7  | 1809    | 1.8  | 1744    | 2.1  | 1833    | 1.7  | 1735    | 1.9    | 2303    | 1.0  | 2306      | 1.0 |  |  |  |  |
| 14 0338         | 1.0     | 29 0246 | 1.1  | 14 0141                                  | 1.1  | 29 0029 | 1.0  | 14 0143 | 1.2  | 29 0006 | 1.1  | 14 0454 | 2.0    | 29 0509 | 2.1  |           |     |  |  |  |  |
| 1032            | 1.7     | 1726    | 1.8  | 14 0727                                  | 1.4  | 29 0607 | 1.7  | 14 0737 | 1.4  | 29 0545 | 1.7  | 14 1100 | 0.7    | 29 1123 | 0.8  |           |     |  |  |  |  |
| TH 1536         | 1.5     | F       |      | SU 1015                                  | 1.4  | M 1123  | 1.1  | M 1018  | 1.4  | TU 1113 | 1.1  | TH 1718 | 2.2    | F 1729  | 2.0  |           |     |  |  |  |  |
|                 |         | 1950    | 1.6  |  | 1720 | 2.1     | 1749 | 2.3     | 1710 | 2.0     | 1730 | 2.1     | 2321   | 0.8     | 2322 | 0.8       |     |  |  |  |  |
| 15 0311         | 1.2     | 30 0057 | 1.1  | 15 0549                                  | 1.6  |         |      |         |      | 2348    | 1.0  |         |        |         |      |           |     |  |  |  |  |
| 1658            | 1.8     | 0634    | 1.5  | 15 0549                                  | 1.6  |         |      |         |      | 15 0002 | 1.1  | 30 0534 | 1.9    | 15 0518 | 2.3  | 30 0527   | 2.3 |  |  |  |  |
| F               |         | SA 1047 | 1.3  | M 1054                                   | 1.0  |         |      |         |      | 15 0527 | 1.6  | 30 1125 | 0.9    | 15 1132 | 0.5  | 30 1145   | 0.6 |  |  |  |  |
|                 |         | 1733    | 2.2  | 1733                                     | 2.4  |         |      |         |      | TU 1047 | 1.0  | W 1741  | 2.2    | F 1745  | 2.4  | SA 1750   | 2.2 |  |  |  |  |
|                 |         |         |      |  |      |         |      |         |      | 1720    | 2.3  | 2351    | 0.8    | 2342    | 0.6  | 2340      | 0.7 |  |  |  |  |
|                 |         |         |      |  |      |         |      |         |      | 2347    | 0.9  |         |        |         |      |           |     |  |  |  |  |
| 31              | 0029    | 0.9     |      |  |      |         |      |         |      | 31      | 0542 | 2.1     |        |         |      |           |     |  |  |  |  |
|                 | 0607    | 1.6     |      |  |      |         |      |         |      |         | 1143 | 0.6     |        |         |      |           |     |  |  |  |  |
|                 | SU 1118 | 1.0     |      |  |      |         |      |         |      |         | 1757 | 2.4     |        |         |      |           |     |  |  |  |  |
|                 | 1751    | 2.4     |      |  | </td |         |      |         |      |         |      |         |        |         |      |           |     |  |  |  |  |

# AUSTRALIA, EAST COAST - BRISBANE BAR

LAT 27°22'S LONG 153°10'E

| TIME ZONE -1000 |      |      |      | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |      |          |      |      |       |      |     |       |      |      | YEAR | 1968 |     |
|-----------------|------|------|------|--|------|------|----------|------|------|-------|------|-----|-------|------|------|------|------|-----|
|                 |      |      |      | JANUARY                                  |      |      | FEBRUARY |      |      | MARCH |      |     | APRIL |      |      |      |      |     |
|                 | TIME | M    | TIME | M  | TIME | M    | TIME     | M    | TIME | M     | TIME | M   | TIME  | M    | TIME | M    |      |     |
| 1               | 0053 | 0.4  | 0027 | 0.4                                      | 1    | 0217 | 0.5      | 0205 | 0.3  | 1     | 0203 | 0.6 | 0152  | 0.4  | 1    | 0250 | 0.5  |     |
|                 | 0738 | 2.3  | 16   | 0712                                     | 2.2  | 1    | 0853     | 2.3  | 16   | 0841  | 2.6  | 1   | 0827  | 2.2  | 16   | 0817 | 2.5  |     |
| F               | 1411 | 0.7  | SA   | 1347                                     | 0.6  | M    | 1532     | 0.6  | TU   | 1526  | 0.4  | TU  | 1502  | 0.6  | W    | 1500 | 0.3  |     |
|                 | 1935 | 1.6  |      | 1908                                     | 1.7  |      | 2105     | 1.7  |      | 2057  | 1.9  |     | 2045  | 1.8  |      | 2041 | 2.1  |     |
| 2               | 0139 | 0.4  | 17   | 0123                                     | 0.4  | 2    | 0256     | 0.4  | 17   | 0257  | 0.2  | 2   | 0240  | 0.5  | 17   | 0244 | 0.3  |     |
|                 | 0824 | 2.3  |      | 0806                                     | 2.4  | 2    | 0929     | 2.3  | 17   | 0928  | 2.7  | 2   | 0900  | 2.2  | 17   | 0901 | 2.6  |     |
| SA              | 1502 | 0.6  | SU   | 1447                                     | 0.5  | TU   | 1606     | 0.6  | W    | 1611  | 0.3  | W   | 1532  | 0.5  | TH   | 1539 | 0.3  |     |
|                 | 2025 | 1.6  |      | 2008                                     | 1.7  | O    | 2138     | 1.7  | •    | 2145  | 2.0  |     | 2114  | 1.9  |      | 2125 | 2.2  |     |
| 3               | 0223 | 0.3  | 18   | 0215                                     | 0.3  | 3    | 0331     | 0.4  | 18   | 0347  | 0.2  | 3   | 0314  | 0.4  | 18   | 0332 | 0.2  |     |
|                 | 0908 | 2.3  |      | 0856                                     | 2.5  | 3    | 1001     | 2.3  | 18   | 1011  | 2.7  | 3   | 0930  | 2.3  | 18   | 0942 | 2.6  |     |
| SU              | 1548 | 0.6  | M    | 1541                                     | 0.4  | W    | 1635     | 0.6  | TH   | 1652  | 0.2  | TH  | 1559  | 0.5  | F    | 1615 | 0.2  |     |
|                 | 2110 | 1.6  |      | 2104                                     | 1.8  |      | 2208     | 1.8  |      | 2230  | 2.1  | O   | 2143  | 2.0  | •    | 2208 | 2.3  |     |
| 4               | 0303 | 0.3  | 19   | 0306                                     | 0.2  | 4    | 0403     | 0.4  | 19   | 0433  | 0.2  | 4   | 0347  | 0.4  | 19   | 0418 | 0.2  |     |
|                 | 0947 | 2.3  |      | 0945                                     | 2.6  | 4    | 1030     | 2.3  | 19   | 1053  | 2.7  | 4   | 0958  | 2.3  | 19   | 1022 | 2.4  |     |
| M               | 1627 | 0.6  | TU   | 1631                                     | 0.4  | TH   | 1702     | 0.5  | F    | 1729  | 0.2  | F   | 1625  | 0.5  | SA   | 1648 | 0.2  |     |
| O               | 2150 | 1.6  | •    | 2156                                     | 1.8  |      | 2238     | 1.8  |      | 2313  | 2.2  |     | 2215  | 2.0  |      | 2248 | 2.4  |     |
| 5               | 0339 | 0.3  | 20   | 0354                                     | 0.1  | 5    | 0435     | 0.4  | 20   | 0519  | 0.2  | 5   | 0420  | 0.4  | 20   | 0504 | 0.3  |     |
|                 | 1023 | 2.3  |      | 1032                                     | 2.7  | 5    | 1059     | 2.3  | 20   | 1132  | 2.5  | 5   | 1027  | 2.2  | 20   | 1059 | 2.3  |     |
| TU              | 1702 | 0.6  | W    | 1719                                     | 0.3  | F    | 1728     | 0.5  | SA   | 1804  | 0.3  | SA  | 1653  | 0.4  | SU   | 1719 | 0.3  |     |
|                 | 2223 | 1.7  |      | 2246                                     | 1.9  |      | 2310     | 1.9  |      | 2356  | 2.2  |     | 2249  | 2.1  |      | 2329 | 2.4  |     |
| 6               | 0413 | 0.4  | 21   | 0442                                     | 0.1  | 6    | 0508     | 0.4  | 21   | 0604  | 0.4  | 6   | 0454  | 0.5  | 21   | 0549 | 0.5  |     |
|                 | 1054 | 2.3  |      | 1116                                     | 2.7  | 6    | 1128     | 2.3  | 21   | 1209  | 2.3  | 6   | 1056  | 2.2  | 21   | 1136 | 2.1  |     |
| W               | 1732 | 0.6  | TH   | 1802                                     | 0.3  | SA   | 1756     | 0.5  | SU   | 1837  | 0.3  | SU  | 1720  | 0.4  | M    | 1749 | 0.4  |     |
|                 | 2256 | 1.7  |      | 2334                                     | 2.0  |      | 2344     | 1.9  |      |       |      |     | 2323  | 2.1  |      | W    | 1740 | 0.5 |
| 7               | 0446 | 0.4  | 22   | 0529                                     | 0.2  | 7    | 0542     | 0.5  | 22   | 0040  | 2.2  | 7   | 0530  | 0.6  | 22   | 0010 | 2.4  |     |
|                 | 1126 | 2.3  |      | 1159                                     | 2.7  | 7    | 1156     | 2.2  | 22   | 0651  | 0.5  | 7   | 1125  | 2.1  | 22   | 0636 | 0.6  |     |
| TH              | 1801 | 0.6  | F    | 1842                                     | 0.3  | SU   | 1824     | 0.5  | M    | 1247  | 2.1  | M   | 1746  | 0.5  | TU   | 1213 | 1.8  |     |
|                 | 2330 | 1.7  |      |  |      |      |          |      |      | 1909  | 0.4  |     | 2358  | 2.1  |      | 1818 | 0.5  |     |
| 8               | 0520 | 0.4  | 23   | 0020                                     | 2.0  | 8    | 0021     | 1.9  | 23   | 0127  | 2.2  | 8   | 0608  | 0.7  | 23   | 0053 | 2.3  |     |
|                 | 1157 | 2.3  |      | 0616                                     | 0.3  | 8    | 0620     | 0.6  | 23   | 0743  | 0.7  | 8   | 1156  | 1.9  | 23   | 0728 | 0.8  |     |
| F               | 1831 | 0.6  | SA   | 1240                                     | 2.5  | M    | 1227     | 2.1  | TU   | 1328  | 1.8  | TU  | 1813  | 0.5  | W    | 1253 | 1.6  |     |
|                 |      |      |      | 1921                                     | 0.4  |      | 1855     | 0.6  |      | 1944  | 0.5  |     |       |      |      | 1849 | 0.6  |     |
| 9               | 0007 | 1.7  | 24   | 0108                                     | 2.0  | 9    | 0101     | 1.9  | 24   | 0222  | 2.1  | 9   | 0036  | 2.1  | 24   | 0141 | 2.2  |     |
|                 | 0556 | 0.5  |      | 0706                                     | 0.5  | 9    | 0703     | 0.8  | 24   | 0850  | 0.9  | 9   | 0651  | 0.8  | 24   | 0834 | 0.9  |     |
| SA              | 1229 | 2.2  | SU   | 1322                                     | 2.3  | TU   | 1302     | 1.9  | W    | 1418  | 1.6  | W   | 1233  | 1.8  | TH   | 1344 | 1.4  |     |
|                 | 1905 | 0.6  |      | 2000                                     | 0.4  |      | 1929     | 0.6  |      | 2028  | 0.7  |     | 1844  | 0.6  |      | 1928 | 0.7  |     |
| 10              | 0046 | 1.7  | 25   | 0201                                     | 2.0  | 10   | 0151     | 1.9  | 25   | 0332  | 2.0  | 10  | 0120  | 2.0  | 25   | 0245 | 2.0  |     |
|                 | 0636 | 0.6  |      | 0801                                     | 0.6  | 10   | 0759     | 0.9  | 25   | 1022  | 1.0  | 10  | 0746  | 0.9  | 25   | 1006 | 1.0  |     |
| SU              | 1304 | 2.1  | M    | 1406                                     | 2.1  | W    | 1347     | 1.8  | TH   | 1541  | 1.4  | TH  | 1320  | 1.6  | F    | 1528 | 1.3  |     |
|                 | 1942 | 0.6  |      | 2041                                     | 0.5  |      | 2015     | 0.6  |      | 2131  | 0.8  |     | 1926  | 0.7  |      | 2150 | 0.8  |     |
| 11              | 0134 | 1.7  | 26   | 0302                                     | 2.0  | 11   | 0258     | 1.9  | 26   | 0455  | 2.0  | 11  | 0222  | 2.0  | 26   | 0410 | 1.9  |     |
|                 | 0724 | 0.8  |      | 0907                                     | 0.8  | 11   | 0918     | 0.9  | 26   | 1159  | 0.9  | 11  | 0905  | 0.9  | 26   | 1132 | 0.9  |     |
| M               | 1343 | 2.0  | TU   | 1458                                     | 1.8  | TH   | 1454     | 1.6  | F    | 1727  | 1.4  | F   | 1434  | 1.5  | SA   | 1717 | 1.4  |     |
|                 | 2026 | 0.6  |      | 2129                                     | 0.5  |      | 2122     | 0.7  |      | 2300  | 0.8  |     | 2035  | 0.7  |      | 2217 | 1.0  |     |
| 12              | 0234 | 1.7  | 27   | 0412                                     | 2.0  | 12   | 0426     | 2.0  | 27   | 0608  | 2.0  | 12  | 0349  | 2.0  | 27   | 0527 | 2.0  |     |
|                 | 0828 | 0.9  |      | 1029                                     | 0.9  | 12   | 1057     | 0.9  | 27   | 1307  | 0.8  | 12  | 1048  | 0.9  | 27   | 1231 | 0.9  |     |
| TU              | 1433 | 1.9  | W    | 1605                                     | 1.6  | F    | 1627     | 1.5  | SA   | 1842  | 1.5  | SA  | 1619  | 1.5  | SU   | 1821 | 1.5  |     |
|                 | 2121 | 0.6  |      | 2225                                     | 0.6  |      | 2244     | 0.7  |      |       |      |     | 2211  | 0.8  |      | 2352 | 0.9  |     |
| 13              | 0353 | 1.8  | 28   | 0525                                     | 2.1  | 13   | 0545     | 2.1  | 28   | 0021  | 0.8  | 13  | 0516  | 2.1  | 28   | 0624 | 2.0  |     |
|                 | 0950 | 0.9  |      | 1159                                     | 0.9  | 13   | 1228     | 0.8  | 28   | 0705  | 2.1  | 13  | 1218  | 0.7  | 28   | 1312 | 0.7  |     |
| W               | 1539 | 1.8  | TH   | 1723                                     | 1.5  | SA   | 1753     | 1.6  | SU   | 1353  | 0.7  | SU  | 1749  | 1.6  | M    | 1905 | 1.7  |     |
|                 | 2223 | 0.6  |      | 2330                                     | 0.6  |      |          |      |      | 1933  | 1.6  |     | 2340  | 0.7  |      | 1932 | 2.1  |     |
| 14              | 0510 | 1.9  | 29   | 0631                                     | 2.1  | 14   | 0000     | 0.6  | 29   | 0119  | 0.7  | 14  | 0628  | 2.3  | 29   | 0049 | 0.8  |     |
|                 | 1119 | 0.9  |      | 1313                                     | 0.8  | 14   | 0652     | 2.2  | 29   | 0750  | 2.2  | 14  | 1323  | 0.6  | 29   | 0708 | 2.1  |     |
| TH              | 1654 | 1.7  | F    | 1838                                     | 1.5  | SU   | 1338     | 0.6  | M    | 1429  | 0.7  | M   | 1858  | 1.7  | TU   | 1347 | 0.7  |     |
|                 | 2327 | 0.5  |      |  |      |      | 1904     | 1.7  |      | 2012  | 1.7  |     |       |      |      | 1940 | 1.8  |     |
| 15              | 0615 | 2.1  | 30   | 0034                                     | 0.6  | 15   | 0107     | 0.5  |      |       |      | 15  | 0053  | 0.5  | 30   | 0134 | 0.7  |     |
|                 | 1239 | 0.8  |      | 0725                                     | 2.2  | 15   | 0750     | 2.4  |      |       |      | 15  | 0727  | 2.4  | 30   | 0745 | 2.1  |     |
| F               | 1805 | 1.7  | SA   | 1409                                     | 0.7  | M    | 1437     | 0.5  |      |       |      | TU  | 1415  | 0.4  | W    | 1419 | 0.6  |     |
|                 |      |      |      | 1939                                     | 1.5  |      | 2005     | 1.8  |      |       |      |     | 1953  | 1.9  |      | 2012 | 1.9  |     |
| 31              | 0129 | 0.5  |      | 0812                                     | 2.2  |      |          |      |      |       |      | 31  | 0213  | 0.6  |      | 0818 | 2.2  |     |
|                 | SU   | 1453 | 0.6  |  |      |      |          |      |      |       |      |     | TH    | 1448 | 0.5  |      | 2044 | 2.0 |
|                 | 2026 | 1.6  |      |  |      |      |          |      |      |       |      |     |       | 2044 | 2.0  |      |      |     |

# AUSTRALIA, EAST COAST - BRISBANE BAR

LAT 27°22'S LONG 153°10'E

| TIME ZONE -1000 |             |             |             | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |             |             |             |          |   |      |   | YEAR 0000 |   |      |   |
|-----------------|-------------|-------------|-------------|--|-------------|-------------|-------------|----------|---|------|---|-----------|---|------|---|
|                 | MAY         | JUNE        | JULY        |  |             |             |             |          |   |      |   | AUGUST    |   |      |   |
| TIME            | M           | TIME        | M           | TIME                                     | M           | TIME        | M           | TIME     | M | TIME | M | TIME      | M | TIME | M |
| 1 0306 0.6      | 16          | 0346 0.5    | 1 0423 0.5  | 0508 0.6                                 | 1 0507 0.4  | 0519 0.5    | 1 0612 0.2  | 0538 0.3 |   |      |   |           |   |      |   |
| 0843 2.0        | 0916 1.9    | 0943 1.8    | 1028 1.6    | 1029 1.7                                 | 1051 1.7    | 1156 2.0    | 1135 1.9    |          |   |      |   |           |   |      |   |
| SU 1506 0.3     | M 1523 0.3  | W 1548 0.3  | TH 1612 0.4 | F 1623 0.2                               | SA 1638 0.4 | M 1753 0.3  | TU 1731 0.5 |          |   |      |   |           |   |      |   |
| O 2126 2.4      | 2157 2.5    | 2230 2.5    | 2259 2.4    | 2304 2.6                                 | 2309 2.3    | 2336 2.1    |             |          |   |      |   |           |   |      |   |
| 2 0348 0.5      | 17          | 0435 0.6    | 2 0511 0.5  | 0546 0.6                                 | 2 0554 0.4  | 0547 0.5    | 2 0008 2.5  | 0604 0.4 |   |      |   |           |   |      |   |
| 0921 2.0        | 0958 1.7    | 1033 1.7    | 1107 1.6    | 1121 1.8                                 | 1123 1.7    | 0649 0.2    | 1210 1.9    |          |   |      |   |           |   |      |   |
| M 1538 0.3      | TU 1557 0.3 | TH 1629 0.3 | F 1649 0.4  | SA 1710 0.3                              | SU 1711 0.4 | TU 1243 2.0 | W 1808 0.6  |          |   |      |   |           |   |      |   |
| 2204 2.4        | 2238 2.5    | 2314 2.5    | 2335 2.3    | 2348 2.6                                 | 2339 2.2    | 1841 0.4    |             |          |   |      |   |           |   |      |   |
| 3 0430 0.6      | 18          | 0521 0.6    | 3 0603 0.5  | 0620 0.6                                 | 3 0640 0.4  | 0615 0.5    | 3 0049 2.3  | 0004 2.0 |   |      |   |           |   |      |   |
| 0959 1.9        | 1040 1.6    | 1123 1.7    | 1145 1.6    | 1211 1.8                                 | 1159 1.7    | 0725 0.3    | 0632 0.4    |          |   |      |   |           |   |      |   |
| TU 1610 0.3     | W 1630 0.4  | F 1713 0.4  | SA 1725 0.5 | SU 1758 0.3                              | M 1747 0.5  | W 1332 2.1  | TH 1248 1.9 |          |   |      |   |           |   |      |   |
| 2243 2.4        | 2318 2.4    |             |             |  |             | 1935 0.6    | 1849 0.7    |          |   |      |   |           |   |      |   |
| 4 0514 0.6      | 19          | 0606 0.7    | 4 0000 2.5  | 19 0009 2.2                              | 4 0032 2.5  | 0010 2.2    | 4 0131 2.0  | 0035 1.8 |   |      |   |           |   |      |   |
| 1040 1.8        | 1122 1.6    | 1217 1.7    | 1223 1.6    | M 1302 1.8                               | TU 1237 1.7 | TH 1428 2.1 | F 1331 1.9  |          |   |      |   |           |   |      |   |
| W 1644 0.4      | TH 1705 0.5 | SA 1800 0.4 | 1803 0.6    | 1850 0.4                                 | 1824 0.6    | 2038 0.7    | 1940 0.8    |          |   |      |   |           |   |      |   |
| 2323 2.4        | 2357 2.3    |             |             |  |             |             |             |          |   |      |   |           |   |      |   |
| 5 0601 0.6      | 20          | 0648 0.7    | 5 0048 2.5  | 20 0045 2.2                              | 5 0117 2.4  | 0041 2.1    | 5 0220 1.8  | 0114 1.6 |   |      |   |           |   |      |   |
| 1125 1.7        | 1204 1.5    | 0748 0.6    | 0728 0.7    | 0807 0.4                                 | 0718 0.5    | 0848 0.4    | 0738 0.5    |          |   |      |   |           |   |      |   |
| TH 1721 0.4     | F 1740 0.6  | SU 1814 0.6 | M 1307 1.6  | TU 1357 1.9                              | W 1319 1.7  | F 1534 2.1  | SA 1428 1.9 |          |   |      |   |           |   |      |   |
| 1854 0.6        | 1846 0.7    | 1946 0.6    | 1909 0.7    | 2158 0.7                                 |             |             |             |          |   |      |   |           |   |      |   |
| 6 0007 2.4      | 21          | 0037 2.2    | 6 0139 2.4  | 0123 2.1                                 | 6 0204 2.2  | 0115 1.9    | 6 0325 1.5  | 0213 1.5 |   |      |   |           |   |      |   |
| 0653 0.7        | 0731 0.8    | 0842 0.6    | 0808 0.7    | 0852 0.4                                 | 0754 0.5    | 0940 0.5    | 0833 0.5    |          |   |      |   |           |   |      |   |
| F 1216 1.6      | SA 1250 1.5 | M 1419 1.7  | TU 1358 1.6 | W 1459 1.9                               | TH 1410 1.8 | SA 1647 2.1 | SU 1546 1.9 |          |   |      |   |           |   |      |   |
| 1804 0.5        | 1822 0.7    | 1958 0.7    | 1938 0.8    | 2052 0.7                                 | 2005 0.9    | 2334 0.8    | 2229 0.9    |          |   |      |   |           |   |      |   |
| 7 0056 2.3      | 22          | 0120 2.1    | 7 0235 2.3  | 0205 2.0                                 | 7 0256 2.1  | 0158 1.8    | 7 0450 1.4  | 0346 1.3 |   |      |   |           |   |      |   |
| 0753 0.7        | 0818 0.8    | 0937 0.6    | 0855 0.7    | 0939 0.4                                 | 0839 0.5    | 1045 0.5    | 0954 0.6    |          |   |      |   |           |   |      |   |
| SA 1317 1.5     | SU 1345 1.5 | TU 1530 1.8 | W 1504 1.7  | TH 1606 2.0                              | F 1517 1.8  | SU 1758 2.1 | M 1708 2.0  |          |   |      |   |           |   |      |   |
| 1857 0.6        | 1911 0.8    | 2110 0.7    | 2043 0.9    | 2208 0.8                                 | 2121 0.9    |             |             |          |   |      |   |           |   |      |   |
| 8 0153 2.3      | 23          | 0208 2.0    | 8 0336 2.2  | 0256 1.9                                 | 8 0357 1.8  | 0258 1.6    | 8 0054 0.7  | 0003 0.7 |   |      |   |           |   |      |   |
| 0905 0.7        | 0909 0.8    | 1030 0.5    | 23 0948 0.6 | 1030 0.4                                 | 23 0937 0.5 | 0614 1.4    | 0522 1.4    |          |   |      |   |           |   |      |   |
| SU 1433 1.5     | M 1458 1.5  | W 1639 1.9  | TH 1618 1.7 | F 1713 2.1                               | SA 1636 1.9 | M 1156 0.5  | TU 1118 0.5 |          |   |      |   |           |   |      |   |
| 2007 0.7        | 2017 0.9    | 2227 0.8    | 2204 0.9    | 2330 0.8                                 | 2253 0.9    | 1859 2.2    | 1818 2.2    |          |   |      |   |           |   |      |   |
| 9 0302 2.3      | 24          | 0304 2.0    | 9 0437 2.1  | 0358 1.8                                 | 9 0503 1.7  | 0418 1.5    | 9 0153 0.6  | 0112 0.6 |   |      |   |           |   |      |   |
| 1015 0.7        | 1005 0.8    | 1122 0.5    | 24 1043 0.6 | 1123 0.4                                 | 24 1044 0.5 | 0721 1.4    | 0637 1.5    |          |   |      |   |           |   |      |   |
| M 1558 1.6      | TU 1617 1.6 | TH 1742 2.1 | F 1725 1.9  | SA 1815 2.2                              | SU 1745 2.0 | TU 1301 0.5 | W 1230 0.4  |          |   |      |   |           |   |      |   |
| 2131 0.8        | 2138 1.0    | 2343 0.7    | 2327 0.9    | 2320 0.8                                 | 2253 0.9    | 1949 2.2    | 1918 2.3    |          |   |      |   |           |   |      |   |
| 10 0413 2.3     | 25          | 0405 2.0    | 10 0535 2.0 | 0504 1.7                                 | 10 0048 0.7 | 0018 0.8    | 10 0238 0.5 | 0208 0.4 |   |      |   |           |   |      |   |
| 1118 0.6        | 1058 0.7    | 1208 0.4    | 25 1138 0.5 | 0609 1.6                                 | 25 0536 1.5 | 0812 1.5    | 25 0738 1.6 |          |   |      |   |           |   |      |   |
| TU 1712 1.8     | W 1720 1.7  | F 1838 2.2  | SA 1822 2.1 | SU 1217 0.4                              | M 1150 0.5  | W 1355 0.4  | TH 1332 0.3 |          |   |      |   |           |   |      |   |
| 2253 0.7        | 2259 0.9    |             |             | 1911 2.3                                 | 1845 2.2    | 2033 2.3    | 2009 2.4    |          |   |      |   |           |   |      |   |
| 11 0518 2.3     | 26          | 0503 2.0    | 11 0052 0.7 | 26 0038 0.8                              | 11 0153 0.7 | 0125 0.6    | 11 0316 0.5 | 0258 0.3 |   |      |   |           |   |      |   |
| 1211 0.5        | 1147 0.6    | 0629 1.9    | 26 0604 1.7 | 0712 1.5                                 | 0643 1.5    | 0853 1.6    | 0832 1.8    |          |   |      |   |           |   |      |   |
| W 1813 2.0      | TH 1812 1.9 | SA 1253 0.4 | SU 1229 0.4 | M 1309 0.4                               | TU 1251 0.4 | TH 1439 0.4 | F 1428 0.2  |          |   |      |   |           |   |      |   |
| 1927 2.4        | 1912 2.2    | 1901 2.3    | 1939 2.3    | 2110 2.3                                 | 2110 2.3    | 2056 2.6    |             |          |   |      |   |           |   |      |   |
| 12 0007 0.7     | 27          | 0008 0.8    | 12 0153 0.6 | 27 0139 0.7                              | 12 0246 0.6 | 0223 0.5    | 12 0350 0.4 | 0342 0.2 |   |      |   |           |   |      |   |
| 0614 2.3        | 0555 1.9    | 0721 1.8    | 27 0659 1.7 | 0808 1.5                                 | 27 0744 1.6 | 0928 1.7    | 0921 1.9    |          |   |      |   |           |   |      |   |
| TH 1256 0.4     | F 1232 0.5  | SU 1335 0.3 | M 1318 0.3  | TU 1400 0.4                              | W 1346 0.3  | F 1518 0.4  | SA 1519 0.2 |          |   |      |   |           |   |      |   |
| 1905 2.2        | 1858 2.1    | 2013 2.4    | 2000 2.3    | 2047 2.4                                 | 2030 2.4    | 2142 2.3    | O 2140 2.6  |          |   |      |   |           |   |      |   |
| 13 0109 0.6     | 28          | 0107 0.7    | 13 0247 0.6 | 28 0234 0.6                              | 13 0333 0.5 | 0316 0.4    | 13 0419 0.4 | 0423 0.1 |   |      |   |           |   |      |   |
| 0704 2.2        | 0643 1.9    | 0810 1.7    | 28 0753 1.7 | 0858 1.6                                 | 28 0840 1.7 | 0959 1.7    | 28 1006 2.0 |          |   |      |   |           |   |      |   |
| F 1337 0.3      | SA 1313 0.4 | M 1416 0.3  | TU 1404 0.3 | W 1446 0.4                               | TH 1438 0.2 | SA 1552 0.4 | SU 1608 0.1 |          |   |      |   |           |   |      |   |
| 1951 2.3        | 1941 2.2    | 2058 2.5    | 2046 2.4    | 2128 2.4                                 | 2118 2.6    | 2211 2.2    | 2222 2.6    |          |   |      |   |           |   |      |   |
| 14 0205 0.5     | 29          | 0158 0.7    | 14 0338 0.6 | 29 0325 0.5                              | 14 0413 0.5 | 0405 0.3    | 14 0445 0.4 | 0500 0.1 |   |      |   |           |   |      |   |
| 0749 2.1        | 0728 1.9    | 0859 1.7    | 29 0845 1.7 | 0940 1.6                                 | 29 0933 1.8 | 1029 1.8    | 1051 2.1    |          |   |      |   |           |   |      |   |
| SA 1413 0.3     | SU 1353 0.3 | TU 1456 0.3 | W 1450 0.2  | TH 1527 0.4                              | F 1529 0.2  | SU 1624 0.4 | M 1655 0.2  |          |   |      |   |           |   |      |   |
| 2034 2.5        | 2023 2.3    | ● 2141 2.5  | O 2133 2.5  | 2206 2.3                                 | O 2204 2.6  | 2239 2.2    | 2308 2.2    |          |   |      |   |           |   |      |   |
| 15 0256 0.5     | 30          | 0247 0.6    | 15 0425 0.6 | 30 0416 0.4                              | 15 0449 0.5 | 0451 0.2    | 15 0511 0.4 | 0536 0.1 |   |      |   |           |   |      |   |
| 0833 2.0        | 0812 1.8    | 0945 1.6    | 30 0938 1.7 | 1018 1.6                                 | 30 1023 1.9 | 1101 1.8    | 1135 2.2    |          |   |      |   |           |   |      |   |
| SU 1449 0.3     | M 1431 0.3  | W 1536 0.3  | TH 1536 0.2 | F 1604 0.4                               | SA 1618 0.2 | M 1657 0.4  | TU 1742 0.3 |          |   |      |   |           |   |      |   |
| ● 2116 2.5      | 2104 2.4    | 2222 2.4    | 2219 2.6    | 2239 2.3                                 | 2247 2.7    | 2308 2.2    | 2340 2.2    |          |   |      |   |           |   |      |   |
| 31 0334 0.5     |             |             |             |  |             |             |             |          |   |      |   |           |   |      |   |
| 0856 1.8        |             |             |             |  |             |             |             |          |   |      |   |           |   |      |   |
| TU 1508 0.3     |             |             |             |  |             |             |             |          |   |      |   |           |   |      |   |
| O 2146 2.5      |             |             |             |  |             |             |             |          |   |      |   |           |   |      |   |
| 31 0533 0.2     |             |             |             |  |             |             |             |          |   |      |   |           |   |      |   |
| 31 1109 1.9     |             |             |             |  |             |             |             |          |   |      |   |           |   |      |   |
| SU 1705 0.2     |             |             |             |  |             |             |             |          |   |      |   |           |   |      |   |
| 2328 2.6        |             |             |             |  |             |             |             |          |   |      |   |           |   |      |   |

# AUSTRALIA, TORRES STRAIT - HAMMOND ROCK LIGHTHOUSE

LAT 10°30'S LONG 142°13'E

TIDAL STREAM PREDICTIONS (RATES IN KNOTS)

| TIME ZONE -1000   |                   |                   |                   | POSITIVE (+) DIRECTION 080 NEGATIVE (-) DIRECTION 260 |                   |       |         | YEAR 0000 |         |       |         |
|-------------------|-------------------|-------------------|-------------------|---|-------------------|-------|---------|-----------|---------|-------|---------|
| JULY              |                   |                   |                   | AUGUST  |                   |       |         | SEPTEMBER |         |       |         |
| SLACK             | MAXIMUM           | SLACK             | MAXIMUM           | SLACK   | MAXIMUM           | SLACK | MAXIMUM | SLACK     | MAXIMUM | SLACK | MAXIMUM |
| TIME              | TIME              | TIME              | TIME              | TIME  | TIME              | TIME  | TIME    | TIME      | TIME    | TIME  | TIME    |
| RATE              | RATE              | RATE              | RATE              | RATE  | RATE              | RATE  | RATE    | RATE      | RATE    | RATE  | RATE    |
| 1 0409 0104 -3.6  | 16 0552 0238 -3.0 | 1 0521 0219 -4.8  | 16 0553 0238 -2.8 | 1 0017 0337 -5.6                                      | 16 0600 0223 -3.2 |       |         |           |         |       |         |
| 0903 0642 2.7     | 1013 0807 1.7     | 1054 0812 4.5     | 1053 0825 1.9     | 0656 0954 4.6   | 1132 0842 2.0     |       |         |           |         |       |         |
| F 1701 1309 -6.9  | SA 1821 1425 -5.4 | M 1818 1438 -7.6  | TU 1830 1440 -3.8 | TH 1255 1614 -5.3                                     | F 1813 1447 -2.4  |       |         |           |         |       |         |
| 2254 1951 4.1     | 2107 3.0          | 2108 4.9          | 2335 2058 1.9     | 1943 2224 3.5   | 2250 2034 1.3     |       |         |           |         |       |         |
| 2 0454 0151 -3.7  | 17 0009 0308 -2.7 | 2 0008 0310 -4.9  | 17 0616 0253 -2.7 | 2 0108 0438 -5.2                                      | 17 0640 0248 -3.2 |       |         |           |         |       |         |
| 0955 0731 3.0     | 0624 0836 1.5     | 0616 0908 4.4     | 1116 0848 1.7     | 0808 1107 4.0   | 1210 0919 1.7     |       |         |           |         |       |         |
| SA 1751 1359 -7.2 | SU 1040 1455 -4.8 | TU 1153 1532 -7.0 | W 1853 1502 -3.3  | F 1412 1727 -4.1                                      | SA 1838 1518 -1.8 |       |         |           |         |       |         |
| 2344 2040 4.3     | 1855 2136 2.4     | 1912 2159 4.5     | 2339 2114 1.5     | 2055 2331 2.6   | 2308 2057 1.0     |       |         |           |         |       |         |
| 3 0545 0241 -3.8  | 18 0030 0334 -2.4 | 3 0055 0406 -4.9  | 18 0646 0311 -2.6 | 3 0205 0551 -4.8                                      | 18 0739 0326 -3.1 |       |         |           |         |       |         |
| 1050 0823 3.1     | 0656 0905 1.2     | 0719 1009 4.0     | 1144 0915 1.5     | 0930 1233 3.5   | 1308 1014 1.3     |       |         |           |         |       |         |
| SU 1844 1452 -7.1 | M 1106 1523 -4.2  | W 1257 1633 -6.1  | TH 1917 1526 -2.7 | SA 1545 1856 -3.3                                     | SU 1921 1607 -1.2 |       |         |           |         |       |         |
| 2133 4.2          | 1929 2201 1.9     | 2011 2256 3.8     | 2348 2132 1.2     | 2223  | 2339 2136 0.7     |       |         |           |         |       |         |
| 4 0036 0335 -3.9  | 19 0046 0359 -2.3 | 4 0148 0508 -4.8  | 19 0726 0337 -2.6 | 4 0313 0051 2.0                                       | 19 0907 0427 -2.9 |       |         |           |         |       |         |
| 0642 0921 3.1     | 0730 0934 1.0     | 0830 1121 3.6     | 1218 0950 1.2     | 1057 0714 -4.7  | 1455 1145 1.1     |       |         |           |         |       |         |
| M 1149 1549 -6.8  | TU 1131 1553 -3.6 | TH 1410 1742 -5.1 | F 1948 1557 -2.2  | SU 1723 1405 3.6                                      | M 2051 1742 -0.8  |       |         |           |         |       |         |
| 1941 2228 4.0     | 2004 2226 1.4     | 2120              | 2155 0.9          | 2353 2030 -3.1  | 2253 0.4          |       |         |           |         |       |         |
| 5 0129 0434 -4.0  | 20 0058 0425 -2.2 | 5 0245 0001 3.1   | 20 0002 0413 -2.5 | 5 0430 0216 1.8                                       | 0038 0606 -2.9    |       |         |           |         |       |         |
| 0747 1024 3.0     | 0810 1007 0.8     | 0951 0618 -4.7    | 0826 1042 0.9     | 1215 0836 -4.9  | 1043 1339 1.4     |       |         |           |         |       |         |
| TU 1254 1652 -6.3 | W 1159 1623 -3.0  | F 1538 1242 3.3   | SA 1308 1644 -1.6 | M 1843 1524 4.0                                       | TU 1702 1949 -1.0 |       |         |           |         |       |         |
| 2042 2328 3.7     | 2041 2253 1.0     | 2237 1904 -4.2    | 2034 2234 0.6     | 2147 -3.4   | 2254              |       |         |           |         |       |         |
| 6 0224 0538 -4.1  | 21 0110 0457 -2.1 | 6 0348 0113 2.6   | 21 0028 0511 -2.5 | 6 0106 0329 2.0                                       | 0243 0057 0.5     |       |         |           |         |       |         |
| 0859 1137 2.8     | 21 0903 1050 0.6  | 1114 0735 -4.8    | 0952 1208 0.7     | 0544 0943 -5.3  | 1155 0748 -3.5    |       |         |           |         |       |         |
| W 1408 1801 -5.7  | TH 1235 1703 -2.5 | SA 1711 1409 3.4  | SU 1438 1807 -1.2 | TU 1319 1627 4.4                                      | W 1813 1456 2.2   |       |         |           |         |       |         |
| 2149              | 2125 2325 0.7     | 2357 2030 -3.8    | 2154 2342 0.4     | 1944 2245 -3.7  | 2103 -1.7         |       |         |           |         |       |         |
| 7 0322 0033 3.3   | 22 0128 0540 -2.2 | 7 0454 0228 2.3   | 22 0122 0640 -2.7 | 7 0200 0426 2.4                                       | 22 0001 0229 1.3  |       |         |           |         |       |         |
| 1017 0647 -4.4    | 1009 1150 0.4     | 1230 0850 -5.2    | 1122 1357 1.0     | 0646 1038 -5.6  | 22 0438 0900 -4.5 |       |         |           |         |       |         |
| TH 1531 1255 2.8  | F 1329 1757 -2.0  | SU 1838 1531 3.8  | M 1650 2001 -1.1  | W 1411 1717 4.6                                       | TH 1249 1549 3.2  |       |         |           |         |       |         |
| 2259 1916 -5.1    | 2221              | 2149 -3.7         | 2327              | 2031 2330 -3.9  | 1859 2153 -2.7    |       |         |           |         |       |         |
| 8 0421 0139 3.0   | 23 0157 0009 0.5  | 8 0109 0338 2.3   | 23 0304 0122 0.5  | 8 0242 0513 2.7                                       | 23 0049 0332 2.5  |       |         |           |         |       |         |
| 1133 0756 -4.8    | 1121 0638 -2.3    | 0558 0956 -5.6    | 1226 0811 -3.3    | 0737 1124 -5.8  | 23 0600 0957 -5.6 |       |         |           |         |       |         |
| F 1659 1416 3.1   | SA 1459 1308 0.5  | M 1335 1638 4.3   | TU 1822 1517 1.8  | 1456 1757 4.5   | F 1336 1634 4.1   |       |         |           |         |       |         |
| 2033 4.7          | 2324 1911 -1.7    | 1951 2253 -3.8    | 2120 -1.6         | 2108  | 1939 2236 -3.7    |       |         |           |         |       |         |
| 9 0008 0244 2.8   | 24 0248 0108 0.4  | 9 0210 0437 2.5   | 24 0026 0245 1.1  | 9 0317 0007 -4.0                                      | 24 0134 0425 3.7  |       |         |           |         |       |         |
| 0518 0903 -5.3    | 24 1218 0744 -2.7 | 0656 1053 -6.0    | 0449 0921 -4.3    | 0819 0551 2.9   | 0705 1048 -6.6    |       |         |           |         |       |         |
| SA 1242 1531 3.5  | SU 1650 1431 0.9  | TU 1430 1734 4.6  | W 1317 1612 2.7   | 1534 1202 -5.6  | SA 1421 1716 4.9  |       |         |           |         |       |         |
| 1823 2146 -4.5    | 2032 -1.7         | 2048 2347 -3.9    | 1920 2213 -2.3    | 2136 1830 4.2   | 2018 2318 -4.8    |       |         |           |         |       |         |
| 10 0114 0346 2.7  | 25 0019 0213 0.6  | 10 0259 0527 2.6  | 25 0111 0347 2.0  | 10 0345 0036 -3.9                                     | 25 0219 0515 4.8  |       |         |           |         |       |         |
| 0612 1005 -5.9    | 0359 0848 -3.3    | 0746 1141 -6.2    | 0608 1016 -5.4    | 0854 0623 2.9   | 0803 1136 -7.2    |       |         |           |         |       |         |
| SU 1344 1638 4.0  | M 1304 1538 1.5   | W 1519 1821 4.7   | TH 1402 1658 3.7  | SA 1607 1234 -5.3                                     | SU 1505 1758 5.4  |       |         |           |         |       |         |
| 1939 2252 -4.4    | 1821 2138 -2.0    | 2134              | 2005 2258 -3.2    | 2157 1858 3.7   | O 2056            |       |         |           |         |       |         |
| 1 0214 0442 2.7   | 26 0102 0312 1.0  | 11 0341 0031 -3.9 | 26 0153 0440 3.0  | 1 0409 0100 -3.7                                      | 26 0305 0001 -5.6 |       |         |           |         |       |         |
| 0703 1059 -6.3    | 0511 0944 -4.2    | 0829 0608 2.6     | 0711 1106 -6.5    | 0924 0649 2.8   | 0857 0604 5.6     |       |         |           |         |       |         |
| M 1440 1738 4.4   | TU 1345 1631 2.3  | TH 1601 1223 -6.1 | F 1445 1741 4.6   | SU 1635 1301 -4.9                                     | M 1550 1223 -7.4  |       |         |           |         |       |         |
| 2043 2349 -4.2    | 1926 2231 -2.4    | 2211 1900 4.5     | 2046 2340 -4.1    | 2212 1920 3.2   | 2135 1840 5.5     |       |         |           |         |       |         |
| 12 0308 0532 2.6  | 27 0141 0406 1.7  | 12 0415 0108 -3.7 | 27 0237 0529 4.1  | 12 0430 0119 -3.5                                     | 27 0353 0045 -6.2 |       |         |           |         |       |         |
| 0750 1149 -6.5    | 0617 1034 -5.2    | 0906 0645 2.6     | 0808 1153 -7.3    | 0950 0712 2.7   | 0952 0653 5.9     |       |         |           |         |       |         |
| TU 1531 1829 4.6  | W 1427 1718 3.2   | F 1638 1259 -5.9  | SA 1529 1823 5.2  | M 1658 1323 -4.4                                      | TU 1635 1312 -7.1 |       |         |           |         |       |         |
| 2139              | 2020 2317 -2.9    | ● 2241 1934 4.0   | O 2126            | 2222 1937 2.7   | 2215 1924 5.3     |       |         |           |         |       |         |
| 3 0355 0040 -4.0  | 28 0220 0454 2.4  | 13 0445 0138 -3.4 | 28 0322 0023 -4.8 | 13 0449 0134 -3.4                                     | 28 0443 0130 -6.5 |       |         |           |         |       |         |
| 0831 0617 2.4     | 0716 1122 -6.1    | 0938 0715 2.4     | 0903 0618 4.9     | 1014 0733 2.6   | 1048 0745 5.9     |       |         |           |         |       |         |
| W 1619 1234 -6.5  | TH 1509 1802 4.0  | SA 1712 1330 -5.4 | SU 1614 1240 -7.8 | TU 1719 1344 -3.9                                     | W 1723 1403 -6.4  |       |         |           |         |       |         |
| ● 2227 1916 4.4   | 2107              | 2304 2002 3.5     | 2208 1907 5.5     | 2227 1951 2.3   | 2256 2009 4.7     |       |         |           |         |       |         |
| 4 0438 0124 -3.7  | 29 0300 0002 -3.5 | 14 0509 0201 -3.2 | 29 0409 0108 -5.4 | 14 0508 0148 -3.3                                     | 29 0538 0219 -6.4 |       |         |           |         |       |         |
| 0909 0658 2.2     | 0811 0543 3.1     | 1006 0741 2.3     | 0956 0707 5.4     | 1038 0753 2.4   | 1148 0840 5.5     |       |         |           |         |       |         |
| TH 1702 1315 -6.3 | F 1553 1209 -7.0  | SU 1741 1356 -4.9 | M 1701 1329 -7.8  | W 1737 1403 -3.4                                      | TH 1816 1457 -5.4 |       |         |           |         |       |         |
| 2308 1957 4.1     | O 2152 1847 4.6   | 2319 2024 2.9     | 2249 1952 5.5     | 2232 2004 1.9   | 2340 2058 3.9     |       |         |           |         |       |         |
| 5 0517 0204 -3.4  | 30 0344 0046 -4.1 | 15 0531 0221 -2.9 | 30 0459 0154 -5.8 | 15 0531 0203 -3.3                                     | 30 0639 0311 -6.0 |       |         |           |         |       |         |
| 0943 0734 2.0     | 0906 0631 3.8     | 1030 0804 2.1     | 1052 0758 5.5     | 1102 0815 2.2   | 1256 0942 4.8     |       |         |           |         |       |         |
| F 1742 1352 -5.9  | SA 1639 1257 -7.6 | M 1807 1420 -4.4  | TU 1750 1420 -7.3 | TH 1753 1423 -2.9                                     | F 1917 1600 -4.2  |       |         |           |         |       |         |
| 2342 2034 3.6     | 2236 1932 5.0     | 2328 2042 2.3     | 2332 2038 5.1     | 2238 2017 1.6   | 2154 2.9          |       |         |           |         |       |         |
| 31 0430 0132 -4.5 |                   | 31 0554 0243 -5.8 |                   |   |                   |       |         |           |         |       |         |
| 0959 0721 4.3     |                   | 1150 0853 5.2     |                   |   |                   |       |         |           |         |       |         |
| SU 1727 1346 -7.8 |                   | W 1843 1513 -6.4  |                   |   |                   |       |         |           |         |       |         |
| 2321 2019 5.1     |                   | 2128 4.4          |                   |   |                   |       |         |           |         |       |         |

CURRENT INCLUDED IN PREDICTIONS.

# AUSTRALIA, NORTH COAST - DARWIN

LAT 12°28'S LONG 130°51'E

| TIME ZONE -0930 |     |         |     |         |          |         |     |         |     | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |     |         |     |         |       |      |   |      |   | YEAR | 1988 |  |  |  |  |  |  |  |  |  |  |  |
|-----------------|-----|---------|-----|---------|----------|---------|-----|---------|-----|--|-----|---------|-----|---------|-------|------|---|------|---|------|------|--|--|--|--|--|--|--|--|--|--|--|
| JANUARY         |     |         |     |         | FEBRUARY |         |     |         |     | MARCH                                    |     |         |     |         | APRIL |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| TIME            | M   | TIME    | M   | TIME    | M        | TIME    | M   | TIME    | M   | TIME                                     | M   | TIME    | M   | TIME    | M     | TIME | M | TIME | M |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 1 0259          | 5.4 | 16 0154 | 5.2 | 1 0015  | 3.4      | 16 0438 | 5.5 | 1 0008  | 3.2 | 16 0443                                  | 5.8 | 1 0014  | 2.2 | 16 0012 | 1.1   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 1022            | 1.7 | 16 0927 | 2.0 | 1 0501  | 5.3      | 16 1126 | 1.4 | 1 0523  | 5.4 | 16 1114                                  | 1.6 | 1 0609  | 6.4 | 16 0616 | 7.2   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| F 1708          | 6.3 | SA 1649 | 6.0 | M 1158  | 1.8      | TU 1817 | 7.0 | TU 1155 | 2.1 | W 1751                                   | 6.9 | F 1220  | 1.9 | SA 1217 | 1.6   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 2305            | 3.7 | 2241    | 4.0 | 1835    | 6.6      |         |     | 1820    | 6.4 |  |     | 1828    | 6.7 | • 1815  | 7.2   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 2 0358          | 5.5 | 17 0318 | 5.3 | 2 0043  | 3.0      | 17 0019 | 2.8 | 2 0032  | 2.8 | 17 0001                                  | 2.3 | 2 0038  | 1.8 | 17 0050 | 0.6   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 1107            | 1.5 | 17 1031 | 1.6 | 2 0547  | 5.7      | 17 0538 | 6.2 | 2 0559  | 5.9 | 17 0540                                  | 6.5 | 2 0640  | 6.7 | 17 0700 | 7.5   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| SA 1753         | 6.6 | SU 1740 | 6.6 | TU 1236 | 1.6      | W 1219  | 0.9 | W 1228  | 1.8 | TH 1204                                  | 1.1 | SA 1246 | 1.8 | SU 1253 | 1.7   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 2351            | 3.4 | 2336    | 3.6 | O 1908  | 6.9      | • 1858  | 7.5 | 1849    | 6.7 | 1830                                     | 7.4 | O 1850  | 6.9 | 1843    | 7.3   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 3 0447          | 5.6 | 18 0427 | 5.6 | 3 0108  | 2.7      | 18 0059 | 2.2 | 3 0053  | 2.4 | 18 0041                                  | 1.5 | 3 0104  | 1.4 | 18 0124 | 0.4   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 1145            | 1.4 | 18 1126 | 1.1 | 3 0625  | 6.1      | 0631    | 6.8 | 3 0631  | 6.3 | 18 0631                                  | 7.2 | 3 0711  | 6.9 | 18 0738 | 7.6   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| SU 1832         | 6.9 | M 1826  | 7.1 | W 1307  | 1.4      | TH 1304 | 0.5 | TH 1254 | 1.5 | F 1246                                   | 0.9 | SU 1310 | 1.8 | M 1327  | 1.8   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
|                 |     |         |     | 1938    | 7.1      | 1935    | 7.9 | O 1914  | 6.9 | • 1904                                   | 7.7 | 1908    | 7.0 | 1910    | 7.2   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 4 0024          | 3.1 | 19 0020 | 3.1 | 4 0131  | 2.5      | 19 0139 | 1.6 | 4 0114  | 2.1 | 19 0120                                  | 0.9 | 4 0130  | 1.1 | 19 0156 | 0.4   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 0531            | 5.8 | 19 0524 | 6.1 | 4 0702  | 6.3      | 0721    | 7.3 | 4 0701  | 6.6 | 19 0716                                  | 7.6 | 4 0740  | 7.1 | 19 0815 | 7.5   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| M 1219          | 1.3 | TU 1217 | 0.7 | TH 1334 | 1.3      | F 1342  | 0.4 | F 1319  | 1.4 | SA 1323                                  | 0.9 | M 1335  | 1.9 | TU 1359 | 2.1   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| O 1907          | 7.0 | • 1909  | 7.5 | 2004    | 7.2      | 2008    | 8.1 | 1937    | 7.1 | 1933                                     | 7.9 | 1926    | 7.0 | 1938    | 7.0   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 5 0053          | 2.9 | 20 0102 | 2.7 | 5 0157  | 2.2      | 20 0219 | 1.1 | 5 0138  | 1.8 | 20 0157                                  | 0.5 | 5 0157  | 1.0 | 20 0227 | 0.6   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 0611            | 6.0 | 20 0617 | 6.5 | 5 0735  | 6.5      | 20 0807 | 7.5 | 5 0730  | 6.8 | 20 0758                                  | 7.7 | 5 0809  | 7.2 | 20 0849 | 7.2   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| TU 1253         | 1.2 | W 1303  | 0.5 | F 1359  | 1.3      | SA 1419 | 0.6 | SA 1341 | 1.4 | SU 1357                                  | 1.1 | TU 1400 | 2.0 | W 1430  | 2.5   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 1939            | 7.1 | 1949    | 7.7 | 2026    | 7.2      | 2037    | 8.1 | 1956    | 7.2 | 1959                                     | 7.8 | 1946    | 6.9 | 2004    | 6.5   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 6 0123          | 2.7 | 21 0143 | 2.3 | 6 0226  | 2.1      | 21 0257 | 0.8 | 6 0205  | 1.6 | 21 0232                                  | 0.4 | 6 0224  | 0.9 | 21 0256 | 1.0   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 0651            | 6.2 | 21 0708 | 6.8 | 6 0807  | 6.5      | 21 0850 | 7.4 | 6 0759  | 6.9 | 21 0837                                  | 7.6 | 6 0839  | 7.1 | 21 0922 | 6.8   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| W 1325          | 1.2 | TH 1345 | 0.4 | SA 1421 | 1.4      | SU 1452 | 1.1 | SU 1402 | 1.5 | M 1428                                   | 1.6 | W 1429  | 2.3 | TH 1502 | 2.8   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 2010            | 7.1 | 2025    | 7.9 | 2047    | 7.2      | 2104    | 7.9 | 2013    | 7.2 | 2024                                     | 7.6 | 2008    | 6.7 | 2030    | 6.1   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 7 0155          | 2.6 | 22 0225 | 1.9 | 7 0256  | 2.0      | 22 0336 | 0.8 | 7 0232  | 1.4 | 22 0306                                  | 0.5 | 7 0253  | 1.0 | 22 0325 | 1.5   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 0728            | 6.2 | 22 0759 | 6.9 | 7 0838  | 6.5      | 22 0932 | 7.1 | 7 0827  | 6.9 | 22 0913                                  | 7.3 | 7 0913  | 6.9 | 22 0954 | 6.3   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| TH 1355         | 1.3 | F 1425  | 0.6 | SU 1438 | 1.7      | M 1523  | 1.7 | M 1423  | 1.8 | TU 1458                                  | 2.1 | TH 1503 | 2.6 | F 1535  | 3.2   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 2038            | 7.0 | 2059    | 7.8 | 2107    | 7.1      | 2129    | 7.4 | 2030    | 7.1 | 2047                                     | 7.1 | 2035    | 6.4 | 2058    | 5.6   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 8 0229          | 2.5 | 23 0309 | 1.7 | 8 0326  | 1.9      | 23 0413 | 1.0 | 8 0259  | 1.3 | 23 0338                                  | 0.9 | 8 0325  | 1.3 | 23 0358 | 2.1   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 0804            | 6.1 | 23 0849 | 6.9 | 8 0911  | 6.3      | 23 1013 | 6.7 | 8 0857  | 6.8 | 23 0949                                  | 6.8 | 8 0951  | 6.6 | 23 1031 | 5.8   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| F 1423          | 1.6 | SA 1504 | 1.0 | M 1454  | 2.0      | TU 1551 | 2.4 | TU 1445 | 2.1 | W 1527                                   | 2.7 | F 1539  | 3.0 | SA 1615 | 3.5   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 2106            | 6.9 | 2131    | 7.7 | 2125    | 6.9      | 2151    | 6.9 | 2047    | 6.9 | 2108                                     | 6.5 | 2104    | 6.0 | 2134    | 5.0   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 9 0304          | 2.5 | 24 0354 | 1.6 | 9 0358  | 1.9      | 24 0450 | 1.4 | 9 0327  | 1.4 | 24 0408                                  | 1.4 | 9 0403  | 1.7 | 24 0447 | 2.7   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 0840            | 6.0 | 24 0939 | 6.6 | 9 0948  | 6.1      | 24 1055 | 6.1 | 9 0931  | 6.7 | 24 1024                                  | 6.3 | 9 1036  | 6.1 | 24 1120 | 5.3   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| SA 1444         | 1.8 | SU 1539 | 1.6 | TU 1515 | 2.4      | W 1617  | 3.1 | W 1512  | 2.5 | TH 1556                                  | 3.2 | SA 1623 | 3.5 | SU 1716 | 3.8   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 2132            | 6.7 | 2202    | 7.4 | 2144    | 6.6      | 2208    | 6.2 | 2107    | 6.6 | 2126                                     | 5.9 | 2138    | 5.5 | 2245    | 4.5   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 10 0342         | 2.6 | 25 0440 | 1.6 | 10 0430 | 2.0      | 25 0529 | 1.9 | 10 0355 | 1.5 | 25 0440                                  | 2.0 | 10 0455 | 2.2 | 25 0606 | 3.1   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 0920            | 5.7 | 25 1030 | 6.2 | 10 1029 | 5.9      | 25 1145 | 6.1 | 10 1008 | 6.4 | 25 1105                                  | 5.7 | 10 1138 | 5.6 | 25 1246 | 5.0   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| SU 1502         | 2.2 | M 1613  | 2.3 | W 1544  | 2.9      | TH 1652 | 3.8 | TH 1545 | 2.9 | F 1633                                   | 3.7 | SU 1727 | 3.9 | M 2031  | 3.9   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 2158            | 6.6 | 2232    | 6.9 | 2205    | 6.2      | 2227    | 5.6 | 2128    | 6.2 | 2146                                     | 5.2 | 2238    | 5.0 |         |       |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 11 0423         | 2.6 | 26 0529 | 1.8 | 11 0505 | 2.2      | 26 0620 | 2.4 | 11 0427 | 1.8 | 26 0527                                  | 2.6 | 11 0622 | 2.6 | 26 0748 | 3.3   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 1004            | 5.5 | 26 1125 | 5.8 | 11 1118 | 5.6      | 26 1307 | 5.1 | 11 1051 | 6.0 | 26 1203                                  | 5.2 | 11 1329 | 5.3 | 26 1445 | 5.1   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| M 1524          | 2.6 | TU 1647 | 3.1 | TH 1627 | 3.5      | F 1802  | 4.3 | F 1624  | 3.5 | SA 1738                                  | 4.1 | M 1957  | 4.0 | TU 2158 | 3.4   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 2226            | 6.3 | 2259    | 6.3 | 2228    | 5.8      | 2254    | 4.9 | 2153    | 5.7 | 2138                                     | 4.6 | 2158    | 3.4 |         |       |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 12 0510         | 2.7 | 27 0623 | 2.0 | 12 0549 | 2.3      | 27 0738 | 2.8 | 12 0510 | 2.2 | 27 0650                                  | 3.1 | 12 0115 | 4.7 | 27 0921 | 3.1   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 1057            | 5.2 | 27 1232 | 5.3 | 12 1224 | 5.3      | 27 1542 | 5.2 | 12 1151 | 5.5 | 27 1451                                  | 5.0 | 12 0810 | 2.7 | 27 1547 | 5.4   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| TU 1600         | 3.1 | W 1733  | 3.7 | F 1731  | 4.1      | SA 2313 | 4.2 | SA 1721 | 4.1 | SU 2245                                  | 4.0 | TU 1520 | 5.6 | W 1547  | 5.4   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 2257            | 6.0 | 2329    | 5.7 | 2305    | 5.3      |         |     | 2228    | 5.2 |  |     | 2153    | 3.3 | 2228    | 2.9   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 13 0603         | 2.6 | 28 0723 | 2.3 | 13 0701 | 2.5      | 28 0216 | 4.4 | 13 0627 | 2.6 | 28 0241                                  | 4.3 | 13 0323 | 5.2 | 28 0419 | 5.3   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 1205            | 5.1 | 28 1411 | 5.2 | 13 1447 | 5.2      | 28 0940 | 2.9 | 13 1404 | 5.2 | 28 0853                                  | 3.2 | 28 0938 | 2.4 | 28 1020 | 2.8   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| W 1700          | 3.7 | TH 1904 | 4.3 | SA 1939 | 4.5      | SU 1702 | 5.6 | SU 1933 | 4.4 | M 1622                                   | 5.3 | W 1621  | 6.1 | TH 1626 | 5.7   |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 2338            | 5.6 |         |     |         |          | 2342    | 3.6 |         |     | 2309                                     | 3.5 | 2248    | 2.6 |         |       |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |
| 14 0705         | 2.6 | 29 0023 | 5.1 | 14 0032 | 4.9      | 29 0432 | 4.8 | 14 0019 | 4.7 | 29 0423                                  | 4.9 |         |     |         |       |      |   |      |   |      |      |  |  |  |  |  |  |  |  |  |  |  |

## NEW ZEALAND, NORTH ISLAND - AUCKLAND

LAT 36°51'S      LONG 174°46'E

| TIME ZONE -1200 |     |         |      |         |          |         |      |         |         | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |     |         |      |         |            |      |         |        |     |  |
|-----------------|-----|---------|------|---------|----------|---------|------|---------|---------|--|-----|---------|------|---------|------------|------|---------|--------|-----|--|
| JANUARY         |     |         |      |         | FEBRUARY |         |      |         |         | MARCH                                    |     |         |      |         | APRIL      |      |         |        |     |  |
| TIME            | M   | TIME    | M    | TIME    | M        | TIME    | M    | TIME    | M       | TIME                                     | M   | TIME    | M    | TIME    | M          | TIME | M       |        |     |  |
| 1 0511          | 2.9 | 16      | 0410 | 2.8     | 1 0001   | 0.8     | 16   | 0558    | 3.0     | 1 0611                                   | 2.7 | 16      | 0536 | 3.0     | 1 0029     | 0.8  | 16      | 0034   | 0.4 |  |
| 1112            | 0.9 | 1020    | 0.9  | 1 0641  | 2.8      | 16      | 1200 | 0.6     | 1 1206  | 1.0                                      | 16  | 1138    | 0.6  | 1 0707  | 2.8        | 16   | 0713    | 3.2    |     |  |
| F 1733          | 2.8 | SA 1625 | 2.8  | M 1236  | 1.0      | TU 1820 | 2.9  | TU 1837 | 2.6     | W 1804                                   | 2.9 | F 1265  | 0.8  | SA 1302 | 0.2        | 1933 | 2.8     | • 1941 | 3.3 |  |
| 2334            | 0.7 | 2248    | 0.7  | 1902    | 2.7      |         |      |         |         |  |     |         |      |         |            |      |         |        |     |  |
| 2 0610          | 2.9 | 17      | 0517 | 2.8     | 2 0049   | 0.8     | 17   | 0024    | 0.4     | 2 0020                                   | 0.9 | 17      | 0001 | 0.4     | 2 0111     | 0.7  | 17      | 0127   | 0.3 |  |
| 1208            | 0.9 | 1123    | 0.8  | 2 0731  | 2.9      | 17      | 0702 | 3.2     | 2 0703  | 2.8                                      | 17  | 0641    | 3.2  | 2 0747  | 2.9        | 17   | 0804    | 3.3    |     |  |
| SA 1830         | 2.8 | SU 1733 | 2.8  | TU 1321 | 0.9      | W 1257  | 0.5  | W 1251  | 0.9     | TH 1234                                  | 0.4 | SA 1333 | 0.7  | SU 1351 | 0.2        |      |         |        |     |  |
|                 |     | 2348    | 0.6  | O 1949  | 2.8      | • 1924  | 3.1  | 1925    | 2.7     | 1907                                     | 3.1 | O 2011  | 2.9  | 2030    | 3.4        |      |         |        |     |  |
| 3 0025          | 0.7 | 18      | 0622 | 3.0     | 3 0132   | 0.7     | 18   | 0118    | 0.3     | 3 0104                                   | 0.8 | 18      | 0057 | 0.3     | 3 0150     | 0.6  | 18      | 0217   | 0.3 |  |
| 0703            | 2.9 | 1222    | 0.7  | 3 0813  | 2.9      | 18      | 0758 | 3.4     | 3 0745  | 2.9                                      | 18  | 0737    | 3.3  | 3 0824  | 2.9        | 18   | 0851    | 3.4    |     |  |
| SU 1259         | 0.9 | M 1839  | 2.9  | W 1401  | 0.8      | TH 1349 | 0.3  | TH 1331 | 0.8     | F 1326                                   | 0.2 | SU 1409 | 0.6  | M 1438  | 0.2        |      |         |        |     |  |
| 1922            | 2.8 |         |      | 2031    | 2.8      | 2020    | 3.3  | O 2006  | 2.8     | • 2002                                   | 3.3 | 2049    | 3.0  | 2116    | 3.4        |      |         |        |     |  |
| 4 0113          | 0.7 | 19      | 0045 | 0.4     | 4 0211   | 0.7     | 19   | 0209    | 0.2     | 4 0143                                   | 0.7 | 19      | 0148 | 0.2     | 4 0226     | 0.6  | 19      | 0305   | 0.4 |  |
| 0751            | 3.0 | 0722    | 3.2  | 4 0851  | 3.0      | 19      | 0850 | 3.5     | 4 0822  | 2.9                                      | 19  | 0828    | 3.5  | 4 0901  | 3.0        | 19   | 0937    | 3.3    |     |  |
| M 1345          | 0.8 | TU 1318 | 0.5  | TH 1437 | 0.8      | F 1438  | 0.2  | F 1407  | 0.7     | SA 1415                                  | 0.1 | M 1444  | 0.5  | TU 1524 | 0.2        |      |         |        |     |  |
| O 2008          | 2.9 | • 1940  | 3.1  | 2108    | 2.9      | 2112    | 3.4  | 2043    | 2.9     | 2052                                     | 3.4 | 2126    | 3.0  | 2201    | 3.4        |      |         |        |     |  |
| 5 0156          | 0.6 | 20      | 0137 | 0.3     | 5 0247   | 0.6     | 20   | 0257    | 0.1     | 5 0219                                   | 0.6 | 20      | 0237 | 0.2     | 5 0303     | 0.6  | 20      | 0352   | 0.5 |  |
| 0833            | 3.1 | 0817    | 3.4  | 5 0926  | 3.1      | 20      | 0938 | 3.6     | 5 0857  | 3.0                                      | 20  | 0916    | 3.5  | 5 0938  | 3.0        | 20   | 1021    | 3.3    |     |  |
| TU 1426         | 0.8 | W 1409  | 0.4  | F 1511  | 0.7      | SA 1526 | 0.1  | SA 1441 | 0.6     | SU 1502                                  | 0.1 | TU 1519 | 0.5  | W 1611  | 0.4        |      |         |        |     |  |
| 2050            | 2.9 | 2035    | 3.2  | 2144    | 2.9      | 2201    | 3.5  | 2118    | 3.0     | 2139                                     | 3.5 | 2204    | 3.1  | 2246    | 3.3        |      |         |        |     |  |
| 6 0235          | 0.6 | 21      | 0227 | 0.2     | 6 0322   | 0.6     | 21   | 0346    | 0.2     | 6 0254                                   | 0.6 | 21      | 0325 | 0.2     | 6 0340     | 0.6  | 21      | 0442   | 0.6 |  |
| 0912            | 3.1 | 0908    | 3.5  | 6 1000  | 3.1      | 21      | 1026 | 3.6     | 6 0932  | 3.0                                      | 21  | 1002    | 3.5  | 6 1016  | 3.0        | 21   | 1106    | 3.1    |     |  |
| W 1503          | 0.8 | TH 1458 | 0.3  | SA 1545 | 0.7      | SU 1614 | 0.2  | SU 1514 | 0.6     | M 1549                                   | 0.2 | W 1557  | 0.6  | TH 1700 | 0.5        |      |         |        |     |  |
| 2129            | 2.9 | 2128    | 3.3  | 2221    | 2.9      | 2249    | 3.5  | 2154    | 3.0     | 2226                                     | 3.5 | 2244    | 3.0  | 2330    | 3.2        |      |         |        |     |  |
| 7 0312          | 0.6 | 22      | 0316 | 0.2     | 7 0357   | 0.7     | 22   | 0436    | 0.3     | 7 0329                                   | 0.6 | 22      | 0414 | 0.3     | 7 0422     | 0.7  | 22      | 0536   | 0.8 |  |
| 0949            | 3.1 | 0958    | 3.6  | 7 1036  | 3.0      | 22      | 1112 | 3.5     | 7 1007  | 3.0                                      | 22  | 1047    | 3.4  | 7 1057  | 3.0        | 22   | 1151    | 3.0    |     |  |
| TH 1540         | 0.8 | F 1547  | 0.2  | SU 1620 | 0.7      | M 1705  | 0.3  | M 1547  | 0.6     | TU 1638                                  | 0.3 | TH 1639 | 0.6  | F 1754  | 0.7        |      |         |        |     |  |
| 2207            | 2.9 | 2219    | 3.4  | 2258    | 2.9      | 2336    | 3.4  | 2231    | 3.0     | 2311                                     | 3.4 | 2327    | 3.0  |         |            |      |         |        |     |  |
| 8 0349          | 0.7 | 23      | 0406 | 0.2     | 8 0434   | 0.7     | 23   | 0529    | 0.5     | 8 0404                                   | 0.7 | 23      | 0505 | 0.5     | 8 0511     | 0.8  | 23      | 0014   | 3.0 |  |
| 1026            | 3.1 | 1047    | 3.6  | 8 1112  | 3.0      | 23      | 1159 | 3.4     | 8 1043  | 3.0                                      | 23  | 1132    | 3.3  | 8 1140  | 2.9        | 23   | 0634    | 0.9    |     |  |
| F 1616          | 0.8 | SA 1638 | 0.3  | M 1657  | 0.7      | TU 1759 | 0.4  | TU 1623 | 0.6     | W 1730                                   | 0.5 | F 1730  | 0.7  | SA 1236 | 2.8        |      |         |        |     |  |
| 2245            | 2.9 | 2309    | 3.4  | 2336    | 2.9      |         |      | 2309    | 3.0     | 2357                                     | 3.2 |         |      |         |            |      |         |        |     |  |
| 9 0427          | 0.7 | 24      | 0457 | 0.3     | 9 0514   | 0.8     | 24   | 0024    | 3.2     | 9 0444                                   | 0.7 | 24      | 0602 | 0.7     | 9 0012     | 3.0  | 24      | 0059   | 2.9 |  |
| 1102            | 3.0 | 1135    | 3.5  | 9 1150  | 3.0      | 24      | 0628 | 0.6     | 9 1122  | 3.0                                      | 24  | 1218    | 3.1  | 9 0608  | 0.8        | 24   | 0732    | 0.9    |     |  |
| SA 1655         | 0.8 | SU 1731 | 0.3  | TU 1738 | 0.8      | W 1246  | 3.2  | W 1704  | 0.7     | TH 1826                                  | 0.6 | SA 1227 | 2.9  | SU 1323 | 2.7        |      |         |        |     |  |
| 2324            | 2.8 |         |      |         |          | 1857    | 0.6  | 2349    | 2.9     |  |     | 1830    | 0.7  | 1947    | 0.9        |      |         |        |     |  |
| 10 0507         | 0.8 | 25      | 0000 | 3.3     | 10 0016  | 2.9     | 25   | 0113    | 3.1     | 10 0529                                  | 0.8 | 25      | 0043 | 3.1     | 10 0100    | 3.0  | 25      | 0146   | 2.8 |  |
| 1140            | 3.0 | 0553    | 0.5  | 10 0558 | 0.8      | 25      | 0729 | 0.8     | 10 1202 | 2.9                                      | 25  | 0704    | 0.8  | 10 0713 | 0.8        | 25   | 0825    | 1.0    |     |  |
| SU 1736         | 0.8 | M 1224  | 3.4  | W 1229  | 2.9      | TH 1334 | 3.0  | TH 1751 | 0.7     | F 1304                                   | 2.9 | SU 1318 | 2.8  | M 1414  | 2.6        |      |         |        |     |  |
|                 |     | 1828    | 0.4  | 1825    | 0.8      | 1956    | 0.7  |         |         | 1925                                     | 0.8 | 1936    | 0.7  | 2039    | 0.9        |      |         |        |     |  |
| 11 0004         | 2.8 | 26      | 0050 | 3.2     | 11 0058  | 2.8     | 26   | 0203    | 2.9     | 11 0032                                  | 2.9 | 26      | 0130 | 2.9     | 11 0154    | 2.9  | 26      | 0236   | 2.7 |  |
| 0551            | 0.8 | 0653    | 0.6  | 11 0649 | 0.9      | 26      | 0830 | 0.9     | 11 0623 | 0.9                                      | 26  | 0804    | 0.9  | 11 0817 | 0.8        | 26   | 0914    | 1.0    |     |  |
| M 1219          | 2.9 | TU 1314 | 3.2  | TH 1311 | 2.9      | F 1425  | 2.8  | F 1245  | 2.9     | SA 1353                                  | 2.7 | M 1415  | 2.8  | TU 1510 | 2.5        |      |         |        |     |  |
| 1821            | 0.8 | 1926    | 0.5  | 1918    | 0.8      | 2053    | 0.8  | 1848    | 0.8     | 2022                                     | 0.9 | 2040    | 0.7  | 2128    | 0.9        |      |         |        |     |  |
| 12 0046         | 2.8 | 27      | 0142 | 3.1     | 12 0144  | 2.8     | 27   | 0257    | 2.8     | 12 0118                                  | 2.9 | 27      | 0221 | 2.8     | 12 0255    | 2.9  | 27      | 0332   | 2.6 |  |
| 0638            | 0.9 | 0754    | 0.8  | 12 0747 | 0.9      | 27      | 0928 | 1.0     | 12 0725 | 0.9                                      | 27  | 0900    | 1.0  | 12 0918 | 0.7        | 27   | 1000    | 0.9    |     |  |
| TU 1300         | 2.9 | W 1405  | 3.0  | F 1357  | 2.8      | SA 1521 | 2.6  | SA 1333 | 2.8     | SU 1447                                  | 2.6 | TU 1521 | 2.8  | W 1612  | 2.5        |      |         |        |     |  |
| 1908            | 0.8 | 2024    | 0.6  | 2016    | 0.8      | 2147    | 0.9  | 1951    | 0.8     | 2116                                     | 0.9 | 2141    | 0.6  | 2216    | 0.9        |      |         |        |     |  |
| 13 0129         | 2.7 | 28      | 0236 | 2.9     | 13 0235  | 2.8     | 28   | 0359    | 2.7     | 13 0210                                  | 2.9 | 28      | 0317 | 2.7     | 13 0403    | 2.9  | 28      | 0431   | 2.6 |  |
| 0728            | 0.9 | 0854    | 0.9  | 0850    | 0.9      | 28      | 1023 | 1.0     | 13 0831 | 0.9                                      | 28  | 0951    | 1.0  | 13 1017 | 0.6        | 28   | 1046    | 0.9    |     |  |
| W 1343          | 2.8 | TH 1458 | 2.9  | SA 1449 | 2.8      | SU 1628 | 2.5  | SU 1427 | 2.8     | M 1550                                   | 2.5 | W 1635  | 2.8  | TH 1712 | 2.6        |      |         |        |     |  |
| 1958            | 0.8 | 2120    | 0.7  | 2118    | 0.8      | 2240    | 0.9  | 2057    | 0.7     | 2207                                     | 0.9 | 2240    | 0.6  | 2303    | 0.9        |      |         |        |     |  |
| 14 0217         | 2.7 | 29      | 0334 | 2.8     | 14 0335  | 2.8     | 29   | 0508    | 2.6     | 14 0311                                  | 2.8 | 29      | 0423 | 2.6     | 14 0513    | 3.0  | 29      | 0528   | 2.6 |  |
| 0822            | 0.9 | 0953    | 0.9  | 0955    | 0.9      | 29      | 1116 | 1.0     | 14 0935 | 0.8                                      | 29  | 1041    | 1.0  | 14 1114 | 0.5        | 29   | 1131    | 0.8    |     |  |
| TH 1430         | 2.8 | F 1557  | 2.7  | SU 1553 | 2.8      | M 1738  | 2.5  | M 1532  | 2.8     | TU 1700                                  | 2.5 | TH 1746 | 3.0  | F 1806  | 2.7        |      |         |        |     |  |
| 2052            | 0.8 | 2215    | 0.8  | 2222    | 0.7      | 2332    | 0.9  | 2201    | 0.7     | 2256                                     | 0.9 | 2339    | 0.5  | 2350    | 0.8        |      |         |        |     |  |
| 15 0310         | 2.7 | 30      | 0437 | 2.8     | 15 0446  | 2.8     |      |         |         |  |     |         |      |         | 0617       | 3.1  | 30      | 0619   | 2.7 |  |
| 0919            | 0.9 | 1050    | 1.0  | 1059    | 0.8      |         |      |         |         |  |     |         |      |         | 1209       | 0.3  | 30      | 1215   | 0.7 |  |
| F 1523          | 2.8 | SA 1702 | 2.7  | M 1707  | 2.8      |         |      |         |         |  |     |         |      |         | F 1847     | 3.1  | SA 1853 | 2.8    |     |  |
| .2148           | 0.7 | 2309    | 0.8  | 2325    | 0.6      |         |      |         |         |  |     |         |      |         |            |      |         |        |     |  |
| 31 0542         | 2.7 |         |      |         |          |         |      |         |         |  |     |         |      |         | 31 0622    | 2.7  |         |        |     |  |
| 1145            | 1.0 |         |      |         |          |         |      |         |         |  |     |         |      |         | 31 1213    | 0.9  |         |        |     |  |
| SU 1806         | 2.6 |         |      |         |          |         |      |         |         |  |     |         |      |         | 31 TH 1850 | 2.7  |         |        |     |  |

**NEW ZEALAND, NORTH ISLAND - AUCKLAND**

LAT 36°51'S LONG 174°46'E

TIME ZONE -1200

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

YEAR 1988

|          |     | MAY JUNE JULY AUGUST |     |         |      |         |     |         |     |         |        |         |     |         |     |
|----------|-----|----------------------|-----|---------|------|---------|-----|---------|-----|---------|--------|---------|-----|---------|-----|
|          |     | MAY                  |     |         | JUNE |         |     | JULY    |     |         | AUGUST |         |     |         |     |
| TIME     | M   | TIME                 | M   | TIME    | M    | TIME    | M   | TIME    | M   | TIME    | M      | TIME    | M   | TIME    | M   |
| 1 0036   | 0.8 | 16 0108              | 0.5 | 1 0135  | 0.7  | 16 0227 | 0.7 | 1 0202  | 0.5 | 16 0247 | 0.7    | 1 0318  | 0.1 | 16 0328 | 0.6 |
| SU 0705  | 2.8 | 0730                 | 3.2 | 1 0758  | 2.9  | 16 0852 | 3.0 | 1 0824  | 3.0 | 16 0916 | 2.9    | 1 0951  | 3.3 | 1006    | 2.8 |
| SU 1257  | 0.6 | M 1329               | 0.3 | W 1352  | 0.4  | TH 1439 | 0.5 | F 1419  | 0.3 | SA 1456 | 0.5    | M 1536  | 0.1 | TU 1541 | 0.5 |
| O 1936   | 2.9 | 2007                 | 3.3 | 2032    | 3.1  | 2117    | 3.2 | 2059    | 3.3 | 2136    | 3.0    | 2219    | 3.4 | 2220    | 2.9 |
| 2 0119   | 0.7 | 17 0158              | 0.5 | 2 0221  | 0.6  | 17 0311 | 0.7 | 2 0250  | 0.4 | 17 0325 | 0.7    | 2 0407  | 0.1 | 17 0403 | 0.6 |
| SU 0747  | 2.9 | 0827                 | 3.2 | 2 0845  | 3.0  | 17 0936 | 2.9 | 2 0916  | 3.1 | 17 0955 | 2.8    | 2 1041  | 3.3 | 1042    | 2.8 |
| M 1337   | 0.5 | TU 1416              | 0.3 | TH 1436 | 0.4  | F 1521  | 0.5 | SA 1506 | 0.3 | SU 1534 | 0.6    | TU 1626 | 0.2 | W 1617  | 0.6 |
| 2017     | 3.0 | 2054                 | 3.3 | 2118    | 3.2  | 2159    | 3.1 | 2149    | 3.3 | 2213    | 3.0    | 2307    | 3.4 | 2256    | 2.9 |
| 3 0200   | 0.6 | 18 0246              | 0.5 | 3 0307  | 0.6  | 18 0353 | 0.7 | 3 0338  | 0.4 | 18 0402 | 0.7    | 3 0459  | 0.2 | 18 0439 | 0.6 |
| SU 0828  | 3.0 | 0913                 | 3.2 | 3 0932  | 3.0  | 18 1018 | 2.9 | 3 1007  | 3.1 | 18 1034 | 2.8    | 3 1132  | 3.2 | 18 1120 | 2.8 |
| TU 1416  | 0.5 | W 1501               | 0.4 | F 1522  | 0.4  | SA 1603 | 0.6 | SU 1554 | 0.3 | M 1612  | 0.6    | W 1720  | 0.3 | TH 1656 | 0.7 |
| 2058     | 3.1 | 2138                 | 3.3 | 2205    | 3.2  | 2239    | 3.1 | 2238    | 3.4 | 2250    | 3.0    | 2356    | 3.3 | 2333    | 2.8 |
| 4 0240   | 0.6 | 19 0332              | 0.6 | 4 0355  | 0.6  | 19 0436 | 0.8 | 4 0429  | 0.4 | 19 0440 | 0.7    | 4 0554  | 0.3 | 19 0519 | 0.7 |
| SU 0910  | 3.0 | 0957                 | 3.1 | 4 1021  | 3.0  | 19 1100 | 2.8 | 4 1059  | 3.1 | 19 1112 | 2.8    | 4 1222  | 3.1 | 19 1159 | 2.7 |
| W 1455   | 0.5 | TH 1546              | 0.5 | SA 1610 | 0.4  | SU 1646 | 0.7 | M 1646  | 0.3 | TU 1653 | 0.7    | TH 1819 | 0.5 | F 1740  | 0.8 |
| 2140     | 3.1 | 2221                 | 3.2 | 2254    | 3.2  | 2319    | 3.0 | 2328    | 3.3 | 2328    | 2.9    |         |     |         |     |
| 5 0322   | 0.6 | 20 0418              | 0.7 | 5 0447  | 0.6  | 20 0520 | 0.8 | 5 0523  | 0.4 | 20 0521 | 0.8    | 5 0046  | 3.2 | 20 0012 | 2.8 |
| SU 0952  | 3.0 | 1041                 | 3.0 | 5 1112  | 3.0  | 20 1142 | 2.8 | 5 1151  | 3.1 | 20 1152 | 2.7    | 5 0654  | 0.4 | 20 0605 | 0.7 |
| TH 1537  | 0.5 | F 1631               | 0.6 | SU 1703 | 0.5  | M 1732  | 0.8 | TU 1742 | 0.4 | W 1736  | 0.8    | F 1314  | 3.0 | SA 1241 | 2.7 |
| 2223     | 3.1 | 2304                 | 3.1 | 2344    | 3.2  | 2359    | 2.9 |         |     |         |        | 1923    | 0.6 | 1831    | 0.8 |
| 6 0408   | 0.7 | 21 0507              | 0.8 | 6 0544  | 0.6  | 21 0608 | 0.9 | 6 0018  | 3.3 | 21 0006 | 2.9    | 6 0137  | 3.0 | 21 0053 | 2.7 |
| SU 1037  | 3.0 | 1125                 | 2.9 | 6 1205  | 3.0  | 21 1224 | 2.7 | 6 0621  | 0.4 | 21 0606 | 0.8    | 6 0754  | 0.5 | 21 0658 | 0.7 |
| F 1623   | 0.6 | SA 1720              | 0.7 | M 1802  | 0.6  | TU 1821 | 0.9 | W 1244  | 3.1 | TH 1232 | 2.7    | SA 1407 | 2.9 | SU 1325 | 2.7 |
| 2309     | 3.1 | 2347                 | 3.0 |         |      |         |     | 1842    | 0.5 | 1823    | 0.8    | 2026    | 0.7 | 1929    | 0.9 |
| 7 0459   | 0.7 | 22 0559              | 0.9 | 7 0035  | 3.2  | 22 0040 | 2.9 | 7 0109  | 3.2 | 22 0046 | 2.8    | 7 0231  | 2.9 | 22 0137 | 2.7 |
| SU 1124  | 2.9 | 1209                 | 2.8 | 7 0643  | 0.6  | 22 0656 | 0.9 | 7 0720  | 0.4 | 22 0653 | 0.8    | 7 0853  | 0.5 | 22 0756 | 0.7 |
| SA 1717  | 0.6 | SU 1812              | 0.8 | TU 1259 | 3.0  | W 1307  | 2.7 | TH 1337 | 3.0 | F 1315  | 2.7    | SU 1505 | 2.8 | M 1413  | 2.6 |
| 2357     | 3.1 |                      |     | 1903    | 0.6  | 1911    | 0.9 | 1943    | 0.6 | 1913    | 0.9    | 2127    | 0.8 | 2030    | 0.9 |
| 8 0558   | 0.7 | 23 0030              | 2.9 | 8 0128  | 3.1  | 23 0121 | 2.8 | 8 0202  | 3.1 | 23 0127 | 2.7    | 8 0329  | 2.7 | 23 0227 | 2.6 |
| SU 1215  | 2.9 | 0653                 | 0.9 | 8 0743  | 0.5  | 23 0744 | 0.9 | 8 0818  | 0.5 | 23 0743 | 0.8    | 8 0950  | 0.6 | 23 0857 | 0.7 |
| 1818     | 0.7 | M 1254               | 2.7 | W 1356  | 2.9  | TH 1352 | 2.6 | F 1433  | 3.0 | SA 1359 | 2.7    | M 1607  | 2.7 | TU 1509 | 2.6 |
|          |     | 1906                 | 0.9 |         |      | 2004    | 0.6 | 2044    | 0.7 | 2006    | 0.9    | 2225    | 0.8 | 2132    | 0.8 |
| 9 0048   | 3.1 | 24 0113              | 2.8 | 9 0224  | 3.1  | 24 0204 | 2.7 | 9 0257  | 3.0 | 24 0211 | 2.7    | 9 0434  | 2.6 | 24 0325 | 2.6 |
| SU 0701  | 0.7 | 24 0744              | 0.9 | 9 0839  | 0.5  | 24 0830 | 0.8 | 9 0914  | 0.5 | 24 0834 | 0.8    | 9 1045  | 0.7 | 24 0958 | 0.6 |
| M 1309   | 2.9 | TU 1341              | 2.6 | TH 1455 | 2.9  | F 1439  | 2.6 | SA 1532 | 2.9 | SU 1448 | 2.6    | TU 1714 | 2.7 | W 1614  | 2.7 |
| 1921     | 0.7 | 1957                 | 0.9 | 2102    | 0.6  | 2049    | 0.9 | 2143    | 0.7 | 2101    | 0.9    | 2321    | 0.8 | 2233    | 0.7 |
| 10 0142  | 3.0 | 25 0158              | 2.8 | 10 0322 | 3.0  | 25 0251 | 2.7 | 10 0356 | 2.9 | 25 0300 | 2.7    | 10 0540 | 2.6 | 25 0434 | 2.6 |
| SU 0802  | 0.7 | 0831                 | 0.9 | 10 0934 | 0.5  | 25 0917 | 0.8 | 10 1009 | 0.5 | 25 0928 | 0.7    | 11 1138 | 0.7 | 25 1057 | 0.5 |
| TU 1407  | 2.8 | W 1430               | 2.6 | F 1557  | 2.9  | SA 1530 | 2.6 | SU 1634 | 2.8 | M 1544  | 2.6    | W 1816  | 2.7 | TH 1725 | 2.8 |
| 2022     | 0.7 | 2045                 | 0.9 | 2200    | 0.7  | 2139    | 0.9 | 2241    | 0.8 | 2159    | 0.9    |         |     | 2332    | 0.6 |
| 11 0241  | 3.0 | 26 0246              | 2.7 | 11 0423 | 3.0  | 26 0342 | 2.7 | 11 0458 | 2.8 | 26 0357 | 2.6    | 11 0013 | 0.8 | 26 0547 | 2.7 |
| SU 0900  | 0.6 | 0916                 | 0.9 | 11 1029 | 0.5  | 26 1006 | 0.7 | 11 1105 | 0.6 | 26 1025 | 0.7    | 11 0640 | 2.6 | 26 1155 | 0.4 |
| W 1511   | 2.8 | TH 1523              | 2.6 | SA 1700 | 2.9  | SU 1627 | 2.7 | M 1737  | 2.8 | TU 1647 | 2.7    | TH 1228 | 0.6 | F 1830  | 3.0 |
| 2121     | 0.6 | 2133                 | 0.9 | 2258    | 0.7  | 2232    | 0.9 | 2339    | 0.8 | 2258    | 0.8    | 1910    | 2.8 |         |     |
| 12 0344  | 3.0 | 27 0337              | 2.7 | 12 0524 | 2.9  | 27 0438 | 2.7 | 12 0559 | 2.7 | 27 0501 | 2.7    | 12 0100 | 0.8 | 27 0028 | 0.4 |
| SU 0955  | 0.5 | 1001                 | 0.8 | 12 1124 | 0.5  | 27 1058 | 0.7 | 12 1158 | 0.6 | 27 1123 | 0.6    | 12 0731 | 2.7 | 27 0653 | 2.9 |
| TH 1618  | 2.9 | F 1619               | 2.6 | SU 1800 | 3.0  | M 1726  | 2.7 | TU 1835 | 2.9 | W 1752  | 2.8    | F 1313  | 0.6 | SA 1249 | 0.2 |
| 2219     | 0.6 | 2221                 | 0.9 |         |      | 2327    | 0.7 |         |     | 2356    | 0.7    | 1955    | 2.8 | O 1928  | 3.2 |
| 13 0449  | 3.0 | 28 0431              | 2.7 | 13 0622 | 2.9  | 28 0537 | 2.7 | 13 0033 | 0.8 | 28 0608 | 2.8    | 13 0142 | 0.7 | 28 0119 | 0.2 |
| 1051     | 0.4 | 1048                 | 0.8 | 13 1218 | 0.5  | 28 1150 | 0.6 | 13 0657 | 2.8 | 28 1218 | 0.4    | 13 0815 | 2.7 | 28 0750 | 3.1 |
| F 1724   | 3.0 | SA 1715              | 2.7 | M 1856  | 3.1  | TU 1823 | 2.8 | W 1249  | 0.6 | TH 1853 | 3.0    | SA 1353 | 0.6 | SU 1339 | 0.1 |
| 2317     | 0.6 | 2310                 | 0.9 |         |      |         |     | 1928    | 2.9 |         |        | 2034    | 2.9 | 2020    | 3.3 |
| 14 0551  | 3.1 | 29 0527              | 2.7 | 14 0050 | 0.7  | 29 0021 | 0.7 | 14 0123 | 0.7 | 29 0051 | 0.5    | 14 0220 | 0.6 | 29 0208 | 0.0 |
| 1146     | 0.4 | 1135                 | 0.7 | 14 0716 | 3.0  | 29 0636 | 2.8 | 14 0748 | 2.8 | 29 0710 | 2.9    | 14 0854 | 2.8 | 29 0842 | 3.3 |
| SA 1824  | 3.1 | SU 1809              | 2.8 | TU 1309 | 0.4  | W 1242  | 0.5 | TH 1335 | 0.6 | F 1311  | 0.3    | SU 1430 | 0.5 | M 1428  | 0.0 |
|          |     |                      |     | • 1947  | 3.1  | O 1918  | 3.0 | 2015    | 3.0 | O 1949  | 3.1    | 2111    | 2.9 | 2109    | 3.4 |
| 15 0014  | 0.5 | 30 0000              | 0.8 | 15 0141 | 0.7  | 30 0113 | 0.6 | 15 0207 | 0.7 | 30 0142 | 0.4    | 15 0255 | 0.6 | 30 0256 | 0.0 |
| 0647     | 3.1 | 0620                 | 2.8 | 15 0806 | 3.0  | 30 0731 | 2.9 | 15 0834 | 2.8 | 30 0807 | 3.1    | 15 0930 | 2.8 | 30 0932 | 3.3 |
| SU 1239  | 0.3 | M 1222               | 0.6 | W 1356  | 0.4  | TH 1331 | 0.4 | F 1417  | 0.5 | SA 1400 | 0.2    | M 1506  | 0.5 | TU 1516 | 0.0 |
| • 1918   | 3.2 | 1859                 | 2.9 | 2033    | 3.2  | 2010    | 3.1 | 2057    | 3.0 | 2041    | 3.3    | 2145    | 2.9 | 2157    | 3.5 |
| 31 0049  | 0.7 |                      |     |         |      |         |     |         |     |         |        | 31 0230 | 0.2 |         |     |
| 0710     | 2.8 |                      |     |         |      |         |     |         |     |         |        | 31 0900 | 3.2 |         |     |
| TU 1308  | 0.5 |                      |     |         |      |         |     |         |     |         |        | SU 1448 | 0.1 |         |     |
| • O 1946 | 3.0 |                      |     |         |      |         |     |         |     |         |        | 2130    | 3.4 |         |     |

CHINA - BEIHAI

LAT 21°29'N      LONG 109°04'E

FOR INTERMEDIATE HEIGHTS USE HARMONIC CONSTANTS (SEE PART III) AND NP 159.

# CHINA - HONG KONG

LAT 22°18'N LONG 114°12'E

| TIME ZONE -0800 |      |     |         | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |      |      |      |      |      |      | YEAR 1988 |      |     |      |        |     |        |      |      |      |      |     |
|-----------------|------|-----|---------|--|------|------|------|------|------|------|------|-----------|------|-----|------|--------|-----|--------|------|------|------|------|-----|
|                 |      |     |         | MAY                                      |      |      |      | JUNE |      |      |      | JULY      |      |     |      | AUGUST |     |        |      |      |      |      |     |
|                 | TIME | M   | TIME    | M  | TIME | M    | TIME | M    | TIME | M    | TIME | M         | TIME | M   | TIME | M      |     |        |      |      |      |      |     |
| 1               | 0222 | 0.9 | 16      | 0217                                     | 1.0  | 1    | 0213 | 1.1  | 16   | 0219 | 1.2  | 1         | 0228 | 1.1 | 16   | 0257   | 1.1 | 1      | 0020 | -1.5 | 0448 | 1.0  |     |
| SU              | 0837 | 2.0 | 0907    | 2.2                                      | 1    | 0836 | 2.4  | 16   | 0932 | 2.3  | 1    | 0916      | 2.5  | 16  | 1002 | 2.2    | 1   | 0439   | 0.9  | 16   | 1103 | 2.0  |     |
| M               | 1520 | 0.6 | M 1603  | 0.3                                      | W    | 1638 | 0.2  | TH   | 1734 | 0.3  | F    | 1719      | 0.1  | SA  | 1747 | 0.4    | M   | 1114   | 2.3  | TU   | 1753 | 0.7  |     |
| O               | 2206 | 1.6 | 2258    | 1.4                                      |      | 2341 | 1.3  |      |      |      |      |           |      |     |      |        |     | 1809   | 0.4  |      |      |      |     |
| 2               | 0242 | 1.0 | 17      | 0240                                     | 1.1  | 2    | 0245 | 1.1  | 17   | 0020 | 1.3  | 2         | 0015 | 1.3 | 17   | 0008   | 1.4 | 2      | 0058 | 1.6  | 0007 | 1.7  |     |
| M               | 0855 | 2.1 | 0928    | 2.3                                      | 2    | 0915 | 2.4  | 17   | 0251 | 1.2  | 2    | 0320      | 1.1  | 17  | 0346 | 1.1    | 2   | 0541   | 0.9  | 17   | 0535 | 1.0  |     |
| M               | 1559 | 0.5 | TU 1652 | 0.3                                      | TH   | 1726 | 0.2  | F    | 1006 | 2.3  | SA   | 1012      | 2.5  | SU  | 1035 | 2.2    | TU  | 1208   | 2.1  | W    | 1139 | 1.8  |     |
|                 | 2253 | 1.5 | 2346    | 1.4                                      |      |      |      |      | 1816 | 0.4  |      | 1804      | 0.2  |     | 1818 | 0.5    |     | 1842   | 0.6  |      | 1814 | 0.8  |     |
| 3               | 0303 | 1.0 | 18      | 0300                                     | 1.1  | 3    | 0031 | 1.3  | 18   | 0057 | 1.3  | 3         | 0101 | 1.4 | 18   | 0036   | 1.4 | 3      | 0139 | 1.7  | 0036 | 1.1  |     |
| TU              | 0913 | 0.4 | W 1742  | 0.3                                      | F    | 1001 | 2.4  | SA   | 1041 | 2.2  | SU   | 1107      | 2.4  | M   | 1109 | 2.1    | W   | 1304   | 1.8  | TH   | 1218 | 1.6  |     |
|                 | 2339 | 1.5 |         |  |      | 1816 | 0.2  |      | 1857 | 0.5  |      | 1847      | 0.3  |     | 1848 | 0.6    |     | 1911   | 0.7  |      | 1832 | 0.9  |     |
| 4               | 0326 | 1.1 | 19      | 0034                                     | 1.3  | 4    | 0128 | 1.3  | 19   | 0139 | 1.3  | 4         | 0150 | 1.4 | 19   | 0110   | 1.5 | 4      | 0223 | 1.8  | 0107 | 1.6  |     |
| W               | 0934 | 2.3 | 0318    | 1.2                                      | 4    | 0358 | 1.2  | 19   | 0404 | 1.3  | 4    | 0530      | 1.1  | 19  | 0535 | 1.2    | 4   | 0750   | 0.9  | 0716 | 1.0  |      |     |
| W               | 1726 | 0.3 | TH 1014 | 2.3                                      | SA   | 1052 | 2.4  | SU   | 1118 | 2.1  | M    | 1203      | 2.3  | TU  | 1142 | 1.9    | TH  | 1410   | 1.5  | F    | 1312 | 1.4  |     |
|                 |      |     |         |  |      | 1832 | 0.4  |      | 1909 | 0.3  |      | 1937      | 0.5  |     | 1928 | 0.4    |     | 1915   | 0.7  |      | 1848 | 1.0  |     |
| 5               | 0030 | 1.4 | 20      | 0128                                     | 1.3  | 5    | 0238 | 1.3  | 20   | 0230 | 1.3  | 5         | 0241 | 1.5 | 20   | 0148   | 1.5 | 5      | 0309 | 1.9  | 0139 | 1.8  |     |
| 0350            | 1.1  | 20  | 0330    | 1.2                                      | 5    | 0448 | 1.3  | 20   | 0459 | 1.3  | 5    | 0642      | 1.1  | 20  | 0632 | 1.2    | 5   | 0914   | 0.9  | 20   | 0821 | 1.6  |     |
| TH              | 1005 | 2.3 | F 1047  | 2.2                                      | SU   | 1148 | 2.3  | M    | 1156 | 2.0  | TU   | 1302      | 2.0  | W   | 1217 | 1.8    | F   | 1541   | 1.3  | SA   | 1454 | 1.2  |     |
|                 | 1816 | 0.3 |         |  |      | 2003 | 0.5  |      | 2014 | 0.6  |      | 2008      | 0.6  |     | 1939 | 0.8    |     | 1954   | 1.0  |      | 1901 | 1.1  |     |
| 6               | 0130 | 1.3 | 21      | 1124                                     | 2.1  | 6    | 0353 | 1.4  | 21   | 0324 | 1.4  | 6         | 0330 | 1.6 | 21   | 0228   | 1.6 | 6      | 0358 | 1.9  | 0219 | 1.9  |     |
| 0413            | 1.2  | 21  | 2018    | 0.6                                      | 6    | 0608 | 1.3  | 21   | 0619 | 1.3  | 6    | 0758      | 1.1  | 21  | 0734 | 1.2    | 6   | 1110   | 0.8  | 21   | 1004 | 0.9  |     |
| F               | 1045 | 2.3 | SA      |  | M    | 1251 | 2.2  | TU   | 1238 | 1.8  | W    | 1410      | 1.8  | TH  | 1259 | 1.5    | SA  | 1748   | 1.1  | SU   | 1717 | 1.1  |     |
|                 | 1913 | 0.4 |         |  |      | 2056 | 0.5  |      | 2050 | 0.7  |      | 2045      | 0.7  |     | 2001 | 0.9    |     | 1951   | 1.1  |      | 1903 | 1.1  |     |
| 7               | 0256 | 1.3 | 22      | 1207                                     | 2.0  | 7    | 0447 | 1.4  | 22   | 0407 | 1.5  | 7         | 0416 | 1.7 | 22   | 0307   | 1.6 | 7      | 0449 | 2.0  | 0310 | 2.0  |     |
| 0427            | 1.3  | 22  | 2112    | 0.6                                      | 7    | 0751 | 1.3  | 22   | 0747 | 1.3  | 7    | 0924      | 1.0  | 22  | 0849 | 1.1    | 7   | 1250   | 0.6  | 22   | 1217 | 0.7  |     |
| SA              | 1134 | 2.3 | SU      |  | TU   | 1409 | 2.0  | W    | 1331 | 1.7  | TH   | 1537      | 1.5  | F   | 1423 | 1.3    | SU  |        |      | M    |      |      |     |
|                 | 2020 | 0.4 |         |  |      | 2147 | 0.6  |      | 2124 | 0.8  |      | 2120      | 0.9  |     | 2022 | 0.9    |     |        |      |      |      |      |     |
| 8               | 1237 | 2.2 | 23      | 1302                                     | 1.9  | 8    | 0526 | 1.6  | 23   | 0439 | 1.6  | 8         | 0458 | 1.8 | 23   | 0344   | 1.7 | 8      | 0541 | 2.0  | 0411 | 2.1  |     |
| SU              | 2133 | 0.5 | 23      | 2205                                     | 0.7  | 8    | 0932 | 1.3  | 23   | 0928 | 1.3  | 8         | 1105 | 0.9 | 23   | 1044   | 1.0 | 8      | 1348 | 0.5  | 23   | 1315 | 0.5 |
|                 | M    |     |         |  |      | W    | 1542 | 1.8  | TH   | 1459 | 1.5  | F         | 1718 | 1.3 | SA   | 1650   | 1.1 | M      |      |      | TU   |      |     |
|                 |      |     |         |  |      |      | 2234 | 0.7  |      | 2156 | 0.9  |           | 2153 | 1.0 |      | 2043   | 1.0 |        |      |      |      |      |     |
| 9               | 1403 | 2.0 | 24      | 1421                                     | 1.7  | 9    | 0600 | 1.7  | 24   | 0506 | 1.7  | 9         | 0538 | 1.9 | 24   | 0420   | 1.9 | 9      | 0634 | 2.1  | 0515 | 2.2  |     |
| M               | 2242 | 0.5 | 24      | 2252                                     | 0.8  | 9    | 1109 | 1.1  | 24   | 1131 | 1.1  | 9         | 1236 | 0.7 | 24   | 1239   | 0.8 | 9      | 1429 | 0.4  | 24   | 1357 | 0.4 |
|                 |      |     |         |  |      | TH   | 1715 | 1.6  | F    | 1658 | 1.3  | SA        | 1909 | 1.2 | SU   | 1855   | 1.1 | TU     | 2229 | 1.2  | W    | 2118 | 1.3 |
|                 |      |     |         |  |      |      | 2315 | 0.8  |      | 2227 | 0.9  |           | 2226 | 1.1 |      | 2110   | 1.1 |        | 2318 | 1.2  |      | 2323 | 1.3 |
| 10              | 0648 | 1.5 | 25      | 0626                                     | 1.5  | 10   | 0632 | 1.8  | 25   | 0531 | 1.8  | 10        | 0617 | 2.0 | 25   | 0458   | 2.0 | 10     | 0724 | 2.1  | 0619 | 2.3  |     |
| 0925            | 1.4  | 25  | 1024    | 1.4                                      | 10   | 1229 | 0.9  | 25   | 1251 | 0.9  | 10   | 1342      | 0.5  | 25  | 1333 | 0.6    | 10  | 1505   | 0.4  | 25   | 1435 | 0.3  |     |
| TU              | 1547 | 1.9 | W 1603  | 1.6                                      | F    | 1847 | 1.4  | SA   | 1843 | 1.2  | SU   | 2057      | 1.1  | M   | 2043 | 1.1    | W   | 2216   | 1.3  | TH   | 2135 | 1.4  |     |
|                 | 2338 | 0.6 |         |  |      | 2351 | 0.8  |      | 2259 | 1.0  |      | 2305      | 1.1  |     | 2209 | 1.1    |     |        |      |      |      |      |     |
| 11              | 0704 | 1.6 | 26      | 0631                                     | 1.6  | 11   | 0703 | 2.0  | 26   | 0556 | 1.9  | 11        | 0656 | 2.1 | 26   | 0541   | 2.1 | 11     | 0040 | 1.2  | 26   | 0042 | 1.2 |
| 1113            | 1.2  | 26  | 1206    | 1.2                                      | 11   | 1333 | 0.6  | 26   | 1341 | 0.7  | 11   | 1434      | 0.4  | 26  | 1415 | 0.4    | 11  | 0809   | 2.2  | 26   | 0721 | 2.4  |     |
| W               | 1721 | 1.8 | TH 1734 | 1.5                                      | SA   | 2013 | 1.3  | SU   | 2013 | 1.2  | M    | 2159      | 1.2  | TU  | 2129 | 1.2    | TH  | 1538   | 0.4  | F    | 1512 | 0.2  |     |
|                 |      |     |         |  |      |      | 2335 | 1.1  |      | 2352 | 1.1  |           | 2329 | 1.1 |      | 2225   | 1.3 |        | 2201 | 1.5  |      |      |     |
| 12              | 0020 | 0.6 | 27      | 0002                                     | 0.9  | 12   | 0022 | 1.0  | 27   | 0623 | 2.1  | 12        | 0736 | 2.2 | 27   | 0630   | 2.3 | 12     | 0135 | 1.2  | 27   | 0147 | 1.1 |
| 0727            | 1.7  | 27  | 0644    | 1.7                                      | 12   | 0732 | 2.1  | 27   | 1423 | 0.5  | 12   | 1518      | 0.3  | 27  | 1456 | 0.2    | 12  | 0848   | 2.2  | 27   | 0824 | 2.5  |     |
| TH              | 1229 | 1.0 | F 1305  | 1.0                                      | SU   | 1427 | 0.5  | M    | 2119 | 1.2  | TU   | 2233      | 1.2  | W   | 2201 | 1.2    | F   | 1609   | 0.4  | SA   | 1547 | 0.3  |     |
|                 | 1845 | 1.8 |         |  |      | 2124 | 1.3  |      |      |      |      |           |      |     |      |        |     | • 2238 | 1.4  | O    | 2229 | 1.6  |     |
| 13              | 0055 | 0.7 | 28      | 0028                                     | 0.9  | 13   | 0052 | 1.1  | 28   | 0015 | 1.1  | 13        | 0040 | 1.1 | 28   | 0035   | 1.1 | 13     | 0226 | 1.1  | 28   | 0247 | 0.9 |
| 0752            | 1.8  | 28  | 0701    | 1.8                                      | 13   | 0802 | 2.2  | 28   | 0656 | 2.2  | 13   | 0816      | 2.2  | 28  | 0725 | 2.4    | 13  | 0923   | 2.2  | 28   | 0925 | 2.5  |     |
| F               | 1330 | 0.8 | SA      | 1351                                     | 0.8  | M    | 1517 | 0.3  | TU   | 1505 | 0.3  | W         | 1559 | 0.3 | TH   | 1537   | 0.1 | SA     | 1638 | 0.5  | SU   | 1621 | 0.4 |
|                 | 2002 | 1.7 |         | 2013                                     | 1.4  |      | 2219 | 1.3  |      | 2208 | 1.2  |           | 2258 | 1.2 |      | 2233   | 1.3 |        | 2255 | 1.5  |      | 2301 | 1.7 |
| 14              | 0125 | 0.8 | 29      | 0052                                     | 1.0  | 14   | 0121 | 1.1  | 29   | 0057 | 1.1  | 14        | 0126 | 1.1 | 29   | 0135   | 1.1 | 14     | 0314 | 1.1  | 29   | 0346 | 0.8 |
| 0818            | 2.0  | 29  | 0719    | 2.0                                      | 14   | 0831 | 2.3  | 29   | 0736 | 2.3  | 14   | 0854      | 2.2  | 29  | 0822 | 2.5    | 14  | 0956   | 2.2  | 29   | 1023 | 2.4  |     |
| SA              | 1424 | 0.6 | SU      | 1431                                     | 0.6  | TU   | 1604 | 0.3  | W    | 1549 | 0.2  | TH        | 1637 | 0.3 | F    | 1618   | 0.1 | SU     | 1706 | 0.5  | M    | 1652 | 0.5 |
|                 | 2108 | 1.6 |         | 2115                                     | 1.4  |      | 2304 | 1.3  |      | 2250 | 1.3  |           | 2321 | 1.3 | O    | 2307   | 1.4 |        | 2315 | 1.5  |      | 2332 | 1.8 |
| 15              | 0152 | 0.9 | 30      | 0116                                     | 1.0  | 15   | 0150 | 1.1  | 30   | 0141 | 1.1  | 15        | 0211 | 1.1 | 30   | 0235   | 1.0 | 15     | 0401 | 1.0  | 30   | 0442 | 0.7 |
| 0843            | 2.1  | 30  | 0740    | 2.1                                      | 15   | 0901 | 2.3  | 30   | 0823 | 2.4  | 15   | 0929      | 2.2  | 30  | 0922 | 2.5    | 15  | 1029   | 2.1  | 30   | 1117 | 2.2  |     |
| SU              | 1515 | 0.4 | M       | 1511                                     | 0.5  | W    | 1650 | 0.3  | TH   | 1633 | 0.1  | F         | 1713 | 0.3 | SA   | 1657   | 0.2 | M      |      |      |      |      |     |

**KOREA, WEST COAST - INCH'ON (CHEMULPHO)**

LAT 37°28'N LONG 126°37'E

| TIME ZONE -0900 |     |         |     | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |     |         |     |         |     |         |     |         |      |         |      | YEAR | 1988 |      |        |  |  |
|-----------------|-----|---------|-----|--|-----|---------|-----|---------|-----|---------|-----|---------|------|---------|------|------|------|------|--------|--|--|
|                 |     |         |     | MAY                                      |     |         |     |         |     | JUNE    |     |         |      |         |      | JULY |      |      | AUGUST |  |  |
| TIME            | M   | TIME    | M   | TIME                                     | M   | TIME    | M   | TIME    | M   | TIME    | M   | TIME    | M    | TIME    | M    | TIME | M    | TIME | M      |  |  |
| 1 0450          | 8.3 | 16 0519 | 9.1 | 1 0535                                   | 8.7 | 16 0625 | 8.5 | 1 0609  | 9.0 | 16 0013 | 1.0 | 1 0054  | -0.2 | 16 0102 | 0.9  |      |      |      |        |  |  |
| 1 1058          | 1.2 | 16 1124 | 1.0 | 1 1151                                   | 1.5 | 16 1234 | 1.9 | 1 1222  | 1.3 | 16 0648 | 8.5 | 1 0724  | 9.4  | 16 0720 | 8.5  |      |      |      |        |  |  |
| SU 1655         | 7.9 | M 1719  | 7.9 | W 1741                                   | 7.5 | TH 1826 | 7.2 | F 1820  | 7.7 | SA 1255 | 1.7 | M 1330  | 0.4  | TU 1327 | 1.1  |      |      |      |        |  |  |
| O 2303          | 0.6 | 2327    | 0.3 | 2348                                     | 0.5 |         |     |         |     | 1855    | 7.4 | 1944    | 8.6  | 1938    | 8.0  |      |      |      |        |  |  |
| 2 0523          | 8.5 | 17 0557 | 9.0 | 2 0615                                   | 8.7 | 17 0026 | 1.0 | 2 0020  | 0.2 | 17 0049 | 1.0 | 2 0138  | 0.0  | 17 0133 | 1.1  |      |      |      |        |  |  |
| 1 1132          | 1.1 | 17 1205 | 1.2 | 2 1232                                   | 1.4 | 17 0703 | 8.4 | 2 0656  | 9.1 | 17 0722 | 8.4 | 2 0804  | 9.3  | 17 0746 | 8.4  |      |      |      |        |  |  |
| M 1727          | 7.9 | TU 1758 | 7.7 | TH 1823                                  | 7.5 | F 1312  | 2.0 | SA 1307 | 1.1 | SU 1329 | 1.6 | TU 1409 | 0.4  | W 1352  | 1.1  |      |      |      |        |  |  |
| 2335            | 0.5 |         |     |  |     | 1907    | 7.1 | 1909    | 7.8 | 1933    | 7.5 | 2028    | 8.6  | 2005    | 8.0  |      |      |      |        |  |  |
| 3 0555          | 8.6 | 18 0005 | 0.5 | 3 0030                                   | 0.5 | 18 0104 | 1.2 | 3 0106  | 0.1 | 18 0124 | 1.1 | 3 0221  | 0.5  | 18 0205 | 1.3  |      |      |      |        |  |  |
| 1 1209          | 1.1 | 18 0636 | 8.7 | 3 0659                                   | 8.8 | 18 0741 | 8.2 | 3 0742  | 9.1 | 18 0752 | 8.4 | 3 0842  | 8.9  | 18 0810 | 8.1  |      |      |      |        |  |  |
| TU 1801         | 7.8 | W 1246  | 1.6 | F 1316                                   | 1.4 | SA 1349 | 2.0 | SU 1349 | 1.0 | M 1359  | 1.5 | W 1447  | 0.5  | TH 1418 | 1.1  |      |      |      |        |  |  |
|                 |     | 1837    | 7.4 | 1912                                     | 7.5 | 1949    | 7.1 | 1957    | 7.9 | 2009    | 7.5 | 2111    | 8.4  | 2034    | 7.9  |      |      |      |        |  |  |
| 4 0007          | 0.5 | 19 0041 | 0.8 | 4 0114                                   | 0.4 | 19 0141 | 1.3 | 4 0152  | 0.2 | 19 0159 | 1.2 | 4 0306  | 1.1  | 19 0234 | 1.7  |      |      |      |        |  |  |
| 0 0627          | 8.7 | 19 0714 | 8.4 | 4 0749                                   | 8.7 | 19 0818 | 8.1 | 4 0826  | 9.1 | 19 0821 | 8.2 | 4 0919  | 8.3  | 19 0837 | 7.9  |      |      |      |        |  |  |
| W 1243          | 1.2 | TH 1325 | 1.9 | SA 1401                                  | 1.5 | SU 1426 | 2.0 | M 1434  | 0.9 | TU 1429 | 1.5 | TH 1527 | 0.9  | F 1446  | 1.3  |      |      |      |        |  |  |
| 1835            | 7.7 | 1917    | 7.1 | 2002                                     | 7.4 | 2029    | 7.0 | 2047    | 8.0 | 2041    | 7.5 | 2156    | 8.0  | 2103    | 7.7  |      |      |      |        |  |  |
| 5 0043          | 0.5 | 20 0117 | 1.1 | 5 0159                                   | 0.5 | 20 0221 | 1.5 | 5 0237  | 0.5 | 20 0231 | 1.4 | 5 0353  | 2.0  | 20 0306 | 2.2  |      |      |      |        |  |  |
| 0 0704          | 8.6 | 20 0751 | 8.2 | 5 0837                                   | 8.7 | 20 0852 | 7.9 | 5 0908  | 8.8 | 20 0850 | 8.0 | 5 0958  | 7.6  | 20 0906 | 7.4  |      |      |      |        |  |  |
| TH 1323         | 1.4 | F 1405  | 2.1 | SU 1447                                  | 1.5 | M 1500  | 2.1 | TU 1516 | 1.0 | W 1458  | 1.6 | F 1611  | 1.4  | SA 1519 | 1.6  |      |      |      |        |  |  |
| 1914            | 7.5 | 1957    | 6.9 | 2055                                     | 7.4 | 2111    | 6.9 | 2135    | 7.9 | 2114    | 7.4 | 2248    | 7.6  | 2137    | 7.4  |      |      |      |        |  |  |
| 6 0122          | 0.5 | 21 0155 | 1.4 | 6 0249                                   | 0.8 | 21 0258 | 1.7 | 6 0327  | 1.0 | 21 0306 | 1.8 | 6 0449  | 2.9  | 21 0350 | 2.8  |      |      |      |        |  |  |
| 0 0746          | 8.5 | 21 0829 | 7.9 | 6 0924                                   | 8.4 | 21 0927 | 7.7 | 6 0951  | 8.4 | 21 0919 | 7.7 | 6 1046  | 6.9  | 21 0945 | 6.9  |      |      |      |        |  |  |
| F 1405          | 1.6 | SA 1442 | 2.4 | M 1537                                   | 1.6 | TU 1537 | 2.2 | W 1604  | 1.2 | TH 1529 | 1.7 | SA 1707 | 2.1  | SU 1604 | 2.1  |      |      |      |        |  |  |
| 1957            | 7.3 | 2042    | 6.7 | 2151                                     | 7.2 | 2151    | 6.8 | 2227    | 7.7 | 2151    | 7.2 | 2354    | 7.1  | 2233    | 7.0  |      |      |      |        |  |  |
| 7 0204          | 0.7 | 22 0234 | 1.7 | 7 0343                                   | 1.2 | 22 0340 | 2.1 | 7 0422  | 1.8 | 22 0345 | 2.3 | 7 0611  | 3.6  | 22 0457 | 3.5  |      |      |      |        |  |  |
| 0 0831          | 8.4 | 22 0911 | 7.6 | 7 1017                                   | 8.1 | 22 1006 | 7.4 | 7 1038  | 7.8 | 22 0956 | 7.3 | 7 1155  | 6.2  | 22 1052 | 6.3  |      |      |      |        |  |  |
| SA 1450         | 1.9 | SU 1524 | 2.6 | TU 1636                                  | 1.8 | W 1620  | 2.3 | TH 1657 | 1.5 | F 1607  | 2.0 | SU 1821 | 2.6  | M 1715  | 2.6  |      |      |      |        |  |  |
| 2047            | 7.1 | 2129    | 6.5 | 2252                                     | 7.1 | 2241    | 6.6 | 2326    | 7.4 | 2236    | 7.0 |         |      |         |      |      |      |      |        |  |  |
| 8 0252          | 1.0 | 23 0319 | 2.1 | 8 0446                                   | 1.8 | 23 0430 | 2.6 | 8 0528  | 2.5 | 23 0436 | 2.9 | 8 0126  | 6.9  | 23 0014 | 6.7  |      |      |      |        |  |  |
| 0 0924          | 8.0 | 23 0956 | 7.2 | 8 1116                                   | 7.7 | 23 1052 | 7.0 | 8 1135  | 7.1 | 23 1043 | 6.8 | 8 0753  | 3.7  | 23 0652 | 3.7  |      |      |      |        |  |  |
| SU 1545         | 2.2 | M 1614  | 2.8 | W 1739                                   | 1.9 | TH 1713 | 2.4 | F 1759  | 1.9 | SA 1657 | 2.3 | M 1331  | 6.0  | TU 1245 | 6.0  |      |      |      |        |  |  |
| 2148            | 6.7 | 2225    | 6.3 |  |     | 2342    | 6.6 |         |     | 2339    | 6.8 | 1950    | 2.6  | 1902    | 2.7  |      |      |      |        |  |  |
| 9 0348          | 1.5 | 24 0412 | 2.5 | 9 0003                                   | 7.0 | 24 0537 | 3.0 | 9 0039  | 7.2 | 24 0551 | 3.4 | 9 0301  | 7.2  | 24 0203 | 7.0  |      |      |      |        |  |  |
| 1 1030          | 7.6 | 24 1049 | 6.9 | 9 0602                                   | 2.3 | 24 1152 | 6.7 | 9 0649  | 3.0 | 24 1150 | 6.4 | 9 0915  | 3.2  | 24 0832 | 3.3  |      |      |      |        |  |  |
| M 1656          | 2.5 | TU 1718 | 3.0 | TH 1224                                  | 7.3 | F 1815  | 2.5 | SA 1244 | 6.7 | SU 1812 | 2.5 | TU 1456 | 6.3  | W 1424  | 6.4  |      |      |      |        |  |  |
| 2305            | 6.5 | 2329    | 6.1 | 1849                                     | 1.8 |         |     | 1910    | 2.0 |         |     | 2104    | 2.3  | 2030    | 2.1  |      |      |      |        |  |  |
| 10 0505         | 2.0 | 25 0523 | 2.9 | 10 0118                                  | 7.3 | 25 0052 | 6.7 | 10 0158 | 7.3 | 25 0105 | 6.8 | 10 0402 | 7.7  | 25 0317 | 7.8  |      |      |      |        |  |  |
| 1 1150          | 7.3 | 25 1157 | 6.7 | 10 0723                                  | 2.4 | 25 0700 | 3.2 | 10 0811 | 3.0 | 25 0731 | 3.5 | 10 1010 | 2.6  | 25 0938 | 2.4  |      |      |      |        |  |  |
| TU 1819         | 2.4 | W 1831  | 2.8 | F 1332                                   | 7.2 | SA 1301 | 6.5 | SU 1400 | 6.5 | M 1321  | 6.2 | W 1557  | 6.8  | TH 1530 | 7.1  |      |      |      |        |  |  |
|                 |     |         |     | 1955                                     | 1.5 | 1923    | 2.3 | 2019    | 1.9 | 1937    | 2.4 | 2158    | 1.7  | 2133    | 1.2  |      |      |      |        |  |  |
| 11 0034         | 6.6 | 26 0046 | 6.2 | 11 0230                                  | 7.7 | 26 0200 | 7.0 | 11 0310 | 7.7 | 26 0227 | 7.2 | 11 0445 | 8.2  | 26 0411 | 8.6  |      |      |      |        |  |  |
| 0 0634          | 2.2 | 26 0649 | 3.0 | 11 0835                                  | 2.2 | 26 0816 | 3.0 | 11 0923 | 2.7 | 26 0851 | 3.1 | 11 1050 | 2.1  | 26 1026 | 1.5  |      |      |      |        |  |  |
| W 1310          | 7.4 | TH 1305 | 6.6 | SA 1436                                  | 7.2 | SU 1408 | 6.6 | M 1509  | 6.7 | TU 1438 | 6.5 | TH 1642 | 7.3  | F 1623  | 7.9  |      |      |      |        |  |  |
| 1937            | 2.0 | 1937    | 2.5 | 2053                                     | 1.2 | 2024    | 2.0 | 2120    | 1.6 | 2049    | 1.9 | 2241    | 1.3  | 2224    | 0.4  |      |      |      |        |  |  |
| 12 0154         | 7.1 | 27 0155 | 6.7 | 12 0330                                  | 8.2 | 27 0300 | 7.5 | 12 0408 | 8.1 | 27 0331 | 7.8 | 12 0520 | 8.5  | 27 0458 | 9.2  |      |      |      |        |  |  |
| 0 0756          | 1.9 | 27 0803 | 2.7 | 12 0936                                  | 2.0 | 27 0917 | 2.6 | 12 1015 | 2.4 | 27 0952 | 2.4 | 12 1127 | 1.7  | 27 1108 | 0.8  |      |      |      |        |  |  |
| TH 1419         | 7.6 | F 1408  | 6.8 | SU 1530                                  | 7.3 | M 1504  | 6.9 | TU 1605 | 6.9 | W 1541  | 7.0 | F 1722  | 7.6  | SA 1708 | 8.5  |      |      |      |        |  |  |
| 2038            | 1.3 | 2032    | 2.0 | 2141                                     | 0.9 | 2115    | 1.6 | 2210    | 1.4 | 2146    | 1.2 | 2320    | 1.0  | O 2311  | -0.1 |      |      |      |        |  |  |
| 13 0301         | 7.8 | 28 0253 | 7.3 | 13 0419                                  | 8.5 | 28 0349 | 8.0 | 13 0455 | 8.3 | 28 0426 | 8.5 | 13 0552 | 8.6  | 28 0537 | 9.6  |      |      |      |        |  |  |
| 0 0901          | 1.5 | 28 0901 | 2.3 | 13 1026                                  | 1.8 | 28 1008 | 2.2 | 13 1101 | 2.1 | 28 1042 | 1.8 | 13 1159 | 1.4  | 28 1147 | 0.3  |      |      |      |        |  |  |
| F 1515          | 7.9 | SA 1459 | 7.1 | M 1618                                   | 7.4 | TU 1554 | 7.2 | W 1651  | 7.1 | TH 1632 | 7.5 | SA 1758 | 7.8  | SU 1753 | 8.9  |      |      |      |        |  |  |
| 2128            | 0.7 | 2115    | 1.6 | 2226                                     | 0.8 | 2205    | 1.2 | 2255    | 1.2 | 2237    | 0.6 | 2355    | 0.8  | 2354    | -0.3 |      |      |      |        |  |  |
| 14 0355         | 8.5 | 29 0338 | 7.8 | 14 0503                                  | 8.7 | 29 0434 | 8.4 | 14 0535 | 8.5 | 29 0513 | 9.0 | 14 0622 | 8.7  | 29 0618 | 9.6  |      |      |      |        |  |  |
| 0 0954          | 1.1 | 29 0949 | 2.0 | 14 1111                                  | 1.7 | 29 1053 | 1.8 | 14 1143 | 1.9 | 29 1124 | 1.3 | 14 1231 | 1.2  | 29 1225 | 0.0  |      |      |      |        |  |  |
| SA 1600         | 8.1 | SU 1541 | 7.3 | TU 1700                                  | 7.4 | W 1642  | 7.4 | TH 1733 | 7.3 | F 1722  | 7.9 | SU 1833 | 7.9  | M 1838  | 9.1  |      |      |      |        |  |  |
| 2210            | 0.3 | 2154    | 1.2 | 2308                                     | 0.8 | O 2250  | 0.8 | 2335    | 1.0 | O 2324  | 0.2 |         |      |         |      |      |      |      |        |  |  |
| 15 0437         | 8.9 | 30 0418 | 8.2 | 15 0545                                  | 8.7 | 30 0524 | 8.7 | 15 0613 | 8.5 | 30 0559 | 9.3 | 15 0630 | 0.8  | 30 0307 | -0.2 |      |      |      |        |  |  |
| 1 1042          | 1.0 | 30 1031 | 1.7 | 15 1154                                  | 1.8 | 30 1138 | 1.6 | 15 1220 | 1.8 | 30 1208 | 0.9 | 15 0651 | 8.6  | 30 0656 | 9.5  |      |      |      |        |  |  |
| SU 1639         | 8.0 | M 1621  | 7.5 | W 1744                                   | 7.3 | TH 1730 | 7.6 | F 1815  | 7.4 | SA 1810 | 8.2 | M 1259  | 1.1  | TU 1303 | -0.1 |      |      |      |        |  |  |
| • 2250          | 0.2 | 2231    | 0.9 | 2348                                     | 0.9 | 2335    | 0.5 |         |     |         |     | 1907    | 8.0  | 1920    | 9.2  |      |      |      |        |  |  |
| 31 0455         | 8.5 |         |     |  |     |         |     |         |     |         |     |         |      |         |      |      |      |      |        |  |  |

# JAPAN - TOMOGASIMA SUIDO

LAT 34°16'N LONG 135°00'E.

TIDAL STREAM PREDICTIONS (RATES IN KNOTS)

TIME ZONE -0900

POSITIVE (+) DIRECTION 355 NEGATIVE (-) DIRECTION 175

YEAR 0000

| JULY |                 |         |                |      |    | AUGUST         |         |                |      |    |                | SEPTEMBER      |                |                |  |  |  |  |
|------|-----------------|---------|----------------|------|----|----------------|---------|----------------|------|----|----------------|----------------|----------------|----------------|--|--|--|--|
|      | SLACK           | MAXIMUM | TIME           | RATE |    | SLACK          | MAXIMUM | TIME           | RATE |    | SLACK          | MAXIMUM        | TIME           | RATE           |  |  |  |  |
| 1    | 0022 0231 -1.6  | 16      | 0026 0237 -1.7 |      | 1  | 0048 0308 -1.9 | 16      | 0034 0306 -2.1 |      | 1  | 0034 0336 -2.4 | 16             | 0010 0335 -2.6 |                |  |  |  |  |
|      | 0544 0712 0.3   |         | 0537 0739 0.5  |      | 1  | 0557 0851 1.2  | 16      | 0552 0906 1.7  |      | 1  | 0633 1013 2.3  | 16             | 0637 1031 2.6  |                |  |  |  |  |
| F    | 0856 1347 -3.2  | SA      | 0951 1402 -3.2 |      | M  | 1134 1458 -2.9 | TU      | 1207 1512 -2.7 |      | TH | 1337 1614 -1.9 | F              | 1409 1633 -1.6 |                |  |  |  |  |
|      | 1652 2105 3.4   |         | 1707 2112 3.2  |      |    | 1803 2148 2.6  |         | 1816 2143 2.1  |      |    | 1916 2215 1.3  |                | 1937 2213 0.8  |                |  |  |  |  |
| 2    | 0058 0307 -1.6  | 17      | 0056 0309 -1.7 |      | 2  | 0112 0341 -2.0 | 17      | 0055 0338 -2.2 |      | 2  | 0056 0414 -2.5 | 17             | 0035 0416 -2.6 |                |  |  |  |  |
|      | 0613 0803 0.4   |         | 0605 0831 0.8  |      | 2  | 0634 0945 1.5  | 17      | 0632 0959 1.9  |      | 2  | 0723 1114 2.5  | 17             | 0731 1133 2.7  |                |  |  |  |  |
| SA   | 1003 1427 -3.1  | SU      | 1053 1443 -3.1 |      | TU | 1234 1542 -2.6 | W       | 1307 1557 -2.3 |      | F  | 1445 1710 -1.5 | SA             | 1519 1736 -1.2 |                |  |  |  |  |
|      | 1735 2143 3.3   |         | 1750 2148 3.0  |      |    | 1847 2223 2.2  |         | 1901 2219 1.8  |      |    | 2016 2304 0.9  |                | 2052 2313 0.5  |                |  |  |  |  |
| 3    | 0130 0343 -1.6  | 18      | 0124 0343 -1.8 |      | 3  | 0137 0418 -2.1 | 18      | 0118 0415 -2.3 |      | 3  | 0124 0459 -2.4 | 18             | 0107 0505 -2.5 |                |  |  |  |  |
|      | 0648 0906 0.6   |         | 0639 0928 1.0  |      | 3  | 0720 1043 1.7  | 18      | 0720 1057 2.1  |      | 3  | 0823 1218 2.6  | 18             | 0835 1237 2.8  |                |  |  |  |  |
| SU   | 1114 1510 -2.9  | M       | 1158 1526 -2.8 |      | W  | 1339 1631 -2.1 | TH      | 1411 1649 -1.8 |      | SA | 1603 1824 -1.1 | SU             | 1637 1903 -1.0 |                |  |  |  |  |
|      | 1820 2222 3.0   |         | 1834 2224 2.7  |      |    | 1937 2304 1.9  |         | 1953 2302 1.4  |      |    | 2140           |                | 2235           |                |  |  |  |  |
| 4    | 0201 0421 -1.7  | 19      | 0151 0420 -1.9 |      | 4  | 0202 0458 -2.2 | 19      | 0144 0457 -2.4 |      | 4  | 0003 0.6       | 19             | 0022 0.4       |                |  |  |  |  |
|      | 0730 1012 0.8   |         | 0723 1029 1.3  |      | 4  | 0813 1144 2.0  | 19      | 0816 1200 2.3  |      | 4  | 0200 0554 -2.3 | 19             | 0153 0608 -2.3 |                |  |  |  |  |
| M    | 1226 1558 -2.6  | TU      | 1305 1615 -2.4 |      | TH | 1451 1730 -1.7 | F       | 1526 1753 -1.3 |      | SU | 0932 1322 2.7  | M              | 0947 1342 2.8  |                |  |  |  |  |
|      | 1908 2304 2.7   |         | 1922 2305 2.3  |      |    | 2037 2350 1.5  |         | 2101 2353 1.0  |      |    | 1732 2007 -1.0 |                | 1759 2043 -1.1 |                |  |  |  |  |
| 5    | 0232 0503 -1.8  | 20      | 0219 0501 -2.0 |      | 5  | 0232 0546 -2.2 | 20      | 0214 0548 -2.3 |      | 5  | 0107 0.5       | 20             | 0133 0.4       |                |  |  |  |  |
|      | 0820 1117 1.2   |         | 0814 1130 1.6  |      | 5  | 0914 1247 2.3  | 20      | 0921 1304 2.5  |      | 5  | 0246 0708 -2.3 | 20             | 0259 0733 -2.2 |                |  |  |  |  |
| TU   | 1340 1652 -2.2  | W       | 1417 1710 -2.0 |      | F  | 1614 1848 -1.2 | SA      | 1654 1923 -1.0 |      | M  | 1043 1429 2.9  | TU             | 1100 1446 2.9  |                |  |  |  |  |
|      | 2004 2348 2.4   |         | 2019 2349 2.0  |      |    | 2152           |         | 2230           |      |    | 1854 2134 -1.2 |                | 1907 2151 -1.4 |                |  |  |  |  |
| 6    | 0304 0550 -1.9  | 21      | 0249 0548 -2.1 |      | 6  | 0305 0640 1.1  | 21      | 0051 0.7       |      | 6  | 0038 0214 0.4  | 21             | 0058 0240 0.5  |                |  |  |  |  |
|      | 0914 1219 1.5   |         | 0912 1232 1.9  |      | 6  | 0645 -2.3      | 21      | 0251 0652 -2.3 |      | 6  | 0349 0835 -2.3 | 21             | 0425 0900 -2.3 |                |  |  |  |  |
| W    | 1500 1756 -1.8  | TH      | 1537 1820 -1.5 |      | SA | 1018 1351 2.5  | SU      | 1028 1409 2.7  |      | TU | 1151 1534 3.0  | W              | 1207 1548 3.0  |                |  |  |  |  |
|      | 2107            |         | 2126           |      |    | 1750 2027 -1.1 |         | 1828 2105 -1.0 |      |    | 1957 2232 -1.5 |                | 2001 2239 -1.7 |                |  |  |  |  |
| 7    | 0035 2.0        | 22      | 0037 1.6       |      | 7  | 0136 0.8       | 22      | 0151 0.5       |      | 7  | 0136 0319 0.5  | 22             | 0140 0344 0.8  |                |  |  |  |  |
|      | 0337 0644 -2.0  |         | 0321 0642 -2.2 |      | 7  | 0342 0755 -2.4 | 22      | 0337 0811 -2.4 |      | 7  | 0509 0947 -2.6 | 22             | 0558 1007 -2.6 |                |  |  |  |  |
| TH   | 1010 1320 1.9   | F       | 1012 1334 2.2  |      | SU | 1121 1456 2.8  | M       | 1134 1516 2.9  |      | W  | 1251 1636 3.1  | TH             | 1307 1645 3.0  |                |  |  |  |  |
|      | 1627 1919 -1.4  |         | 1708 1951 -1.2 |      |    | 1920 2152 -1.2 |         | 1945 2217 -1.3 |      |    | 2047 2318 -1.7 |                | 2044 2320 -1.9 |                |  |  |  |  |
| 8    | 0122 1.7        | 23      | 0127 1.2       |      | 8  | 0041 0233 0.6  | 23      | 0116 0253 0.5  |      | 8  | 0218 0421 -0.7 | 23             | 0215 0441 1.1  |                |  |  |  |  |
|      | 0412 0744 -2.2  |         | 0355 0747 -2.3 |      | 8  | 0425 0907 -2.5 | 23      | 0436 0926 -2.6 |      | 8  | 0635 1045 -2.8 | 23             | 0719 1102 -2.8 |                |  |  |  |  |
| F    | 1106 1421 2.3   | SA      | 1111 1437 2.6  |      | M  | 1220 1602 3.0  | TU      | 1235 1621 3.1  |      | TH | 1346 1732 3.2  | F              | 1401 1737 2.9  |                |  |  |  |  |
|      | 1803 2051 -1.3  |         | 1844 2122 -1.2 |      |    | 2028 2254 -1.4 |         | 2042 2309 -1.5 |      |    | 2128 2356 -1.9 |                | 2121 2355 -2.1 |                |  |  |  |  |
| 9    | 0212 1.3        | 24      | 0006 0220 0.9  |      | 9  | 0152 0331 0.5  | 24      | 0213 0355 0.5  |      | 9  | 0252 0516 1.0  | 24             | 0246 0532 1.5  |                |  |  |  |  |
|      | 0448 0846 -2.4  |         | 0433 0853 -2.5 |      | 9  | 0519 1009 -2.8 | 24      | 0549 1027 -2.8 |      | 9  | 0748 1135 -3.0 | 24             | 0825 1150 -3.0 |                |  |  |  |  |
| SA   | 1158 1522 2.6   | SU      | 1207 1541 2.9  |      | TU | 1314 1706 3.3  | W       | 1330 1722 3.3  |      | F  | 1436 1820 3.1  | SA             | 1450 1821 2.7  |                |  |  |  |  |
|      | 1932 2207 -1.4  |         | 2005 2233 -1.3 |      |    | 2122 2344 -1.6 |         | 2128 2352 -1.8 |      |    | 2203           |                | 2152           |                |  |  |  |  |
| 10   | 0051 0303 0.9   | 25      | 0122 0313 0.6  |      | 10 | 0249 0429 0.4  | 25      | 0255 0454 0.6  |      | 10 | 0030 -2.1      | 25             | 0028 -2.3      |                |  |  |  |  |
|      | 0523 0942 -2.7  |         | 0513 0953 -2.7 |      | 10 | 0622 1102 -3.0 | 25      | 0705 1119 -3.0 |      | 10 | 0321 0604 1.3  | 25             | 0314 0617 1.8  |                |  |  |  |  |
| SU   | 1249 1625 3.0   | M       | 1300 1646 3.2  |      | W  | 1405 1804 3.4  | TH      | 1421 1814 3.3  |      | SA | 0850 1219 -3.1 | SU             | 0922 1233 -3.0 |                |  |  |  |  |
|      | 2043 2309 -1.5  |         | 2107 2329 -1.5 |      |    | 2207           |         | 2208           |      |    | 1521 1901 2.8  | O              | 1535 1857 2.4  |                |  |  |  |  |
| 11   | 0200 0352 0.7   | 26      | 0229 0407 0.5  |      | 11 | 0026 -1.7      | 26      | 0030 -1.9      |      | 11 | 0101 -2.2      | 26             | 0058 -2.4      |                |  |  |  |  |
|      | 0558 1033 -2.9  |         | 0557 1046 -3.0 |      | 11 | 0331 0524 0.5  | 26      | 0327 0547 0.9  |      | 11 | 0346 0645 1.6  | 26             | 0341 0656 2.1  |                |  |  |  |  |
| M    | 1337 1726 3.3   | TU      | 1350 1747 3.4  |      | TH | 0728 1149 -3.2 | F       | 0812 1204 -3.2 |      | SU | 0943 1300 -3.1 | M              | 1013 1313 -2.9 |                |  |  |  |  |
|      | 2141            |         | 2158           |      |    | 1452 1852 3.4  |         | 1507 1859 3.2  |      |    | 1603 1935 2.5  |                | 1616 1928 2.0  |                |  |  |  |  |
| 12   | 0001 -1.6       | 27      | 0016 -1.7      |      | 12 | 0103 -1.8      | 27      | 0104 -2.0      |      | 12 | 0130 -2.2      | 27             | 0127 -2.5      |                |  |  |  |  |
|      | 0304 0441 0.4   |         | 0324 0500 0.4  |      | 12 | 0402 0613 0.7  | 27      | 0353 0632 1.1  |      | 12 | 0412 0723 1.9  | 27             | 0409 0735 2.4  |                |  |  |  |  |
| TU   | 0634 1119 -3.1  | W       | 0649 1133 -3.1 |      | F  | 0830 1231 -3.3 | SA      | 0909 1246 -3.2 |      | M  | 1034 1339 -3.0 | TU             | 1103 1353 -2.7 |                |  |  |  |  |
|      | 1422 1823 3.5   |         | 1437 1840 3.5  |      |    | 1535 1935 3.3  | O       | 1550 1937 3.0  |      |    | 1642 2003 2.2  |                | 1655 1952 1.6  |                |  |  |  |  |
|      | 2231            |         | 2242           |      |    | 2319           |         | 2311           |      |    | 2318           |                | 2255           |                |  |  |  |  |
| 13   | 0046 -1.7       | 28      | 0057 -1.7      |      | 13 | 0136 -1.9      | 28      | 0134 -2.0      |      | 13 | 0159 -2.3      | 28             | 0155 -2.6      |                |  |  |  |  |
|      | 0358 0527 0.3   |         | 0407 0550 0.4  |      | 13 | 0427 0655 0.9  | 28      | 0419 0711 1.4  |      | 13 | 0441 0802 2.2  | 28             | 0441 0815 2.6  |                |  |  |  |  |
| W    | 0710 1202 -3.2  | TH      | 0745 1216 -3.3 |      | SA | 0926 1311 -3.3 | SU      | 1002 1325 -3.2 |      | TU | 1122 1419 -2.7 | W              | 1152 1433 -2.4 |                |  |  |  |  |
|      | ● 1505 1914 3.6 |         | 1520 1927 3.5  |      |    | 1616 2011 3.1  |         | 1630 2009 2.7  |      |    | 1721 2028 1.8  |                | 1734 2016 1.3  |                |  |  |  |  |
|      | 2314            |         | 2320           |      |    | 2348           |         | 2336           |      |    | 2335           |                | 2308           |                |  |  |  |  |
| 14   | 0126 -1.7       | 29      | 0134 -1.7      |      | 14 | 0206 -1.9      | 29      | 0203 -2.1      |      | 14 | 0228 -2.5      | 29             | 0226 -2.7      |                |  |  |  |  |
|      | 0441 0611 0.3   |         | 0437 0635 0.5  |      | 14 | 0452 0736 1.2  | 29      | 0445 0750 1.7  |      | 14 | 0514 0845 2.4  | 29             | 0517 0900 2.8  |                |  |  |  |  |
| TH   | 0755 1242 -3.3  | F       | 0842 1257 -3.3 |      | SU | 1020 1351 -3.2 | M       | 1052 1405 -3.0 |      |    | W              | 1214 1459 -2.4 | TH             | 1243 1515 -2.1 |  |  |  |  |
|      | 1546 1957 3.6   |         | 1602 2007 3.4  |      |    | 1655 2042 2.8  |         | 1708 2037 2.3  |      |    | 1800 2054 1.4  |                | 1815 2043 1.0  |                |  |  |  |  |
|      | 2352            |         | 2353           |      |    | 2356           |         | 2352           |      |    | 2352           |                | 2323           |                |  |  |  |  |
| 15   | 0203 -1.7       | 30      | 0207 -1.8      |      | 15 | 0012 0236 -2.0 | 30      | 0232 -2.2      |      | 15 | 0300 -2.6      | 30             | 0259 -2.7      |                |  |  |  |  |
|      | 0511 0653 0.4   |         | 0501 0718 0.7  |      | 15 | 0519 0818 1.4  | 30      | 0515 0832 1.9  |      | 15 | 0552 0934 2.5  | 30             | 0557 0952 2.8  |                |  |  |  |  |
| F    | 0851 1322 -3.3  | SA      | 0939 1337 -3.3 |      | M  | 1112 1431 -3.0 | TU      | 1144 1445 -2.7 |      | TH | 1308 1543 -2.0 | F              | 1339 1601 -1.7 |                |  |  |  |  |
|      | 1627 2037 3.4   |         | 1642 2042 3.2  |      |    | 1735 2112 2.5  |         | 1747 2105 2.0  |      |    | 1843 2128 1.1  |                | 1903 2122 0.7  |                |  |  |  |  |
|      | 1627            |         | 1642           |      |    | 1722           |         | 1722           |      |    | 2              |                |                |                |  |  |  |  |

**NEWFOUNDLAND – ST. JOHN'S HARBOUR**

LAT 47°34'N LONG 52°41'W

TIME ZONE +0330

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

YEAR 0000

**JANUARY**

**FEBRUARY**

**MARCH**

**APRIL**

|           | Time | m    | Time      | m    | Time   | m         | Time | m   | Time      | m      | Time | m         | Time | m    | Time      | m    |     |
|-----------|------|------|-----------|------|--------|-----------|------|-----|-----------|--------|------|-----------|------|------|-----------|------|-----|
| <b>1</b>  | 0510 | 0.6  | <b>16</b> | 0020 | 1.2    | <b>1</b>  | 0005 | 1.1 | <b>16</b> | 0110   | 1.1  | <b>1</b>  | 0525 | 0.4  | <b>16</b> | 0635 | 0.5 |
|           | 1115 | 1.2  |           | 0645 | 0.5    |           | 0640 | 0.6 |           | 0820   | 0.6  |           | 1105 | 1.1  |           | 1205 | 0.9 |
| M         | 1800 | 0.6  | TU        | 1235 | 1.2    | TH        | 1215 | 1.1 | F         | 1405   | 0.9  | TH        | 1705 | 0.5  | F         | 1825 | 0.6 |
|           | 1925 | 0.5  |           | 1845 | 0.6    |           | 2015 | 0.6 |           | 2330   | 1.2  |           |      |      |           |      |     |
| <b>2</b>  | 0005 | 1.0  | <b>17</b> | 0110 | 1.1    | <b>2</b>  | 0100 | 1.1 | <b>17</b> | 0215   | 1.1  | <b>2</b>  | 0620 | 0.5  | <b>17</b> | 0015 | 1.1 |
|           | 0610 | 0.6  |           | 0750 | 0.6    |           | 0755 | 0.6 |           | 0955   | 0.6  |           | 1145 | 1.0  |           | 0740 | 0.6 |
| TU        | 1200 | 1.1  | W         | 1340 | 1.0    | F         | 1315 | 1.0 | SA        | 1600   | 0.9  | F         | 1750 | 0.5  | M         | 1410 | 0.8 |
|           | 1855 | 0.6  |           | 2015 | 0.6    |           | 1940 | 0.6 |           | 2125   | 0.6  |           | 1920 | 0.6  |           | 2125 | 0.6 |
| <b>3</b>  | 0100 | 1.0  | <b>18</b> | 0210 | 1.1    | <b>3</b>  | 0210 | 1.1 | <b>18</b> | 0355   | 1.1  | <b>3</b>  | 0015 | 1.1  | <b>18</b> | 0115 | 1.0 |
|           | 0720 | 0.7  |           | 0900 | 0.6    |           | 0915 | 0.6 |           | 1120   | 0.6  |           | 0730 | 0.5  |           | 0915 | 0.6 |
| W         | 1255 | 1.1  | TH        | 1505 | 1.0    | SA        | 1445 | 1.0 | SU        | 1720   | 0.9  | SA        | 1245 | 0.9  | TU        | 1600 | 0.9 |
|           | 1945 | 0.6  |           | 2110 | 0.6    |           | 2050 | 0.6 |           | 2235   | 0.6  |           | 1855 | 0.6  |           | 2140 | 0.5 |
| <b>4</b>  | 0205 | 1.1  | <b>19</b> | 0320 | 1.1    | <b>4</b>  | 0335 | 1.2 | <b>19</b> | 0515   | 1.1  | <b>4</b>  | 0120 | 1.1  | <b>19</b> | 0300 | 1.0 |
|           | 0835 | 0.7  |           | 1025 | 0.6    |           | 1035 | 0.5 |           | 1220   | 0.5  |           | 0850 | 0.6  |           | 1055 | 0.6 |
| TH        | 1415 | 1.0  | F         | 1630 | 1.0    | SU        | 1620 | 1.0 | M         | 1810   | 1.0  | SU        | 1415 | 0.9  | M         | 1700 | 0.8 |
|           | 2040 | 0.6  |           | 2205 | 0.6    |           | 2205 | 0.6 |           | 2340   | 0.6  |           | 2015 | 0.6  |           | 2210 | 0.6 |
| <b>5</b>  | 0315 | 1.1  | <b>20</b> | 0430 | 1.2    | <b>5</b>  | 0455 | 1.3 | <b>20</b> | 0610   | 1.2  | <b>5</b>  | 0300 | 1.1  | <b>20</b> | 0450 | 1.0 |
|           | 0950 | 0.6  |           | 1135 | 0.6    |           | 1140 | 0.4 |           | 1255   | 0.5  |           | 1015 | 0.5  |           | 1150 | 0.5 |
| F         | 1535 | 1.0  | SA        | 1730 | 1.0    | M         | 1730 | 1.0 | TU        | 1850   | 1.0  | M         | 1605 | 0.9  | TU        | 1750 | 0.9 |
|           | 2135 | 0.6  |           | 2305 | 0.6    |           | 2315 | 0.5 |           |        |      |           | 2145 | 0.6  |           | 2320 | 0.6 |
| <b>6</b>  | 0420 | 1.2  | <b>21</b> | 0530 | 1.2    | <b>6</b>  | 0555 | 1.4 | <b>21</b> | 0030   | 0.5  | <b>6</b>  | 0440 | 1.2  | <b>21</b> | 0545 | 1.1 |
|           | 1100 | 0.5  |           | 1230 | 0.5    |           | 1235 | 0.3 |           | 0650   | 1.3  |           | 1125 | 0.4  |           | 1230 | 0.4 |
| SA        | 1645 | 1.1  | SU        | 1820 | 1.0    | TU        | 1830 | 1.1 | W         | 1330   | 0.4  | TU        | 1720 | 1.0  | W         | 1825 | 1.0 |
|           | 2235 | 0.5  |           | 2355 | 0.5    |           |      |     |           | 1925   | 1.1  |           | 2310 | 0.5  |           | 1850 | 1.1 |
| <b>7</b>  | 0515 | 1.3  | <b>22</b> | 0620 | 1.3    | <b>7</b>  | 0020 | 0.4 | <b>22</b> | 0110   | 0.4  | <b>7</b>  | 0550 | 1.3  | <b>22</b> | 0015 | 0.2 |
|           | 1200 | 0.4  |           | 1310 | 0.5    |           | 0655 | 1.5 |           | 0725   | 1.3  |           | 1220 | 0.3  |           | 0625 | 1.3 |
| SU        | 1740 | 1.1  | M         | 1900 | 1.1    | W         | 1325 | 0.2 | TH        | 1355   | 0.4  | W         | 1820 | 1.1  | SA        | 1325 | 0.1 |
|           | 2330 | 0.5  |           |      |        | 1920      | 1.2  |     | 2000      | 1.1    |      |           |      | O    | 1930      | 1.3  |     |
| <b>8</b>  | 0610 | 1.4  | <b>23</b> | 0040 | 0.5    | <b>8</b>  | 0120 | 0.3 | <b>23</b> | 0145   | 0.4  | <b>8</b>  | 0015 | 0.4  | <b>23</b> | 0140 | 0.2 |
|           | 1250 | 0.3  |           | 0700 | 1.4    |           | 0745 | 1.5 |           | 0755   | 1.4  |           | 0645 | 1.4  |           | 0800 | 1.3 |
| M         | 1835 | 1.2  | TU        | 1345 | 0.4    | TH        | 1415 | 0.2 | F         | 1420   | 0.3  | TH        | 1310 | 0.2  | SU        | 1405 | 0.1 |
|           |      |      |           | 1940 | 1.1    | O         | 2010 | 1.3 |           | ● 2030 | 1.1  |           | 1910 | 1.2  | M         | 1330 | 0.2 |
| <b>9</b>  | 0025 | 0.4  | <b>24</b> | 0120 | 0.5    | <b>9</b>  | 0210 | 0.3 | <b>24</b> | 0220   | 0.3  | <b>9</b>  | 0115 | 0.3  | <b>24</b> | 0130 | 0.2 |
|           | 0700 | 1.5  |           | 0740 | 1.4    |           | 0830 | 1.6 |           | 0825   | 1.4  |           | 0730 | 1.5  |           | 0840 | 1.3 |
| TU        | 1340 | 0.3  | W         | 1420 | 0.4    | F         | 1500 | 0.2 | SA        | 1445   | 0.3  | F         | 1355 | 0.1  | M         | 1445 | 0.2 |
|           | O    | 1930 | 1.2       |      | ● 2015 | 1.1       | 2100 | 1.3 |           | 2055   | 1.2  | O         | 1955 | 1.3  | TU        | 1400 | 0.2 |
| <b>10</b> | 0120 | 0.4  | <b>25</b> | 0155 | 0.4    | <b>10</b> | 0300 | 0.2 | <b>25</b> | 0255   | 0.3  | <b>10</b> | 0205 | 0.2  | <b>25</b> | 0205 | 0.1 |
|           | 0750 | 1.6  |           | 0810 | 1.4    |           | 0915 | 1.5 |           | 0855   | 1.3  |           | 0815 | 1.5  |           | 0800 | 1.3 |
| W         | 1425 | 0.2  | TH        | 1445 | 0.4    | SA        | 1545 | 0.2 | SU        | 1510   | 0.3  | SA        | 1435 | 0.1  | SU        | 1520 | 0.2 |
|           | 2020 | 1.3  |           | 2050 | 1.1    |           | 2145 | 1.3 |           | 2125   | 1.2  |           | 2040 | 1.3  |           | 2125 | 1.3 |
| <b>11</b> | 0215 | 0.3  | <b>26</b> | 0230 | 0.4    | <b>11</b> | 0350 | 0.3 | <b>26</b> | 0325   | 0.3  | <b>11</b> | 0250 | 0.1  | <b>26</b> | 0355 | 0.1 |
|           | 0840 | 1.6  |           | 0845 | 1.4    |           | 1000 | 1.5 |           | 0925   | 1.3  |           | 0900 | 1.4  |           | 0830 | 1.3 |
| TH        | 1515 | 0.2  | F         | 1515 | 0.4    | SU        | 1625 | 0.2 | M         | 1535   | 0.3  | SU        | 1515 | 0.1  | W         | 1550 | 0.3 |
|           | 2110 | 1.3  |           | 2120 | 1.1    |           | 2225 | 1.3 |           | 2155   | 1.2  |           | 2120 | 1.4  |           | 2200 | 1.3 |
| <b>12</b> | 0305 | 0.3  | <b>27</b> | 0305 | 0.4    | <b>12</b> | 0435 | 0.3 | <b>27</b> | 0400   | 0.3  | <b>12</b> | 0335 | 0.2  | <b>27</b> | 0415 | 0.2 |
|           | 0925 | 1.6  |           | 0915 | 1.4    |           | 1040 | 1.4 |           | 0955   | 1.3  |           | 0940 | 1.4  |           | 1030 | 1.1 |
| F         | 1605 | 0.2  | SA        | 1540 | 0.4    | M         | 1710 | 0.3 | TU        | 1605   | 0.4  | M         | 1555 | 0.2  | TH        | 1625 | 0.4 |
|           | 2200 | 1.3  |           | 2150 | 1.1    |           | 2305 | 1.3 |           | 2225   | 1.2  |           | 2155 | 1.3  |           | 2230 | 1.2 |
| <b>13</b> | 0400 | 0.4  | <b>28</b> | 0340 | 0.4    | <b>13</b> | 0525 | 0.4 | <b>28</b> | 0440   | 0.4  | <b>13</b> | 0420 | 0.2  | <b>28</b> | 0505 | 0.2 |
|           | 1015 | 1.5  |           | 0945 | 1.4    |           | 1120 | 1.2 |           | 1030   | 1.2  |           | 1020 | 1.3  |           | 1100 | 1.0 |
| SA        | 1655 | 0.3  | SU        | 1610 | 0.4    | TU        | 1750 | 0.4 | W         | 1635   | 0.4  | TU        | 1630 | 0.3  | F         | 1655 | 0.4 |
|           | 2250 | 1.2  |           | 2220 | 1.1    |           | 2345 | 1.2 |           | 2255   | 1.2  |           | 2230 | 1.3  |           | 2300 | 1.2 |
| <b>14</b> | 0450 | 0.4  | <b>29</b> | 0415 | 0.5    | <b>14</b> | 0615 | 0.5 |           |        |      | <b>14</b> | 0500 | 0.3  | <b>29</b> | 0600 | 0.3 |
|           | 1100 | 1.4  |           | 1015 | 1.3    |           | 1200 | 1.1 |           |        |      |           | 1055 | 1.2  |           | 1045 | 0.9 |
| SU        | 1745 | 0.3  | M         | 1640 | 0.4    | W         | 1835 | 0.5 |           |        |      | W         | 1705 | 0.4  | SA        | 1735 | 0.5 |
|           | 2335 | 1.2  |           | 2250 | 1.1    |           | 2250 | 1.1 |           |        |      |           | 2305 | 1.2  |           | 2340 | 1.1 |
| <b>15</b> | 0545 | 0.5  | <b>30</b> | 0455 | 0.5    | <b>15</b> | 0020 | 1.2 |           |        |      | <b>15</b> | 0545 | 0.4  | <b>30</b> | 0710 | 0.4 |
|           | 1145 | 1.3  |           | 1050 | 1.2    |           | 0710 | 0.5 |           |        |      |           | 1130 | 1.0  |           | 0825 | 0.5 |
| M         | 1835 | 0.4  | TU        | 1715 | 0.5    | TH        | 1245 | 1.0 |           |        |      | TH        | 1745 | 0.5  | F         | 1635 | 0.4 |
|           |      |      |           | 2325 | 1.1    |           | 1920 | 0.6 |           |        |      |           | 2340 | 1.2  |           | 2305 | 1.2 |
| <b>31</b> | 0540 | 0.5  |           | 1130 | 1.1    |           |      |     |           |        |      | <b>31</b> | 0610 | 0.4  |           |      |     |
|           |      |      |           | W    | 1755   | 0.5       |      |     |           |        |      |           | 1135 | 1.0  |           |      |     |
|           |      |      |           |      |        |           |      |     |           |        |      |           | SA   | 1720 | 0.5       |      |     |
|           |      |      |           |      |        |           |      |     |           |        |      |           | 2350 | 1.2  |           |      |     |

CANADA, BRITISH COLUMBIA - SEYMOUR NARROWS

LAT 50°08'N LONG 125°21'W

TIDAL STREAM PREDICTIONS (RATES IN KNOTS)

| TIME ZONE +0800                 |                                 |                                 | POSITIVE (+) DIRECTION 180 NEGATIVE (-) DIRECTION 000 |                                 |                                 |                                 |                                 |                                 | YEAR 0000                       |                                 |                                 |
|---------------------------------|---------------------------------|---------------------------------|---|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| JANUARY                         |                                 |                                 | FEBRUARY  |                                 |                                 | MARCH                           |                                 |                                 |                                 |                                 |                                 |
| SLACK MAXIMUM<br>TIME TIME RATE                       | SLACK MAXIMUM<br>TIME TIME RATE | SLACK MAXIMUM<br>TIME TIME RATE | SLACK MAXIMUM<br>TIME TIME RATE | SLACK MAXIMUM<br>TIME TIME RATE | SLACK MAXIMUM<br>TIME TIME RATE | SLACK MAXIMUM<br>TIME TIME RATE | SLACK MAXIMUM<br>TIME TIME RATE | SLACK MAXIMUM<br>TIME TIME RATE |
| 1 0340 0640 -9.1                | 16 0325 0625 -8.0               |                                 | 1 0115 12.0   | 16 0055 13.6                    |                                 | 1 0050 10.7                     | 16 0035 12.7                    |                                 |                                 |                                 |                                 |
| F 0950 1210 5.5                 | 16 0935 1150 4.7                |                                 | 1 0450 0755-10.0                                      | 16 0430 0735-11.3               |                                 | 1 0420 0730-10.0                | 16 0355 0705-12.0               |                                 |                                 |                                 |                                 |
| F 1440 1820-10.5                | SA 1410 1800-10.0               |                                 | M 1105 1335 5.9                                       | TU 1040 1315 8.1                |                                 | TU 1035 1315 6.8                | W 1010 1300 10.2                |                                 |                                 |                                 |                                 |
| 2120                            | 2100                            |                                 | 1615 1940 -9.8  | 1600 1930-12.1                  |                                 | 1605 1920 -9.5                  | 1600 1915-12.3                  |                                 |                                 |                                 |                                 |
|                                 |                                 |                                 | 2230  | 2225                            |                                 | 2215                            | 2215                            |                                 |                                 |                                 |                                 |
| 2 0045 12.9                     | 17 0025 12.9                    |                                 | 2 0155 12.2   | 17 0140 14.3                    |                                 | 2 0130 11.0                     | 17 0120 13.1                    |                                 |                                 |                                 |                                 |
| 2 0430 0730 -9.8                | 17 0410 0715 -9.4               |                                 | 2 0525 0830-10.5                                      | 17 0510 0815-12.5               |                                 | 2 0455 0800-10.5                | 17 0435 0745-13.1               |                                 |                                 |                                 |                                 |
| SA 1040 1300 5.5                | SU 1020 1240 5.6                |                                 | TU 1145 1415 6.5                                      | W 1120 1400 9.6                 |                                 | W 1105 1350 7.8                 | TH 1050 1340 11.8               |                                 |                                 |                                 |                                 |
| 1530 1905-10.5                  | 1505 1850-10.9                  |                                 | O 1700 2020 -9.9                                      | ● 1655 2015-12.8                |                                 | 1645 2000-10.0                  | 1650 2000-13.1                  |                                 |                                 |                                 |                                 |
| 2205                            | 2150                            |                                 | 2310  | 2310                            |                                 | 2255                            | 2300                            |                                 |                                 |                                 |                                 |
| 3 0130 13.2                     | 18 0115 14.1                    |                                 | 3 0230 12.1   | 18 0225 14.4                    |                                 | 3 0200 11.1                     | 18 0200 13.0                    |                                 |                                 |                                 |                                 |
| 3 0510 0815-10.3                | 18 0455 0800-10.7               |                                 | 3 0600 0905-10.7                                      | 18 0545 0855-13.2               |                                 | 3 0520 0830-10.9                | 18 0510 0825-13.7               |                                 |                                 |                                 |                                 |
| SU 1125 1350 5.6                | M 1105 1330 6.6                 |                                 | W 1215 1450 7.0                                       | TH 1200 1445 10.8               |                                 | TH 1135 1420 8.6                | F 1125 1425 13.0                |                                 |                                 |                                 |                                 |
| 1620 1950-10.3                  | 1600 1940-11.7                  |                                 | 1740 2055 -9.8  | 1745 2100-13.0                  |                                 | O 1720 2035-10.2                | ● 1735 2045-13.2                |                                 |                                 |                                 |                                 |
| 2245                            | 2235                            |                                 | 2350  | 2350                            |                                 | 2330                            | 2345                            |                                 |                                 |                                 |                                 |
| 4 0210 13.1                     | 19 0200 14.8                    |                                 | 4 0305 11.7   | 19 0000 0305 13.8               |                                 | 4 0236 10.8                     | 19 0240 12.3                    |                                 |                                 |                                 |                                 |
| 4 0550 0855-10.5                | 19 0535 0840-11.7               |                                 | 4 0630 0940-10.7                                      | 19 0620 0930-13.5               |                                 | 4 0550 0900-10.9                | 19 0545 0900-13.8               |                                 |                                 |                                 |                                 |
| M 1210 1430 5.7                 | TU 1150 1415 7.6                |                                 | TH 1250 1525 7.3                                      | F 1235 1530 11.5                |                                 | F 1205 1455 9.2                 | SA 1205 1505 13.5               |                                 |                                 |                                 |                                 |
| O 1705 2035 -9.9                | ● 1655 2025-12.2                |                                 | 1820 2135 -9.4  | 1835 2145-12.5                  |                                 | 1800 2110-10.1                  | 1825 2130-12.7                  |                                 |                                 |                                 |                                 |
| 2325                            | 2320                            |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 5 0250 12.7                     | 20 0240 15.0                    |                                 | 5 0025 0335 11.0                                      | 20 0045 0345 12.7               |                                 | 5 0005 0305 10.3                | 20 0030 0320 11.1               |                                 |                                 |                                 |                                 |
| 5 0630 0935-10.5                | 20 0615 0920-12.4               |                                 | 5 0700 1010-10.5                                      | 20 0700 1010-13.3               |                                 | 5 0615 0930-10.8                | 20 0620 0940-13.2               |                                 |                                 |                                 |                                 |
| TU 1250 1515 5.7                | W 1230 1505 8.5                 |                                 | F 1320 1600 7.6                                       | SA 1315 1615 11.8               |                                 | SA 1235 1525 9.6                | SU 1240 1550 13.4               |                                 |                                 |                                 |                                 |
| 1750 2115 -9.4                  | 1750 2110-12.2                  |                                 | 1900 2210 -8.9  | 1925 2230-11.6                  |                                 | 1835 2145 -9.7                  | 1910 2215-11.7                  |                                 |                                 |                                 |                                 |
|                                 |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 6 0005 0330 12.0                | 21 0010 0325 14.6               |                                 | 6 0100 0410 10.1                                      | 21 0130 0430 11.1               |                                 | 6 0040 0335 9.5                 | 21 0115 0400 9.5                |                                 |                                 |                                 |                                 |
| 6 0705 1010-10.3                | 21 0655 1000-12.7               |                                 | 6 0725 1040-10.1                                      | 21 0735 1050-12.6               |                                 | 6 0640 1000-10.5                | 21 0655 1020-12.2               |                                 |                                 |                                 |                                 |
| W 1330 1555 5.7                 | TH 1310 1550 9.2                |                                 | SA 1350 1640 7.7                                      | SU 1400 1700 11.4               |                                 | SU 1305 1600 9.8                | M 1325 1635 12.6                |                                 |                                 |                                 |                                 |
| 1835 2155 -6.6                  | 1845 2200-11.8                  |                                 | 1940 2250 -8.1  | 2020 2320-10.1                  |                                 | 1915 2220 -9.1                  | 2000 2300-10.2                  |                                 |                                 |                                 |                                 |
|                                 |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 7 0045 0405 11.1                | 22 0055 0410 13.6               |                                 | 7 0140 0445 9.0                                       | 22 0220 0515 9.2                |                                 | 7 0120 0410 8.5                 | 22 0205 0445 7.7                |                                 |                                 |                                 |                                 |
| 7 0735 1045 -9.9                | 22 0730 1040-12.7               |                                 | 7 0755 1115 -9.6                                      | 22 0810 1135-11.4               |                                 | 7 0710 1030-10.1                | 22 0735 1100-10.8               |                                 |                                 |                                 |                                 |
| TH 1405 1635 5.7                | F 1355 1640 9.6                 |                                 | SU 1425 1720 7.7                                      | M 1445 1755 10.7                |                                 | M 1335 1640 9.8                 | TU 1405 1720 11.3               |                                 |                                 |                                 |                                 |
| 1920 2235 -7.8                  | 1940 2250-10.9                  |                                 | 2025 2330 -7.2  | 2120                            |                                 | 2000 2305 -8.2                  | 2055 2355 -8.5                  |                                 |                                 |                                 |                                 |
|                                 |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 8 0125 0440 10.0                | 23 0145 0455 12.1               |                                 | 8 0225 0520 7.6                                       | 23 0015 -8.5                    |                                 | 8 0200 0445 7.1                 | 23 0305 0535 5.7                |                                 |                                 |                                 |                                 |
| 8 0810 1125 -9.4                | 23 0810 1125-12.2               |                                 | 8 0825 1150 -9.0                                      | 23 0315 0605 7.1                |                                 | 8 0740 1105 -9.4                | 23 0815 1150 -9.1               |                                 |                                 |                                 |                                 |
| F 1445 1715 5.6                 | SA 1440 1730 9.7                |                                 | M 1505 1805 7.7                                       | TU 0855 1220-10.1               |                                 | TU 1415 1725 9.4                | W 1465 1815 9.9                 |                                 |                                 |                                 |                                 |
| 2010 2315 -6.9                  | 2040 2340 -9.7                  |                                 | 2120  | 1535 1850 9.8                   |                                 | 2055 2350 -7.1                  | 2155                            |                                 |                                 |                                 |                                 |
|                                 |                                 |                                 |   | 2225                            |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 9 0205 0520 8.9                 | 24 0240 0545 10.2               |                                 | 9 0020 -6.2   | 24 0120 -7.0                    |                                 | 9 0255 0530 5.6                 | 24 0055 -7.1                    |                                 |                                 |                                 |                                 |
| 9 0845 1200 -8.9                | 24 0850 1210-11.5               |                                 | 9 0315 0605 6.2                                       | 24 0425 0700 5.1                |                                 | 9 0815 1145 -8.6                | 24 0415 0635 4.0                |                                 |                                 |                                 |                                 |
| SA 1525 1805 5.7                | SU 1525 1825 9.6                |                                 | TU 0900 1230 -8.4                                     | W 0940 1315 -8.6                |                                 | W 1500 1820 9.0                 | TH 0910 1245 -7.4               |                                 |                                 |                                 |                                 |
| 2100                            | 2140                            |                                 | 1550 1900 7.7   | 1635 1955 9.0                   |                                 | 2155                            | 1555 1925 8.6                   |                                 |                                 |                                 |                                 |
|                                 |                                 |                                 | 2225  | 2340                            |                                 | 2305                            |                                 |                                 |                                 |                                 |                                 |
| 10 0005 -6.0                    | 25 0040 -8.3                    |                                 | 10 0120 -5.3  | 25 0235 -6.0                    |                                 | 10 0050 -6.0                    | 25 0210 -6.1                    |                                 |                                 |                                 |                                 |
| 10 0250 0605 7.6                | 25 0335 0635 8.3                |                                 | 10 0415 0700 4.7                                      | 25 0550 0815 3.7                |                                 | 10 0400 0630 4.2                | 25 0540 0755 3.0                |                                 |                                 |                                 |                                 |
| SU 0915 1240 -8.4               | M 0935 1300-10.6                |                                 | W 0940 1320 -7.9                                      | TH 1040 1425 -7.5               |                                 | TH 0855 1240 -7.8               | F 1015 1355 -6.1                |                                 |                                 |                                 |                                 |
| 1605 1855 5.9                   | 1620 1925 9.5                   |                                 | 1645 2000 7.9   | 1740 2110 8.7                   |                                 | 1555 1925 8.6                   | 1700 2035 7.8                   |                                 |                                 |                                 |                                 |
| 2200                            | 2255                            |                                 | 2340  |                                 |                                 | 2310                            |                                 |                                 |                                 |                                 |                                 |
| 11 0055 -5.3                    | 26 0145 -7.1                    |                                 | 11 0235 -4.8  | 26 0055 0400 -6.0               |                                 | 11 0205 -5.5                    | 26 0020 0330 -6.1               |                                 |                                 |                                 |                                 |
| 11 0345 0650 6.3                | 26 0445 0735 6.4                |                                 | 11 0540 0805 3.6                                      | 26 0715 0935 3.2                |                                 | 11 0525 0740 3.2                | 26 0700 0920 3.0                |                                 |                                 |                                 |                                 |
| M 0955 1325 -8.0                | TU 1020 1355 -9.7               |                                 | TH 1030 1420 -7.5                                     | F 1155 1540 -7.0                |                                 | F 1000 1350 -7.1                | SA 1145 1520 -5.6               |                                 |                                 |                                 |                                 |
| 1660 1950 6.4                   | 1715 2030 9.5                   |                                 | 1745 2110 8.5   | 1845 2220 8.9                   |                                 | 1705 2040 8.8                   | 1820 2150 8.2                   |                                 |                                 |                                 |                                 |
| 2310                            |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 12 0200 -4.7                    | 27 0010 0300 -6.4               |                                 | 12 0100 0355 -5.3                                     | 27 0205 0510 -6.9               |                                 | 12 0025 0330 -5.9               | 27 0125 0440 -6.9               |                                 |                                 |                                 |                                 |
| 12 0450 0745 5.2                | 27 0605 0840 5.0                |                                 | 12 0705 0920 3.2                                      | 27 0830 1050 3.6                |                                 | 12 0650 0905 3.2                | 27 0805 1035 3.9                |                                 |                                 |                                 |                                 |
| TU 1035 1415 -7.9               | W 1115 1600 -9.0                |                                 | F 1135 1630 -7.7                                      | SA 1315 1655 -7.3               |                                 | SA 1120 1510 -7.2               | SU 1310 1635 -6.1               |                                 |                                 |                                 |                                 |
| 1740 2050 7.2                   | 1815 2140 9.8                   |                                 | 1845 2215 9.7   | 1950 2320 9.5                   |                                 | 1820 2150 9.5                   | 1925 2250 8.2                   |                                 |                                 |                                 |                                 |
|                                 |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 13 0020 0310 -4.7               | 28 0120 0420 -6.5               |                                 | 13 0205 0510 -6.5                                     | 28 0300 0605 -8.0               |                                 | 13 0130 0440 -7.2               | 28 0220 0535 -8.0               |                                 |                                 |                                 |                                 |
| 13 0605 0845 4.4                | 28 0725 0950 4.2                |                                 | 13 0820 1035 3.7                                      | 28 0920 1150 4.6                |                                 | 13 0800 1020 4.3                | 28 0850 1130 5.2                |                                 |                                 |                                 |                                 |
| W 1120 1510 -7.9                | TH 1215 1605 -8.7               |                                 | SA 1250 1645 -8.5                                     | SU 1425 1750 -8.0               |                                 | SU 1245 1626 -8.1               | M 1420 1735 -7.1                |                                 |                                 |                                 |                                 |
| 1830 2150 8.4                   | 1915 2240 10.3                  |                                 | 1950 2315 11.1  | 2045                            |                                 | 1930 2255 10.7                  | 2025 2340 8.8                   |                                 |                                 |                                 |                                 |
|                                 |                                 |                                 |   | 2045                            |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 14 0130 0425 -5.3               | 29 0230 0530 -7.3               |                                 | 14 0300 0605 -8.2                                     | 29 0010 10.2                    |                                 | 14 0230 0540 -8.9               | 29 0300 0615 -9.0               |                                 |                                 |                                 |                                 |
| 14 0725 0950 4.0                | 29 0840 1100 4.1                |                                 | 14 0915 1135 4.9                                      | 29 0340 0650 -9.1               |                                 | 14 0850 1120 6.1                | 29 0925 1210 6.6                |                                 |                                 |                                 |                                 |
| TH 1215 1605 -8.3               | F 1325 1710 -8.8                |                                 | SU 1400 1745 -9.7                                     | M 1000 1235 5.8                 |                                 | M 1400 1730 -9.5                | TU 1510 1820 -8.2               |                                 |                                 |                                 |                                 |
| 1920 2245 9.9                   | 2010 2340 11.0                  |                                 | 2045  | 1520 1840 -8.9                  |                                 | 2030 2345 11.8                  | 2110                            |                                 |                                 |                                 |                                 |
|                                 |                                 |                                 |   | 2135                            |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 15 0230 0530 -6.5               | 30 0325 0625 -8.3               |                                 | 15 0010 12.5  |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 15 0835 1050 4.1                | 30 0940 1200 4.6                |                                 | 15 0350 0655 -9.8                                     |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| F 1310 1705 -9.1                | SA 1425 1805 -9.2               |                                 | M 1000 1230 6.4                                       |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 2010 2335 11.4                  | 2105                            |                                 | 1505 1840-11.0  |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
|                                 |                                 |                                 | 2135  |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 31 0030 11.6                    |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 31 0410 0715 -9.3               |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| SU 1025 1250 5.2                |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 1525 1855 -9.5                  |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 2150                            |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 31 0055 9.6                     |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 31 0410 0725-10.4               |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| TH 1025 1320 9.1                |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 1625 1935 -9.8                  |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
| 2230                            |                                 |                                 |   |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |

FOR FURTHER INFORMATION SEE BRITISH COLUM

CANADA – HALIFAX

LAT 44°40'N    LONG 63°35'W

 FOR INTERMEDIATE HEIGHTS USE HARMONIC CONSTANTS (SEE PART III).

**CANADA, BRITISH COLUMBIA - VANCOUVER HARBOUR**

LAT 49°17'N LONG 123°07'W

| TIME ZONE +0800 |     |         |     | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |     |         |          |         |      |         |      |         |       |         |      | YEAR 0000 |      |   |
|-----------------|-----|---------|-----|--|-----|---------|----------|---------|------|---------|------|---------|-------|---------|------|-----------|------|---|
|                 |     |         |     | JANUARY                                  |     |         | FEBRUARY |         |      | MARCH   |      |         | APRIL |         |      |           |      |   |
| TIME            | M   | TIME    | M   | TIME                                     | M   | TIME    | TIME     | M       | TIME | M       | TIME | M       | TIME  | M       | TIME | M         | TIME | M |
| 1 0530          | 4.6 | 16 0505 | 4.5 | 1 0615                                   | 4.6 | 16 0550 | 4.7      | 1 0535  | 4.4  | 16 0500 | 4.5  | 1 0510  | 4.2   | 16 0455 | 4.5  |           |      |   |
| 1005            | 3.7 | 16 0915 | 3.9 | 1 1130                                   | 3.5 | 16 1100 | 3.4      | 1 1110  | 3.0  | 16 1045 | 2.7  | 1 1140  | 1.9   | 16 1145 | 0.9  |           |      |   |
| F 1410          | 4.2 | SA 1315 | 4.4 | M 1600                                   | 3.9 | TU 1540 | 4.3      | TU 1600 | 3.8  | W 1600  | 4.1  | F 1735  | 3.9   | SA 1815 | 4.3  |           |      |   |
| 2215            | 0.7 | 2145    | 0.5 | 2320                                     | 0.9 | 2305    | 0.4      | 2255    | 1.2  | 2245    | 1.0  | 2325    | 2.2   | ● 2350  | 2.5  |           |      |   |
| 2 0605          | 4.7 | 17 0545 | 4.7 | 2 0645                                   | 4.6 | 17 0620 | 4.8      | 2 0600  | 4.4  | 17 0525 | 4.6  | 2 0530  | 4.2   | 17 0525 | 4.4  |           |      |   |
| 1105            | 3.7 | 17 1015 | 3.9 | 2 1205                                   | 3.4 | 17 1150 | 3.0      | 2 1145  | 2.8  | 17 1125 | 2.2  | 2 1215  | 1.6   | 17 1225 | 0.6  |           |      |   |
| SA 1500         | 4.1 | SU 1420 | 4.5 | TU 1640                                  | 4.0 | W 1650  | 4.4      | W 1650  | 3.9  | TH 1700 | 4.2  | SA 1820 | 4.0   | SU 1915 | 4.5  |           |      |   |
| 2255            | 0.7 | 2235    | 0.3 | O 2355                                   | 0.9 | ● 2350  | 0.5      | 2330    | 1.3  | 2330    | 1.2  | O       |       |         |      |           |      |   |
| 3 0645          | 4.8 | 18 0625 | 4.8 | 3 0710                                   | 4.6 | 18 0650 | 4.8      | 3 0620  | 4.4  | 18 0555 | 4.6  | 3 0000  | 2.4   | 18 0040 | 2.9  |           |      |   |
| 1155            | 3.7 | 18 1105 | 3.8 | 3 1245                                   | 3.2 | 18 1235 | 2.7      | 3 1210  | 2.6  | 18 1210 | 1.7  | 3 0545  | 4.2   | 18 0545 | 4.3  |           |      |   |
| SU 1540         | 4.1 | M 1525  | 4.5 | W 1720                                   | 3.9 | TH 1750 | 4.3      | TH 1730 | 3.9  | F 1805  | 4.2  | SU 1235 | 1.3   | M 1305  | 0.5  |           |      |   |
| 2330            | 0.7 | 2320    | 0.1 |  |     | O 2355  | 1.5      | ●       |      |         |      | 1905    | 4.1   | 2010    | 4.5  |           |      |   |
| 4 0715          | 4.8 | 19 0700 | 4.9 | 4 0025                                   | 1.0 | 19 0035 | 0.8      | 4 0640  | 4.4  | 19 0010 | 1.6  | 4 0035  | 2.7   | 19 0125 | 3.1  |           |      |   |
| 1230            | 3.7 | 19 1200 | 3.7 | 4 0735                                   | 4.6 | 19 0720 | 4.8      | 4 1245  | 2.3  | 19 0625 | 4.6  | 4 0600  | 4.2   | 19 0615 | 4.2  |           |      |   |
| M 1615          | 4.0 | TU 1625 | 4.5 | TH 1320                                  | 3.0 | F 1325  | 2.3      | F 1815  | 3.9  | SA 1255 | 1.3  | M 1305  | 1.1   | TU 1345 | 0.5  |           |      |   |
| O               |     | ●       |     | 1805                                     | 3.8 | 1855    | 4.2      |         |      | 1905    | 4.3  | 1955    | 4.1   | 2105    | 4.5  |           |      |   |
| 5 0010          | 0.7 | 20 0005 | 0.1 | 5 0050                                   | 1.2 | 20 0110 | 1.2      | 5 0025  | 1.7  | 20 0055 | 2.1  | 5 0110  | 3.0   | 20 0215 | 3.4  |           |      |   |
| 0750            | 4.8 | 20 0735 | 5.0 | 5 0755                                   | 4.6 | 20 0750 | 4.8      | 5 0655  | 4.4  | 20 0650 | 4.6  | 5 0620  | 4.2   | 20 0640 | 4.0  |           |      |   |
| TU 1310         | 3.6 | W 1255  | 3.4 | F 1355                                   | 2.8 | SA 1410 | 1.9      | SA 1315 | 2.0  | SU 1340 | 1.0  | TU 1345 | 0.9   | W 1425  | 0.6  |           |      |   |
| 1655            | 4.0 | 1730    | 4.4 | 1845                                     | 3.7 | 1955    | 4.0      | 1900    | 3.8  | 2005    | 4.2  | 2050    | 4.2   | 2205    | 4.5  |           |      |   |
| 6 0045          | 0.8 | 21 0055 | 0.3 | 6 0115                                   | 1.5 | 21 0155 | 1.8      | 6 0055  | 2.0  | 21 0140 | 2.5  | 6 0155  | 3.2   | 21 0315 | 3.4  |           |      |   |
| 0815            | 4.8 | 21 0810 | 5.0 | 6 0810                                   | 4.6 | 21 0815 | 4.8      | 6 0705  | 4.4  | 21 0715 | 4.5  | 6 0640  | 4.2   | 21 0700 | 3.8  |           |      |   |
| W 1355          | 3.4 | TH 1345 | 3.1 | SA 1435                                  | 2.5 | SU 1500 | 1.5      | SU 1350 | 1.8  | M 1420  | 0.9  | W 1420  | 0.8   | TH 1505 | 0.9  |           |      |   |
| 1745            | 3.8 | 1840    | 4.1 | 1945                                     | 3.6 | 2105    | 3.9      | 1945    | 3.8  | 2110    | 4.2  | 2150    | 4.2   | 2305    | 4.4  |           |      |   |
| 7 0115          | 1.0 | 22 0135 | 0.6 | 7 0145                                   | 1.8 | 22 0235 | 2.4      | 7 0125  | 2.4  | 22 0220 | 3.0  | 7 0245  | 3.4   | 22 0450 | 3.5  |           |      |   |
| 0845            | 4.8 | 22 0845 | 5.0 | 7 0830                                   | 4.6 | 22 0845 | 4.7      | 7 0725  | 4.4  | 22 0745 | 4.3  | 7 0700  | 4.1   | 22 0740 | 3.6  |           |      |   |
| TH 1445         | 3.3 | F 1445  | 2.7 | SU 1510                                  | 2.3 | M 1550  | 1.3      | M 1420  | 1.6  | TU 1505 | 0.9  | TH 1505 | 0.8   | F 1550  | 1.1  |           |      |   |
| 1830            | 3.7 | 1945    | 3.9 | 2040                                     | 3.5 | 2220    | 3.8      | 2045    | 3.8  | 2220    | 4.2  | 2300    | 4.2   |         |      |           |      |   |
| 8 0145          | 1.2 | 23 0215 | 1.1 | 8 0215                                   | 2.2 | 23 0325 | 2.9      | 8 0200  | 2.7  | 23 0315 | 3.3  | 8 0345  | 3.6   | 23 0005 | 4.4  |           |      |   |
| 0910            | 4.7 | 23 0910 | 5.0 | 8 0850                                   | 4.5 | 23 0910 | 4.5      | 8 0745  | 4.4  | 23 0805 | 4.1  | 8 0740  | 4.0   | 23 0545 | 3.4  |           |      |   |
| F 1520          | 3.1 | SA 1545 | 2.3 | M 1550                                   | 2.0 | TU 1640 | 1.2      | TU 1455 | 1.4  | W 1550  | 1.0  | F 1555  | 0.9   | SA 0945 | 3.3  |           |      |   |
| 1930            | 3.5 | 2100    | 3.7 | 2145                                     | 3.5 |         |          | 2145    | 3.8  | 2335    | 4.2  |         |       | 1645    | 1.4  |           |      |   |
| 9 0210          | 1.5 | 24 0300 | 1.7 | 9 0250                                   | 2.7 | 24 0005 | 3.9      | 9 0245  | 3.1  | 24 0425 | 3.5  | 9 0015  | 4.2   | 24 0100 | 4.3  |           |      |   |
| 0935            | 4.7 | 24 0945 | 4.9 | 9 0905                                   | 4.5 | 24 0425 | 3.4      | 9 0800  | 4.3  | 24 0840 | 3.8  | 9 0510  | 3.6   | 24 0810 | 3.1  |           |      |   |
| SA 1610         | 2.8 | SU 1640 | 1.9 | TU 1630                                  | 1.8 | W 0940  | 4.2      | W 1540  | 1.2  | TH 1640 | 1.2  | SA 0830 | 3.8   | SU 1000 | 3.1  |           |      |   |
| 2040            | 3.3 | 2220    | 3.5 | 2310                                     | 3.5 | 1735    | 1.2      | 2305    | 3.9  |         |      | 1700    | 1.0   | 1750    | 1.6  |           |      |   |
| 10 0240         | 1.9 | 25 0345 | 2.4 | 10 0340                                  | 3.1 | 25 0140 | 4.0      | 10 0340 | 3.4  | 25 0055 | 4.2  | 10 0120 | 4.3   | 25 0145 | 4.3  |           |      |   |
| 0955            | 4.7 | 25 1015 | 4.8 | 10 0930                                  | 4.4 | 25 0555 | 3.6      | 10 0830 | 4.2  | 25 0630 | 3.5  | 10 0700 | 3.5   | 25 0845 | 2.8  |           |      |   |
| SU 1700         | 2.5 | M 1735  | 1.6 | W 1715                                   | 1.5 | TH 1010 | 4.0      | TH 1630 | 1.2  | F 0855  | 3.6  | SU 1000 | 3.6   | M 1230  | 3.0  |           |      |   |
| 2200            | 3.2 |         |     |  |     | 1835    | 1.3      |         |      | 1740    | 1.4  | 1810    | 1.1   | 1855    | 1.9  |           |      |   |
| 11 0315         | 2.3 | 26 0010 | 3.5 | 11 0110                                  | 3.7 | 26 0255 | 4.2      | 11 0040 | 4.0  | 26 0200 | 4.2  | 21 0210 | 4.4   | 26 0225 | 4.2  |           |      |   |
| 1020            | 4.6 | 26 0440 | 3.0 | 11 0440                                  | 3.5 | 26 0800 | 3.7      | 11 0445 | 3.6  | 26 0825 | 4.3  | 21 0810 | 3.2   | 26 0905 | 2.5  |           |      |   |
| M 1740          | 2.2 | TU 1050 | 4.6 | TH 1000                                  | 4.3 | F 1055  | 3.8      | F 0900  | 4.1  | SA 1000 | 3.4  | M 1155  | 3.5   | TU 1355 | 3.1  |           |      |   |
| 2330            | 3.2 | 1830    | 1.3 | 1815                                     | 1.3 | 1940    | 1.3      | 1730    | 1.1  | 1855    | 1.5  | 1920    | 1.2   | 2000    | 2.0  |           |      |   |
| 12 0350         | 2.8 | 27 0210 | 3.8 | 12 0255                                  | 4.0 | 27 0350 | 4.3      | 12 0210 | 4.1  | 27 0250 | 4.3  | 12 0255 | 4.4   | 27 0255 | 4.2  |           |      |   |
| 1040            | 4.5 | 27 0555 | 3.5 | 12 0605                                  | 3.8 | 27 0915 | 3.5      | 12 0620 | 3.7  | 27 0915 | 3.1  | 12 0855 | 2.8   | 27 0935 | 2.2  |           |      |   |
| TU 1825         | 1.9 | W 1120  | 4.4 | F 1045                                   | 4.2 | SA 1230 | 3.6      | SA 0955 | 4.0  | SU 1240 | 3.3  | TU 1345 | 3.6   | W 1505  | 3.4  |           |      |   |
| 1925            | 1.2 | 1920    | 1.1 | 2045                                     | 1.3 | 1840    | 1.1      | 2000    | 1.6  | 2030    | 1.3  | 2050    | 2.2   |         |      |           |      |   |
| 13 0125         | 3.4 | 28 0325 | 4.1 | 13 0355                                  | 4.2 | 28 0430 | 4.4      | 13 0305 | 4.3  | 28 0335 | 4.3  | 13 0325 | 4.4   | 28 0320 | 4.1  |           |      |   |
| 0450            | 3.2 | 28 0740 | 3.7 | 13 0750                                  | 3.9 | 28 1010 | 3.4      | 13 0805 | 3.6  | 28 0945 | 2.9  | 13 0940 | 2.3   | 28 1000 | 1.9  |           |      |   |
| W 1105          | 4.4 | TH 1155 | 4.2 | SA 1145                                  | 4.2 | SU 1400 | 3.6      | SU 1130 | 3.9  | M 1415  | 3.4  | W 1515  | 3.7   | TH 1600 | 3.6  |           |      |   |
| 1910            | 1.5 | 2020    | 1.1 | 2025                                     | 0.9 | 2135    | 1.2      | 1955    | 0.9  | 2055    | 1.6  | 2125    | 1.6   | 2140    | 2.4  |           |      |   |
| 14 0320         | 3.8 | 29 0425 | 4.4 | 14 0445                                  | 4.4 | 29 0505 | 4.4      | 14 0350 | 4.4  | 29 0415 | 4.2  | 14 0400 | 4.5   | 29 0340 | 4.1  |           |      |   |
| 0630            | 3.6 | 29 0910 | 3.7 | 14 0910                                  | 3.8 | 29 1040 | 3.2      | 14 0915 | 3.4  | 29 1010 | 2.7  | 14 1020 | 1.8   | 29 1030 | 1.6  |           |      |   |
| TH 1140         | 4.4 | F 1245  | 4.0 | SU 1255                                  | 4.2 | M 1505  | 3.7      | M 1315  | 3.9  | TU 1510 | 3.5  | TH 1615 | 4.0   | F 1655  | 3.8  |           |      |   |
| 2000            | 1.2 | 2110    | 1.0 | 2125                                     | 0.6 | 2220    | 1.2      | 2100    | 0.9  | 2145    | 1.6  | 2215    | 1.8   | 2220    | 2.6  |           |      |   |
| 15 0415         | 4.1 | 30 0510 | 4.5 | 15 0515                                  | 4.6 |         |          | 15 0425 | 4.5  | 30 0435 | 4.2  | 15 0425 | 4.5   | 30 0400 | 4.1  |           |      |   |
| 0800            | 3.8 | 30 1010 | 3.7 | 15 1015                                  | 3.7 |         |          | 15 1000 | 3.0  | 30 1040 | 2.4  | 15 1100 | 1.3   | 30 1100 | 1.2  |           |      |   |
| 1225            | 4.4 | SA 1350 | 3.9 | M 1425                                   | 4.3 |         |          | TU 1450 | 4.0  | W 1600  | 3.7  | F 1715  | 4.2   | SA 1745 | 4.0  |           |      |   |
| 2055            | 0.8 | 2200    | 0.9 | 2215                                     | 0.4 |         |          | 2155    | 0.9  | 2220    | 1.8  | 2305    | 2.2   | 2300    | 2.8  |           |      |   |
| 31 0545         | 4.6 |         |     |  |     |         |          | 31 0455 | 4.2  |         |      |         |       |         |      |           |      |   |
| 1100            | 3.6 |         |     |  |     |         |          | 31 1110 | 2.2  |         |      |         |       |         |      |           |      |   |
| SU 1500         | 3.9 |         |     |  |     |         |          | 31 1650 | 3.8  |         |      |         |       |         |      |           |      |   |
| 2245            | 0.9 |         |     |  |     |         |          | 2255    | 1.9  |         |      |         |       |         |      |           |      |   |

**CANADA, BRITISH COLUMBIA - PRINCE RUPERT**

LAT 54°19'N LONG 130°20'W

TIME ZONE +0800

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

YEAR 0000

| MAY     |     |         |     | JUNE    |     |         |     | JULY    |     |         |     | AUGUST  |     |         |     |
|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|
| TIME    | M   |
| 1 0035  | 6.4 | 16 0100 | 6.9 | 1 0115  | 6.6 | 16 0205 | 6.3 | 1 0150  | 6.8 | 0230    | 6.1 | 1 0315  | 6.7 | 0315    | 5.8 |
| 1 0705  | 1.0 | 16 0740 | 0.4 | 1 0805  | 0.5 | 16 0850 | 0.8 | 1 0840  | 0.2 | 16 0905 | 0.9 | 1 0940  | 0.5 | 16 0925 | 1.4 |
| SU 1325 | 5.8 | M 1400  | 6.0 | W 1430  | 5.7 | TH 1510 | 5.6 | F 1500  | 5.9 | SA 1520 | 5.7 | M 1600  | 6.6 | TU 1535 | 6.0 |
| O 1905  | 2.0 | 1940    | 2.1 | 2000    | 2.3 | 2045    | 2.5 | 2040    | 2.0 | 2115    | 2.3 | 2205    | 1.2 | 2150    | 1.8 |
| 2 0115  | 6.6 | 17 0140 | 6.7 | 2 0200  | 6.6 | 17 0245 | 6.1 | 2 0240  | 6.7 | 0305    | 5.9 | 2 0405  | 6.3 | 17 0350 | 5.5 |
| 2 0740  | 0.8 | 17 0820 | 0.5 | 2 0850  | 0.5 | 17 0930 | 0.9 | 2 0920  | 0.3 | 17 0935 | 1.1 | 2 1020  | 0.9 | 17 0950 | 1.7 |
| M 1400  | 5.8 | TU 1445 | 5.9 | TH 1515 | 5.7 | F 1550  | 5.5 | SA 1545 | 6.0 | SU 1555 | 5.7 | TU 1640 | 6.5 | W 1605  | 5.9 |
| 1940    | 2.1 | 2015    | 2.3 | 2045    | 2.4 | 2125    | 2.6 | 2130    | 2.0 | 2145    | 2.3 | 2300    | 1.3 | 2225    | 1.9 |
| 3 0140  | 6.6 | 18 0220 | 6.5 | 3 0245  | 6.5 | 18 0325 | 5.9 | 3 0330  | 6.5 | 18 0345 | 5.7 | 3 0500  | 5.8 | 18 0425 | 5.2 |
| 3 0815  | 0.7 | 0905    | 0.7 | 0935    | 0.6 | 1005    | 1.1 | 1005    | 0.5 | 1005    | 1.3 | 1100    | 1.5 | 1020    | 2.1 |
| TU 1440 | 5.7 | W 1525  | 5.7 | F 1600  | 5.6 | SA 1630 | 5.4 | SU 1630 | 6.1 | M 1625  | 5.6 | W 1725  | 6.3 | TH 1635 | 5.8 |
| 2015    | 2.2 | 2100    | 2.5 | 2135    | 2.4 | 2210    | 2.7 | 2225    | 1.9 | 2225    | 2.3 | 2355    | 1.5 | 2310    | 2.0 |
| 4 0210  | 6.6 | 19 0300 | 6.2 | 4 0335  | 6.3 | 19 0410 | 5.6 | 4 0425  | 6.2 | 19 0420 | 5.4 | 4 0600  | 5.3 | 19 0510 | 4.9 |
| 4 0900  | 0.8 | 19 0950 | 0.9 | 4 1020  | 0.7 | 19 1045 | 1.4 | 4 1050  | 0.8 | 19 1035 | 1.6 | 4 1150  | 2.1 | 19 1055 | 2.5 |
| W 1520  | 5.6 | TH 1610 | 5.4 | SA 1650 | 5.6 | SU 1705 | 5.3 | M 1715  | 6.1 | TU 1655 | 5.6 | TH 1820 | 6.0 | F 1715  | 5.6 |
| 2055    | 2.4 | 2140    | 2.7 | 2235    | 2.5 | 2300    | 2.7 | 2325    | 1.9 | 2305    | 2.3 | -       | -   | -       | -   |
| 5 0255  | 6.4 | 20 0345 | 5.9 | 5 0430  | 6.0 | 20 0455 | 5.3 | 5 0520  | 5.8 | 20 0500 | 5.1 | 5 0100  | 1.6 | 20 0000 | 2.2 |
| 5 0940  | 0.9 | 1030    | 1.3 | 5 1110  | 1.0 | 20 1120 | 1.7 | 5 1135  | 1.2 | 20 1105 | 2.0 | 5 0710  | 4.9 | 20 0605 | 4.6 |
| TH 1615 | 5.4 | F 1655  | 5.2 | SU 1745 | 5.5 | M 1750  | 5.2 | TU 1805 | 6.0 | W 1730  | 5.5 | F 1245  | 2.7 | SA 1140 | 2.9 |
| 2135    | 2.6 | 2230    | 3.0 | 2340    | 2.5 | 2355    | 2.8 | -       | -   | 2355    | 2.3 | 1920    | 5.8 | 1805    | 5.5 |
| 6 0340  | 6.2 | 21 0430 | 5.5 | 6 0535  | 5.7 | 21 0545 | 5.0 | 6 0025  | 1.8 | 21 0550 | 4.8 | 6 0215  | 1.8 | 21 0110 | 2.2 |
| 6 1030  | 1.1 | 1120    | 1.6 | 6 1205  | 1.3 | 21 1200 | 2.0 | 6 0620  | 5.4 | 21 1145 | 2.3 | 6 0835  | 4.6 | 21 0730 | 4.4 |
| F 1700  | 5.2 | SA 1750 | 5.0 | M 1845  | 5.6 | TU 1835 | 5.2 | W 1225  | 1.7 | TH 1810 | 5.5 | SA 1400 | 3.0 | SU 1245 | 3.2 |
| 2230    | 2.8 | 2330    | 3.1 | -       | -   | -       | -   | 1900    | 6.0 | -       | -   | 2035    | 5.6 | 1915    | 5.4 |
| 7 0430  | 5.9 | 22 0525 | 5.2 | 7 0050  | 2.3 | 22 0055 | 2.7 | 7 0135  | 1.8 | 22 0055 | 2.3 | 7 0330  | 1.7 | 22 0235 | 2.1 |
| 7 1125  | 1.3 | 1210    | 1.9 | 7 0645  | 5.4 | 22 0640 | 4.7 | 7 0735  | 5.0 | 22 0650 | 4.5 | 7 1005  | 4.7 | 22 0915 | 4.4 |
| SA 1800 | 5.1 | SU 1845 | 4.9 | TU 1305 | 1.6 | W 1250  | 2.3 | TH 1325 | 2.2 | F 1230  | 2.7 | SU 1535 | 3.1 | M 1420  | 3.3 |
| 2340    | 3.0 | -       | -   | 1945    | 5.7 | 1925    | 5.3 | 2000    | 5.9 | 1900    | 5.5 | 2145    | 5.6 | 2040    | 5.5 |
| 8 0540  | 5.6 | 23 0040 | 3.1 | 8 0200  | 2.1 | 23 0155 | 2.6 | 8 0245  | 1.7 | 23 0200 | 2.3 | 8 0440  | 1.6 | 23 0355 | 1.8 |
| 8 1230  | 1.5 | 0630    | 4.9 | 8 0755  | 5.2 | 23 0745 | 4.5 | 8 0855  | 4.8 | 23 0805 | 4.4 | 8 1115  | 4.9 | 23 1035 | 4.7 |
| SU 1915 | 5.1 | M 1305  | 2.1 | W 1415  | 1.9 | TH 1340 | 2.5 | F 1435  | 2.6 | SA 1335 | 3.0 | M 1645  | 3.0 | TU 1550 | 3.1 |
| -       | -   | -       | -   | 2045    | 5.9 | 2015    | 5.4 | 2100    | 5.9 | 2005    | 5.5 | 2245    | 5.8 | 2155    | 5.8 |
| 9 0100  | 2.9 | 24 0155 | 3.0 | 9 0310  | 1.8 | 24 0255 | 2.3 | 9 0350  | 1.5 | 24 0310 | 2.1 | 9 0535  | 1.4 | 24 0455 | 1.3 |
| 9 0655  | 5.4 | 24 0740 | 4.7 | 9 0910  | 5.2 | 24 0900 | 4.5 | 9 1010  | 4.9 | 24 0940 | 4.5 | 9 1205  | 5.2 | 24 1130 | 5.2 |
| M 1340  | 1.6 | TU 1400 | 2.3 | TH 1510 | 2.1 | F 1440  | 2.7 | SA 1545 | 2.8 | SU 1450 | 3.1 | TU 1740 | 2.8 | W 1655  | 2.7 |
| 2025    | 5.3 | 2045    | 5.1 | 2140    | 6.1 | 2105    | 5.5 | 2200    | 6.0 | 2110    | 5.6 | 2340    | 5.9 | 2255    | 6.2 |
| 10 0225 | 2.6 | 25 0300 | 2.7 | 10 0410 | 1.4 | 25 0355 | 2.0 | 10 0450 | 1.3 | 25 0415 | 1.7 | 10 0620 | 1.2 | 25 0545 | 0.9 |
| 10 0820 | 5.4 | 25 0850 | 4.7 | 10 1025 | 5.2 | 25 1010 | 4.7 | 10 1120 | 5.0 | 25 1055 | 4.7 | 10 1250 | 5.5 | 25 1210 | 5.7 |
| TU 1450 | 1.7 | W 1455  | 2.3 | F 1610  | 2.3 | SA 1540 | 2.8 | SU 1645 | 2.8 | M 1615  | 3.0 | W 1825  | 2.5 | TH 1745 | 2.2 |
| 2130    | 5.7 | 2130    | 5.4 | 2230    | 6.3 | 2155    | 5.8 | 2300    | 6.1 | 2215    | 5.9 | -       | -   | 2350    | 6.6 |
| 11 0335 | 2.1 | 26 0355 | 2.3 | 11 0515 | 1.1 | 26 0445 | 1.6 | 11 0545 | 1.1 | 26 0515 | 1.3 | 11 0700 | 1.0 | 26 1255 | 6.1 |
| 11 0935 | 5.5 | 0955    | 4.8 | 11 1125 | 5.4 | 26 1110 | 4.9 | 11 1215 | 5.2 | 26 1150 | 5.1 | 11 0700 | 1.0 | 26 1840 | 1.6 |
| W 1545  | 1.7 | TH 1650 | 2.4 | SA 1705 | 2.3 | SU 1635 | 2.8 | M 1745  | 2.7 | TU 1710 | 2.8 | TH 1320 | 5.6 | F 1840  | 1.6 |
| 2220    | 6.1 | 2210    | 5.6 | 2315    | 6.4 | 2245    | 6.0 | 2350    | 6.2 | 2310    | 6.2 | 1900    | 2.3 | -       | -   |
| 12 0435 | 1.6 | 27 0440 | 2.0 | 12 0555 | 0.8 | 27 0535 | 1.2 | 12 0635 | 0.9 | 27 0605 | 0.9 | 12 0100 | 6.2 | 27 0040 | 6.9 |
| 12 1040 | 5.6 | 27 1050 | 5.0 | 12 1220 | 5.5 | 27 1205 | 5.2 | 12 1300 | 5.4 | 27 1235 | 5.4 | 12 0735 | 0.9 | 27 0710 | 0.3 |
| TH 1645 | 1.7 | F 1635  | 2.4 | SU 1755 | 2.4 | M 1730  | 2.7 | TU 1830 | 2.6 | W 1800  | 2.5 | F 1345  | 5.8 | SA 1330 | 6.5 |
| 2300    | 6.4 | 2245    | 5.9 | -       | -   | 2330    | 6.3 | -       | -   | -       | -   | ● 1935  | 2.1 | O 1925  | 1.2 |
| 13 0525 | 1.0 | 28 0520 | 1.6 | 13 0000 | 6.5 | 28 0625 | 0.9 | 13 0035 | 6.2 | 28 0005 | 6.6 | 13 0140 | 6.2 | 28 0130 | 7.0 |
| 13 1140 | 5.8 | 28 1140 | 5.2 | 13 0645 | 0.7 | 28 1255 | 5.4 | 13 0715 | 0.8 | 28 0655 | 0.5 | 13 0805 | 0.9 | 28 0750 | 0.2 |
| F 1730  | 1.7 | SA 1715 | 2.4 | M 1305  | 5.6 | TU 1815 | 2.5 | W 1340  | 5.6 | TH 1320 | 5.8 | SA 1415 | 5.9 | SU 1405 | 6.8 |
| 2345    | 6.7 | 2320    | 6.2 | 1840    | 2.4 | -       | -   | ● 1915  | 2.5 | 1855    | 2.1 | 2005    | 2.0 | 2010    | 0.9 |
| 14 0610 | 0.7 | 29 0600 | 1.2 | 14 0045 | 6.5 | 29 0015 | 6.5 | 14 0115 | 6.3 | 29 0055 | 6.8 | 14 0210 | 6.2 | 29 0215 | 6.9 |
| 14 1230 | 5.9 | 29 1225 | 5.4 | 14 0725 | 0.6 | 29 0710 | 0.5 | 14 0755 | 0.8 | 29 0735 | 0.2 | 14 0830 | 1.0 | 29 0830 | 0.4 |
| SA 1815 | 1.8 | SU 1800 | 2.4 | TU 1350 | 5.7 | W 1335  | 5.6 | TH 1415 | 5.6 | F 1400  | 6.1 | SU 1445 | 6.0 | M 1445  | 7.0 |
| -       | -   | -       | -   | ● 1925  | 2.4 | O 1905  | 2.3 | 1955    | 2.3 | O 1940  | 1.8 | 2040    | 1.9 | 2055    | 0.7 |
| 15 0025 | 6.8 | 30 0000 | 6.4 | 15 0125 | 6.4 | 30 0105 | 6.7 | 15 0155 | 6.2 | 30 0140 | 6.9 | 15 0245 | 6.0 | 30 0300 | 6.7 |
| 15 0655 | 0.4 | 30 0640 | 0.9 | 15 0810 | 0.6 | 30 0755 | 0.3 | 15 0830 | 0.8 | 30 0815 | 0.1 | 15 0900 | 1.2 | 30 0905 | 0.8 |
| SU 1315 | 6.0 | M 1315  | 5.5 | W 1430  | 5.7 | TH 1420 | 5.8 | F 1450  | 5.7 | SA 1440 | 6.3 | M 1510  | 6.0 | TU 1520 | 6.9 |
| ● 1900  | 1.9 | 1840    | 2.3 | 2005    | 2.5 | 1950    | 2.2 | 2030    | 2.3 | 2025    | 1.5 | 2115    | 1.8 | 2145    | 0.8 |
| 31 0035 | 6.5 | -       | -   | -       | -   | -       | -   | -       | -   | -       | -   | 31 0230 | 6.9 | -       | -   |
| 31 0725 | 0.7 | -       | -   | -       | -   | -       | -   | -       | -   | -       | -   | 31 0900 | 0.2 | -       | -   |
| TU 1350 | 5.6 | -       | -   | -       | -   | -       | -   | -       | -   | -       | -   | SU 1515 | 6.5 | -       | -   |
| O 1920  | 2.3 | -       | -   | -       | -   | -       | -   | -       | -   | -       | -   | 2115    | 1.3 | -       | -   |

**CANADA, BRITISH COLUMBIA - PRINCE RUPERT**

LAT 54°19'N LONG 130°20'W

| TIME ZONE +0800 |     |         |     | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |     |         |     |          |     |         |     | YEAR 1988 |     |         |     |       |   |  |  |
|-----------------|-----|---------|-----|--|-----|---------|-----|----------|-----|---------|-----|-----------|-----|---------|-----|-------|---|--|--|
|                 |     |         |     | JANUARY                                  |     |         |     | FEBRUARY |     |         |     | MARCH     |     |         |     | APRIL |   |  |  |
| TIME            | M   | TIME    | M   | TIME                                     | M   | TIME    | M   | TIME     | M   | TIME    | M   | TIME      | M   | TIME    | M   | TIME  | M |  |  |
| 1 0520          | 3.0 | 16 0435 | 3.1 | 1 0115                                   | 5.6 | 16 0040 | 5.9 | 1 0040   | 5.6 | 16 0010 | 6.2 | 1 0055    | 6.2 | 16 0055 | 7.0 |       |   |  |  |
| 1125            | 6.4 | 16 1040 | 6.4 | 1 0640                                   | 2.7 | 16 0615 | 2.2 | 1 0625   | 2.5 | 16 0600 | 1.7 | 1 0700    | 1.5 | 16 0715 | 0.4 |       |   |  |  |
| F 1810          | 1.2 | SA 1740 | 1.2 | M 1240                                   | 6.3 | TU 1215 | 6.9 | TU 1225  | 6.1 | W 1205  | 6.7 | F 1310    | 6.0 | SA 1325 | 6.5 |       |   |  |  |
|                 |     |         |     | 1915                                     | 1.1 | 1900    | 0.3 | 1855     | 1.2 | 1835    | 0.6 | 1910      | 1.4 | 1920    | 1.3 |       |   |  |  |
| 2 0040          | 5.6 | 17 0010 | 5.5 | 2 0140                                   | 5.8 | 17 0120 | 6.4 | 2 0105   | 5.9 | 17 0050 | 6.6 | 2 0115    | 6.4 | 17 0130 | 7.1 |       |   |  |  |
| 0605            | 2.9 | 17 0530 | 2.8 | 2 0715                                   | 2.5 | 17 0705 | 1.7 | 2 0655   | 2.2 | 17 0650 | 1.2 | 2 0730    | 1.2 | 17 0755 | 0.3 |       |   |  |  |
| SA 1205         | 6.5 | SU 1135 | 6.7 | TU 1315                                  | 6.4 | W 1305  | 7.2 | W 1300   | 6.2 | TH 1255 | 6.9 | SA 1345   | 6.0 | SU 1410 | 6.4 |       |   |  |  |
| 1855            | 1.1 | 1830    | 0.7 | O 1945                                   | 1.0 | • 1940  | 0.2 | 1920     | 1.1 | 1910    | 0.5 | O 1940    | 1.5 | 2000    | 1.6 |       |   |  |  |
| 3 0120          | 5.7 | 18 0100 | 5.8 | 3 0215                                   | 5.9 | 18 0200 | 6.7 | 3 0135   | 6.1 | 18 0125 | 6.9 | 3 0145    | 6.5 | 18 0215 | 7.0 |       |   |  |  |
| 0650            | 2.8 | 18 0625 | 2.5 | 3 0750                                   | 2.3 | 18 0745 | 1.3 | 3 0730   | 1.9 | 18 0735 | 0.8 | 3 0805    | 1.1 | 18 0840 | 0.4 |       |   |  |  |
| SU 1250         | 6.5 | M 1225  | 7.0 | W 1350                                   | 6.4 | TH 1355 | 7.2 | TH 1330  | 6.3 | F 1340  | 6.9 | SU 1415   | 6.0 | M 1455  | 6.2 |       |   |  |  |
| 1930            | 1.0 | 1915    | 0.4 | 2020                                     | 1.0 | 2020    | 0.2 | O 1950   | 1.1 | • 1950  | 0.6 | 2005      | 1.7 | 2040    | 1.9 |       |   |  |  |
| 4 0155          | 5.8 | 19 0140 | 6.2 | 4 0235                                   | 6.0 | 19 0235 | 6.9 | 4 0200   | 6.2 | 19 0200 | 7.1 | 4 0210    | 6.5 | 19 0245 | 6.8 |       |   |  |  |
| 0725            | 2.7 | 19 0715 | 2.2 | 4 0820                                   | 2.2 | 19 0835 | 1.1 | 4 0800   | 1.7 | 19 0815 | 0.5 | 4 0835    | 1.0 | 19 0920 | 0.6 |       |   |  |  |
| M 1325          | 6.5 | TU 1315 | 7.3 | TH 1420                                  | 6.3 | F 1440  | 7.0 | F 1400   | 6.2 | SA 1425 | 6.8 | M 1450    | 5.9 | TU 1540 | 5.0 |       |   |  |  |
| O 2005          | 1.0 | • 2000  | 0.2 | 2045                                     | 1.0 | 2055    | 0.5 | 2015     | 1.2 | 2030    | 0.9 | 2035      | 1.9 | 2115    | 2.3 |       |   |  |  |
| 5 0230          | 5.9 | 20 0220 | 6.4 | 5 0300                                   | 6.1 | 20 0310 | 7.0 | 5 0220   | 6.3 | 20 0240 | 7.1 | 5 0240    | 6.5 | 20 0320 | 6.4 |       |   |  |  |
| 0800            | 2.7 | 20 0800 | 1.9 | 5 0855                                   | 2.1 | 20 0920 | 1.0 | 5 0830   | 1.6 | 20 0900 | 0.5 | 5 0910    | 1.1 | 20 1005 | 1.0 |       |   |  |  |
| TU 1400         | 6.4 | W 1405  | 7.3 | F 1455                                   | 6.2 | SA 1525 | 6.7 | SA 1435  | 6.2 | SU 1510 | 6.5 | TU 1530   | 5.6 | W 1625  | 5.5 |       |   |  |  |
| 2045            | 1.0 | 2040    | 0.1 | 2110                                     | 1.2 | 2135    | 0.9 | 2040     | 1.3 | 2105    | 1.3 | 2105      | 2.2 | 2155    | 2.7 |       |   |  |  |
| 6 0300          | 5.9 | 21 0305 | 6.6 | 6 0325                                   | 6.1 | 21 0350 | 6.9 | 6 0250   | 6.4 | 21 0315 | 6.9 | 6 0310    | 6.4 | 21 0405 | 6.0 |       |   |  |  |
| 0840            | 2.7 | 21 0850 | 1.7 | 6 0925                                   | 2.1 | 21 1010 | 1.1 | 6 0900   | 1.5 | 21 0945 | 0.7 | 6 0950    | 1.2 | 21 1055 | 1.4 |       |   |  |  |
| W 1440          | 6.3 | TH 1455 | 7.1 | SA 1525                                  | 6.0 | SU 1610 | 6.2 | SU 1515  | 6.0 | M 1555  | 6.0 | W 1610    | 5.4 | TH 1715 | 5.1 |       |   |  |  |
| 2115            | 1.1 | 2125    | 0.3 | 2140                                     | 1.5 | 2210    | 1.5 | 2105     | 1.6 | 2140    | 1.9 | 2145      | 2.5 | 2245    | 3.0 |       |   |  |  |
| 7 0335          | 5.8 | 22 0345 | 6.6 | 7 0355                                   | 6.1 | 22 0430 | 6.6 | 7 0310   | 6.3 | 22 0355 | 6.6 | 7 0350    | 6.2 | 22 0455 | 5.5 |       |   |  |  |
| 0915            | 2.7 | 22 0940 | 1.6 | 7 1000                                   | 2.1 | 22 1100 | 1.3 | 7 0935   | 1.5 | 22 1030 | 1.1 | 7 1040    | 1.4 | 22 1150 | 1.8 |       |   |  |  |
| TH 1510         | 6.1 | F 1540  | 6.8 | SU 1600                                  | 5.7 | M 1700  | 5.7 | M 1540   | 5.7 | TH 1645 | 5.5 | TH 1700   | 5.1 | F 1820  | 4.8 |       |   |  |  |
| 2145            | 1.3 | 2205    | 0.7 | 2205                                     | 1.8 | 2250    | 2.1 | 2135     | 1.9 | 2220    | 2.4 | 2225      | 2.8 | 2350    | 3.3 |       |   |  |  |
| 8 0405          | 5.8 | 23 0425 | 6.6 | 8 0420                                   | 6.0 | 23 0510 | 6.3 | 8 0340   | 6.2 | 23 0435 | 6.2 | 8 0435    | 5.9 | 23 0555 | 5.1 |       |   |  |  |
| 0955            | 2.7 | 23 1035 | 1.7 | 8 1040                                   | 2.2 | 23 1155 | 1.7 | 8 1010   | 1.6 | 23 1130 | 1.5 | 8 1135    | 1.7 | 23 1255 | 2.1 |       |   |  |  |
| F 1550          | 5.9 | SA 1635 | 6.3 | M 1640                                   | 5.4 | TU 1800 | 5.1 | TU 1620  | 5.4 | W 1735  | 5.1 | F 1805    | 4.8 | SA 1940 | 4.7 |       |   |  |  |
| 2215            | 1.5 | 2245    | 1.2 | 2235                                     | 2.1 | 2335    | 2.7 | 2200     | 2.3 | 2305    | 2.9 | 2325      | 3.1 |         |     |       |   |  |  |
| 9 0440          | 5.7 | 24 0510 | 6.5 | 9 0455                                   | 5.9 | 24 0605 | 5.9 | 9 0415   | 6.1 | 24 0525 | 5.7 | 9 0540    | 5.6 | 24 0120 | 3.4 |       |   |  |  |
| 1035            | 2.7 | 24 1130 | 1.8 | 9 1125                                   | 2.2 | 24 1300 | 2.0 | 9 1055   | 1.8 | 24 1220 | 1.9 | 9 1250    | 1.8 | 24 0720 | 4.9 |       |   |  |  |
| SA 1625         | 5.5 | SU 1725 | 5.8 | TU 1725                                  | 5.0 | W 1910  | 4.7 | W 1705   | 5.1 | TH 1845 | 4.7 | SA 1935   | 4.7 | SU 1405 | 2.2 |       |   |  |  |
| 2250            | 1.8 | 2330    | 1.8 | 2310                                     | 2.6 |         |     | 2240     | 2.7 |         |     |           |     | 2100    | 4.8 |       |   |  |  |
| 10 0510         | 5.7 | 25 0600 | 6.3 | 10 0535                                  | 5.8 | 25 0035 | 3.2 | 10 0455  | 5.9 | 25 0005 | 3.4 | 10 0100   | 3.3 | 25 0255 | 3.2 |       |   |  |  |
| 1120            | 2.7 | 25 1230 | 2.0 | 10 1225                                  | 2.3 | 25 0710 | 5.5 | 10 1150  | 2.0 | 25 0630 | 5.2 | 10 0705   | 5.4 | 25 0845 | 4.8 |       |   |  |  |
| SU 1710         | 5.2 | M 1830  | 5.2 | W 1830                                   | 4.7 | TH 1420 | 2.2 | TH 1815  | 4.7 | F 1340  | 2.2 | SU 1410   | 1.8 | M 1515  | 2.2 |       |   |  |  |
| 2325            | 2.2 |         |     |  |     | 2055    | 4.5 | 2330     | 3.1 | 2025    | 4.5 | 2105      | 4.9 | 2155    | 5.1 |       |   |  |  |
| 11 0555         | 5.7 | 26 0020 | 2.4 | 11 0000                                  | 3.0 | 26 0215 | 3.5 | 11 0555  | 5.6 | 26 0155 | 3.6 | 11 0240   | 3.0 | 26 0400 | 2.9 |       |   |  |  |
| 1215            | 2.7 | 26 0655 | 6.0 | 11 0630                                  | 5.7 | 26 0840 | 5.3 | 11 1315  | 2.1 | 26 0805 | 5.0 | 11 0835   | 5.5 | 26 0950 | 5.0 |       |   |  |  |
| M 1805          | 4.9 | TU 1340 | 2.0 | TH 1340                                  | 2.3 | F 1545  | 2.2 | F 1940   | 4.5 | SA 1505 | 2.3 | M 1530    | 1.6 | TU 1605 | 2.1 |       |   |  |  |
| 1945            | 4.8 | 2000    | 4.5 | 2235                                     | 4.7 |         |     |          |     | 2200    | 4.7 | 2210      | 5.4 | 2240    | 5.3 |       |   |  |  |
| 12 0005         | 2.5 | 27 0120 | 3.0 | 12 0110                                  | 3.3 | 27 0400 | 3.5 | 12 0055  | 3.4 | 27 0340 | 3.4 | 12 0355   | 2.5 | 27 0445 | 2.4 |       |   |  |  |
| 0640            | 5.7 | 27 0800 | 5.9 | 12 0745                                  | 5.7 | 27 1000 | 5.4 | 12 0715  | 5.5 | 27 0930 | 5.1 | 12 0955   | 5.7 | 27 1040 | 5.2 |       |   |  |  |
| TU 1320         | 2.6 | W 1455  | 2.1 | F 1505                                   | 2.1 | SA 1655 | 2.0 | SA 1440  | 2.0 | SU 1615 | 2.1 | TU 1630   | 1.4 | W 1650  | 2.0 |       |   |  |  |
| 1915            | 4.7 | 2120    | 4.7 | 2150                                     | 4.6 | 2335    | 5.0 | 2130     | 4.6 | 2255    | 5.0 | 2255      | 5.9 | 2310    | 5.7 |       |   |  |  |
| 13 0055         | 2.9 | 28 0245 | 3.3 | 13 0255                                  | 3.4 | 28 0505 | 3.2 | 13 0245  | 3.4 | 28 0440 | 3.0 | 13 0455   | 1.9 | 28 0520 | 2.0 |       |   |  |  |
| 0735            | 5.7 | 28 0910 | 5.8 | 13 0910                                  | 5.8 | 28 1100 | 5.6 | 13 0850  | 5.6 | 28 1035 | 5.3 | 13 1055   | 6.0 | 28 1125 | 5.4 |       |   |  |  |
| W 1430          | 2.4 | TH 1610 | 2.0 | SA 1625                                  | 1.7 | SU 1740 | 1.7 | SU 1600  | 1.7 | M 1705  | 1.9 | W 1720    | 1.2 | TH 1725 | 1.9 |       |   |  |  |
| 2040            | 4.6 | 2245    | 4.9 | 2305                                     | 5.0 |         |     | 2245     | 5.1 | 2335    | 5.3 | 2340      | 6.3 | 2340    | 5.9 |       |   |  |  |
| 14 0205         | 3.1 | 29 0405 | 3.4 | 14 0420                                  | 3.2 | 29 0010 | 5.3 | 14 0410  | 3.0 | 29 0525 | 2.6 | 14 0545   | 1.3 | 29 0555 | 1.6 |       |   |  |  |
| 0835            | 5.8 | 29 1015 | 5.8 | 14 1020                                  | 6.2 | 29 0550 | 2.8 | 14 1010  | 5.9 | 29 1120 | 5.5 | 14 1150   | 6.3 | 29 1205 | 5.6 |       |   |  |  |
| TH 1540         | 2.1 | F 1710  | 1.7 | SU 1725                                  | 1.2 | M 1145  | 5.9 | M 1700   | 1.2 | TU 1745 | 1.6 | TH 1800   | 1.1 | F 1800  | 1.9 |       |   |  |  |
| 2205            | 4.8 | 2345    | 5.1 | 2355                                     | 5.5 | 1820    | 1.4 | 2330     | 5.6 |         |     |           |     |         |     |       |   |  |  |
| 15 0320         | 3.2 | 30 0510 | 3.2 | 15 0520                                  | 2.7 |         |     | 15 0510  | 2.3 | 30 0000 | 5.6 | 15 0015   | 6.7 | 30 0005 | 6.2 |       |   |  |  |
| 0940            | 6.1 | 30 1115 | 6.0 | 15 1125                                  | 6.6 |         |     | 15 1110  | 6.4 | 30 0600 | 2.2 | 15 0630   | 0.8 | 30 0630 | 1.2 |       |   |  |  |
| F 1645          | 1.6 | SA 1800 | 1.5 | M 1815                                   | 0.7 |         |     | TU 1745  | 0.9 | W 1200  | 5.8 | F 1240    | 6.5 | SA 1245 | 5.7 |       |   |  |  |
| 2315            | 5.1 |         |     |  |     |         |     |          |     | 1815    | 1.5 | 1845      | 1.1 | 1835    | 1.9 |       |   |  |  |
| 31 0030         | 5.4 |         |     |  |     |         |     |          |     |         |     | 31 0030   | 5.9 |         |     |       |   |  |  |
| 0600            | 3.0 |         |     |  |     |         |     |          |     |         |     | 31 0630   | 1.8 |         |     |       |   |  |  |
| SU 1200         | 6.2 |         |     |  |     |         |     |          |     |         |     | TH 1230   | 5.9 |         |     |       |   |  |  |
| 1845            | 1.2 |         |     |  |     |         |     |          |     |         |     | 1845      | 1.4 |         |     |       |   |  |  |

PANAMA, PACIFIC COAST - BALBOA

LAT 8°57'N LONG 79°34'W

| TIME ZONE +0500 |     |         |      |         |          |         |      |         |      | TIMES AND HEIGHTS OF HIGH AND LOW WATERS |      |         |      |         |         |      |     |      |      | YEAR | 1968 |  |  |
|-----------------|-----|---------|------|---------|----------|---------|------|---------|------|--|------|---------|------|---------|---------|------|-----|------|------|------|------|--|--|
| JANUARY         |     |         |      |         | FEBRUARY |         |      |         |      | MARCH                                    |      |         |      |         | APRIL   |      |     |      |      |      |      |  |  |
| TIME            | M   | TIME    | M    | TIME    | M        | TIME    | M    | TIME    | M    | TIME                                     | M    | TIME    | M    | TIME    | M       | TIME | M   | TIME | M    |      |      |  |  |
| 1 0130          | 4.3 | 16      | 0029 | 4.1     | 1 0253   | 4.0     | 16   | 0215    | 4.4  | 1 0237                                   | 3.8  | 16      | 0202 | 4.4     | 1 0321  | 4.2  | 16  | 0326 | 4.9  |      |      |  |  |
| 0751            | 0.7 | 16      | 0706 | 0.8     | 1 0911   | 0.5     | 16   | 0844    | 0.1  | 1 0849                                   | 0.6  | 16      | 0823 | 0.1     | 1 0932  | 0.4  | 16  | 0937 | -0.2 |      |      |  |  |
| F 1412          | 4.1 | SA 1315 | 3.9  | M 1534  | 4.0      | TU 1452 | 4.5  | TU 1510 | 4.0  | W 1433                                   | 4.6  | F 1540  | 4.4  | SA 1545 | 5.2     |      |     |      |      |      |      |  |  |
| 2012            | 1.0 | 1927    | 1.0  | 2132    | 0.8      | 2109    | 0.2  | 2113    | 0.7  | 2049                                     | 0.0  | 2153    | 0.2  | 2203    | -0.5    |      |     |      |      |      |      |  |  |
| 2 0220          | 4.4 | 17      | 0130 | 4.3     | 2 0338   | 4.1     | 17   | 0311    | 4.7  | 2 0318                                   | 4.0  | 17      | 0255 | 4.7     | 2 0356  | 4.3  | 17  | 0413 | 5.0  |      |      |  |  |
| 0844            | 0.5 | 17      | 0810 | 0.5     | 2 0950   | 0.3     | 17   | 0934    | -0.3 | 2 0928                                   | 0.4  | 17      | 0914 | -0.3    | 2 1005  | 0.2  | 17  | 1020 | -0.3 |      |      |  |  |
| SA 1500         | 4.1 | SU 1412 | 4.2  | TU 1612 | 4.2      | W 1543  | 4.9  | W 1545  | 4.2  | TH 1521                                  | 5.0  | SA 1611 | 4.6  | SU 1630 | 5.3     |      |     |      |      |      |      |  |  |
| 2103            | 0.9 | 2029    | 0.7  | O 2211  | 0.6      | • 2158  | -0.3 | 2150    | 0.5  | 2140                                     | -0.4 | O 2227  | 0.1  | 2245    | -0.6    |      |     |      |      |      |      |  |  |
| 3 0306          | 4.4 | 18      | 0228 | 4.5     | 3 0418   | 4.2     | 18   | 0403    | 5.0  | 3 0356                                   | 4.2  | 18      | 0346 | 5.0     | 3 0431  | 4.4  | 18  | 0459 | 5.0  |      |      |  |  |
| 0927            | 0.4 | 18      | 0903 | 0.1     | 3 1027   | 0.2     | 18   | 1020    | -0.6 | 3 1003                                   | 0.2  | 18      | 1000 | -0.5    | 3 1038  | 0.2  | 18  | 1103 | -0.2 |      |      |  |  |
| SU 1546         | 4.2 | M 1508  | 4.5  | W 1648  | 4.3      | TH 1633 | 5.2  | TH 1619 | 4.4  | F 1611                                   | 5.3  | SU 1643 | 4.7  | M 1713  | 5.2     |      |     |      |      |      |      |  |  |
| 2146            | 0.8 | 2124    | 0.3  | 2246    | 0.4      | 2243    | -0.6 | O 2223  | 0.2  | • 2223                                   | -0.7 | 2300    | 0.0  | 2327    | -0.5    |      |     |      |      |      |      |  |  |
| 4 0350          | 4.4 | 19      | 0324 | 4.8     | 4 0454   | 4.3     | 19   | 0455    | 5.2  | 4 0428                                   | 4.3  | 19      | 0435 | 5.1     | 4 0504  | 4.5  | 19  | 0545 | 4.9  |      |      |  |  |
| 1008            | 0.3 | 19      | 0952 | -0.3    | 4 1100   | 0.1     | 19   | 1104    | -0.8 | 4 1035                                   | 0.1  | 19      | 1043 | -0.7    | 4 1111  | 0.2  | 19  | 1145 | -0.1 |      |      |  |  |
| M 1630          | 4.3 | TU 1602 | 4.8  | TH 1721 | 4.5      | F 1721  | 5.4  | F 1649  | 4.5  | SA 1656                                  | 5.4  | M 1715  | 4.7  | TU 1758 | 5.0     |      |     |      |      |      |      |  |  |
| O 2227          | 0.7 | • 2213  | 0.0  | 2321    | 0.3      | 2328    | -0.7 | 2256    | 0.1  | 2307                                     | -0.8 | 2334    | 0.0  |         |         |      |     |      |      |      |      |  |  |
| 5 0432          | 4.4 | 20      | 0417 | 5.0     | 5 0529   | 4.4     | 20   | 0543    | 5.2  | 5 0502                                   | 4.4  | 20      | 0522 | 5.2     | 5 0540  | 4.5  | 20  | 0007 | -0.2 |      |      |  |  |
| 1045            | 0.2 | 20      | 1039 | -0.5    | 5 1133   | 0.1     | 20   | 1148    | -0.8 | 5 1107                                   | 0.0  | 20      | 1125 | -0.6    | 5 1145  | 0.2  | 20  | 0631 | 4.7  |      |      |  |  |
| TU 1709         | 4.4 | W 1652  | 5.1  | F 1752  | 4.5      | SA 1807 | 5.4  | SA 1719 | 4.6  | SU 1741                                  | 5.4  | TU 1748 | 4.7  | W 1227  | 0.2     |      |     |      |      |      |      |  |  |
| 2304            | 0.6 | 2300    | -0.3 | 2354    | 0.3      |         |      | 2329    | 0.0  | 2350                                     | -0.7 | 1841    | 4.8  |         |         |      |     |      |      |      |      |  |  |
| 6 0512          | 4.4 | 21      | 0509 | 5.1     | 6 0602   | 4.4     | 21   | 0013    | -0.7 | 6 0535                                   | 4.4  | 21      | 0606 | 5.0     | 6 0009  | 0.1  | 21  | 0052 | 0.1  |      |      |  |  |
| 1121            | 0.2 | 21      | 1123 | -0.6    | 6 1206   | 0.2     | 21   | 0630    | 5.1  | 6 1138                                   | 0.1  | 21      | 1207 | -0.4    | 6 0614  | 4.4  | 21  | 0713 | 4.4  |      |      |  |  |
| W 1746          | 4.5 | TH 1743 | 5.3  | SA 1823 | 4.5      | SU 1231 | -0.5 | SU 1748 | 4.6  | M 1824                                   | 5.2  | W 1220  | 0.4  | TH 1312 | 0.6     |      |     |      |      |      |      |  |  |
| 2341            | 0.6 | 2346    | -0.4 |         |          | 1852    | 5.2  |         |      | 1822                                     | 4.6  | 1924    | 4.4  |         |         |      |     |      |      |      |      |  |  |
| 7 0551          | 4.4 | 22      | 0559 | 5.2     | 7 0030   | 0.3     | 22   | 0059    | -0.5 | 7 0001                                   | 0.1  | 22      | 0033 | -0.5    | 7 0047  | 0.2  | 22  | 0137 | 0.3  |      |      |  |  |
| 1156            | 0.3 | 22      | 1209 | -0.6    | 7 0635   | 4.3     | 22   | 0715    | 4.8  | 7 0606                                   | 4.4  | 22      | 0651 | 4.8     | 7 0654  | 4.3  | 22  | 0800 | 4.1  |      |      |  |  |
| TH 1820         | 4.5 | F 1830  | 5.3  | SU 1239 | 0.3      | M 1317  | -0.2 | M 1210  | 0.2  | TU 1251                                  | -0.1 | TH 1300 | 0.6  | F 1403  | 1.0     |      |     |      |      |      |      |  |  |
|                 |     |         |      |         | 1852     | 4.5     | 1936 | 5.0     | 1819 | 4.5                                      | 1908 | 4.9     | 1902 | 4.4     | 2009    | 4.0  |     |      |      |      |      |  |  |
| 8 0018          | 0.6 | 23      | 0035 | -0.3    | 8 0105   | 0.4     | 23   | 0147    | -0.1 | 8 0033                                   | 0.2  | 23      | 0118 | -0.1    | 8 0131  | 0.4  | 23  | 0230 | 0.8  |      |      |  |  |
| 0627            | 4.3 | 23      | 0649 | 5.1     | 8 0705   | 4.1     | 23   | 0801    | 4.5  | 8 0638                                   | 4.3  | 23      | 0734 | 4.4     | 8 0737  | 4.1  | 23  | 0851 | 3.8  |      |      |  |  |
| F 1232          | 0.4 | SA 1255 | -0.4 | M 1313  | 0.5      | TU 1406 | 0.2  | TU 1244 | 0.3  | W 1337                                   | 0.4  | F 1347  | 0.8  | SA 1459 | 1.3     |      |     |      |      |      |      |  |  |
| 1852            | 4.4 | 1916    | 5.2  | 1921    | 4.4      | 2021    | 4.6  | 1847    | 4.5  | 1950                                     | 4.5  | 1947    | 4.2  | 2104    | 3.7     |      |     |      |      |      |      |  |  |
| 9 0057          | 0.7 | 24      | 0124 | -0.2    | 9 0142   | 0.6     | 24   | 0238    | 0.3  | 9 0110                                   | 0.3  | 24      | 0206 | 0.3     | 9 0222  | 0.6  | 24  | 0328 | 1.1  |      |      |  |  |
| 0702            | 4.2 | 24      | 0737 | 4.8     | 9 0737   | 4.0     | 24   | 0850    | 4.1  | 9 0712                                   | 4.1  | 24      | 0822 | 4.0     | 9 0827  | 3.9  | 24  | 0955 | 3.6  |      |      |  |  |
| SA 1310         | 0.5 | SU 1345 | -0.1 | TU 1350 | 0.7      | W 1459  | 0.7  | W 1321  | 0.5  | TH 1429                                  | 0.8  | SA 1446 | 1.0  | SU 1605 | 1.5     |      |     |      |      |      |      |  |  |
| 1924            | 4.3 | 2003    | 5.0  | 1953    | 4.2      | 2110    | 4.1  | 1924    | 4.3  | 2038                                     | 4.1  | 2043    | 4.0  | 2213    | 3.5     |      |     |      |      |      |      |  |  |
| 10 0137         | 0.9 | 25      | 0217 | 0.1     | 10 0225  | 0.7     | 25   | 0335    | 0.6  | 10 0150                                  | 0.5  | 25      | 0302 | 0.7     | 10 0327 | 0.8  | 25  | 0431 | 1.3  |      |      |  |  |
| 0737            | 4.1 | 25      | 0827 | 4.5     | 10 0817  | 3.8     | 25   | 0949    | 3.7  | 10 0751                                  | 3.9  | 25      | 0915 | 3.7     | 10 0936 | 3.8  | 25  | 1107 | 3.6  |      |      |  |  |
| SU 1347         | 0.8 | M 1438  | -0.2 | W 1432  | 0.9      | TH 1559 | 1.0  | TH 1403 | 0.8  | F 1528                                   | 1.2  | SU 1557 | 1.1  | M 1713  | 1.5     |      |     |      |      |      |      |  |  |
| 2000            | 4.2 | 2053    | 4.7  | 2032    | 4.1      | 2213    | 3.8  | 2001    | 4.1  | 2136                                     | 3.7  | 2200    | 3.8  | 2328    | 3.4     |      |     |      |      |      |      |  |  |
| 11 0222         | 0.9 | 26      | 0310 | 0.4     | 11 0312  | 0.9     | 26   | 0437    | 0.9  | 11 0242                                  | 0.7  | 26      | 0402 | 1.0     | 11 0437 | 0.9  | 26  | 0533 | 1.3  |      |      |  |  |
| 0814            | 3.9 | 26      | 0923 | 4.1     | 11 0904  | 3.6     | 26   | 1109    | 3.4  | 11 0838                                  | 3.7  | 26      | 1030 | 3.4     | 11 1057 | 3.8  | 26  | 1214 | 3.7  |      |      |  |  |
| M 1430          | 0.9 | TU 1533 | 0.6  | TH 1526 | 1.1      | F 1707  | 1.3  | F 1458  | 1.0  | SA 1637                                  | 1.4  | M 1714  | 1.1  | TU 1818 | 1.1     |      |     |      |      |      |      |  |  |
| 2035            | 4.1 | 2147    | 4.3  | 2123    | 3.9      | 2331    | 3.5  | 2054    | 3.9  | 2253                                     | 3.4  | 2329    | 3.8  |         |         |      |     |      |      |      |      |  |  |
| 12 0307         | 1.1 | 27      | 0410 | 0.6     | 12 0412  | 1.0     | 27   | 0550    | 1.1  | 12 0343                                  | 0.9  | 27      | 0512 | 1.2     | 12 0550 | 0.8  | 27  | 0035 | 3.5  |      |      |  |  |
| 0856            | 3.7 | 27      | 1026 | 3.8     | 12 1012  | 3.5     | 27   | 1232    | 3.4  | 12 0944                                  | 3.6  | 27      | 1158 | 3.4     | 12 1214 | 4.1  | 27  | 0634 | 1.2  |      |      |  |  |
| TU 1515         | 1.1 | W 1632  | 0.9  | F 1629  | 1.2      | SA 1822 | 1.4  | SA 1607 | 1.2  | SU 1749                                  | 1.5  | TU 1828 | 0.8  | W 1306  | 3.8     |      |     |      |      |      |      |  |  |
| 2119            | 4.0 | 2252    | 4.1  | 2235    | 3.8      |         |      | 2208    | 3.7  |  |      |         |      | 1914    | 1.2     |      |     |      |      |      |      |  |  |
| 13 0400         | 1.1 | 28      | 0513 | 0.9     | 13 0522  | 1.0     | 28   | 0048    | 3.5  | 13 0457                                  | 0.9  | 28      | 0016 | 3.4     | 13 0042 | 4.1  | 28  | 0125 | 3.7  |      |      |  |  |
| 0952            | 3.6 | 28      | 1142 | 3.6     | 13 1136  | 3.5     | 28   | 0700    | 1.1  | 13 1112                                  | 3.6  | 28      | 0621 | 1.2     | 13 0658 | 0.6  | 28  | 0727 | 1.1  |      |      |  |  |
| W 1608          | 1.2 | TH 1739 | 1.2  | SA 1745 | 1.2      | SU 1341 | 3.5  | SU 1726 | 1.2  | M 1306                                   | 3.5  | W 1317  | 4.4  | TH 1346 | 4.1     |      |     |      |      |      |      |  |  |
| 2215            | 3.9 |         |      | 2359    | 3.8      | 1933    | 1.3  | 2341    | 3.7  | 1903                                     | 1.3  | 1933    | 0.5  | 2002    | 0.9     |      |     |      |      |      |      |  |  |
| 14 0458         | 1.1 | 29      | 0002 | 3.9     | 14 0637  | 0.8     | 29   | 0148    | 3.6  | 14 0613                                  | 0.8  | 29      | 0119 | 3.5     | 14 0143 | 4.4  | 29  | 0207 | 4.0  |      |      |  |  |
| 1101            | 3.5 | 29      | 0622 | 0.9     | 14 1251  | 3.7     | 29   | 0802    | 0.9  | 14 1234                                  | 3.8  | 29      | 0725 | 1.1     | 14 0759 | 0.3  | 29  | 0812 | 0.9  |      |      |  |  |
| TH 1710         | 1.3 | F 1256  | 3.6  | SU 1904 | 1.0      | M 1428  | 3.7  | M 1845  | 0.9  | TU 1354                                  | 3.7  | TH 1410 | 4.8  | F 1421  | 4.3     |      |     |      |      |      |      |  |  |
| 2324            | 3.9 | 1848    | 1.3  |         |          | 2028    | 1.0  |         |      | 1957                                     | 1.1  | 2028    | 0.1  | 2044    | 0.1     | 2044 | 0.6 |      |      |      |      |  |  |
| 15 0601         | 1.0 | 30      | 0109 | 3.8     | 15 0111  | 4.1</   |      |         |      |  |      |         |      |         |         |      |     |      |      |      |      |  |  |

**CHILE, GOLFO DE ANCUD - PUERTO MONTT**

LAT 41°29'S LONG 72°58'W

| TIME ZONE +0400 |      |         |     |         |      |          |      |         |        |         |        | YEAR    | 1988 |          |      |        |     |  |  |
|-----------------|------|---------|-----|---------|------|----------|------|---------|--------|---------|--------|---------|------|----------|------|--------|-----|--|--|
| JANUARY         |      |         |     |         |      | FEBRUARY |      |         |        |         |        | MARCH   |      |          |      | APRIL  |     |  |  |
| TIME            | M    | TIME    | M   | TIME    | M    | TIME     | M    | TIME    | M      | TIME    | M      | TIME    | M    | TIME     | M    |        |     |  |  |
| 1 0610          | 1.5  | 16 0528 | 1.8 | 1 0057  | 6.0  | 16 0033  | 6.4  | 1 0043  | 5.9    | 16 0016 | 6.5    | 1 0103  | 6.0  | 0113     | 6.6  |        |     |  |  |
| 1213            | 5.1  | 1134    | 4.9 | 1 0722  | 1.2  | 16 0701  | 0.6  | 1 0703  | 1.1    | 16 0640 | 0.5    | 1 0714  | -1.1 | 16 0725  | 0.4  |        |     |  |  |
| F 1809          | 1.8  | SA 1730 | 2.0 | M 1327  | 5.4  | TU 1308  | 5.8  | TU 1307 | 5.5    | W 1246  | 6.1    | F 1319  | 5.9  | SA 1334  | 6.8  |        |     |  |  |
|                 |      | 2346    | 5.8 |         | 1918 | 1.6      |      | 1906    | 0.9    |         | 1903   | 1.4     |      | 1926     | 1.1  | • 1951 | 0.4 |  |  |
| 2 0023          | 6.0  | 17 0621 | 1.3 | 2 0129  | 6.1  | 17 0119  | 6.8  | 2 0112  | 6.1    | 17 0059 | 6.9    | 2 0131  | 6.0  | 0154     | 6.5  |        |     |  |  |
| 0654            | 1.3  | 1228    | 5.3 | 2 0751  | 1.1  | 17 0744  | 0.3  | 2 0729  | 1.1    | 17 0720 | 0.2    | 2 0740  | 1.0  | 017 0803 | 0.5  |        |     |  |  |
| SA 1258         | 5.3  | SU 1822 | 1.5 | TU 1355 | 5.4  | W 1350   | 6.2  | W 1333  | 5.6    | TH 1326 | 6.5    | SA 1345 | 6.0  | SU 1412  | 6.8  |        |     |  |  |
|                 | 1.7  |         |     | O 1948  | 1.5  | • 1951   | 0.6  |         | 1930   | 1.3     |        | 1933    | 0.3  | O 1956   | 1.0  | 2032   | 0.5 |  |  |
| 3 0103          | 6.1  | 18 0037 | 6.3 | 3 0158  | 6.1  | 18 0203  | 7.0  | 3 0138  | 6.1    | 18 0141 | 7.0    | 3 0158  | 6.0  | 018 0234 | 6.3  |        |     |  |  |
| 0731            | 1.2  | 0708    | 0.8 | 3 0818  | 1.2  | 18 0826  | 0.1  | 3 0754  | 1.0    | 18 0759 | 0.1    | 3 0806  | 1.1  | 18 0839  | 0.8  |        |     |  |  |
| SU 1334         | 5.3  | M 1315  | 5.6 | W 1421  | 5.4  | TH 1432  | 6.4  | TH 1357 | 5.7    | F 1406  | 6.8    | SU 1412 | 6.1  | M 1449   | 6.7  |        |     |  |  |
|                 | 1.6  |         |     | 2016    | 1.5  |          | 2036 | 0.4     | O 1957 | 1.2     | • 2016 | 0.2     | 2026 | 1.1      | 2111 | 0.8    |     |  |  |
| 4 0137          | 6.1  | 19 0125 | 6.7 | 4 0225  | 6.0  | 19 0245  | 7.0  | 4 0204  | 6.1    | 19 0222 | 7.0    | 4 0226  | 5.9  | 0312     | 5.9  |        |     |  |  |
| 0804            | 1.2  | 0754    | 0.5 | 4 0845  | 1.3  | 19 0906  | 0.2  | 4 0818  | 1.1    | 19 0836 | 0.1    | 4 0831  | 1.2  | 0912     | 1.2  |        |     |  |  |
| M 1407          | 5.3  | TU 1401 | 5.9 | TH 1447 | 5.4  | F 1512   | 6.5  | F 1421  | 5.7    | SA 1444 | 6.8    | M 1439  | 6.1  | TU 1524  | 6.3  |        |     |  |  |
| O 1958          | 1.6  | • 1958  | 0.9 | 2044    | 1.6  |          | 2119 | 0.5     | 2024   | 1.2     |        | 2057    | 0.3  | 2055     | 1.2  | 2149   | 1.2 |  |  |
| 5 0208          | 6.1  | 20 0212 | 6.9 | 5 0251  | 5.9  | 20 0326  | 6.8  | 5 0229  | 6.0    | 20 0301 | 6.7    | 5 0254  | 5.6  | 0349     | 5.4  |        |     |  |  |
| 0834            | 1.3  | 0840    | 0.4 | 5 0910  | 1.4  | 20 0945  | 0.4  | 5 0842  | 1.1    | 20 0912 | 0.4    | 5 0857  | 1.4  | 0945     | 1.8  |        |     |  |  |
| TU 1437         | 5.2  | W 1446  | 6.0 | F 1512  | 5.3  | SA 1552  | 6.4  | SA 1445 | 5.7    | SU 1521 | 6.7    | TU 1506 | 5.9  | W 1559   | 5.8  |        |     |  |  |
|                 | 1.7  | 2045    | 0.9 | 2111    | 1.7  |          | 2201 | 0.7     | 2051   | 1.3     |        | 2136    | 0.5  | 2126     | 1.4  | 2228   | 1.7 |  |  |
| 6 0238          | 5.9  | 21 0258 | 6.9 | 6 0316  | 5.7  | 21 0406  | 6.4  | 6 0254  | 5.8    | 21 0339 | 6.3    | 6 0324  | 5.3  | 0430     | 4.8  |        |     |  |  |
| 0904            | 1.4  | 0925    | 0.4 | 6 0934  | 1.5  | 21 1021  | 0.7  | 6 0905  | 1.3    | 21 0947 | 0.8    | 6 0924  | 1.6  | 2109     | 2.3  |        |     |  |  |
| W 1507          | 5.1  | TH 1532 | 6.1 | SA 1536 | 5.3  | SU 1630  | 6.2  | SU 1509 | 5.7    | M 1557  | 6.4    | W 1536  | 5.7  | TH 1637  | 5.3  |        |     |  |  |
|                 | 1.9  | 2133    | 0.9 | 2138    | 1.8  |          | 2242 | 1.1     | 2118   | 1.4     |        | 2215    | 1.0  | 2200     | 1.7  | 2318   | 2.3 |  |  |
| 7 0308          | 5.8  | 22 0344 | 6.7 | 7 0341  | 5.6  | 22 0444  | 5.9  | 7 0318  | 5.6    | 22 0416 | 5.7    | 7 0358  | 4.9  | 0525     | 4.3  |        |     |  |  |
| 0934            | 1.6  | 1010    | 0.6 | 7 0957  | 1.7  | 22 1057  | 1.2  | 7 0927  | 1.4    | 22 1020 | 1.4    | 7 0955  | 2.0  | 22 1105  | 2.8  |        |     |  |  |
| TH 1537         | 5.0  | F 1617  | 6.0 | SU 1601 | 5.2  | M 1709   | 5.9  | M 1534  | 5.6    | TU 1634 | 5.9    | TH 1612 | 5.4  | F 1732   | 4.8  |        |     |  |  |
|                 | 2.0  | 2220    | 1.1 | 2205    | 1.9  |          | 2324 | 1.6     | 2145   | 1.6     |        | 2256    | 1.6  | 2243     | 2.1  |        |     |  |  |
| 8 0338          | 5.6  | 23 0429 | 6.4 | 8 0407  | 5.3  | 23 0525  | 5.3  | 8 0344  | 5.4    | 23 0457 | 5.1    | 8 0445  | 4.5  | 0034     | 2.7  |        |     |  |  |
| 1004            | 1.8  | 1053    | 0.9 | 8 1020  | 1.8  | 23 1134  | 1.8  | 8 0950  | 1.6    | 23 1056 | 2.0    | 8 1037  | 2.4  | 0704     | 4.1  |        |     |  |  |
| F 1608          | 4.9  | SA 1701 | 5.9 | M 1629  | 5.1  | TU 1753  | 5.4  | TU 1600 | 5.4    | W 1715  | 5.4    | F 1704  | 5.0  | SA 1237  | 3.2  |        |     |  |  |
|                 | 2.2  | 2307    | 1.3 | 2235    | 2.1  |          |      | 2215    | 1.8    |         | 2348   | 2.2     | 2353 | 2.4      | 1912 | 4.6    |     |  |  |
| 9 0410          | 5.4  | 24 0513 | 6.0 | 9 0435  | 5.1  | 24 0016  | 2.1  | 9 0413  | 5.0    | 24 0551 | 4.4    | 9 0610  | 4.1  | 0228     | 2.7  |        |     |  |  |
| 1035            | 2.0  | 1134    | 1.2 | 9 1047  | 2.0  | 24 0617  | 4.6  | 1016    | 2.0    | 1145    | 2.6    | 1155    | 2.8  | 0856     | 4.2  |        |     |  |  |
| SA 1641         | 4.8  | SU 1746 | 5.7 | TU 1702 | 5.0  | W 1223   | 2.4  | W 1631  | 5.2    | TH 1816 | 4.9    | SA 1840 | 4.7  | SU 1446  | 3.1  |        |     |  |  |
|                 | 2.3  | 2355    | 1.7 | 2313    | 2.3  |          | 1854 | 5.0     | 2253   | 2.2     |        |         |      | 2054     | 4.6  |        |     |  |  |
| 10 0443         | 5.2  | 25 0559 | 5.5 | 10 0512 | 4.7  | 25 0139  | 2.6  | 10 0451 | 4.6    | 25 0115 | 2.6    | 10 0156 | 2.5  | 0343     | 2.5  |        |     |  |  |
| 1107            | 2.1  | 1218    | 1.7 | 1122    | 2.3  | 25 0752  | 4.1  | 1051    | 2.3    | 25 0740 | 4.0    | 0821    | 4.2  | 25 1001  | 4.5  |        |     |  |  |
| SU 1718         | 4.8  | M 1835  | 5.4 | W 1747  | 4.8  | TH 1351  | 2.9  | TH 1716 | 4.9    | F 1325  | 3.1    | SU 1412 | 2.9  | M 1555   | 2.8  |        |     |  |  |
|                 | 2.5  |         |     |         |      | 2041     | 4.7  |         | 2352   | 2.5     | 2011   | 4.6     | 2037 | 4.9      | 2159 | 4.9    |     |  |  |
| 11 0521         | 4.9  | 26 0050 | 2.1 | 11 0608 | 2.6  | 26 0357  | 2.6  | 11 0557 | 4.1    | 26 0329 | 2.6    | 11 0332 | 2.1  | 26 0428  | 2.2  |        |     |  |  |
| 1144            | 2.2  | 0653    | 5.0 | 11 0609 | 4.3  | 26 1020  | 4.2  | 1153    | 2.8    | 26 0959 | 4.2    | 11 0950 | 4.7  | 26 1039  | 4.9  |        |     |  |  |
| M 1802          | 4.7  | TU 1309 | 2.1 | TH 1219 | 2.7  | F 1608   | 2.8  | F 1845  | 4.6    | SA 1546 | 2.9    | M 1546  | 2.4  | TU 1638  | 2.4  |        |     |  |  |
|                 |      | 1935    | 5.2 | 1904    | 4.6  |          | 2228 | 4.9     |        | 2158    | 4.6    |         | 2159 | 5.4      | 2242 | 5.2    |     |  |  |
| 12 0005         | 2.6  | 27 0204 | 2.4 | 12 0150 | 2.8  | 27 0515  | 2.1  | 12 0203 | 2.7    | 27 0442 | 2.2    | 12 0434 | 1.6  | 27 0502  | 1.9  |        |     |  |  |
| 0607            | 4.7  | 0810    | 4.5 | 0809    | 4.0  | 27 1131  | 4.6  | 0830    | 3.9    | 27 1058 | 4.6    | 1045    | 5.2  | 27 1111  | 5.2  |        |     |  |  |
| TU 1230         | 2.4  | W 1421  | 2.5 | F 1412  | 2.9  | SA 1719  | 2.4  | SA 1420 | 3.0    | SU 1650 | 2.5    | TU 1646 | 1.8  | W 1714   | 2.1  |        |     |  |  |
|                 | 4.7  | 2059    | 5.0 | 2105    | 4.6  | 2330     | 5.3  | 2101    | 4.7    |         | 2257   | 5.2     | 2256 | 5.9      | 2318 | 5.4    |     |  |  |
| 13 0108         | 2.7  | 28 0351 | 2.5 | 13 0416 | 2.5  | 28 0601  | 1.7  | 13 0410 | 2.3    | 28 0524 | 1.8    | 13 0522 | 1.1  | 28 0533  | 1.7  |        |     |  |  |
| 0713            | 4.5  | 0957    | 4.3 | 1030    | 4.2  | 28 1210  | 5.0  | 1029    | 4.4    | 28 1133 | 5.0    | 13 1130 | 5.8  | 28 1140  | 5.5  |        |     |  |  |
| W 1334          | 2.5  | TH 1600 | 2.6 | SA 1620 | 2.6  | SU 1801  | 2.0  | SU 1617 | 2.5    | M 1729  | 2.1    | W 1737  | 1.2  | TH 1747  | 1.8  |        |     |  |  |
|                 | 4.7  | 2227    | 5.1 | 2242    | 5.1  |          |      | 2233    | 5.2    |         | 2335   | 5.5     | 2345 | 6.3      | 2352 | 5.6    |     |  |  |
| 14 0239         | 2.7  | 29 0516 | 2.1 | 14 0528 | 1.8  | 29 0011  | 5.7  | 14 0513 | 1.6    | 29 0555 | 1.5    | 0605    | 0.7  | 29 0602  | 1.5  |        |     |  |  |
| 0849            | 4.3  | 1126    | 4.6 | 1138    | 4.8  | 29 0634  | 1.3  | 1123    | 5.0    | 29 1202 | 5.3    | 1213    | 6.3  | 29 1210  | 5.7  |        |     |  |  |
| TH 1501         | 2.6  | F 1716  | 2.3 | SU 1729 | 2.0  | M 1240   | 5.3  | M 1718  | 1.8    | TU 1800 | 1.7    | TH 1823 | 0.7  | F 1821   | 1.5  |        |     |  |  |
|                 | 4.9  | 2333    | 5.4 | 2344    | 5.8  | 1834     | 1.7  | 2329    | 5.9    |         |        |         |      |          |      |        |     |  |  |
| 15 0421         | 2.4  | 30 0611 | 1.7 | 15 0617 | 1.2  |          |      |         |        |         |        |         |      |          |      |        |     |  |  |
| 1023            | 4.5  | 1218    | 4.9 | 1226    | 5.4  |          |      |         |        |         |        |         |      |          |      |        |     |  |  |
| F 1626          | 2.4  | SA 1807 | 2.0 | M 1820  | 1.4  |          |      |         |        |         |        |         |      |          |      |        |     |  |  |
|                 | 5.3  | 2248    | 5.3 |         |      |          |      |         |        |         |        |         |      |          |      |        |     |  |  |
| 31 0021         | 5.7  |         |     |         |      |          |      |         |        |         |        |         |      |          |      |        |     |  |  |
| 0650            | 1.4  |         |     |         |      |          |      |         |        |         |        |         |      |          |      |        |     |  |  |
| SU 1256         | 5.2  |         |     |         |      |          |      |         |        |         |        |         |      |          |      |        |     |  |  |
|                 | 1846 | 1.8     |     |         |      |          |      |         |        |         |        |         |      |          |      |        |     |  |  |
| 31 0035         | 5.9  |         |     |         |      |          |      |         |        |         |        |         |      |          |      |        |     |  |  |
| 0648            | 1.2  |         |     |         |      |          |      |         |        |         |        |         |      |          |      |        |     |  |  |
| TH 1253         | 5.6  |         |     |         |      |          |      |         |        |         |        |         |      |          |      |        |     |  |  |
|                 | 1857 | 1.3     |     |         |      |          |      |         |        |         |        |         |      |          |      |        |     |  |  |

**U.S.A. - ADMIRALTY INLET**

LAT 48°02'N LONG 122°38'W

TIDAL STREAM PREDICTIONS (RATES IN KNOTS)

| TIME ZONE +0800 |         |         |         | POSITIVE (+) DIRECTION 180 NEGATIVE (-) DIRECTION 005 |         |         |         | YEAR 1988 |         |        |         |      |      |
|-----------------|---------|---------|---------|---|---------|---------|---------|-----------|---------|--------|---------|------|------|
| APRIL           |         |         |         | MAY   |         |         |         | JUNE      |         |        |         |      |      |
| SLACK           | MAXIMUM | SLACK   | MAXIMUM | SLACK   | MAXIMUM | SLACK   | MAXIMUM | SLACK     | MAXIMUM |        |         |      |      |
| TIME            | TIME    | RATE    | TIME    | TIME  | RATE    | TIME    | TIME    | RATE      | TIME    |        |         |      |      |
| 1 0145          | 1.7     | 16      | 0144    | 1.9   | 1 0131  | 1.0     | 16 0001 | 0155      | 0.9     |        |         |      |      |
| 0426            | 0802    | -2.9    | 0411    | 0800  | -3.9    | 0333    | 0741    | -3.3      | 0326    |        |         |      |      |
| F 1141          | 1417    | 1.7     | SA 1135 | 1433  | 2.9     | SU 1126 | 1428    | 2.4       | M 1152  |        |         |      |      |
| 1656            | 2019    | -2.4    | ● 1743  | 2044  | -2.6    | O 1744  | 2041    | -2.0      | 1504    | 3.2    |         |      |      |
| 2342            |         |         |         |   |         | 1839    | 2129    | -2.0      | 1208    | 1527   | 3.1     |      |      |
| 2 0217          | 1.6     | 17      | 0003    | 0226  | 1.6     | 0009    | 0202    | 0.8       | 0144    | 0257   | 0.3     |      |      |
| 0445            | 0827    | -3.0    | 0441    | 0836  | -4.0    | 0354    | 0814    | -3.4      | 0405    | 0902   | -3.7    |      |      |
| SA 1206         | 1451    | 1.9     | SU 1216 | 1520  | 3.0     | M 1156  | 1503    | 2.6       | TU 1233 | 1549   | 3.1     |      |      |
| O 1741          | 2055    | -2.3    | 1837    | 2135  | -2.4    | 1829    | 2124    | -1.9      | 1926    | 2218   | -1.9    |      |      |
| 3 0019          | 0242    | 1.4     | 18 0055 | 0307  | 1.3     | 0054    | 0235    | 0.6       | 0240    | 0346   | 0.3     |      |      |
| 0503            | 0855    | -3.1    | 0510    | 0917  | -3.9    | 0416    | 0845    | -3.5      | 0451    | 0949   | -3.5    |      |      |
| SU 1233         | 1523    | 2.1     | M 1258  | 1605  | 3.0     | TU 1231 | 1544    | 2.7       | W 1315  | 1633   | 2.9     |      |      |
| 1825            | 2132    | -2.2    | 1930    | 2224  | -2.2    | 1914    | 2205    | -1.8      | 2011    | 2305   | -1.8    |      |      |
| 4 0058          | 0314    | 1.1     | 19 0149 | 0346  | 0.9     | 0143    | 0314    | 0.5       | 0406    | 0.2    | 0444    | 0.2  |      |
| 0520            | 0922    | -3.2    | 0538    | 0957  | -3.7    | 0440    | 0920    | -3.5      | 1011    | -3.2   | 1042    | -3.3 |      |
| M 1303          | 1558    | 2.2     | TU 1342 | 1652  | 2.8     | W 1309  | 1625    | 2.8       | TH 1358 | 1717   | 2.6     |      |      |
| 1910            | 2212    | -2.0    | 2021    | 2316  | -1.9    | 2002    | 2253    | -1.8      | 2055    | 2356   | -1.7    |      |      |
| 5 0140          | 0343    | 0.9     | 20 0250 | 0429  | 0.6     | 0240    | 0355    | 0.3       | 0456    | 0.0    | 0031    | -2.2 |      |
| 0538            | 0951    | -3.2    | 0604    | 1038  | -3.3    | 0506    | 1000    | -3.4      | 1055    | -2.8   | 0442    | 0549 |      |
| TU 1338         | 1640    | 2.3     | W 1428  | 1740  | 2.5     | TH 1353 | 1711    | 2.7       | F 1443  | 1800   | 2.3     |      |      |
| 1959            | 2259    | -1.8    | 2114    |   |         | 2051    | 2348    | -1.7      | 2137    |        | 1515    | 1835 |      |
| 6 0227          | 0413    | 0.6     | 21 0013 | -1.7  | 6 0442  | 0.1     | .0051   | -1.7      | 0539    | 0700   | 0.4     |      |      |
| 0557            | 1028    | -3.2    | 0515    | 0.2   | 1049    | -3.2    | 0553    | -0.1      | M 0829  | 1247   | -2.4    |      |      |
| W 1419          | 1727    | 2.2     | TH 1727 | -2.9  | F 1442  | 1804    | 2.6     | SA 1424   | 1746    | 2.9    |         |      |      |
| 2053            | 2348    | -1.6    | 1519    | 1835  | 2.2     | 2143    |         | SU 2119   |         | 1449   | 1804    |      |      |
| 2208            |         |         |         |   |         | 1530    | 1848    | 2.0       | 2127    |        | 2156    |      |      |
| 7 0325          | 0454    | 0.4     | 22 0114 | -1.5  | 7 0044  | -1.7    | 0143    | -1.8      | 0630    | 0821   | 0.7     |      |      |
| 0618            | 1109    | -3.1    | 0613    | 0.0   | 0547    | 0.0     | 0701    | -0.2      | TU 1017 | 1358   | -2.0    |      |      |
| TH 1507         | 1817    | 2.1     | F 1216  | -2.5  | SA 1146 | -2.9    | SU 1238 | -2.0      | W 1024  | 1358   | -1.3    |      |      |
| 2153            |         |         | 1616    | 1930  | 1.9     | 1537    | 1858    | 2.4       | 1714    | 2021   | 2.0     |      |      |
| 2303            |         |         | 2303    |   | 2235    |         | 1620    | 1939      | 1.8     | 2318   |         | 2250 |      |
| 8 0049          | -1.4    | 23 0219 | -1.5    | 8 0147  | -1.9    | 0234    | -2.0    | 8 0309    | -3.1    | 0301   | -2.6    |      |      |
| 0542            | 0.1     | 0725    | -0.2    | 0703  | 0.0     | 0815    | -0.1    | 0717      | 0938    | 1.2    | 0729    | 0940 |      |
| F 1201          | -2.9    | SA 1317 | -2.2    | SU 1251   | -2.6    | M 1340  | -1.7    | W 1205    | 1518    | -1.7   | 1207    | 1514 |      |
| 1604            | 1920    | 2.1     | 1716    | 2032  | 1.7     | 1638    | 1958    | 2.3       | 1714    | 2027   | 1.6     |      |      |
| 2259            |         |         | 2356    |   | 2324    |         | 1714    | 2027      | 1.6     | 2356   |         | 2316 |      |
| 9 0204          | -1.4    | 24 0327 | -1.6    | 9 0249  | -2.2    | 0323    | -2.2    | 9 0358    | -3.4    | 0343   | -2.8    |      |      |
| 0651            | 0.0     | 0849    | -0.1    | 0827  | 0.2     | 0830    | 0.2     | 0802      | 1045    | 1.7    | 0801    | 1036 |      |
| SA 1304         | -2.7    | SU 1433 | -1.9    | M 1415  | -2.3    | TU 1451 | -1.5    | TH 1341   | 1636    | -1.6   | F 1338  | 1628 |      |
| 1709            | 2028    | 2.0     | 1819    | 2127  | 1.6     | 1744    | 2058    | 2.1       | 1813    | 2116   | 1.4     | 1931 | 2142 |
| 10 0004         | 0315    | -1.5    | 25 0042 | 0422  | -1.9    | 0009    | 0345    | -2.5      | 0005    | 0406   | -2.4    |      |      |
| 0821            | 0.0     | 1009    | 0.1     | 0757  | 0949    | 0.7     | 0831    | 1031      | 0.6     | 0846   | 1143    | 2.2  |      |
| SU 1427         | -2.5    | M 1543  | -1.8    | TU 1143   | 1530    | -2.1    | W 1235  | 1606      | -1.4    | F 1500 | 1747    | -1.6 |      |
| 1819            | 2137    | 2.1     | 1920    | 2224  | 1.5     | 1852    | 2156    | 2.0       | 1914    | 2202   | 1.2     |      |      |
| 2504            |         |         |         |   |         | 1914    | 2202    | 1.2       | 2049    | 2304   | 1.0     | 2047 | 2235 |
| 11 0100         | 0422    | -1.9    | 26 0121 | 0506  | -2.2    | 11 0051 | 0435    | -3.0      | 11 0033 | 0448   | -3.6    |      |      |
| 0835            | 0951    | 0.3     | 0924    | 1110  | 0.5     | 0835    | 1100    | 1.3       | 0846    | 1131   | 1.7     |      |      |
| M 1107          | 1543    | -2.5    | TU 1254 | 1648  | -1.8    | W 1326  | 1647    | -2.1      | 0851    | 1236   | 2.6     |      |      |
| 1926            | 2237    | 2.1     | 2015    | 2310  | 1.5     | TH 1401 | 1706    | -1.4      | 0865    | 1247   | -2.4    |      |      |
| 2237            |         |         |         |   |         | 1959    | 2251    | 1.8       | 0871    | 1246   | 1.0     | 0871 | 1246 |
| 12 0148         | 0513    | -2.4    | 27 0155 | 0542  | -2.4    | 12 0130 | 0523    | -3.4      | 12 0103 | 0520   | -2.9    |      |      |
| 0906            | 1104    | 0.8     | 0945    | 1155  | 0.9     | 0913    | 1155    | 1.9       | 0921    | 1207   | 1.6     |      |      |
| TU 1302         | 1700    | -2.6    | W 1414  | 1748  | -1.8    | TH 1449 | 1755    | -2.1      | F 1508  | 1806   | -1.4    |      |      |
| 2028            | 2332    | 2.2     | 2106    | 2345  | 1.4     | 2104    | 2341    | 1.6       | 2117    | 2328   | 0.8     |      |      |
| 2348            |         |         |         |   |         | 2104    | 2341    | 1.6       | 2306    |        | 2257    |      |      |
| 13 0229         | 0601    | -2.9    | 28 0224 | 0617  | -2.7    | 13 0206 | 0605    | -3.7      | 13 0103 | 0555   | -3.1    |      |      |
| 0941            | 1205    | 1.4     | 1008    | 1236  | 1.4     | 0952    | 1248    | 2.5       | 0949    | 1246   | 2.0     |      |      |
| W 1431          | 1802    | -2.7    | TH 1517 | 1837  | -1.9    | F 1557  | 1853    | -2.1      | SA 1605 | 1855   | -1.5    |      |      |
| 2126            |         |         | 2153    |   | 2205    |         | 1744    | 2058      | 2.1     | M 1054 | 1410    | 3.0  |      |
| 2239            |         |         |         |   |         | 2205    |         | 1834      | 2122    | -1.8   | TU 1027 | 1348 | 2.9  |
| 2304            |         |         |         |   |         | 2304    |         | 1834      | 2122    | -1.8   | O 1812  | 2058 | -1.8 |
| 2348            |         |         |         |   |         | 2309    |         | 1834      | 2122    | -1.8   | 2348    |      | 2348 |
| 14 0017         | 2.2     | 29 0249 | 0645    | -3.0  | 14 0241 | 0647    | -3.9    | 14 0156   | 0630    | -3.4   |         |      |      |
| 0305            | 0640    | -3.3    | 0249    | 0645  | -3.0    | 0241    | 0647    | -3.9      | 0258    | 0746   | -3.8    |      |      |
| TH 1018         | 1259    | 2.1     | F 1032  | 1317  | 1.8     | SA 1032 | 1338    | 2.9       | SU 1020 | 1326   | 2.4     |      |      |
| 1543            | 1903    | -2.8    | 1610    | 1920  | -2.0    | 1657    | 1950    | -2.1      | 1655    | 1945   | -1.6    |      |      |
| 2220            |         |         | 1610    | 1920  | -2.0    | 1657    | 1950    | -2.1      | 1655    | 1945   | -1.6    |      |      |
| 2239            |         |         | 2239    |   | 2304    |         | 1744    | 2058      | 2.1     | 1744   | 2058    | -1.8 |      |
| 2304            |         |         |         |   |         | 2309    |         | 1834      | 2122    | -1.8   | O 1812  | 2058 | -1.8 |
| 2348            |         |         |         |   |         | 2309    |         | 1834      | 2122    | -1.8   | 2348    |      | 2348 |
| 15 0101         | 2.1     | 30 0312 | 0714    | -3.2  | 15 0314 | 0728    | -4.0    | 15 0223   | 0704    | -3.5   |         |      |      |
| 0339            | 0719    | -3.7    | 0312    | 0714  | -3.2    | 0314    | 0728    | -4.0      | 0223    | 0704   | -3.5    |      |      |
| F 1056          | 1348    | 2.6     | SA 1058 | 1353  | 2.1     | SU 1112 | 1421    | 3.1       | M 1053  | 1407   | 2.7     |      |      |
| 1646            | 1955    | -2.7    | 1658    | 2000  | -2.0    | 1658    | 2000    | -2.1      | 1741    | 2029   | -1.7    |      |      |
| 2312            |         |         | 2324    |   | 2324    |         | 1741    | 2029      | -1.7    | 1915   | 2205    | -1.8 |      |
| 2324            |         |         |         |   |         | 2324    |         | 1834      | 2122    | -1.8   | O 1852  | 2141 | -2.0 |

31 0001 0127 0.4  
0252 0740 -3.7  
TU 1129 1445 3.0

-103 O 1827 2115 -1.8

**UNITED STATES – BOSTON**

LAT 42°21'N LONG 71°03'W

TIME ZONE +0500

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

YEAR 0000

| JANUARY |        |           |      | FEBRUARY |           |         |      | MARCH     |      |         |           | APRIL   |      |           |         |
|---------|--------|-----------|------|----------|-----------|---------|------|-----------|------|---------|-----------|---------|------|-----------|---------|
| Time    | m      | Time      | m    | Time     | m         | Time    | m    | Time      | m    | Time    | m         | Time    | m    | Time      | m       |
| 0327    | 2.7    | <b>16</b> | 0421 | 3.1      | 1         | 0418    | 2.8  | <b>16</b> | 0541 | 2.9     | 1         | 0256    | 3.0  | <b>16</b> | 0405    |
| 0929    | 0.5    | 1030      | 0.1  | 1038     | 0.3       | 1038    | 0.3  | 1038      | 0.1  | 0916    | 0.1       | 1028    | 0.2  | 1046      | 0.1     |
| M 1538  | 2.7    | TU 1645   | 2.9  | TH 1646  | 2.7       | F 1822  | 2.6  | TH 1524   | 2.8  | F 1645  | 2.6       | 1700    | 2.7  | M 1807    | 2.5     |
| 2156    | 0.3    | 2255      | 0.1  | 2257     | 0.3       | 2133    | 0.2  | 2243      | 0.5  | 2305    | 0.4       |         |      |           |         |
| 0413    | 2.7    | <b>17</b> | 0519 | 3.0      | <b>2</b>  | 0510    | 2.9  | <b>17</b> | 0018 | 0.5     | <b>2</b>  | 0343    | 3.0  | <b>17</b> | 0501    |
| 1021    | 0.5    | 1133      | 0.2  | 1136     | 0.2       | 0640    | 2.8  | 1009      | 0.2  | 1127    | 0.3       | 1149    | 0.1  | 0620      | 0.7     |
| TU 1629 | 2.7    | W 1749    | 2.8  | F 1744   | 2.6       | SA 1308 | 0.3  | F 1618    | 2.7  | SA 1746 | 2.5       | M 1805  | 2.7  | TU 1244   | 0.5     |
| 2245    | 0.3    | 2353      | 0.2  | 2352     | 0.3       | 1925    | 2.5  | 2226      | 0.3  | 2342    | 0.6       | 1904    | 2.5  |           |         |
| 0501    | 2.7    | <b>18</b> | 0617 | 3.0      | <b>3</b>  | 0606    | 3.0  | <b>18</b> | 0117 | 0.5     | <b>3</b>  | 0437    | 3.0  | <b>18</b> | 0601    |
| 1115    | 0.4    | 1237      | 0.2  | 1236     | 0.2       | 0739    | 2.8  | 1107      | 0.2  | 1230    | 0.4       | 0623    | 3.1  | 0717      | 0.6     |
| W 1723  | 2.7    | TH 1853   | 2.7  | SA 1845  | 2.7       | 1408    | 0.3  | SA 1718   | 2.6  | SU 1849 | 2.5       | TU 1253 | 0.0  | W 1337    | 0.4     |
| 2336    | 0.3    |           |      |          |           | 2023    | 2.5  | 2324      | 0.3  | 1909    | 2.8       |         |      | 1955      | 2.6     |
| 0552    | 2.8    | <b>19</b> | 0051 | 0.3      | <b>4</b>  | 0051    | 0.3  | <b>19</b> | 0212 | 0.5     | <b>4</b>  | 0537    | 3.0  | <b>19</b> | 0042    |
| 1211    | 0.3    | 0715      | 3.0  | 0704     | 3.1       | 0833    | 2.9  | 1210      | 0.1  | 0702    | 2.7       | 0728    | 3.2  | 0810      | 0.5     |
| TH 1819 | 2.7    | F 1339    | 0.2  | SU 1336  | 0.0       | M 1500  | 0.2  | SU 1821   | 2.7  | M 1330  | 0.4       | 1425    | 0.4  |           |         |
|         |        | 1954      | 2.6  | 1947     | 2.7       | 2114    | 2.6  | 1947      | 2.5  | 2011    | 3.0       | 2041    | 2.7  |           |         |
| 0029    | 0.3    | <b>20</b> | 0147 | 0.4      | <b>5</b>  | 0150    | 0.2  | <b>20</b> | 0302 | 0.4     | <b>5</b>  | 0027    | 0.3  | <b>20</b> | 0215    |
| 0644    | 3.0    | 0810      | 3.0  | 0804     | 3.3       | 0921    | 2.9  | 0640      | 3.1  | 0759    | 2.8       | 0831    | 3.3  | 0858      | 0.4     |
| F 1308  | 0.2    | SA 1436   | 0.2  | M 1435   | -0.2      | TU 1544 | 0.2  | M 1313    | 0.0  | TU 1423 | 0.4       | 1451    | -0.2 | F 1508    | 0.3     |
| 1916    | 2.7    | 2050      | 2.6  | 2047     | 2.8       | 2158    | 2.6  | 1926      | 2.7  | 2039    | 2.6       | 2107    | 3.2  | 2123      | 2.9     |
| 0123    | 0.2    | <b>21</b> | 0239 | 0.4      | <b>6</b>  | 0248    | 0.0  | <b>21</b> | 0347 | 0.4     | <b>6</b>  | 0129    | 0.2  | <b>21</b> | 0231    |
| 0736    | 3.1    | 0900      | 3.0  | 0902     | 3.4       | 1005    | 3.0  | 0744      | 3.2  | 0850    | 2.9       | 0929    | 3.4  | 0942      | 3.0     |
| SA 1404 | 0.0    | SU 1526   | 0.1  | TU 1532  | -0.4      | W 1624  | 0.1  | TU 1414   | -0.2 | W 1509  | 0.3       | F 1544  | -0.3 | SA 1548   | 0.2     |
| 2013    | 2.8    | 2140      | 2.6  | 2144     | 3.0       | 2238    | 2.7  | 2028      | 2.9  | 2124    | 2.7       | 2200    | 3.3  | 2202      | 3.0     |
| 0217    | 0.2    | <b>22</b> | 0327 | 0.4      | <b>7</b>  | 0344    | -0.1 | <b>22</b> | 0428 | 0.3     | <b>7</b>  | 0230    | 0.0  | <b>22</b> | 0318    |
| 0829    | 3.3    | 0945      | 3.0  | 0958     | 3.6       | 1045    | 3.0  | 0846      | 3.4  | 0935    | 2.9       | 1023    | 3.4  | 1024      | 3.0     |
| SU 1459 | -0.2   | M 1609    | 0.1  | W 1625   | -0.5      | TH 1701 | 0.1  | W 1512    | -0.3 | TH 1550 | 0.2       | 1634    | -0.3 | SU 1628   | 0.2     |
| 2109    | 2.9    | 2224      | 2.7  | 2239     | 3.1       | 2314    | 2.8  | 2126      | 3.0  | 2204    | 2.8       | 2249    | 3.4  | 2239      | 3.1     |
| 0310    | 0.0    | <b>23</b> | 0410 | 0.3      | <b>8</b>  | 0439    | -0.3 | <b>23</b> | 0507 | 0.2     | <b>8</b>  | 0328    | -0.2 | <b>23</b> | 0451    |
| 0922    | 3.4    | 1027      | 3.0  | 1053     | 3.7       | 1122    | 3.1  | 0944      | 3.5  | 1017    | 3.0       | 1114    | 3.4  | 1104      | 3.0     |
| M 1552  | -0.4   | TU 1649   | 0.0  | TH 1717  | -0.6      | F 1736  | 0.0  | TH 1606   | -0.4 | F 1627  | 0.1       | 1721    | -0.3 | M 1707    | 0.1     |
| 2204    | 3.0    | 2304      | 2.7  | O 2331   | 3.3       | ● 2349  | 2.8  | 2220      | 3.2  | 2241    | 2.9       | 2335    | 3.5  | ● 2317    | 3.2     |
| 0403    | -0.1   | <b>24</b> | 0451 | 0.3      | <b>9</b>  | 0532    | -0.4 | <b>24</b> | 0546 | 0.2     | <b>9</b>  | 0423    | -0.3 | <b>24</b> | 0441    |
| 1015    | 3.6    | 1106      | 3.1  | 1147     | 3.7       | 1159    | 3.1  | 1039      | 3.6  | 1055    | 3.0       | 1203    | 3.4  | 1145      | 3.0     |
| TU 1644 | -0.5   | W 1727    | 0.0  | F 1807   | -0.6      | SA 1812 | 0.0  | F 1657    | -0.5 | SA 1704 | 0.1       | M 1807  | -0.2 | TU 1747   | 0.1     |
| O 2257  | 3.1    | ● 2341    | 2.7  |          |           |         |      | O 2311    | 3.4  | ● 2316  | 3.0       |         |      | 2355      | 3.3     |
| 0456    | -0.2   | <b>25</b> | 0531 | 0.3      | <b>10</b> | 0022    | 3.4  | <b>25</b> | 0024 | 2.9     | <b>10</b> | 0516    | -0.4 | <b>25</b> | 0520    |
| 1108    | 3.7    | 1145      | 3.1  | 0625     | -0.4      | 0625    | 0.1  | 1131      | -3.6 | 1133    | 3.1       | 0636    | -0.4 | 1227      | 3.0     |
| W 1736  | -0.6   | TH 1804   | 0.0  | SA 1239  | 3.6       | SU 1236 | 3.0  | SA 1745   | -0.5 | SU 1740 | 0.1       | TU 1251 | 3.3  | W 1828    | 0.1     |
| 2349    | 3.2    |           |      | 1857     | -0.6      | 1848    | 0.0  |           |      | 2351    | 3.0       | 1853    | -0.1 |           |         |
| 0548    | -0.2   | <b>26</b> | 0017 | 2.7      | <b>11</b> | 0112    | 3.4  | <b>26</b> | 0059 | 2.9     | <b>11</b> | 0000    | 3.4  | <b>26</b> | 0035    |
| 1201    | 3.7    | 0610      | 0.2  | 0717     | -0.4      | 0704    | 0.1  | 0607      | -0.5 | 1211    | 3.1       | 0723    | -0.3 | 0659      | -0.2    |
| TH 1827 | -0.6   | F 1222    | 3.1  | SU 1332  | 3.5       | M 1314  | 3.0  | SU 1222   | 3.5  | M 1817  | 0.1       | W 1339  | 3.1  | TH 1311   | 3.0     |
|         |        | 1840      | 0.0  | 1946     | -0.5      | 1925    | 0.1  | 1833      | -0.5 |         |           | 1939    | 0.1  | 1912      | 0.2     |
| 0042    | 3.2    | <b>27</b> | 0054 | 2.8      | <b>12</b> | 0203    | 3.3  | <b>27</b> | 0135 | 3.0     | <b>12</b> | 0047    | 3.5  | <b>27</b> | 0151    |
| 0641    | -0.3   | 0650      | 0.2  | 0810     | -0.3      | 0745    | 0.1  | 0657      | -0.4 | 0639    | 0.0       | 0811    | -0.1 | 0746      | -0.2    |
| F 1255  | 3.7    | SA 1300   | 3.0  | M 1425   | 3.3       | TU 1354 | 3.0  | M 1312    | 3.4  | TU 1250 | 3.0       | 1427    | 2.9  | F 1358    | 3.0     |
| 1918    | -0.6   | 1918      | 0.0  | 2037     | -0.3      | 2004    | 0.1  | 1920      | -0.3 | 1855    | 0.1       | 2026    | 0.2  | 1959      | 0.2     |
| 0135    | 3.2    | <b>28</b> | 0130 | 2.8      | <b>13</b> | 0254    | 3.2  | <b>28</b> | 0213 | 3.0     | <b>13</b> | 0134    | 3.4  | <b>28</b> | 0207    |
| 0735    | -0.2   | 0730      | 0.2  | 0905     | -0.1      | 0828    | 0.1  | 0747      | -0.3 | 0720    | -0.1      | 0901    | 0.1  | 0836      | -0.1    |
| SA 1349 | 3.5    | SU 1339   | 3.0  | TU 1520  | 3.1       | W 1437  | 2.9  | TU 1402   | 3.2  | W 1330  | 3.0       | F 1518  | 2.8  | SA 1450   | 2.9     |
| 2011    | -0.5   | 1956      | 0.1  | 2128     | -0.1      | 2046    | 0.2  | 2008      | -0.1 | 1936    | 0.1       | 2115    | 0.4  | 2051      | 0.3     |
| 0229    | 3.2    | <b>29</b> | 0208 | 2.8      | <b>14</b> | 0347    | 3.1  |           |      |         |           |         |      | <b>29</b> | 0300    |
| 0831    | -0.2   | 0812      | 0.3  | 1002     | 0.0       |         |      |           |      |         |           |         |      | <b>29</b> | 0931    |
| SU 1446 | 3.4    | M 1420    | 2.9  | W 1617   | 2.9       |         |      |           |      |         |           |         |      | <b>29</b> | 0953    |
| 2104    | -0.3   | 2036      | 0.1  | 2222     | 0.2       |         |      |           |      |         |           |         |      | <b>29</b> | 1546    |
| 0324    | 3.1    | <b>30</b> | 0248 | 2.8      | <b>15</b> | 0442    | 3.0  |           |      |         |           |         |      | <b>30</b> | 1647    |
| 0929    | 0.0    | 0857      | 0.3  | 1102     | 0.2       |         |      |           |      |         |           |         |      | <b>30</b> | 2250    |
| M 1544  | 3.1    | TU 1504   | 2.8  | TH 1718  | 2.7       |         |      |           |      |         |           |         |      | <b>30</b> | 0359    |
| 2158    | -0.1   | 2119      | 0.2  | 2319     | 0.3       |         |      |           |      |         |           |         |      | <b>30</b> | 1030    |
| 31      | 0331   | 2.8       |      |          |           |         |      |           |      |         |           |         |      | <b>31</b> | 0318    |
|         | 0945   | 0.3       |      |          |           |         |      |           |      |         |           |         |      | <b>31</b> | 0947    |
|         | W 1553 | 2.7       |      |          |           |         |      |           |      |         |           |         |      | <b>31</b> | SA 1559 |
|         | 2205   | 0.2       |      |          |           |         |      |           |      |         |           |         |      | <b>31</b> | 2204    |

**U.S.A. - SAN FRANCISCO BAY ENTRANCE (GOLDEN GATE)**

LAT 37°49'N LONG 122°29'W

TIDAL STREAM PREDICTIONS (RATES IN KNOTS)

| TIME ZONE +0800 |         |       |         | POSITIVE (+) DIRECTION 065 NEGATIVE (-) DIRECTION 245 |         |            |         | YEAR 0000 |            |       |         |
|-----------------|---------|-------|---------|---|---------|------------|---------|-----------|------------|-------|---------|
| JANUARY         |         |       |         | FEBRUARY  |         |            |         | MARCH     |            |       |         |
| SLACK           | MAXIMUM | SLACK | MAXIMUM | SLACK   | MAXIMUM | SLACK      | MAXIMUM | SLACK     | MAXIMUM    | SLACK | MAXIMUM |
| TIME            | TIME    | RATE  | TIME    | TIME  | RATE    | TIME       | TIME    | RATE      | TIME       | TIME  | RATE    |
| 1 0504          | 0757    | 2.4   | 16 0419 | 0719  | 2.4     | 1 0101     | 0323    | -1.8      | 16 0035    | 0251  | -2.6    |
| F 1039          | 1408    | -4.7  | SA 1003 | 1338  | -5.1    | 1 0620     | 0912    | 2.5       | 16 0555    | 0853  | 3.4     |
| 1814            | 2128    | 3.6   | 1743    | 2048  | 3.8     | M 1154     | 1515    | -4.6      | TU 1142    | 1504  | -5.8    |
| 2 0542          | 0257    | -1.6  | 17 0018 | 0219  | -1.8    | 1 1918     | 2226    | 3.5       | 16 1855    | 2156  | 4.5     |
| 0551            | 0840    | 2.4   | 17 0512 | 0814  | 2.7     | 2 0135     | 0352    | -1.9      | 17 0114    | 0338  | -3.1    |
| SA 1123         | 1453    | -4.7  | SU 1055 | 1429  | -5.6    | 2 0657     | 0947    | 2.5       | 17 0646    | 0943  | 3.7     |
| 1857            | 2211    | 3.6   | 1831    | 2137  | 4.2     | TU 1234    | 1551    | -4.5      | W 1236     | 1552  | -5.7    |
| 3 0126          | 0334    | -1.6  | 18 0106 | 0310  | -2.1    | 3 0734     | 1023    | 2.6       | 18 0738    | 1033  | 3.8     |
| 0634            | 0922    | 2.3   | 0603    | 0903  | 2.9     | W 1313     | 1626    | -4.4      | TH 1331    | 1638  | -5.3    |
| 1205            | 1532    | -4.7  | M 1147  | 1518  | -5.9    | 3 2024     | 2322    | 3.3       | 2020       | 2315  | 4.3     |
| 1939            | 2250    | 3.6   | 1918    | 2224  | 4.4     | 4 0238     | 0455    | -2.4      | 19 0151    | 0422  | -3.6    |
| 4 0207          | 0411    | -1.6  | 19 0151 | 0359  | -2.4    | 4 0812     | 1102    | 2.5       | 19 0831    | 1127  | 3.8     |
| 0714            | 1001    | 2.3   | 0655    | 0953  | 3.2     | TH 1352    | 1703    | -4.2      | F 1428     | 1725  | -4.7    |
| M 1245          | 1611    | -4.6  | TU 1240 | 1607  | -5.9    | 4 2054     | 2348    | 3.2       | 2101       | 2357  | 4.0     |
| O 2018          | 2326    | 3.4   | ● 2004  | 2306  | 4.5     | 5 0307     | 0531    | -2.6      | 5 0211     | 0458  | -3.5    |
| 5 0246          | 0446    | -1.7  | 20 0233 | 0447  | -2.7    | 5 0852     | 1141    | 2.4       | 20 0927    | 1219  | 3.6     |
| 0754            | 1042    | 2.2   | 0749    | 1046  | 3.3     | F 1432     | 1744    | -3.8      | SA 1527    | 1814  | -3.9    |
| TU 1325         | 1651    | -4.5  | W 1334  | 1659  | -5.7    | 5 2121     |         |           | 2144       |       |         |
| 2056            |         |       | 2049    | 2351  | 4.4     | 6 0001     | 3.3     |           | 6 0235     | 0533  | -3.6    |
| W 0835          | 1123    | 2.1   | TH 1431 | 1748  | -5.2    | 6 0335     | 0610    | -2.8      | 6 0904     | 1200  | 2.8     |
| 1405            | 1729    | -4.3  | 2134    |   |         | 6 0935     | 1224    | 2.3       | 6 SU 1507  | 1752  | -3.0    |
| 2132            |         |       |         |   |         | 6 1516     | 1821    | -3.3      | 6 M 1622   | 1839  | -2.4    |
| 7 0036          | 3.1     |       | 22 0036 | 4.2   |         | 6 2148     |         |           | 6 2101     |       | 2153    |
| 0359            | 0607    | -1.9  | 22 0355 | 0625  | -3.3    | 7 0050     | 2.7     |           | 7 0005     | 2.6   |         |
| TH 0920         | 1205    | 2.0   | F 0948  | 1236  | 3.1     | 7 0403     | 0653    | -3.0      | 7 0300     | 0614  | -3.7    |
| 1447            | 1809    | -4.0  | 1532    | 1839  | -4.5    | 7 SU 1024  | 1314    | 2.1       | 7 M 0947   | 1245  | 2.6     |
| 2206            |         |       | 2220    |   |         | 7 1608     | 1904    | -2.8      | 7 TU 1059  | 1402  | 3.0     |
| 8 0108          | 3.0     |       | 23 0121 | 3.8   |         | 7 2217     |         |           | 7 1558     | 1836  | -2.5    |
| 0434            | 0650    | -2.1  | 0436    | 0717  | -3.5    | 8 0127     | 2.4     |           | 8 2129     |       | 2247    |
| F 1012          | 1255    | 1.8   | SA 1054 | 1340  | 2.9     | 8 0433     | 0736    | -3.1      | 8 0042     | 2.2   |         |
| 1533            | 1852    | -3.6  | 1639    | 1930  | -3.6    | 8 M 1119   | 1409    | 2.0       | 8 0329     | 0657  | -3.7    |
| 2240            |         |       | 2307    |   |         | 8 TU 1241  | 1545    | 2.6       | 8 23 0422  | 0750  | -3.9    |
| 9 0143          | 2.8     |       | 24 0206 | 3.4   |         | 8 1710     | 1953    | -2.3      | 9 TU 1038  | 1337  | 2.4     |
| 0508            | 0733    | -2.3  | 0519    | 0810  | -3.7    | 9 0212     | 2.1     |           | 9 W 1207   | 1520  | 2.6     |
| SA 1109         | 1344    | 1.7   | SU 1203 | 1449  | 2.7     | 9 0508     | 0825    | -3.2      | 9 1700     | 1925  | -1.9    |
| 1627            | 1939    | -3.1  | 1449    | 2028  | -2.8    | 9 0608     | 0928    | -3.6      | 9 1842     | 2034  | -1.2    |
| 2314            |         |       | 2357    |   |         | 9 1826     | 2051    | -1.8      | 9 2205     |       | 2359    |
| 10 0220         | 2.6     |       | 25 0258 | 2.9   |         | 9 2335     |         |           | 9 2253     |       |         |
| 0543            | 0821    | -2.6  | 0604    | 0905  | -3.8    | 10 0257    | 1.9     |           | 10 0219    | 1.6   |         |
| SU 1210         | 1441    | 1.6   | M 1313  | 1605  | 2.6     | 10 0551    | 0920    | -3.4      | 10 0454    | 0846  | -3.6    |
| 1732            | 2028    | -2.6  | 1911    | 2131  | -2.0    | 10 0712    | 1042    | -3.5      | 10 0454    | 0846  | -3.6    |
| 2351            |         |       | 1948    | 2148  | -1.4    | 10 1501    | 1822    | 2.8       | 10 TH 1254 | 1556  | 2.2     |
| 11 0303         | 2.4     |       | 26 0054 | 0356  | 2.5     | 10 2131    |         |           | 10 F 1430  | 1753  | 2.6     |
| 0618            | 0910    | -2.9  | 0653    | 1007  | -3.8    | 11 0035    | 0357    | 1.7       | 11 1937    | 2129  | -1.2    |
| M 1313          | 1547    | 1.7   | TH 1421 | 1727  | 2.7     | 11 0644    | 1020    | -3.7      | 11 2104    |       | 2104    |
| 1847            | 2125    | -2.1  | 2030    | 2242  | -1.5    | 11 1437    | 1736    | 2.3       | 11 2156    |       |         |
| 12 0034         | 0350    | 2.2   | 27 0158 | 0454  | 2.2     | 11 2106    | 2257    | -1.3      | 12 0006    | 0326  | 1.4     |
| 0656            | 1001    | -3.2  | 0746    | 1113  | -3.9    | 12 0254    | 0543    | 1.7       | 12 0600    | 0949  | -3.7    |
| TU 1413         | 1653    | 1.9   | W 1524  | 1836  | 2.9     | 12 0817    | 1158    | -3.6      | 12 F 1408  | 1717  | 2.5     |
| 2006            | 2221    | -1.8  | 2144    |   |         | 12 1602    | 1919    | 3.0       | 12 SA 0749 | 1125  | -3.2    |
| 13 0124         | 0439    | 2.1   | 28 0009 | -1.3  |         | 12 2051    | 2240    | -1.2      | 13 1530    | 1852  | 2.8     |
| 0738            | 1056    | -3.6  | 0303    | 0555  | 2.1     | 13 0306    | 0606    | 2.0       | 13 2156    |       |         |
| W 1510          | 1802    | 2.3   | TH 0841 | 1214  | -4.0    | 13 0444    | 0739    | 2.2       | 13 0018    | -1.1  |         |
| 2120            | 2324    | -1.6  | SA 0848 | 1222  | -4.6    | 13 SU 1011 | 1348    | -4.0      | 13 0241    | 0526  | 1.4     |
| 2247            |         |       | 1633    | 1942  | 3.4     | 13 1736    | 2049    | 3.4       | 13 0749    | 1125  | -3.2    |
| 14 0222         | 0534    | 2.1   | 29 0126 | -1.3  |         | 13 2351    |         |           | 14 1530    | 1852  | 2.8     |
| 0824            | 1151    | -4.1  | 0402    | 0657  | 2.1     | 14 0409    | 0703    | 2.4       | 14 2156    |       |         |
| TH 1603         | 1903    | 2.8   | F 0934  | 1313  | -4.2    | 14 0526    | 0822    | 2.5       | 14 0405    | 0654  | 2.5     |
| 2227            |         |       | SU 0949 | 1319  | -5.1    | 14 0918    | 1259    | -3.8      | 14 0509    | 0804  | 2.5     |
| 1713            | 2027    | 3.4   | 1723    | 2031  | 3.9     | 14 M 1059  | 1421    | -4.2      | 14 M 0940  | 1303  | -4.9    |
| 2339            |         |       | 1811    | 2117  | 4.3     | 14 1814    | 2122    | 3.5       | 14 TU 1042 | 1355  | -3.7    |
| 15 0025         | -1.5    |       | 15 0221 | -1.5  |         | 15 1659    | 2005    | 4.0       | 15 1738    | 2044  | 3.3     |
| 0322            | 0625    | 2.2   | 30 0454 | 0748  | 2.2     | 15 1811    | 2117    | 4.3       | 15 2320    |       | 2339    |
| F 0912          | 1245    | -4.6  | SA 1025 | 1400  | -4.4    | 15 2353    |         |           | 15 0147    | -2.7  |         |
| 1654            | 2001    | 3.3   | 1759    | 2114  | 3.5     | 15 2358    |         |           | 15 0458    | 0752  | 3.2     |
| 2325            |         |       | 1840    | 2151  | 3.5     | 15 2358    |         |           | 15 0546    | 0839  | 2.9     |
| 31 0022         | 0254    | -1.6  | 31 0539 | 0833  | 2.4     | 31 0141    | 0251    | -3.2      | 31 1041    | 1355  | -5.1    |
| SU 1111         | 1440    | -4.5  | SU 1111 | 1440  | -4.5    | 31 0404    | 1355    | 3.2       | 31 1128    | 1429  | -3.7    |
| 1840            | 2151    | 3.5   | 1840    | 2151  | 3.5     | 31 1745    | 2046    | 4.3       | 31 1811    | 2107  | 3.3     |
|                 |         |       |         |   |         | 31 2358    |         |           | 31 1840    | 2133  | 3.2     |

**U.S.A. - ADMIRALTY INLET**

LAT 48°02'N LONG 122°38'W

TIDAL STREAM PREDICTIONS (RATES IN KNOTS)

TIME ZONE +0800

POSITIVE (+) DIRECTION 180 NEGATIVE (-) DIRECTION 005

YEAR 0000

JANUARY

FEBRUARY

MARCH

|    | SLACK<br>TIME  | MAXIMUM<br>RATE | SLACK<br>TIME | MAXIMUM<br>RATE | SLACK<br>TIME | MAXIMUM<br>RATE | SLACK<br>TIME  | MAXIMUM<br>RATE | SLACK<br>TIME  | MAXIMUM<br>RATE | SLACK<br>TIME | MAXIMUM<br>RATE |           |
|----|----------------|-----------------|---------------|-----------------|---------------|-----------------|----------------|-----------------|----------------|-----------------|---------------|-----------------|-----------|
| 1  | 0049           | 2.6             | 0010          | 2.4             | 0200          | 2.6             | 0122           | 3.0             | 0128           | 2.2             | 16            | 0054            | 2.7       |
|    | 0430           | 0714 -1.5       | 16            | 0355 0637 -1.3  | 0529          | 0827 -1.8       | 16             | 0451 0747 -2.3  | 0442           | 0753 -2.1       | 16            | 0402            | 0715 -2.8 |
| F  | 1038           | 1208 0.4        | SA            | 1003 1119 0.3   | M             | 1211 1337 0.4   | TU             | 1114 1311 0.9   | TU             | 1135 1323 0.7   | W             | 1046 1306 1.5   |           |
|    | 1331           | 1827 -3.6       |               | 1231 1743 -3.6  | 1456          | 1934 -3.2       |                | 1503 1920 -3.8  | 1510           | 1922 -2.9       |               | 1524 1909 -3.4  |           |
|    | 2221           |                 |               | 2140            | 2320          |                 | 2256           |                 | 2258           |                 | 2238          |                 |           |
| 2  | 0138           | 2.7             | 17            | 0058 2.8        | 0233          | 2.6             | 0206           | 3.2             | 0201           | 2.3             | 17            | 0135            | 2.7       |
|    | 0516           | 0803 -1.6       | 17            | 0443 0725 -1.6  | 0558          | 0902 -2.0       | 17             | 0526 0830 -2.7  | 0508           | 0822 -2.3       | 17            | 0436            | 0755 -3.2 |
| SA | 1138           | 1257 0.3        | SU            | 1055 1218 0.4   | TU            | 1243 1415 0.5   | W              | 1154 1406 1.3   | W              | 1202 1402 0.9   | TH            | 1124 1357 2.0   |           |
|    | 1412           | 1909 -3.5       |               | 1339 1837 -3.9  | O             | 1545 2014 -3.1  | ●              | 1613 2009 -3.8  | 1601           | 1957 -2.8       |               | 1631 2003 -3.4  |           |
|    | 2300           |                 |               | 2226            | 2353          |                 | 2341           |                 | 2331           |                 | 2326          |                 |           |
| 3  | 0217           | 2.8             | 18            | 0147 3.2        | 0301          | 2.6             | 0249           | 3.2             | 0230           | 2.2             | 18            | 0217            | 2.6       |
|    | 0556           | 0846 -1.7       | 18            | 0526 0813 -1.9  | 0624          | 0931 -2.2       | 18             | 0559 0909 -3.1  | 3              | 0531 0851 -2.5  | 18            | 0507 0833 -3.6  |           |
| SU | 1229           | 1341 0.3        | M             | 1140 1315 0.6   | W             | 1314 1455 0.6   | TH             | 1236 1457 1.7   | TH             | 1227 1438 1.1   | F             | 1204 1446 2.4   |           |
|    | 1452           | 1951 -3.5       |               | 1447 1928 -4.0  | 1631          | 2050 -3.0       |                | 1717 2059 -3.7  | O              | 1647 2034 -2.7  | ●             | 1733 2052 -3.2  |           |
|    | 2337           |                 |               | 2311            |               |                 |                |                 |                |                 |               |                 |           |
| 4  | 0254           | 2.8             | 19            | 0230 3.4        | 0024          | 0332 2.5        | 19             | 0027 0328 3.0   | 4              | 0003 0256 2.1   | 19            | 0013 0255 2.4   |           |
|    | 0631           | 0925 -1.8       | 19            | 0605 0856 -2.2  | 0647          | 1000 -2.3       | 19             | 0631 0948 -3.4  | 4              | 0551 0914 -2.6  | 19            | 0538 0913 -3.8  |           |
| M  | 1314           | 1426 0.3        | TU            | 1224 1410 0.8   | TH            | 1345 1530 0.7   | F              | 1320 1547 1.9   | F              | 1253 1513 1.3   | - SA          | 1246 1535 2.6   |           |
| O  | 1532           | 2026 -3.3       | ●             | 1553 2017 -4.1  | 1716          | 2125 -2.8       |                | 1820 2149 -3.3  | 1732           | 2106 -2.6       |               | 1831 2142 -2.9  |           |
|    | 2356           |                 |               |                 |               |                 |                |                 |                |                 |               |                 |           |
| 5  | 0012           | 0329 2.7        | 20            | 0314 3.5        | 0055          | 0359 2.3        | 20             | 0112 0407 2.7   | 5              | 0035 0323 1.9   | 20            | 0100 0336 2.0   |           |
|    | 0702           | 1000 -1.9       | 20            | 0642 0940 -2.6  | 0709          | 1027 -2.4       | 20             | 0702 1030 -3.5  | 5              | 0610 0941 -2.8  | 20            | 0607 0951 -3.8  |           |
| TU | 1357           | 1507 0.3        | W             | 1309 1506 1.0   | F             | 1415 1607 0.8   | SA             | 1406 1642 2.1   | SA             | 1320 1548 1.4   | SU            | 1329 1623 2.7   |           |
|    | 1611           | 2102 -3.1       |               | 1657 2106 -3.9  | 1802          | 2200 -2.6       |                | 1923 2242 -2.9  | 1817           | 2144 -2.4       |               | 1928 2233 -2.5  |           |
| 6  | 0045           | 0401 2.6        | 21            | 0042 0354 3.4   | 0127          | 0427 2.1        | 21             | 0159 0447 2.2   | 6              | 0109 0348 1.7   | 21            | 0150 0416 1.6   |           |
|    | 0731           | 1035 -2.0       | 21            | 0717 1023 -2.9  | 0729          | 1056 -2.5       | 21             | 0731 1111 -3.6  | 6              | 0627 1007 -2.8  | 21            | 0635 1031 -3.7  |           |
| W  | 1545           | 0.2             | TH            | 1356 1600 1.2   | SA            | 1447 1648 0.9   | SU             | 1455 1737 2.1   | SU             | 1348 1623 1.6   | M             | 1415 1711 2.5   |           |
|    | 2137           | -2.9            |               | 1802 2159 -3.6  | 1851          | 2235 -2.3       |                | 2027 2334 -2.3  | 1903           | 2223 -2.2       |               | 2027 2324 -2.1  |           |
| 7  | 0118           | 0433 2.5        | 22            | 0127 0438 3.2   | 0200          | 0454 1.8        | 22             | 0250 0530 1.7   | 7              | 0145 0415 1.4   | 22            | 0244 0457 1.1   |           |
|    | 0758           | 1108 -2.1       | 22            | 0750 1108 -3.1  | 0747          | 1125 -2.6       | 22             | 0801 1153 -3.5  | 7              | 0643 1033 -2.9  | 22            | 0703 1114 -3.5  |           |
| TH | 1628           | 0.2             | F             | 1447 1658 1.3   | SU            | 1521 1731 1.0   | M              | 1548 1833 2.0   | M              | 1421 1659 1.6   | TU            | 1505 1807 2.3   |           |
|    | 2214           | -2.6            |               | 1909 2249 -3.1  | 1945          | 2318 -1.9       |                | 2137            | 1953           | 2305 -1.9       |               | 2128            |           |
| 8  | 0151           | 0505 2.3        | 23            | 0214 0518 2.7   | 0237          | 0523 1.5        | 23             | 0035 -1.8       | 8              | 0225 0444 1.1   | 23            | 0022 -1.7       |           |
|    | 0823           | 1143 -2.2       | 23            | 0823 1151 -3.2  | 0805          | 1154 -2.6       | 23             | 0347 0613 1.2   | 8              | 0659 1105 -2.9  | 23            | 0349 0539 0.7   |           |
| F  | 1602           | 1714 0.3        | SA            | 1540 1757 1.4   | M             | 1559 1820 1.0   | TU             | 0830 1242 -3.3  | TU             | 1459 1746 1.7   | W             | 0729 1203 -3.1  |           |
|    | 1825           | 2255 -2.3       |               | 2021 2350 -2.5  | 2048          |                 |                | 1647 1936 1.8   | 2050           | 2351 -1.5       | 1601          | 1903 2.0        |           |
|    | 2255           |                 |               |                 |               |                 |                | 2255            |                |                 |               | 2234            |           |
| 9  | 0226           | 0534 2.0        | 24            | 0304 0603 2.2   | 9             | 0005 -1.6       | 24             | 0145 -1.3       | 9              | 0312 0519 0.8   | 24            | 0129 -1.4       |           |
|    | 0848           | 1217 -2.3       | 24            | 0856 1238 -3.3  | 0321          | 0554 1.1        | 24             | 0500 0700 0.7   | 9              | 0717 1142 -2.9  | 24            | 0516 0635 0.3   |           |
| SA | 1643           | 1803 0.3        | SU            | 1636 1903 1.5   | TU            | 0823 1233 -2.7  | W              | 0858 1339 -3.0  | W              | 1546 1841 1.7   | TH            | 0751 1257 -2.7  |           |
|    | 1928           | 2336 -1.9       |               | 2141            | 1644 1914 1.1 |                 |                | 1751 2051 1.7   | 2157           |                 |               | 1703 2012 1.8   |           |
|    | 2205           |                 |               |                 |               |                 |                |                 |                |                 |               | 2345            |           |
| 10 | 0304           | 0609 1.7        | 25            | 0051 -1.9       | 10            | 0104 -1.2       | 25             | 0021 0311 -1.1  | 10             | 0048 -1.2       | 25            | 0248 -1.2       |           |
|    | 0910           | 1254 -2.4       | 25            | 0359 0646 0.5   | 0415          | 0633 0.8        | 25             | 0641 0809 0.3   | 10             | 0415 0556 0.4   | 25            | 0745 0.0        |           |
| SU | 1722           | 1859 0.5        | M             | 0928 1327 -3.3  | W             | 0842 1316 -2.8  | TH             | 0928 1442 -2.8  | TH             | 0737 1231 -2.8  | F             | 1403 -2.4       |           |
|    | 2045           |                 |               | 1735 2015 1.5   |               |                 | 1735 2025 1.3  | 1857 2207 1.7   | 1642           | 1945 1.7        |               | 1812 2122 1.6   |           |
|    | 2311           |                 |               |                 |               |                 | 2336           |                 |                |                 |               |                 |           |
| 11 | 0032           | -1.5            | 26            | 0204 -1.4       | 11            | 0221 -0.9       | 26             | 0142 0436 -1.1  | 11             | 0205 -1.0       | 26            | 0053 0405 -1.3  |           |
|    | 0349           | 0646 1.4        | 26            | 0506 0739 1.1   | 0531          | 0724 0.4        | 26             | 0926 0.1        | 11             | 0657 0.2        | 26            | 0910 -0.1       |           |
| M  | 0932           | 1336 -2.5       | TU            | 1000 1425 -3.3  | TH            | 0906 1411 -2.8  | F              | 1551 -2.7       | F              | 1332 -2.8       | SA            | 1514 -2.2       |           |
|    | 1802           | 2005 0.7        |               | 1836 2124 1.7   |               |                 | 1832 2133 1.5  | 2001 2312 1.8   | 1746           | 2100 1.7        |               | 1918 2228 1.6   |           |
|    | 2219           |                 |               |                 |               |                 |                |                 |                |                 |               |                 |           |
| 12 | 0136           | -1.2            | 27            | 0046 0327 -1.1  | 12            | 0110 0353 -0.9  | 27             | 0246 0549 -1.3  | 12             | 0039 0334 -1.1  | 27            | 0150 0513 -1.5  |           |
|    | 0444           | 0726 1.0        | 27            | 0630 0842 0.7   | 0831          | 0.2             | 27             | 1048 0.1        | 12             | 0813 0.0        | 27            | 1031 0.1        |           |
| TU | 0955           | 1419 -2.6       | W             | 1034 1524 -3.2  | F             | 1517 -2.9       | SA             | 1700 -2.7       | SA             | 1446 -2.8       | SU            | 1628 -2.2       |           |
|    | 1843           | 2111 1.0        |               | 1935 2238 1.9   |               |                 | 1930 2243 1.9  | 2056            |                | 1854 2211 2.0   |               | 2016 2323 1.7   |           |
|    | 2222           |                 |               |                 |               |                 |                |                 |                |                 |               |                 |           |
| 13 | 0003           | 0255 -0.9       | 28            | 0213 0452 -1.1  | 13            | 0228 0512 -1.0  | 28             | 0008 2.0        | 13             | 0148 0450 -1.4  | 28            | 0234 0558 -1.8  |           |
|    | 0556           | 0815 0.7        | 28            | 0811 0945 0.3   | 0951          | 0.1             | 28             | 0334 0639 -1.6  | 13             | 0946 0.1        | 28            | 1007 1136 0.3   |           |
| W  | 1020           | 1504 -2.8       | TH            | 1113 1622 -3.2  | SA            | 1622 -3.2       | SU             | 1149 0.2        | SU             | 1603 -2.9       | M             | 1300 1725 -2.3  |           |
|    | 1925           | 2218 1.4        |               | 2030 2341 2.1   |               |                 | 2026 2345 2.3  |                 | 1756 -2.8      | 1958 2313 2.3   |               | 2106            |           |
|    | 2205           |                 |               |                 |               |                 |                |                 |                |                 |               |                 |           |
| 14 | 0139           | 0418 -0.9       | 29            | 0321 0608 -1.2  | 14            | 0326 0617 -1.4  | 29             | 0051 2.1        | 14             | 0242 0545 -1.8  | 29            | 0006 1.8        |           |
|    | 0724           | 0910 0.4        | 29            | 1054 0.2        | 1106          | 0.2             | 29             | 0411 0720 -1.8  | 14             | 0935 1106 0.4   | 29            | 0309 0633 -2.1  |           |
| TH | 1051           | 1559 -3.1       | F             | 1719 -3.2       | SU            | 1725 -3.4       | M              | 1108 1240 0.4   | M              | 1233 1710 -3.1  | TU            | 1029 1224 0.7   |           |
|    | 2009           | 2315 1.9        |               | 2120            |               |                 | 2119           |                 | 1410 1839 -2.8 | 2055            |               | 1417 1820 -2.4  |           |
|    | 2222           |                 |               |                 |               |                 |                |                 |                |                 |               | 2149            |           |
| 15 | 0255           | 0534 -1.0       | 30            | 0034 2.3        | 15            | 0037 2.7        |                |                 | 15             | 0005 2.5        | 30            | 0045 1.8        |           |
|    | 0853           | 1019 0.3        | 30            | 0413 0703 -1.4  | 0412          | 0706 -1.8       |                |                 | 15             | 0325 0634 -2.3  | 30            | 0339 0706 -2.4  |           |
| F  | 1133           | 1650 -3.3       | SA            | 1157 0.2        | M             | 1035 1214 0.6   |                |                 | TU             | 1010 1211 0.9   | W             | 1053 1306 1.0   |           |
|    | 2055           |                 |               | 1810 -3.2       |               |                 | 1345 1824 -3.7 | 2208            |                | 1408 1814 -3.3  |               | 1518 1901 -2.4  |           |
|    | 2205           |                 |               |                 |               |                 |                |                 |                |                 |               | 2148            |           |
| 31 | 0119 2.5       |                 |               |                 |               |                 |                |                 |                |                 |               | 2228            |           |
|    | 0455 0750 -1.6 |                 |               |                 |               |                 |                |                 |                |                 |               | 2305            |           |
| SU | 1135 1250 0.3  |                 |               |                 |               |                 |                |                 |                |                 |               | 2305            |           |
|    | 1401 1857 -3.2 |                 |               |                 |               |                 |                |                 |                |                 |               |                 |           |
|    | 2245           |                 |               |                 |               |                 |                |                 |                |                 |               |                 |           |

UNITED STATES – SANDY HOOK

LAT 40°28'N LONG 74°01'W

TIME ZONE +0500

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

YEAR 0000

| JANUARY |      |         |      | FEBRUARY |      |         |      | MARCH   |      |         |      | APRIL   |      |         |   |
|---------|------|---------|------|----------|------|---------|------|---------|------|---------|------|---------|------|---------|---|
| Time    | m    | Time    | m    | Time     | m    | Time    | m    | Time    | m    | Time    | m    | Time    | m    | Time    | m |
| 1 0543  | 0.3  | 16 0105 | 1.5  | 1 0040   | 1.3  | 16 0219 | 1.4  | 1 0537  | 0.2  | 16 0049 | 1.4  | 1 0043  | 1.5  | 16 0156 | 1 |
| 1203    | 1.2  | 0719    | 0.1  | 0710     | 0.2  | 0857    | 0.2  | 1144    | 1.2  | 0714    | 0.2  | 0741    | 0.2  | 0838    | 0 |
| M 1822  | 0.1  | TU 1318 | 1.3  | TH 1305  | 1.2  | F 1442  | 1.1  | TH 1741 | 0.1  | F 1315  | 1.2  | SU 1335 | 1.3  | M 1435  | 1 |
| 1948    | 0.0  | 1917    | 0.1  | 2107     | 0.2  | 1923    | 0.3  | 1943    | 0.2  | 2053    | 0.0  | 2053    | 0.0  |         |   |
| 2 0041  | 1.2  | 17 0159 | 1.4  | 2 0133   | 1.3  | 17 0315 | 1.3  | 2 0003  | 1.4  | 17 0141 | 1.4  | 2 0150  | 1.5  | 17 0253 | 1 |
| 0644    | 0.3  | 0827    | 0.1  | 0829     | 0.2  | 0955    | 0.2  | 0639    | 0.2  | 0819    | 0.2  | 0855    | 0.1  | 0933    | 0 |
| TU 1251 | 1.2  | W 1414  | 1.2  | F 1406   | 1.2  | SA 1543 | 1.1  | F 1241  | 1.2  | SA 1411 | 1.1  | M 1443  | 1.3  | TU 1532 | 1 |
| 1914    | 0.1  | 2046    | 0.0  | 2028     | 0.1  | 2201    | 0.2  | 1838    | 0.1  | 2029    | 0.3  | 2102    | 0.2  | 2150    | 0 |
| 3 0128  | 1.2  | 18 0255 | 1.4  | 3 0234   | 1.4  | 18 0413 | 1.4  | 3 0101  | 1.4  | 18 0237 | 1.3  | 3 0300  | 1.5  | 18 0350 | 1 |
| 0758    | 0.3  | 0929    | 0.1  | 0938     | 0.1  | 1047    | 0.1  | 0759    | 0.2  | 0920    | 0.2  | 0958    | 0.1  | 1021    | 0 |
| W 1343  | 1.2  | TH 1513 | 1.2  | SA 1515  | 1.2  | SU 1642 | 1.1  | SA 1345 | 1.2  | SU 1510 | 1.1  | TU 1551 | 1.4  | W 1627  | 1 |
| 2013    | 0.1  | 2140    | 0.0  | 2135     | 0.0  | 2251    | 0.2  | 1957    | 0.2  | 2130    | 0.3  | 2209    | 0.1  | 2240    | 0 |
| 4 0219  | 1.3  | 19 0351 | 1.4  | 4 0342   | 1.5  | 19 0507 | 1.4  | 4 0206  | 1.5  | 19 0336 | 1.3  | 4 0411  | 1.6  | 19 0444 | 1 |
| 0906    | 0.2  | 1024    | 0.1  | 1038     | 0.0  | 1134    | 0.1  | 0914    | 0.1  | 1013    | 0.2  | 1054    | -0.1 | 1104    | 0 |
| TH 1442 | 1.2  | F 1612  | 1.2  | SU 1624  | 1.2  | M 1735  | 1.2  | SU 1455 | 1.2  | M 1610  | 1.2  | W 1655  | 1.5  | TH 1716 | 1 |
| 2111    | 0.1  | 2230    | 0.0  | 2237     | -0.1 | 2338    | 0.1  | 2115    | 0.1  | 2223    | 0.2  | 2309    | 0.0  | 2327    | 0 |
| 5 0315  | 1.4  | 20 0445 | 1.4  | 5 0448   | 1.6  | 20 0555 | 1.5  | 5 0318  | 1.5  | 20 0433 | 1.4  | 5 0514  | 1.6  | 20 0532 | 1 |
| 1006    | 0.1  | 1114    | 0.0  | 1135     | -0.1 | 1218    | 0.0  | 1018    | 0.0  | 1101    | 0.2  | 1147    | -0.2 | 1146    | 0 |
| F 1546  | 1.2  | SA 1709 | 1.2  | M 1728   | 1.3  | TU 1821 | 1.2  | M 1606  | 1.3  | TU 1705 | 1.2  | TH 1751 | 1.6  | F 1758  | 0 |
| 2206    | 0.0  | 2317    | 0.0  | 2336     | -0.2 | 2221    | 0.0  | 2312    | 0.2  |         |      |         |      |         |   |
| 6 0414  | 1.5  | 21 0535 | 1.5  | 6 0549   | 1.7  | 21 0023 | 0.1  | 6 0429  | 1.6  | 21 0524 | 1.4  | 6 0005  | -0.1 | 21 0013 | 1 |
| 1102    | 0.0  | 1201    | 0.0  | 1230     | -0.2 | 0638    | 1.5  | 1116    | -0.1 | 1144    | 0.1  | 0610    | 1.7  | 0615    | 0 |
| SA 1649 | 1.3  | SU 1759 | 1.2  | TU 1825  | 1.5  | W 1300  | 0.0  | TU 1712 | 1.4  | W 1752  | 1.3  | F 1237  | -0.2 | SA 1226 | 0 |
| 2259    | -0.1 |         |      |          |      | 1902    | 1.3  | 2322    | -0.1 | 2358    | 0.1  | 1842    | 1.8  | 1836    | 0 |
| 7 0512  | 1.6  | 22 0002 | 0.0  | 7 0033   | -0.2 | 22 0107 | 0.0  | 7 0532  | 1.7  | 22 0609 | 1.5  | 7 0059  | -0.2 | 22 0057 | 1 |
| 1156    | -0.1 | 0620    | 1.5  | 0643     | 1.8  | 0717    | 1.5  | 1210    | -0.2 | 1226    | 0.0  | 0700    | 1.7  | 0655    | 0 |
| SU 1747 | 1.3  | M 1245  | 0.0  | W 1323   | -0.3 | TH 1340 | -0.1 | W 1809  | 1.6  | TH 1833 | 1.4  | SA 1325 | -0.2 | SU 1306 | 0 |
| 2353    | -0.2 | 1843    | 1.2  | 1918     | 1.6  | 1939    | 1.3  |         |      |         |      | O 1929  | 1.8  | 1911    | 0 |
| 8 0606  | 1.7  | 23 0046 | 0.0  | 8 0129   | -0.3 | 23 0148 | 0.0  | 8 0019  | -0.2 | 23 0042 | 0.1  | 8 0150  | -0.2 | 23 0140 | 0 |
| 1250    | -0.2 | 0701    | 1.5  | 0735     | 1.8  | 0753    | 1.6  | 0628    | 1.8  | 0649    | 1.5  | 0748    | 1.7  | 0733    | 0 |
| M 1841  | 1.4  | TU 1328 | -0.1 | TH 1414  | -0.4 | F 1417  | -0.1 | 1302    | -0.3 | F 1306  | 0.0  | SU 1410 | -0.2 | M 1345  | 0 |
| 1924    | 1.2  | O 2009  | 1.6  | 2015     | 1.4  | 2015    | 1.4  | 1901    | 1.6  | 1910    | 1.5  | 2015    | 1.9  | ● 1945  | 0 |
| 9 0048  | -0.2 | 24 0129 | 0.0  | 9 0222   | -0.3 | 24 0228 | 0.0  | 9 0114  | -0.3 | 24 0124 | 0.0  | 9 0238  | -0.2 | 24 0222 | 0 |
| 0658    | 1.8  | 0739    | 1.6  | 0826     | 1.8  | 0828    | 1.5  | 0719    | 1.8  | 0726    | 1.6  | 0835    | 1.7  | 0811    | 0 |
| TU 1342 | -0.3 | W 1408  | -0.1 | F 1502   | -0.4 | SA 1452 | -0.1 | 1351    | -0.3 | SA 1344 | -0.1 | M 1454  | -0.2 | TU 1424 | 0 |
| O 1933  | 1.5  | ● 2003  | 1.3  | 2101     | 1.6  | 2048    | 1.4  | O 1950  | 1.7  | ● 1944  | 1.5  | 2100    | 1.8  | 2020    | 0 |
| 10 0142 | -0.3 | 25 0209 | 0.0  | 10 0313  | -0.3 | 25 0305 | 0.0  | 10 0207 | -0.3 | 25 0205 | 0.0  | 10 0324 | -0.2 | 25 0304 | 0 |
| 0749    | 1.9  | 0817    | 1.5  | 0917     | 1.8  | 0902    | 1.5  | 0808    | 1.8  | 0801    | 1.6  | 0922    | 1.6  | 0852    | 0 |
| W 1433  | -0.4 | TH 1446 | -0.1 | SA 1549  | -0.4 | SU 1525 | -0.1 | 1438    | -0.3 | 1420    | -0.1 | TU 1536 | -0.1 | W 1502  | 0 |
| 2026    | 1.5  | 2041    | 1.2  | 2154     | 1.6  | 2121    | 1.4  | 2039    | 1.8  | 2017    | 1.6  | 2146    | 1.8  | 2058    | 0 |
| 11 0235 | -0.3 | 26 0248 | 0.0  | 11 0404  | -0.3 | 26 0340 | 0.0  | 11 0257 | -0.3 | 26 0244 | 0.0  | 11 0409 | -0.1 | 26 0346 | 0 |
| 0841    | 1.8  | 0853    | 1.5  | 1010     | 1.7  | 0936    | 1.4  | 0857    | 1.7  | 0836    | 1.5  | 1011    | 1.5  | 0937    | 0 |
| TH 1523 | -0.4 | F 1522  | -0.1 | SU 1634  | -0.3 | M 1556  | -0.1 | 1522    | -0.3 | M 1454  | -0.1 | 1616    | 0.0  | TH 1541 | 0 |
| 2120    | 1.5  | 2118    | 1.2  | 2247     | 1.6  | 2154    | 1.4  | 2128    | 1.8  | 2049    | 1.6  | 2234    | 1.6  | 2141    | 0 |
| 12 0328 | -0.3 | 27 0325 | 0.0  | 12 0454  | -0.2 | 27 0416 | 0.1  | 12 0345 | -0.2 | 27 0322 | 0.0  | 12 0454 | 0.0  | 27 0429 | 0 |
| 0935    | 1.8  | 0928    | 1.5  | 1103     | 1.6  | 1013    | 1.4  | 0947    | 1.6  | 0912    | 1.5  | 1102    | 1.4  | 1028    | 0 |
| F 1612  | -0.4 | SA 1555 | -0.1 | M 1721   | -0.2 | TU 1627 | 0.0  | M 1605  | -0.2 | TU 1527 | 0.0  | TH 1658 | 0.2  | F 1624  | 0 |
| 2216    | 1.5  | 2155    | 1.2  | 2340     | 1.6  | 2230    | 1.4  | 2217    | 1.7  | 2122    | 1.6  | 2322    | 1.6  | 2233    | 0 |
| 13 0420 | -0.2 | 28 0400 | 0.1  | 13 0548  | -0.1 | 28 0453 | 0.1  | 13 0432 | -0.2 | 28 0359 | 0.0  | 13 0541 | 0.1  | 28 0518 | 0 |
| 1031    | 1.7  | 1004    | 1.4  | 1157     | 1.4  | 1055    | 1.3  | 1038    | 1.5  | 0952    | 1.4  | 1154    | 1.3  | 1126    | 0 |
| SA 1701 | -0.3 | SU 1627 | 0.0  | TU 1811  | -0.1 | W 1700  | 0.0  | TU 1648 | -0.1 | W 1601  | 0.0  | F 1743  | 0.3  | SA 1714 | 0 |
| 2314    | 1.5  | 2232    | 1.2  |          |      | 2313    | 1.4  | 2307    | 1.6  | 2200    | 1.6  |         |      | 2331    | 0 |
| 14 0514 | -0.1 | 29 0435 | 0.1  | 14 0033  | 1.5  |         |      | 14 0521 | 0.0  | 29 0439 | 0.1  | 14 0012 | 1.5  | 29 0617 | 0 |
| 1127    | 1.6  | 1042    | 1.3  | 0647     | 0.1  |         |      | 1129    | 1.4  | 1038    | 1.3  | 0634    | 0.2  | 1226    | 0 |
| SU 1753 | -0.2 | M 1659  | 0.0  | W 1250   | 1.3  |         |      | 1733    | 0.0  | TH 1637 | 0.1  | SA 1246 | 1.2  | SU 1817 | 0 |
| 1849    | -0.1 | 2310    | 1.2  | 1906     | 0.1  |         |      | 2358    | 1.5  | 2247    | 1.6  | 1839    | 0.4  |         |   |
| 15 0010 | 1.5  | 30 0513 | 0.2  | 15 0125  | 1.4  |         |      | 15 0614 | 0.1  | 30 0525 | 0.1  | 15 0103 | 1.4  | 30 0034 | 0 |
| 0614    | 0.0  | 1123    | 1.3  | 0753     | 0.1  |         |      | 1222    | 1.3  | 1131    | 1.3  | 0736    | 0.3  | 0726    | 0 |
| M 1223  | 1.5  | TU 1734 | 0.0  | TH 1345  | 1.2  |         |      | 1823    | 0.2  | F 1721  | 0.1  | SU 1340 | 1.2  | M 1328  | 0 |
| 1849    | -0.1 | 2352    | 1.3  | 2007     | 0.1  |         |      | 2341    | 1.5  | 2341    | 1.5  | 1946    | 0.4  | 1935    | 0 |
| 31 0601 | 0.2  |         |      |          |      |         |      |         |      |         |      | 31 0625 | 0.2  |         |   |
| 1211    | 1.2  |         |      |          |      |         |      |         |      |         |      | 1231    | 1.3  |         |   |
| W 1818  | 0.1  |         |      |          |      |         |      |         |      |         |      | SA 1821 | 0.2  |         |   |

**UNITED STATES, LONG ISLAND SOUND TO CASCO BAY**

| No.   | PLACE                               | Lat.<br>N. | Long.<br>W.    | TIME DIFFERENCES |              | HEIGHT DIFFERENCES (IN METRES) |      |      | M.L.<br>Z <sub>0</sub><br>m. |
|-------|-------------------------------------|------------|----------------|------------------|--------------|--------------------------------|------|------|------------------------------|
|       |                                     |            |                | MHW<br>Zone      | MLW<br>+0500 | MHWS                           | MHWN | MLWN |                              |
| 2809  | BOSTON                              |            | (see page 104) |                  |              | 3.1                            | 2.7  | 0.4  | 0.0                          |
| 2762  | Plum Island                         | 41 10      | 72 12          | -0120            | -0117        | -2.2                           | -1.9 | -0.2 | 0.0 0.46                     |
| 2764  | Herod Point                         | 40 58      | 72 50          | -0017            | -0022        | -1.1                           | -1.0 | -0.1 | 0.0 0.94                     |
| 2765  | Port Jefferson                      | 40 57      | 73 05          | +0006            | +0008        | -0.9                           | -0.9 | -0.1 | 0.0 1.07                     |
| 2767  | Lloyd Harbour                       | 40 55      | 73 26          | -0007            | -0005        | -0.7                           | -0.6 | -0.1 | 0.0 1.22                     |
| 2769  | Willets Point                       | U 40 48    | 73 47          | +0012            | +0015        | -0.6                           | -0.6 | -0.1 | -0.1 1.19                    |
| 2771  | Stamford                            | 41 02      | 73 33          | +0006            | +0009        | -0.6                           | -0.6 | -0.1 | -0.1 1.19                    |
| 2772  | Bridgeport                          | U 41 10    | 73 11          | -0010            | -0006        | -0.9                           | -0.8 | -0.1 | 0.0 1.10                     |
| 2773  | New Haven Harbour                   | 41 18      | 72 55          | 0000             | +0002        | -1.0                           | -1.0 | -0.2 | -0.1 0.98                    |
| 2773a | Hoadley Point                       | 41 15      | 72 44          | -0013            | -0011        | -1.3                           | -1.2 | -0.2 | 0.0 0.9                      |
| 2774  | Falkner Island                      | 41 13      | 72 39          | -0023            | -0033        | -1.3                           | -1.2 | -0.2 | 0.0 0.88 x                   |
| 2740  | SANDY HOOK                          |            | (see page 107) |                  |              | 1.6                            | 1.3  | 0.3  | 0.0                          |
| 2775  | Connecticut River<br>Saybrook Jetty | 41 16      | 72 21          | +0254            | +0255        | -0.4                           | -0.3 | -0.1 | 0.0 0.61                     |
| 2776  | River Thames<br>New London          | U 41 22    | 72 06          | +0130            | +0200        | -0.7                           | -0.5 | -0.1 | 0.0 0.49                     |
|       | ATLANTIC OCEAN                      |            |                |                  |              |                                |      |      |                              |
| 2777  | Watch Hill Point                    | 41 18      | 71 52          | +0045            | +0050        | -0.7                           | -0.6 | -0.2 | 0.0 0.43                     |
| 2779  | Block Island (Old Harbour)          | 41 10      | 71 33          | -0014            | -0010        | -0.6                           | -0.5 | -0.1 | 0.0 0.46                     |
| 2780  | Narragansett Bay<br>Point Judith    | 41 22      | 71 29          | -0010            | -0005        | -0.5                           | -0.5 | -0.1 | 0.0 0.49                     |
| 2781  | Newport                             | U 41 30    | 71 20          | +0003            | -0024        | -0.4                           | -0.3 | -0.1 | 0.0 0.55                     |
| 2783  | Providence                          | 41 48      | 71 24          | +0004            | -0052        | -0.1                           | -0.1 | 0.0  | 0.0 0.73                     |
| 2784  | Bristol                             | 41 40      | 71 17          | +0025            | -0030        | -0.2                           | -0.2 | -0.1 | 0.0 0.67                     |
| 2785  | Sakonnet                            | 41 28      | 71 12          | -0010            | -0025        | -0.5                           | -0.5 | -0.1 | 0.0 0.52                     |
| 2786  | Buzzards Bay<br>New Bedford         | 41 36      | 70 54          | +0010            | -0025        | -0.4                           | -0.3 | -0.1 | -0.1 0.58                    |
| 2787  | Cape Cod Canal W. Entrance          | 41 44      | 70 37          | +0108            | +0153        | -0.4                           | -0.3 | -0.1 | 0.0 0.58 *                   |
|       | Nantucket Sound                     |            |                |                  |              |                                |      |      |                              |
| 2790  | Woods Hole (Great Harbour)          | 41 31      | 70 40          | -0022            | +0119        | -1.0                           | -0.8 | -0.2 | 0.0 0.30                     |
| 2791  | Hyannis Port                        | 41 38      | 70 18          | +0435            | +0355        | -0.6                           | -0.4 | -0.2 | 0.0 0.49                     |
| 2792  | Monomoy Point                       | 41 33      | 70 00          | +0413            | +0407        | -0.4                           | -0.2 | -0.1 | 0.0 0.58                     |
| 2793  | Vineyard Haven                      | 41 27      | 70 36          | +0358            | +0335        | -1.0                           | -0.8 | -0.2 | 0.0 0.27                     |
| 2794  | Gay Head                            | 41 21      | 70 50          | -0006            | +0020        | -0.6                           | -0.5 | -0.2 | 0.0 0.46                     |
| 2809  | BOSTON                              |            | (see page 104) |                  |              | 3.1                            | 2.7  | 0.4  | 0.0                          |
|       | Nantucket Island                    |            |                |                  |              |                                |      |      |                              |
| 2797  | Siasconset                          | 41 16      | 69 58          | +0015            | +0019        | -2.7                           | -2.4 | -0.3 | 0.0 0.18                     |
| 2798  | Great Point                         | 41 23      | 70 03          | +0041            | +0026        | -2.1                           | -1.8 | -0.3 | 0.0 0.49                     |
| 2799  | Nantucket Harbour                   | 41 17      | 70 06          | +0107            | +0052        | -2.1                           | -1.8 | -0.3 | 0.0 0.49                     |
| 2800  | Muskeget Island                     | 41 20      | 70 18          | +0023            | +0013        | -2.4                           | -2.1 | -0.3 | 0.0 0.34                     |
| 2802  | Chatham                             | 41 40      | 69 56          | +0030            | +0024        | -0.9                           | -0.8 | -0.1 | 0.0 1.07                     |
| 2803  | Race Point                          | 42 04      | 70 15          | -0003            | -0004        | -0.1                           | -0.1 | 0.0  | 0.0 1.46                     |
| 2805  | Cape Cod Canal E. Entrance          | 41 46      | 70 30          | 0000             | 0000         | -0.3                           | -0.3 | -0.1 | -0.1 1.40                    |
| 2806  | Gurnet Point                        | 42 00      | 70 36          | +0002            | +0007        | -0.1                           | -0.1 | 0.0  | 0.0 1.49                     |
| 2807  | Cohasset Harbour                    | 42 15      | 70 47          | +0002            | -0004        | -0.2                           | -0.2 | 0.0  | 0.0 1.43                     |
| 2809  | BOSTON                              | 42 21      | 71 03          | STANDARD PORT    |              | See Table V                    |      |      |                              |
| 2811  | Salem                               | 42 31      | 70 53          | +0002            | +0001        | -0.2                           | -0.2 | 0.0  | 0.0 1.43                     |
| 2813  | Merrimack River Entrance            | 42 49      | 70 49          | +0010            | +0015        | -0.3                           | -0.3 | -0.1 | -0.1 1.34                    |
| 2814  | Portsmouth                          | 43 05      | 70 45          | +0003            | +0003        | -0.4                           | -0.4 | -0.1 | -0.1 1.28                    |
| 2815  | Cape Porpoise                       | 43 22      | 70 26          | 0000             | +0003        | -0.2                           | -0.2 | 0.0  | -0.1 1.43                    |
| 2816  | Portland                            | U 43 40    | 70 15          | -0011            | -0009        | -0.1                           | -0.1 | 0.0  | -0.1 1.49                    |
| 2818  | Potts Harbour                       | 43 44      | 70 01          | -0009            | -0008        | -0.1                           | -0.2 | 0.0  | -0.1 1.46                    |

○ No data.

\* See notes on page 360.

U Tides predicted in United States Tide Tables.

d Differences approximate.

x M.L. inferred.

**UNITED STATES; CANADA, BAY OF FUNDY**

| No.  | PLACE                          | Lat.<br>N. | Long.<br>W. | TIME DIFFERENCES  |       |               | HEIGHT DIFFERENCES (IN METRES) |      |      |      | M.L.<br>Z <sub>o</sub><br>m. |  |
|------|--------------------------------|------------|-------------|-------------------|-------|---------------|--------------------------------|------|------|------|------------------------------|--|
|      |                                |            |             | MHW<br>Zone +0500 | MLW   | Zone +0500    | MHWS                           | MHWN | MLWN | MLWS |                              |  |
| 2809 | BOSTON . . . . .               |            |             | (see page 104.)   |       |               |                                | 3.1  | 2.7  | 0.4  | 0.0                          |  |
|      | Kennebec River                 |            |             |                   |       |               |                                |      |      |      |                              |  |
| 2819 | Fort Popham . . . . .          | 43 45      | 69 47       | -0002             | -0005 |               | -0.3                           | -0.2 | -0.1 | -0.1 | 1.37                         |  |
| 2820 | Bath . . . . .                 | 43 55      | 69 49       | +0050             | +0108 |               | -1.0                           | -0.9 | -0.1 | 0.0  | 1.04                         |  |
| 2821 | Richmond . . . . .             | 44 05      | 69 48       | +0237             | +0250 |               | -1.3                           | -1.2 | -0.2 | 0.0  | 0.85                         |  |
| 2824 | Monhegan Island . . . . .      | 43 46      | 69 19       | -0025             | -0018 |               | -0.2                           | -0.1 | 0.0  | -0.1 | 1.43                         |  |
| 2825 | Tenants Harbour . . . . .      | 43 58      | 69 12       | -0022             | -0020 |               | 0.0                            | 0.0  | 0.0  | -0.1 | 1.52                         |  |
|      | Penobscot Bay                  |            |             |                   |       |               |                                |      |      |      |                              |  |
| 2827 | Matinicus Harbour . . . . .    | 43 52      | 68 53       | -0028             | -0021 |               | -0.1                           | 0.0  | 0.0  | -0.1 | 1.46                         |  |
| 2828 | Vinalhaven . . . . .           | 44 03      | 68 50       | -0024             | -0015 |               | 0.0                            | 0.0  | 0.0  | -0.1 | 1.52                         |  |
| 2829 | Pulpit Harbour . . . . .       | 44 09      | 68 53       | -0025             | -0025 |               | +0.2                           | +0.2 | 0.0  | -0.1 | 1.62                         |  |
| 2831 | Rockland . . . . .             | 44 06      | 69 06       | -0025             | -0025 |               | +0.2                           | +0.1 | 0.0  | -0.1 | 1.58                         |  |
| 2832 | Belfast . . . . .              | 44 25      | 69 00       | -0020             | -0020 |               | +0.2                           | +0.2 | 0.0  | -0.1 | 1.65                         |  |
| 2833 | Bangor . . . . .               | 44 48      | 68 46       | -0040             | -0015 |               | +1.4                           | +1.1 | +0.2 | -0.1 | 2.19                         |  |
| 2835 | Centre Harbour . . . . .       | 44 16      | 68 35       | -0024             | -0016 |               | +0.3                           | +0.2 | 0.0  | -0.1 | 1.65                         |  |
| 2864 | SAINT JOHN, N.B. . . . .       |            |             | (see page         |       |               |                                | 8.0  | 6.9  | 1.7  | 0.6                          |  |
| 2837 | Blue Hill Harbour . . . . .    | 44 24      | 68 34       | -0055             | -0055 |               | -4.6                           | -4.0 | -1.3 | -0.7 | 1.65                         |  |
| 2838 | Bar Harbour . . . . .          | 44 23      | 68 12       | -0110             | -0110 |               | -4.5                           | -3.9 | -1.3 | -0.7 | 1.74                         |  |
| 2840 | Prospect Harbour . . . . .     | 44 24      | 68 01       | -0105             | -0108 |               | -4.5                           | -3.9 | -1.3 | -0.6 | 1.74                         |  |
| 2842 | Jonesport . . . . .            | 44 32      | 67 36       | -0105             | -0105 |               | -4.2                           | -3.6 | -1.2 | -0.7 | 1.89                         |  |
| 2843 | Cutler, Little River . . . . . | 44 39      | 67 13       | -0110             | -0115 |               | -3.5                           | -3.1 | -1.2 | -0.7 | 2.16                         |  |
| 2845 | West Quoddy Head . . . . .     | 44 49      | 66 59       | -0052             | -0040 |               | -2.0                           | -1.7 | -0.3 | 0.0  | 3.40                         |  |
| 2846 | Eastport . . . . .             | U 44 54    | 66 59       | -0102             | -0054 |               | -1.1                           | -0.9 | -0.1 | +0.1 | 3.85                         |  |
|      | Canada                         |            |             | Zone +0400        |       |               |                                |      |      |      |                              |  |
|      | BAY OF FUNDY                   |            |             |                   |       |               |                                |      |      |      |                              |  |
|      | Grand Manan Island             |            |             |                   |       |               |                                |      |      |      |                              |  |
| 2847 | Outer Wood Island . . . . .    | 44 36      | 66 48       | -0027             | -0029 |               | -2.5                           | -2.2 | -0.2 | +0.1 | 3.09                         |  |
| 2849 | North Head . . . . .           | 44 46      | 66 45       | -0004             | -0007 |               | -1.5                           | -1.3 | -0.2 | 0.0  | 3.56                         |  |
| 2853 | Welshpool . . . . .            | 44 53      | 66 57       | +0003             | +0008 |               | -1.3                           | -1.0 | -0.2 | +0.1 | 3.70                         |  |
|      | Passamaquoddy Bay              |            |             |                   |       |               |                                |      |      |      |                              |  |
| 2858 | St. Andrews . . . . .          | 45 04      | 67 03       | +0011             | +0018 |               | -0.9                           | -0.7 | -0.1 | +0.1 | 3.90                         |  |
| 2860 | Back Bay . . . . .             | 45 03      | 66 52       | -0003             | -0007 |               | -1.2                           | -1.0 | +0.1 | +0.3 | 3.85                         |  |
| 2862 | Lepreau Bay . . . . .          | 45 07      | 66 29       | -0001             | +0003 |               | -0.8                           | -0.5 | -0.2 | +0.2 | 4.0                          |  |
| 2864 | SAINT JOHN, N.B. . . . .       | 45 16      | 66 04       |                   |       | STANDARD PORT |                                |      |      |      | 4.42                         |  |
| 2866 | St. Martins . . . . .          | 45 21      | 65 32       | +0011             | +0007 |               | +1.5                           | +1.5 | +0.5 | +0.4 | 5.28                         |  |
|      | CHIGNECTO BAY                  |            |             |                   |       |               |                                |      |      |      |                              |  |
| 2869 | Herring Cove . . . . .         | 45 34      | 64 58       | +0013             | +0016 |               | +2.4                           | +2.4 | +0.6 | +0.4 | 5.81                         |  |
| 2871 | Grindstone Island . . . . .    | 45 43      | 64 37       | +0016             | +0025 |               | +3.9                           | +3.6 | +0.8 | +0.4 | 6.56                         |  |
|      | River Petitcodiac              |            |             |                   |       |               |                                |      |      |      |                              |  |
| 2872 | Hopewell Cape . . . . .        | 45 51      | 64 35       | +0010             | +0029 |               | +4.7                           | +4.2 | +1.1 | +0.5 | 6.94                         |  |
| 2874 | Moncton . . . . .              | 46 05      | 64 46       | +0045             | ○     |               | ○                              | ○    | ○    | ○    | ○                            |  |
| 2875 | Salisbury . . . . .            | 45 59      | 65 05       | +0130             | ○     |               | ○                              | ○    | ○    | ○    | ○                            |  |
|      | Cumberland Basin               |            |             |                   |       |               |                                |      |      |      |                              |  |
| 2877 | Amherst Harbour . . . . .      | 45 50      | 64 17       | +0035             | +0045 |               | +5.6                           | +5.0 | +0.9 | +0.6 | 7.4                          |  |
| 2878 | Joggins Wharf . . . . .        | 45 41      | 64 28       | +0019             | +0025 |               | +4.2                           | +3.9 | +0.7 | +0.4 | 6.61                         |  |
| 2880 | Cape Capstan . . . . .         | 45 28      | 64 51       | +0011             | +0013 |               | +2.5                           | +2.3 | +0.6 | +0.4 | 5.75                         |  |
|      | MINAS BASIN AND CHANNEL        |            |             |                   |       |               |                                |      |      |      |                              |  |
| 2881 | Ile Haute . . . . .            | 45 15      | 65 00       | +0011             | +0006 |               | +2.5                           | +2.2 | +0.3 | +0.3 | 6.0                          |  |
| 2883 | West Advocate . . . . .        | 45 21      | 64 49       | 0000              | 0000  |               | +2.5                           | +2.3 | +0.6 | +0.4 | 5.76                         |  |
| 2884 | Port Greville . . . . .        | 45 24      | 64 33       | +0029             | +0031 |               | +3.5                           | +3.3 | +0.8 | +0.5 | 6.35                         |  |
| 2885 | Parrsboro . . . . .            | 45 22      | 64 20       | +0050             | +0043 |               | +4.5                           | +4.1 | +0.7 | +0.3 | 6.70                         |  |
| 2886 | Five Islands . . . . .         | 45 23      | 64 04       | +0057             | +0057 |               | +5.6                           | +5.1 | +1.0 | +0.5 | 7.38                         |  |
| 2888 | Truro . . . . .                | 45 22      | 63 20       | +0135             | ○     |               | +0.1                           | -0.5 | ○    | ○    | ○                            |  |
| 2891 | Burke's Head . . . . .         | 45 18      | 63 49       | +0105             | +0110 |               | +6.0                           | +5.4 | +1.0 | +0.5 | 7.53                         |  |

SEASONAL CHANGES IN MEAN LEVEL

| No.         | Jan. 1 | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1 | Aug. 1 | Sep. 1     | Oct. 1 | Nov. 1 | Dec. 1 | Ja |
|-------------|--------|--------|--------|--------|-------|--------|--------|--------|------------|--------|--------|--------|----|
| 2740        | -0.1   | -0.1   | -0.1   | 0.0    | 0.0   | 0.0    | 0.0    | 0.0    | +0.1       | +0.1   | 0.0    | 0.0    | -  |
| 2762 - 2777 | -0.1   | -0.1   | 0.0    | 0.0    | 0.0   | 0.0    | 0.0    | 0.0    | 0.0        | +0.1   | 0.0    | 0.0    | -  |
| 2779 - 2891 |        |        |        |        |       |        |        |        | Negligible |        |        |        |    |

**CANADA: NEWFOUNDLAND AND LABRADOR**

| No.                    | PLACE                  | Lat.<br>N. | Long.<br>W. | TIME DIFFERENCES  |            | HEIGHT DIFFERENCES (IN METRES) |      |      | M.L.<br>$Z_0$<br>m. |      |
|------------------------|------------------------|------------|-------------|-------------------|------------|--------------------------------|------|------|---------------------|------|
|                        |                        |            |             | MHW<br>Zone +0330 | MLW        | MHWS                           | MHWN | MLWN |                     |      |
| 3159                   | ARGENTIA               |            |             |                   |            | 2.2                            | 1.7  | 0.7  | 0.3                 |      |
| <i>Placentia Bay</i>   |                        |            |             |                   |            |                                |      |      |                     |      |
| 3156                   | Tacks Beach            | 47 35      | 54 12       | -0003             | -0004      | -0.2                           | -0.1 | -0.1 | -0.1 1.12           |      |
| 3157                   | Woody Island           | 47 47      | 54 12       | +0015             | +0015      | -0.1                           | 0.0  | 0.0  | +0.1 1.22           |      |
| 3158                   | Come by Chance         | 47 49      | 54 01       | -0004             | -0008      | +0.1                           | +0.2 | +0.2 | +0.2 1.37           |      |
| 3159                   | ARGENTIA               | 47 18      | 53 59       | STANDARD PORT     |            | See Table V                    |      |      |                     | 1.31 |
| 3161                   | St. Bride's            | 46 55      | 54 11       | +0004             | +0002      | -0.1                           | -0.1 | -0.1 | -0.1 1.19           |      |
| 3162                   | Trepassey Harbour      | 46 44      | 53 23       | -0025             | -0010      | -0.6                           | -0.4 | -0.2 | -0.1 0.86           |      |
| 3165                   | ST. JOHN'S HARBOUR     | (see page) |             |                   |            | 1.3                            | 0.9  | 0.5  | 0.3                 |      |
| 3163                   | Fermeuse Harbour       | 46 58      | 52 58       | -0009             | -0015      | 0.0                            | 0.0  | -0.1 | -0.2 0.70           |      |
| 3164                   | Bay Bulls              | 47 19      | 52 48       | -0020             | -0025      | 0.0                            | +0.1 | 0.0  | -0.1 0.8            |      |
| 3165                   | ST. JOHN'S HARBOUR     | 47 34      | 52 41       | STANDARD PORT     |            | See Table V                    |      |      |                     | 0.76 |
| 3167                   | Holyrood               | 47 24      | 53 07       | -0005             | -0005      | 0.0                            | +0.1 | +0.1 | 0.0 0.85            |      |
| 3168                   | Harbour Grace          | 47 41      | 53 13       | -0025             | -0025      | -0.1                           | 0.0  | -0.1 | -0.1 0.7            |      |
| <i>Trinity Bay</i>     |                        |            |             |                   |            |                                |      |      |                     |      |
| 3169                   | Heart's Content        | 47 52      | 53 22       | -0031             | -0031      | -0.2                           | 0.0  | 0.0  | 0.0 0.70            |      |
| 3170                   | Bull Island            | 47 46      | 53 47       | -0010             | ⊖          | -0.2                           | -0.1 | ⊖    | ⊖ 0.6               |      |
| 3171                   | Randomhead Harbour     | 48 06      | 53 34       | -0020             | ⊖          | -0.2                           | 0.0  | ⊖    | ⊖ 0.7               |      |
| 3171a                  | Clarenville            | 48 10      | 53 58       | -0020             | -0015      | -0.1                           | -0.1 | 0.0  | -0.1 0.70           |      |
| 3172                   | Port Union             | 48 30      | 53 05       | -0025             | -0025      | -0.2                           | -0.1 | 0.0  | 0.0 0.64            |      |
| 3173                   | King's Cove            | 48 34      | 53 20       | -0013             | ⊖          | -0.3                           | -0.1 | ⊖    | ⊖ 0.6               |      |
| 3174                   | Bonavista Bay          | 48 35      | 53 57       | -0034             | -0019      | -0.4                           | -0.2 | -0.1 | -0.2 0.52           |      |
| 3177                   | Freshwater Bay         | 48 49      | 54 03       | +0005             | ⊖          | -0.1                           | 0.0  | ⊖    | ⊖ 0.7               |      |
| 3178                   | Valleyfield            | 49 07      | 53 37       | -0019             | -0018      | -0.3                           | -0.2 | -0.1 | -0.1 0.57           |      |
| 3180                   | Funk Island            | 49 46      | 53 11       | -0028             | ⊖          | -0.5                           | -0.3 | ⊖    | ⊖ 0.5               |      |
| 3181                   | Carmanville            | 49 24      | 54 17       | +0001             | -0011      | -0.1                           | 0.0  | +0.1 | -0.1 0.73           |      |
| 3182                   | Fogo Harbour           | 49 43      | 54 17       | -0023             | -0023      | +0.2                           | +0.2 | +0.2 | +0.1 0.9            |      |
| 3183                   | Twillingate Harbour    | 49 39      | 54 46       | -0014             | -0030      | +0.1                           | +0.1 | +0.2 | +0.1 0.88           |      |
| <i>Bay of Exploits</i> |                        |            |             |                   |            |                                |      |      |                     |      |
| 3185                   | Botwood                | 49 09      | 55 20       | -0020             | -0045      | +0.2                           | +0.2 | +0.1 | +0.1 ⊖ 0.63         |      |
| 3186                   | Exploits Burnt Islands | 49 32      | 55 04       | -0005             | -0016      | -0.2                           | -0.1 | -0.1 | -0.2 0.63           |      |
| 3189                   | Little Bay Arm         | 49 36      | 55 55       | -0003             | -0017      | -0.2                           | -0.1 | 0.0  | -0.2 0.64           |      |
| 3191                   | Tilt Cove              | 49 53      | 55 37       | -0002             | -0007      | -0.1                           | 0.0  | 0.0  | -0.2 0.67           |      |
| 3192                   | La Scie                | 49 58      | 55 36       | -0032             | -0017      | -0.1                           | 0.0  | 0.0  | -0.1 0.70           |      |
| 3193                   | Bale Verte             | 49 57      | 56 11       | -0011             | -0022      | -0.1                           | 0.0  | 0.0  | -0.1 0.70           |      |
| <i>White Bay</i>       |                        |            |             |                   |            |                                |      |      |                     |      |
| 3194                   | Seal Cove              | 49 56      | 56 22       | -0015             | -0015      | -0.2                           | -0.1 | -0.1 | -0.2 0.63           |      |
| 3194a                  | Hampden                | 49 34      | 56 52       | -0012             | -0037      | 0.0                            | +0.1 | +0.1 | -0.1 0.80           |      |
| 3195                   | Sops Island            | 49 50      | 56 46       | -0025             | -0024      | -0.2                           | -0.2 | -0.1 | -0.3 0.55           |      |
| 3196                   | Orange Bay             | 50 26      | 56 30       | -0042             | -0055      | +0.1                           | +0.1 | +0.1 | 0.0 ⊖               |      |
| 3197                   | Wild Cove              | 50 42      | 56 10       | -0052             | -0103      | +0.1                           | +0.1 | +0.1 | -0.1 ⊖              |      |
| 3198                   | Croque Harbour         | 51 03      | 55 48       | -0015             | ⊖          | +0.1                           | +0.2 | ⊖    | ⊖ 0.8               |      |
| 3199                   | Arlege Bay             | 51 10      | 56 00       | -0015             | ⊖          | +0.1                           | +0.1 | -0.1 | -0.3 0.7            |      |
| 3200                   | St. Anthony            | 51 22      | 55 35       | -0040             | -0050      | 0.0                            | +0.1 | +0.2 | +0.1 0.82           |      |
| 3200a                  | Quirpon Harbour        | 51 36      | 55 26       | -0033             | -0105      | -0.3                           | -0.3 | -0.1 | -0.3 ⊖              |      |
| 3201                   | Ship Cove              | 51 36      | 55 38       | -0001             | -0011      | -0.4                           | -0.3 | -0.2 | -0.2 0.48           |      |
| <i>Belle Isle</i>      |                        |            |             |                   |            |                                |      |      |                     |      |
| 3202                   | South Point            | 51 53      | 55 21       | -0020             | ⊖          | -0.4                           | -0.1 | ⊖    | ⊖ 0.6 dx            |      |
| 3159                   | ARGENTIA               |            |             |                   |            | 2.2                            | 1.7  | 0.7  | 0.3                 |      |
| Labrador               |                        |            |             |                   |            |                                |      |      |                     |      |
|                        |                        |            |             |                   | Zone +0400 |                                |      |      |                     |      |
| 3204                   | Battle Harbour         | 52 16      | 55 36       | -0149             | -0137      | -0.7                           | -0.6 | 0.0  | +0.1 0.94           |      |
| 3205                   | Port Marmham           | 52 23      | 55 44       | -0138             | -0119      | -0.9                           | -0.7 | -0.1 | -0.1 0.76           |      |
| 3206                   | Port Hope Simpson      | 52 33      | 56 18       | -0201             | -0135      | -0.9                           | -0.7 | -0.1 | 0.0 0.80            |      |

⊖ No data.

C Tides predicted in Canadian Tide Tables.

d Differences approximate.

p For predictions use harmonic constants (see Part III).

t Time differences approximate.

x M.L. inferred.

**CANADA: LABRADOR TO HUDSON BAY**

| No.                                     | PLACE                    | Lat.<br>N. | Long.<br>W. | TIME DIFFERENCES  |       |       | HEIGHT DIFFERENCES (IN METRES) |      |      |      | M.L.<br>Z <sub>0</sub><br>m. |
|---|--------------------------|------------|-------------|-------------------|-------|-------|--------------------------------|------|------|------|------------------------------|
|   |                          |            |             | MHW<br>Zone +0400 | MLW   | MHWS  | MHWN                           | MLWN | MLWS |      |                              |
| 3159                                    | ARGENTIA                 |            |             |                   |       |       | 2.2                            | 1.7  | 0.7  | 0.3  |                              |
| 3214                                    | Cartwright               | 53 42      | 57 02       | -0130             | -0058 | -0.4  | -0.3                           | 0.0  | 0.0  | 1.04 |                              |
| 3216                                    | Cabot Point              | 53 43      | 59 02       | +0322             | +0347 | -1.6  | -1.2                           | -0.4 | -0.1 | 0.43 |                              |
| <i>Hamilton Inlet and Lake Melville</i> |                          |            |             |                   |       |       |                                |      |      |      |                              |
| 3217                                    | Jordans Point            | 54 13      | 58 15       | -0129             | -0103 | 0.0   | +0.1                           | +0.5 | +0.5 | 1.52 |                              |
| 3220                                    | Terrington Basin         | 53 21      | 60 24       | +0328             | +0421 | -1.5  | -1.1                           | -0.3 | -0.1 | 0.47 |                              |
| 3220a                                   | North West River         | 53 31      | 60 09       | +0256             | +0321 | -1.3  | -0.9                           | -0.1 | +0.2 | 0.68 |                              |
| 3221                                    | Smokey                   | 54 28      | 57 15       | -0142             | -0124 | -0.6  | -0.5                           | -0.1 | -0.1 | 0.93 |                              |
| 3225                                    | Makkovik                 | 55 05      | 59 10       | -0143             | -0118 | -0.2  | -0.2                           | +0.1 | +0.1 | 1.19 |                              |
| 3226                                    | Hopedale                 | 55 27      | 60 13       | -0204             | -0138 | -0.2  | -0.1                           | +0.1 | +0.1 | 1.19 |                              |
| 3228                                    | Davis Inlet              | 55 53      | 60 54       | -0200             | -0135 | 0.0   | +0.1                           | +0.3 | +0.3 | 1.40 |                              |
| 3231                                    | Nain                     | 56 32      | 61 41       | -0045             | -0020 | +0.3  | +0.2                           | +0.3 | +0.1 | 1.46 |                              |
| 2101                                    | PUNTA LOYOLA             |            |             |                   |       |       | 12.0                           | 9.5  | 3.8  | 1.6  |                              |
| 3242                                    | Williams Harbour         | 60 00      | 64 16       | -0226             | -0257 | -9.4  | -7.4                           | -3.1 | -1.4 | 1.39 |                              |
| <i>UNGAVA BAY</i>                       |                          |            |             |                   |       |       |                                |      |      |      |                              |
| 3244                                    | Button Islands           | 60 37      | 64 44       | -0210             | Ø     | -6.8  | -5.4                           | Ø    | Ø    | 2.9  |                              |
| 3245                                    | Port Burwell             | 60 25      | 64 51       | -0210             | -0240 | -6.2  | -5.0                           | -2.2 | -1.3 | 3.05 |                              |
| Zone +0500                              |                          |            |             |                   |       |       |                                |      |      |      |                              |
| 3248                                    | Riviere Koksoak Entrance | 58 32      | 68 12       | -0230             | -0255 | +0.2  | 0.0                            | +0.2 | -0.3 | 6.76 |                              |
| 3249                                    | Fort Chimo               | 58 09      | 68 16       | -0114             | Ø     | -4.6  | -3.8                           | Ø    | Ø    | 4.1  |                              |
| 3250                                    | Lac Aux Feuilles         | 58 44      | 69 50       | -0140             | -0215 | +1.2  | +1.0                           | +0.7 | +0.1 | 7.47 |                              |
| 3251                                    | Hopes Advance Bay        | 59 21      | 69 38       | -0240             | -0305 | -0.1  | -0.1                           | +0.4 | +0.1 | 6.81 |                              |
| <i>HUDSON STRAIT (SOUTH)</i>            |                          |            |             |                   |       |       |                                |      |      |      |                              |
| <i>Payne Bay</i>                        |                          |            |             |                   |       |       |                                |      |      |      |                              |
| 3252                                    | Basking Island           | 59 59      | 70 05       | -0155             | -0150 | -2.2  | -1.7                           | -0.4 | -0.2 | 5.62 |                              |
| 3252a                                   | Pikyulik Island          | 60 00      | 69 55       | -0200             | -0155 | -2.6  | -2.0                           | -0.5 | -0.2 | 5.43 |                              |
| 3252b                                   | Agvik Island             | 60 01      | 69 42       | -0240             | -0305 | -0.9  | -0.7                           | +0.3 | +0.2 | 6.46 |                              |
| 3254                                    | Diana Bay                | C 60 52    | 70 04       | -0245             | -0305 | -2.6  | -2.3                           | -0.4 | -0.4 | 5.36 |                              |
| 3256                                    | Stupart Bay              | 61 35      | 71 32       | -0240             | -0305 | -3.4  | -2.8                           | -0.8 | -0.4 | 4.88 |                              |
| 3256a                                   | Doctor Island            | 61 41      | 71 34       | -0220             | -0220 | -3.9  | -3.9                           | 0.0  | -0.3 | 4.71 |                              |
| 3257                                    | Wakeham Bay              | 61 43      | 71 53       | -0225             | -0245 | -1.2  | -2.0                           | +0.3 | -0.8 | 5.80 |                              |
| 3258                                    | Douglas Harbour          | 61 55      | 72 37       | -0230             | -0250 | -4.1  | -3.5                           | -1.1 | -0.7 | 4.37 |                              |
| 3260                                    | Deception Bay            | 62 09      | 74 45       | -0200             | -0211 | -6.5  | -5.2                           | -1.8 | -0.8 | 3.13 |                              |
| 3260a                                   | Sugluk                   | 62 13      | 75 39       | -0143             | -0143 | -7.1  | -5.7                           | -2.0 | -0.9 | 2.81 |                              |
| 3261                                    | Digges Harbour           | 62 34      | 77 52       | -0055             | -0106 | -8.8  | -7.1                           | -2.6 | -1.2 | 1.84 |                              |
| <i>Nottingham Island</i>                |                          |            |             |                   |       |       |                                |      |      |      |                              |
| 3262                                    | Port de Boucherville     | 63 10      | 77 35       | -0108             | -0130 | -8.0  | -6.6                           | -2.7 | -1.6 | 1.98 |                              |
| 3263                                    | Cape Acadia              | 61 35      | 78 52       | +0008             | -0006 | -10.8 | -8.6                           | -3.3 | -1.4 | 0.7  |                              |
| 2935                                    | HALIFAX                  |            |             | (see page 97)     |       |       | 1.8                            | 1.5  | 0.5  | 0.3  |                              |
| <i>HUDSON BAY</i>                       |                          |            |             |                   |       |       |                                |      |      |      |                              |
| 3265                                    | Inoudjouac               | 58 27      | 78 06       | P                 | P     | -1.3  | -1.0                           | -0.2 | -0.1 | 0.39 |                              |
| <i>Belcher Islands</i>                  |                          |            |             |                   |       |       |                                |      |      |      |                              |
| 3266                                    | Tukarak Island           | 56 19      | 78 50       | P                 | P     | -0.3  | -0.3                           | +0.1 | 0.0  | 0.91 |                              |
| 3266a                                   | Innetalling Island       | 55 54      | 79 04       | P                 | P     | -0.1  | -0.2                           | 0.0  | -0.1 | 0.95 |                              |
| 3267                                    | Great Whale Island       | 55 16      | 77 46       | P                 | P     | -0.1  | -0.1                           | -0.1 | -0.2 | 0.91 |                              |
| <i>James Bay</i>                        |                          |            |             |                   |       |       |                                |      |      |      |                              |
| 3267a                                   | Cape Jones               | 54 38      | 79 44       | P                 | P     | +0.3  | +0.1                           | +0.2 | 0.0  | 1.19 |                              |
| 3268                                    | Fort George              | 53 50      | 79 02       | P                 | P     | +0.2  | +0.2                           | +0.2 | +0.1 | 1.19 |                              |
| 3270                                    | Eastmain River           | 52 15      | 78 33       | +0620             | +0540 | -0.8  | -0.6                           | -0.1 | -0.1 | 0.64 |                              |
| 3271                                    | Stag Island              | 51 38      | 79 02       | +0730             | +0640 | +1.0  | +0.9                           | +0.4 | +0.2 | 1.65 |                              |

SEASONAL CHANGES IN MEAN LEVEL

| No.  | Jan. 1  | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1 | Aug. 1 | Sep. 1 | Oct. 1 | Nov. 1 | Dec. 1 |
|------|---------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|
| 2101 |         |        |        |        |       |        |        |        |        |        |        |        |
| 2935 |         |        |        |        |       |        |        |        |        |        |        |        |
| 3156 | - 3189  | 0.0    | +0.1   | +0.1   | 0.0   | 0.0    | 0.0    | -0.1   | -0.1   | -0.1   | 0.0    | 0.0    |
| 3191 | - 3206  | +0.1   | +0.1   | 0.0    | 0.0   | -0.1   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 3214 | - 3252b |        |        |        |       |        |        |        |        |        |        |        |
| 3254 | - 3271  | +0.1   | +0.1   | 0.0    | 0.0   | 0.0    | -0.1   | -0.1   | -0.1   | 0.0    | 0.0    | +0.1   |

## KALIMANTAN, WEST AND SOUTH COASTS, JAVA SEA

| No.  | PLACE                                   | Lat.<br>N. | Long.<br>E. | TIME DIFFERENCES    |       | HEIGHT DIFFERENCES (IN METRES) |         |             |          | M.L.<br>Z.<br>m. |
|------|---|------------|-------------|---------------------|-------|--------------------------------|---------|-------------|----------|------------------|
|      |   |            |             | HHW<br>(Zone -0800) | LLW   | MHHW                           | MLHW    | MHLW        | MLLW     |                  |
| 4848 | AIR MUSI (OUTER BAR)                    | .          | .           | see pag             |       |                                | 3.1     | △           | △        | 0.9              |
| 5193 | Pulau Temaju.                           | 0 30       | 108 50      | -0220               | -0117 | -1.9                           | △       | △           | -0.5     | 0.80             |
| 5194 | Pontianak Outer Bar (Kleine<br>Kapueas) | I 0 05     | 109 08      | -0119               | -0100 | -1.7                           | △       | △           | -0.4     | 0.90             |
|      |   |            |             | S.                  | E.    |                                |         |             |          |                  |
| 5195 | Pontianak                               | 0 01       | 109 20      | -0021               | +0002 | -1.9                           | △       | △           | -0.4     | 0.80             |
| 5196 | Tanjong Salch                           | 0 05       | 109 10      | -0055               | -0020 | -2.1                           | △       | △           | -0.4     | 0.80             |
| 5147 | MIRI                                    | .          | .           | see page            |       |                                | 1.6     | △           | △        | 0.5              |
| 5200 | Sukadana                                | 1 14       | 109 57      | -1145               | -1105 | +0.4                           | △       | △           | 0.0      | 1.10             |
| 5201 | Sungai Pawan.                           | 1 46       | 109 54      | -1140               | -1135 | +0.2                           | △       | △           | 0.0      | 1.10             |
|      |   |            |             | JAVA SEA            |       |                                |         |             |          |                  |
| 5204 | Tanjung Kuala Jelai                     | 2 50       | 110 44      | P                   | P     | -0.9                           | △       | △           | -0.2     | 0.50             |
|      | Sungai Kota Waringin                    |            |             |                     |       |                                |         |             |          |                  |
| 5205 | Kuala Sapu.                             | I 2 54     | 111 26      | P                   | P     | -0.2                           | △       | △           | +0.1     | 1.00             |
|      | Sungai Aru Tobal                        |            |             |                     |       |                                |         |             |          |                  |
| 5207 | Kuala Pembuang                          | 3 10       | 111 48      | P                   | P     | -0.4                           | △       | △           | -0.2     | 0.70             |
| 5208 |   | 3 25       | 112 34      | P                   | P     | +0.3                           | △       | △           | +0.3     | 1.30             |
| 5214 | SUNGAI BARITO                           | .          | .           | see pag             |       |                                | 2.2     | 1.5         | 2.2      | 0.3              |
| 5209 | Sampit Baai                             | I 3 00     | 113 03      | P                   | P     | +0.8                           | +0.1    | 0.0         | +0.2     | 1.40             |
|      | Sungai Mendawai                         |            |             |                     |       |                                |         |             |          |                  |
| 5210 | Pegatan                                 | 3 17       | 113 21      | +0019               | +0035 | 0.0                            | -0.1    | 0.0         | +0.2     | 1.30             |
|      | Sungai Kahajan                          |            |             |                     |       |                                |         |             |          |                  |
| 5211 | Tanjong Damaran                         | 3 19       | 114 05      | +0006               | +0017 | +0.1                           | +0.2    | +0.3        | +0.2     | 1.50             |
| 5212 | Pangkoh                                 | 3 05       | 114 10      | +0124               | +0156 | -0.1                           | +0.2    | +0.2        | +0.4     | 1.50             |
|      | Sungai Barito                           |            |             |                     |       |                                |         |             |          |                  |
| 5214 | OUTER BAR                               | 3 34       | 114 29      | STANDARD PORT       |       |                                |         | See Table V |          | 1.30             |
| 5215 | Banjermasin                             | 3 20       | 114 36      | +0116               | +0117 | -0.3                           | 0.0     | +0.2        | +0.2     | 1.30             |
| 5216 | Sungai Tabanio                          | 3 45       | 114 36      | +0019               | +0014 | -0.4                           | 0.0     | +0.2        | +0.3     | 1.30             |
| 5228 | BALIK PAPAN                             | .          | .           | see pag 84          | MHW   | MLW                            | MHW 2.6 | MHWN 1.5    | MLWN 1.3 | MLWS 0.2         |
|      | Selat Laut                              |            |             |                     |       |                                |         |             |          |                  |
| 5219 | Kampong Baru                            | 3 25       | 116 01      | P                   | P     | -0.3                           | 0.0     | 0.0         | +0.3     | 1.40             |
|      | SELAT MAKASSAR                          |            |             |                     |       |                                |         |             |          |                  |
| 5221 | Teluk Klumpang                          | 3 01       | 116 13      | P                   | P     | -0.2                           | 0.0     | 0.0         | +0.2     | 1.40             |
| 5222 | Tanjong Pamukan                         | 2 34       | 116 20      | +0004               | +0007 | -0.1                           | +0.1    | +0.1        | +0.1     | 1.40             |

#### SEASONAL CHANGES IN MEAN LEVEL

| No.        | Jan. 1 | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1 | Aug. 1 | Sep. 1 | Oct. 1 | Nov. 1 | Dec. 1 | Jan. |
|------------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|------|
| 4718       | +0.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | -1.0   | -1.0   | -1.0   | 0.0    | +1.0   | +1.0   | +0.0 |
| 4848       | +0.1   | +0.2   | +0.2   | +0.1   | 0.0   | 0.0    | -1.0   | -1.0   | -2.0   | -1.0   | 0.0    | 0.0    | +0.0 |
| 4902       | +0.2   | +0.2   | +0.1   | +0.0   | 0.0   | 0.0    | -1.0   | -1.0   | -2.0   | 0.0    | +0.0   | +0.0   | +0.0 |
| 5147       | +0.1   | 0.0    | 0.0    | -1.0   | -1.0  | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | +0.0   | +0.0   | +0.0 |
| 5167-5169  | +0.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | -1.0   | -1.0   | -1.0   | 0.0    | +0.0   | +0.0   | +0.0 |
| 5170, 5171 | +0.2   | +0.2   | +0.0   | 0.0    | 0.0   | 0.0    | -1.0   | -1.0   | -1.0   | 0.0    | +0.0   | +0.0   | +0.0 |
| 5172-5196  | +0.1   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | -1.0   | -1.0   | -1.0   | 0.0    | +0.0   | +0.0   | +0.0 |
| 5200-5214  | +0.0   | +0.0   | +0.1   | +0.1   | +0.1  | 0.0    | -1.0   | -1.0   | -1.0   | 0.0    | 0.0    | 0.0    | +0.0 |
| 5215       | +0.2   | +0.2   | +0.1   | +0.0   | 0.0   | 0.0    | -1.0   | -1.0   | -2.0   | -1.0   | 0.0    | 0.0    | +0.0 |
| 5216-5222  | +0.1   | +0.1   | +0.1   | +0.1   | +0.1  | 0.0    | -1.0   | -1.0   | -2.0   | -1.0   | 0.0    | 0.0    | +0.0 |
| 5228       | +0.2   | +0.2   | +0.2   | +0.2   | +0.2  | 0.0    | -2.0   | -2.0   | -3.0   | -2.0   | 0.0    | 0.0    | +0.0 |
| 6938       | +0.2   | +0.1   | 0.0    | 0.0    | 0.0   | 0.0    | -1.0   | -2.0   | -2.0   | 0.0    | +0.0   | +0.0   | +0.0 |
| 6996       | 0.0    | -1.0   | -1.0   | -1.0   | -1.0  | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | +0.0   | +0.0   | +0.0 |

AUSTRALIA

| No.   | PLACE                 | Lat.<br>S. | Long.<br>E. | TIME DIFFERENCES    |               | HEIGHT DIFFERENCES (IN METRES) |      |             |             | M.L.<br>Z<br>m. |             |
|-------|-----------------------|------------|-------------|---------------------|---------------|--------------------------------|------|-------------|-------------|-----------------|-------------|
|       |                       |            |             | MHW<br>(Zone -0800) | MLW           | MHWS                           | MHWN | MLWN        | MLWS        |                 |             |
| 6323  | DARWIN                |            |             | sec page 88         |               | 6.9                            | 5.1  | 3.2         | 1.4         |                 |             |
|       | Cambridge Gulf        |            |             |                     |               |                                |      |             |             |                 |             |
| 6306  | Lacrosse Island       |            | 14 45       | 128 20              | -0022         | -0028                          | -0.4 | -0.1        | -0.4        | -0.1            |             |
| 6306a | Cape Donett           | A          | 14 49       | 128 23              | -0021         | -0025                          | -0.2 | -0.1        | -0.1        | 0.0             |             |
| 6307  | Webster Bluff         |            | 15 05       | 128 08              | +0025         | 0                              | 0    | 0           | 0           | 0               |             |
| 6309  | Wyndham               | A          | 15 27       | 128 06              | +0104         | +0104                          | +0.5 | +0.5        | -0.5        | -0.6            |             |
| 6310  | Pelican Island        |            | 14 46       | 128 47              | +0100         | +0053                          | +0.5 | +0.6        | +0.2        | 4.48            |             |
|       |                       |            |             |                     |               | (Zone -0930)                   |      |             |             |                 |             |
|       | Victoria River        |            |             |                     |               |                                |      |             |             |                 |             |
| 6311  | Turtle Point          |            | 14 50       | 129 14              | +0140         | +0140                          | -0.8 | -0.6        | -0.7        | 3.5             |             |
| 6312  | Holdfast Reach        |            | 15 14       | 129 49              | +0120         | 0                              | 0    | 0           | 0           | 0               |             |
| 6313  | Mosquito Flat         |            | 15 25       | 130 08              | +0605         | 0                              | 0    | 0           | 0           | 0               |             |
| 6314  | Sandy Island          |            | 15 28       | 130 22              | +0700         | 0                              | 0    | 0           | 0           | 0               |             |
| 6316  | Pearce Point          |            | 14 26       | 129 22              | +0120         | +0120                          | -0.4 | -0.3        | -0.7        | 3.7             |             |
| 6317  | Port Keats            |            | 14 03       | 129 34              | +0020         | +0020                          | -0.4 | -0.3        | -0.7        | 3.7             |             |
| 6319  | Daly River            |            | 13 22       | 130 19              | -0040         | -0040                          | -0.4 | -0.5        | -0.5        | 3.7             |             |
|       | Bynoe Harbour         |            |             |                     |               |                                |      |             |             |                 |             |
| 6320  | Tapa Bay              |            | 12 27       | 130 36              | -0004         | -0004                          | -0.7 | -0.7        | -0.3        | 3.66            |             |
| 6321  | East Point            |            | 12 35       | 130 34              | +0004         | +0004                          | -0.5 | -0.4        | -0.2        | 3.83            |             |
|       | Port Darwin           |            |             |                     |               |                                |      |             |             |                 |             |
| 6322  | Night Cliff           |            | 12 23       | 130 50              | +0006         | +0006                          | -0.4 | -0.4        | -0.2        | 3.85            |             |
| 6323  | DARWIN                |            | 12 28       | 130 51              | STANDARD PORT |                                |      |             |             | 4.10            |             |
|       | See Table V           |            |             |                     |               |                                |      |             |             |                 |             |
| 6325  | Cape Hotham           |            | 12 03       | 131 17              | +0114         | +0114                          | -2.5 | -1.7        | -1.2        | 2.69            |             |
| 6328  | Two Hills Bay         |            | 11 31       | 132 04              | +0145         | +0145                          | -3.0 | -2.1        | -1.5        | 2.33            |             |
|       | Melville Island       |            |             |                     |               |                                |      |             |             |                 |             |
| 6330  | Camp Point            |            | 11 37       | 131 26              | +0110         | +0115                          | -3.2 | -2.2        | -1.6        | 2.26            |             |
| 6332  | Newby Shoal           |            | 11 52       | 129 11              | -0112         | -0117                          | -3.2 | -2.4        | -1.3        | 2.23            |             |
| 6333  | St. Asaph Bay         |            | 11 18       | 130 26              | +0005         | +0005                          | -2.9 | -2.0        | -1.7        | 2.3             |             |
| 6337  | Snake Bay             |            | 11 23       | 130 41              | +0345         | +0345                          | -5.1 | -3.7        | -2.4        | 0               |             |
|       |                       |            |             |                     |               |                                |      |             |             | a               |             |
| 5425  | BANDA                 |            |             | sec.page            |               | HHW                            | LLW  | MHHW<br>x.0 | MLHW<br>x.3 | MHLW<br>x.0     | MLLW<br>0.4 |
| 6336  | Christies Bay         |            | 11 19       | 131 46              | +0427         | +0415                          | 0.0  | +0.2        | +0.1        | +0.1            | 1.41        |
| 6337  | Port Essington        |            | 11 22       | 132 11              | +0310         | +0310                          | +0.5 | +0.5        | +0.2        | +0.4            | 1.7         |
| 6339  | Cape Croker           |            | 11 00       | 132 34              | +0307         | +0305                          | +0.1 | +0.1        | +0.1        | +0.2            | 1.43        |
|       |                       |            |             |                     |               |                                |      |             |             |                 |             |
| 6327  | DARWIN                |            |             | sec page 88         |               | MHW                            | MLW  | MHWS<br>6.9 | MHWN<br>5.1 | MLWN<br>3.2     | MLWS<br>1.4 |
| 6341  | North Goulburn Island |            | 13 33       | 133 26              | +0045         | +0043                          | -4.5 | -3.2        | -2.3        | -1.0            | 1.4         |
|       | Liverpool River       |            |             |                     |               |                                |      |             |             |                 |             |
| 6343  | Entrance Island       |            | 12 58       | 134 15              | +0126         | +0126                          | -3.7 | -2.5        | -2.2        | -1.0            | 1.8         |
|       | Millingimbi Inlet     |            |             |                     |               |                                |      |             |             |                 |             |
| 6344  | Yabooma Island        |            | 11 58       | 134 54              | +0232         | +0232                          | -3.0 | -2.1        | -2.1        | -1.1            | 2.07        |
| 6345  | Guluwuru Island       |            | 11 30       | 136 20              | +0255         | +0255                          | -3.8 | -2.7        | -2.0        | -0.9            | 1.86        |
|       | Marchinbar Island     |            |             |                     |               |                                |      |             |             |                 |             |
| 6346  | Jensen Bay            |            | 12 11       | 136 45              | +0210         | +0205                          | -3.5 | -2.5        | -1.8        | -0.8            | 2.00        |
| 6347  | Mallison Island       |            | 12 11       | 136 06              | +0355         | +0355                          | -2.2 | -1.1        | -2.0        | -0.8            | 2.63        |

0 No data.

Δ Tide is usually diurnal.

Δ Tides predicted in Australian National Tide Tables.

Z Tides predicted in New Zealand Tide Tables.

a Data approximate.

d Differences approximate.

p For predictions use harmonic constants (Part III) and N.P.159.

t Time differences approximate.

x M.L. inferred.

## ILES LOYALTY TO AUSTRALIA

| No.                          | PLACE                   | Lat.<br>S. | Long.<br>E. | TIME DIFFERENCES<br>(Zone -1100) |        | HEIGHT DIFFERENCES (IN METRES) |       |      |      | M.L.<br>Z <sub>0</sub><br>m. |      |  |  |  |  |
|------------------------------|-------------------------|------------|-------------|----------------------------------|--------|--------------------------------|-------|------|------|------------------------------|------|--|--|--|--|
|                              |                         |            |             | MHW                              | LLW    | MHHW                           | MLHW  | MHLW | MLLW |                              |      |  |  |  |  |
| <b>5732 VILA HARBOUR</b>     |                         |            |             |                                  |        |                                |       |      |      |                              |      |  |  |  |  |
| <b>Iles Loyalty</b>          |                         |            |             |                                  |        |                                |       |      |      |                              |      |  |  |  |  |
| 5737                         | Uvea (Uea) Island       | .          | .           | 20 27                            | 166 37 | -0015                          | -0005 | +0.4 | +0.5 | +0.4                         | +0.4 |  |  |  |  |
| 5738                         | Lifu Island             | .          | .           | 20 50                            | 167 10 | +0025                          | ○     | +0.4 | +0.4 | ○                            | ○    |  |  |  |  |
| 5739                         | Maré Island             | .          | .           | 21 33                            | 167 53 | +0020                          | ○     | +0.4 | +0.4 | ○                            | ○    |  |  |  |  |
| <b>D'Entrecasteaux Reefs</b> |                         |            |             |                                  |        |                                |       |      |      |                              |      |  |  |  |  |
| 5741                         | Huon Island             | .          | .           | 18 03                            | 162 58 | -0010                          | ○     | +0.6 | ○    | ○                            | ○    |  |  |  |  |
| <b>New Caledonia</b>         |                         |            |             |                                  |        |                                |       |      |      |                              |      |  |  |  |  |
| 5745                         | Pam Bay                 | .          | .           | 20 14                            | 164 18 | +0155                          | ○     | +0.2 | +0.1 | ○                            | ○    |  |  |  |  |
| 5746                         | Port Pueblo             | .          | .           | 20 22                            | 164 36 | -0110                          | ○     | +0.1 | 0.0  | -0.1                         | -0.1 |  |  |  |  |
| 5747                         | Port Hyengen            | .          | .           | 20 41                            | 164 58 | +0020                          | ○     | +0.1 | +0.1 | ○                            | ○    |  |  |  |  |
| 5748                         | Tuo Bay                 | .          | .           | 20 47                            | 165 14 | +0015                          | ○     | +0.1 | 0.0  | ○                            | ○    |  |  |  |  |
| 5749                         | Baie de Poro            | .          | .           | 21 17                            | 165 42 | +0023                          | +0023 | +0.1 | +0.1 | +0.1                         | 0.67 |  |  |  |  |
| 5749a                        | Baie de Kouaoua         | .          | .           | 21 24                            | 165 50 | +0014                          | +0014 | +0.2 | +0.2 | +0.2                         | 0.83 |  |  |  |  |
| 5750                         | Baie d'Amata            | .          | .           | 21 27                            | 165 59 | +0033                          | +0031 | -0.2 | -0.1 | -0.1                         | 0.6  |  |  |  |  |
| 5750a                        | Thio                    | F          | 21 37       | 166 15                           | +0018  | +0012                          | 0.0   | +0.1 | +0.1 | +0.1                         | 0.85 |  |  |  |  |
| 5751                         | Uinué Bay               | .          | .           | 21 59                            | 166 43 | +0045                          | ○     | +0.1 | 0.0  | ○                            | ○    |  |  |  |  |
| 5752                         | Port Yate               | .          | .           | 22 09                            | 166 57 | -0045                          | ○     | ○    | ○    | ○                            | ○    |  |  |  |  |
| <b>Isle of Pines</b>         |                         |            |             |                                  |        |                                |       |      |      |                              |      |  |  |  |  |
| 5754                         | Kuto                    | .          | .           | 22 40                            | 167 26 | +0050                          | +0117 | 0.0  | 0.0  | +0.1                         | +0.2 |  |  |  |  |
| 5755                         | Goro                    | .          | .           | 22 19                            | 167 01 | +0113                          | +0100 | -0.2 | -0.2 | +0.1                         | +0.1 |  |  |  |  |
| 5756                         | Baie du Prony           | .          | .           | 22 19                            | 166 50 | +0137                          | +0123 | -0.1 | -0.1 | 0.0                          | 0.70 |  |  |  |  |
| 5756a                        | Ouara                   | .          | .           | 22 25                            | 166 50 | +0135                          | +0120 | -0.1 | -0.2 | 0.0                          | 0.69 |  |  |  |  |
| 5757                         | Ire                     | .          | .           | 22 24                            | 166 47 | +0142                          | +0127 | 0.0  | 0.0  | +0.1                         | +0.2 |  |  |  |  |
| <b>7280 LUHUASHAN</b>        |                         |            |             |                                  |        |                                |       |      |      |                              |      |  |  |  |  |
|                              |                         |            |             |                                  |        | MHW                            | MLW   | 4.3  | 3.3  | 2.0                          | 0.9  |  |  |  |  |
| 5757a                        | La Tortue               | .          | .           | 22 48                            | 166 46 | -0159                          | -0146 | -2.9 | -2.2 | -1.3                         | -0.5 |  |  |  |  |
| 5758                         | Amédée Lighthouse       | .          | .           | 22 29                            | 166 29 | -0205                          | -0203 | -2.8 | -2.1 | -1.3                         | -0.5 |  |  |  |  |
| 5759                         | Nouméa                  | F          | 22 16       | 166 27                           | -0201  | -0148                          | -2.8  | -2.1 | -1.3 | -0.5                         | 0.96 |  |  |  |  |
| 5760                         | Baie St. Vincent        | .          | .           | 22 01                            | 166 10 | -0150                          | -0135 | -2.5 | -1.8 | -1.0                         | -0.3 |  |  |  |  |
| 5761                         | Isié Pass               | .          | .           | 21 54                            | 165 46 | -0135                          | ○     | -2.5 | ○    | ○                            | ○    |  |  |  |  |
| 5762                         | Uarai Bay               | .          | .           | 21 47                            | 165 45 | -0210                          | -0210 | -2.6 | -2.0 | -1.3                         | -0.6 |  |  |  |  |
| 5763                         | Burail Bay              | .          | .           | 21 37                            | 165 26 | -0140                          | ○     | -2.9 | ○    | ○                            | ○    |  |  |  |  |
| 5764                         | Poya Bay                | .          | .           | 21 21                            | 165 04 | -0150                          | -0150 | -2.8 | -2.1 | -1.2                         | -0.4 |  |  |  |  |
| 5765                         | Gomen Bay               | .          | .           | 20 45                            | 164 25 | -0202                          | -0202 | -2.8 | -2.1 | -1.5                         | -0.5 |  |  |  |  |
| 5766                         | Paagoumene Bay          | .          | .           | 20 29                            | 164 11 | -0135                          | -0135 | -2.7 | -2.0 | -1.3                         | -0.5 |  |  |  |  |
| 5767                         | Banare                  | .          | .           | 20 14                            | 164 01 | -0210                          | -0210 | -2.8 | -2.1 | -1.3                         | -0.4 |  |  |  |  |
| 5768                         | Belp Islands<br>Aue Bay | .          | 19 40       | 163 38                           | -0300  | -0300                          | -0300 | ○    | ○    | ○                            | ○    |  |  |  |  |
| 6400                         | AUCKLAND                | .          | .           | see page 89                      |        |                                |       | 3.2  | 2.7  | 0.8                          | 0.3  |  |  |  |  |
| <b>TASMAN SEA</b>            |                         |            |             |                                  |        |                                |       |      |      |                              |      |  |  |  |  |
| (Zone -1130)                 |                         |            |             |                                  |        |                                |       |      |      |                              |      |  |  |  |  |
| 5770                         | Norfolk Island          | A          | 29 04       | 167 56                           | +0055  | +0058                          | -1.4  | -1.4 | -0.4 | -0.1                         | 0.88 |  |  |  |  |
| 5998                         | BRISBANE BAR            | .          | .           | see pag 85                       |        |                                |       | 2.1  | 1.7  | 0.7                          | 0.3  |  |  |  |  |
| (Zone -1030)                 |                         |            |             |                                  |        |                                |       |      |      |                              |      |  |  |  |  |
| 5772                         | Lord Howe Island        | .          | 31 32       | 159 04                           | -0050  | -0050                          | -0.1  | -0.1 | +0.1 | +0.1                         | 1.16 |  |  |  |  |
| 5774                         | Middleton Reef          | .          | 29 28       | 159 04                           | -0055  | ○                              | -0.3  | -0.2 | ○    | ○                            | d    |  |  |  |  |

○ No data.

△ Tide is usually diurnal.

A Tides predicted in Australian National Tide Tables.

F Tides predicted in French Tide Tables.

a Data approximate.

d Differences approximate.

p For predictions use harmonic constants (Part III) and N.P.159.

t Time differences approximate.

x M.L. inferred.

AUSTRALIA

| No.              | PLACE                           | Lat.<br>S. | Long.<br>E. | TIME DIFFERENCES     |               | HEIGHT DIFFERENCES (IN METRES) |             |             |             | M.L.<br>Zo<br>m. |
|------------------|---------------------------------|------------|-------------|----------------------|---------------|--------------------------------|-------------|-------------|-------------|------------------|
|                  |                                 |            |             | HHW<br>(Zone - 1000) | LLW           | MHHW                           | MLHW        | MHLW        | MLLW        |                  |
| 5998             | BRISBANE BAR                    | .          | .           | see page 85          |               | 2.2                            | 1.8         | 0.6         | 0.4         |                  |
| <i>CORAL SEA</i> |                                 |            |             |                      |               |                                |             |             |             |                  |
| 5775             | Cato Island                     | .          | 23 15       | 155 32               | -0135         | -0139                          | -0.4        | -0.4        | 0.0         | 0.0              |
|                  | <i>Frederick Reef</i>           |            |             |                      |               |                                |             |             |             | 1.06             |
| 5778             | Observatory Cay                 | .          | 21 02       | 154 23               | -0130         | 0                              | -0.5        | 0           | 0           | 0                |
| 5779             | Middle Bellona Reef             | .          | 21 24       | 158 51               | -0150         | 0                              | -0.6        | 0           | 0           | 0                |
|                  | <i>Chesterfield Reef</i>        |            |             |                      |               |                                |             |             |             | d                |
| 5780             | Long Island                     | .          | 19 53       | 158 19               | -0140         | 0                              | -0.8        | 0           | 0           | 0                |
| 5781             | Marion Reef                     | .          | 19 06       | 152 24               | p             | p                              | -0.5        | -0.5        | -0.3        | -0.5             |
| 5782             | Mellish Reef                    | .          | 17 25       | 155 52               | p             | p                              | -0.7        | -0.6        | +0.3        | 0.0              |
|                  |                                 |            |             |                      |               |                                |             |             | 1.0         | ax               |
| 5925             | TOWNSVILLE                      |            |             |                      | MHW           | MLW                            | MHWS<br>2.9 | MHWN<br>2.0 | MLWN<br>1.2 | MLWS<br>0.4      |
|                  | <i>Lihou Reef</i>               |            |             |                      |               |                                |             |             |             |                  |
| 5783             | Observatory Cay                 | .          | 17 08       | 152 07               | -0200         | 0                              | -1.2        | 0           | 0           | 0                |
| 5785             | Willis Islands                  | .          | 16 13       | 150 01               | -0200         | 0                              | -1.2        | 0           | 0           | 0                |
| 5788             | Osprey Reef                     | .          | 13 53       | 146 32               | -0020         | 0                              | -1.2        | 0           | 0           | 0                |
| 5790             | Murray Islands                  | .          | 9 55        | 144 02               | +0050         | 0                              | -0.3        | 0           | 0           | 0                |
|                  | <i>Great North-East Channel</i> |            |             |                      |               |                                |             |             |             | d                |
| 5793             | Bramble Cay                     | .          | 9 08        | 143 52               | +0105         | +0050                          | 0.0         | -0.1        | +0.4        | +0.2             |
| 5794             | Darnley Island                  | .          | 9 36        | 143 46               | +0100         | +0100                          | -0.2        | -0.2        | +0.1        | +0.1             |
| 5798             | Rennel Island                   | .          | 9 46        | 143 16               | +0135         | +0130                          | 0.0         | 0.0         | +0.3        | +0.2             |
| 5800             | Dungeness Reef                  | .          | 9 59        | 142 59               | +0205         | +0150                          | 0.0         | -0.1        | +0.4        | +0.1             |
| 5810             | TWIN ISLAND                     |            |             |                      | HHW           | LLW                            | MHHW<br>2.5 | MLHW<br>1.6 | MHLW<br>1.1 | MLLW<br>0.9      |
|                  | <i>TORRES STRAIT</i>            |            |             |                      |               |                                |             |             |             |                  |
|                  | <i>Eastern Approaches</i>       |            |             |                      |               |                                |             |             |             |                  |
| 5802             | Saibai Island                   | .          | 9 23        | 142 37               | +0039         | -0041                          | -0.1        | Δ           | Δ           | +0.3             |
| 5807             | Coconut Island                  | .          | 10 03       | 143 04               | -0113         | -0108                          | +1.1        | +1.2        | +0.9        | +0.8             |
| 5808             | Suarji Island                   | .          | 10 10       | 142 31               | -0011         | -0033                          | +0.3        | +0.4        | +0.3        | +0.1             |
| 5808a            | Moa Island (Banks Island)       | .          | 10 14       | 142 13               | p             | p                              | +0.2        | Δ           | Δ           | +0.1             |
| 5809             | Hawkesbury Island               | .          | 10 23       | 142 08               | p             | p                              | -0.3        | +0.4        | +0.5        | -0.5             |
| 5810             | TWIN ISLAND                     | .          | 10 28       | 142 26               | STANDARD PORT |                                | See Table V |             |             |                  |
| 5811             | East Strait Island              | .          | 10 30       | 142 27               | +0014         | +0005                          | +0.1        | +0.1        | +0.2        | +0.2             |
| 5813             | Tuesday Islets (No. 1)          | .          | 10 33       | 142 21               | +0010         | -0001                          | +0.1        | -0.1        | +0.1        | -0.2             |
| 5817             | THURSDAY ISLAND                 |            |             |                      |               |                                | 2.5         | 1.7         | 1.2         | 0.6              |
|                  | <i>Prince of Wales Channel</i>  |            |             |                      |               |                                |             |             |             |                  |
| 5814             | Wednesday Island (Ince Point)   | .          | 10 30       | 142 19               | -0031         | -0037                          | 0.0         | -0.1        | +0.2        | +0.4             |
| 5817             | THURSDAY ISLAND                 | .          | 10 35       | 142 13               | STANDARD PORT |                                | See Table V |             |             |                  |
| 5818             | Hammond Rock                    | .          | A 10 31     | 142 13               | +0038         | +0057                          | +0.2        | +0.3        | +0.8        | +0.4             |
| 5820             | GOOD'S ISLAND                   |            |             |                      |               |                                | 3.2         | 3.0         | 2.6         | 1.3              |
| 5819             | Round Island                    | .          | 10 33       | 142 12               | -0036         | -0023                          | -0.6        | -1.0        | -0.7        | -0.4             |
| 5820             | GOOD'S ISLAND                   | .          | 10 34       | 142 10               | STANDARD PORT |                                | See Table V |             |             |                  |

SEASONAL CHANGES IN MEAN LEVEL

| No.        | Jan. 1 | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1 | Aug. 1     | Sep. 1 | Oct. 1 | Nov. 1 | Dec. 1 | Jan. 1 |
|------------|--------|--------|--------|--------|-------|--------|--------|------------|--------|--------|--------|--------|--------|
| 5732-5788  |        |        |        |        |       |        |        | Negligible |        |        |        |        |        |
| 5790-5814  | 0.0    | 0.0    | 0.0    | +0.1   | +0.1  | 0.0    | 0.0    | -0.1       | -0.1   | 0.0    | 0.0    | 0.0    | 0.0    |
| 5817, 5818 | +0.1   | +0.1   | +0.1   | +0.1   | 0.0   | -0.1   | -0.1   | -0.2       | -0.1   | -0.1   | 0.0    | +0.1   | +0.1   |
| 5819, 5820 | +0.1   | +0.2   | +0.2   | +0.1   | 0.0   | -0.1   | -0.2   | -0.2       | -0.2   | -0.1   | 0.0    | +0.1   | +0.1   |
| 5925       | 0.0    | +0.1   | +0.1   | +0.1   | 0.0   | 0.0    | -0.1   | -0.1       | -0.1   | -0.1   | 0.0    | 0.0    | 0.0    |
| 5998       | 0.0    | 0.0    | 0.0    | +0.1   | +0.1  | 0.0    | 0.0    | -0.1       | -0.1   | -0.1   | 0.0    | 0.0    | 0.0    |
| 6400       |        |        |        |        |       |        |        | Negligible |        |        |        |        |        |
| 7280       | -0.1   | -0.2   | -0.2   | -0.1   | 0.0   | 0.0    | 0.0    | +0.1       | +0.2   | +0.2   | +0.1   | 0.0    | -0.1   |

AUSTRALIA: NEW ZEALAND

| No.                              | PLACE                              | Lat.<br>S. | Long.<br>E. | TIME DIFFERENCES |               | HEIGHT DIFFERENCES (IN METRES) |             |             |             | M.L.<br>Z.<br>m. |
|----------------------------------|------------------------------------|------------|-------------|------------------|---------------|--------------------------------|-------------|-------------|-------------|------------------|
|                                  |                                    |            |             | HHW              | LLW           | MHHW                           | MLHW        | MLLW        |             |                  |
| 5435                             | BANDA                              |            |             | see page         |               |                                |             |             |             | 0.4              |
| <i>GULF OF CARPENTARIA</i>       |                                    |            |             |                  |               |                                |             |             |             |                  |
| 6348                             | Gove                               | A          | 12 13       | 136 48           | p             | p                              | +1.2        | +0.4        | +0.6        | +0.2             |
| 6349                             | Caledon Bay                        |            | 12 57       | 136 40           | p             | p                              | +0.1        | -0.1        | -0.1        | 0.0              |
| 6349a                            | Capo Grey                          |            | 13 00       | 136 39           | p             | p                              | +1.3        | +0.7        | -0.1        | -0.5             |
| 6351                             | Port Langdon                       |            | 13 52       | 136 50           | p             | p                              | -1.0        | -1.2        | -0.6        | -0.2             |
| 6351a                            | Milner Bay                         |            | 13 50       | 136 30           | p             | p                              | -1.0        | △           | △           | -0.2             |
| 6351b                            | Rose River                         |            | 14 17       | 135 43           | p             | p                              | -0.3        | -0.3        | +0.4        | +0.1             |
| <i>Sir Edward Pellew Group</i>   |                                    |            |             |                  |               |                                |             |             |             |                  |
| 6352                             | Ataluma Point                      |            | 15 45       | 136 49           | p             | p                              | +1.5        | +0.8        | +1.3        | +1.6             |
| 6353                             | Turtle Island                      |            | 15 35       | 137 06           | p             | p                              | +0.6        | +0.5        | +1.0        | 2.53             |
|                                  |                                    |            |             |                  |               |                                |             |             |             | 2.07             |
| 6996                             | CUA CAM                            |            |             | see page         | (Zone -1000)  |                                | 2.9         | △           | △           | 0.9              |
| 6355                             | Bayley Island                      |            | 16 54       | 139 04           | p             | p                              | +0.1        | △           | △           | -0.2             |
| 6356                             | Sweers Island                      |            | 17 07       | 139 38           | p             | p                              | +0.1        | △           | △           | +0.1             |
| 6357                             | Kangaroo Point                     |            | 17 35       | 139 45           | -0.940        | -0.940                         | -0.3        | △           | △           | +0.6             |
| 6358                             | Karumba (Kimberley)                | A          | 17 39       | 140 50           | -0.945        | -0.945                         | +0.1        | △           | △           | +0.2             |
| 6359                             | Van Diemen Inlet                   |            | 16 58       | 140 58           | -1.045        | -1.045                         | -0.6        | △           | △           | +0.3             |
| 6362                             | WEIPA                              |            |             | see page 129     |               |                                | 2.3         | 1.9         | 1.6         | 0.7              |
| 6362                             | WEIPA                              |            | 12 41       | 141 53           | STANDARD FORT |                                |             |             | See Table V |                  |
| 6363                             | Pennesther River                   |            | 12 13       | 141 47           | -0.020        | -0.010                         | +0.1        | +0.1        | +0.1        | 0.64             |
|                                  |                                    |            |             |                  |               |                                |             |             | 0.1         | 1.7              |
| 6526                             | WESTPORT                           |            |             | see page         | MHW           | MLW                            | MHWs<br>3.2 | MHWN<br>2.6 | MLWN<br>0.9 | MLWS<br>0.3      |
| <i>New Zealand, North Island</i> |                                    |            |             |                  |               |                                |             |             |             |                  |
| (Zone -1200)                     |                                    |            |             |                  |               |                                |             |             |             |                  |
| 6366                             | Port Taranaki                      | Z          | 39 04       | 174 02           | -0.06         | -0.06                          | +0.1        | +0.1        | +0.0        | 1.79             |
| 6367                             | Waitara River Entrance             |            | 38 59       | 174 14           | -0.06         | -0.06                          | +0.3        | +0.3        | +0.1        | 2.0              |
| 6369                             | Kawhia                             |            | 38 04       | 174 49           | -0.048        | -0.048                         | -0.2        | -0.2        | -0.1        | 1.60             |
| 6370                             | Aotearoa Harbour                   |            | 38 00       | 174 50           | -0.010        | -0.010                         | +0.5        | +0.3        | +0.1        | 2.1              |
| 6371                             | Raglan                             |            | 37 48       | 174 53           | -0.040        | -0.040                         | -0.2        | -0.2        | -0.2        | 1.50             |
| 6372                             | Waikato River Entrance             |            | 37 24       | 174 45           | -0.010        | -0.010                         | +0.5        | +0.4        | +0.2        | 2.1              |
| <i>Manukau Harbour</i>           |                                    |            |             |                  |               |                                |             |             |             |                  |
| 6373                             | Paratutae Island                   |            | 37 03       | 174 31           | -0.046        | -0.041                         | -0.1        | -0.1        | +0.1        | 1.77             |
| 6374                             | Cornwallis                         |            | 37 00       | 174 36           | -0.035        | -0.032                         | +0.3        | +0.3        | +0.2        | 2.0              |
| 6375                             | Onchunga                           | Z          | 36 56       | 174 47           | -0.015        | -0.021                         | +0.9        | +0.8        | +0.5        | 2.37             |
| <i>Kaipara Harbour</i>           |                                    |            |             |                  |               |                                |             |             |             |                  |
| 6377                             | Pouto Point                        |            | 36 22       | 174 11           | -0.020        | -0.020                         | 0.0         | -0.2        | +0.2        | 0.0              |
| 6378                             | Shelly Beach                       |            | 36 35       | 174 23           | -0.014        | -0.035                         | +1.0        | +0.8        | +0.6        | +0.4             |
| 6379                             | Tinopai                            |            | 36 35       | 174 15           | -0.005        | -0.005                         | +0.4        | +0.2        | +0.2        | 2.00             |
| 6380                             | Te Kopuru                          |            | 36 02       | 173 56           | +0.050        | +0.130                         | +0.2        | +0.4        | Θ           | Θ                |
| <i>Hokianga Harbour</i>          |                                    |            |             |                  |               |                                |             |             |             |                  |
| 6381                             | Opononi                            |            | 35 30       | 173 24           | -0.056        | -0.056                         | -0.4        | -0.3        | -0.1        | 1.51             |
| 6382                             | Rawene                             |            | 35 24       | 173 30           | -0.041        | -0.032                         | +0.1        | 0.0         | 0.0         | 1.74             |
| 6384                             | Ahipara Bay                        |            | 35 12       | 173 08           | -0.120        | -0.120                         | +0.4        | +0.3        | +0.2        | 2.02             |
| 6385                             | Great Island (Three Kings Islands) |            | 34 09       | 172 09           | -0.0205       | -0.0205                        | +0.2        | 1.0         | 1.0         | 1.8              |
| 6386                             | Cape Maria van Diemen              |            | 34 29       | 172 38           | -0.140        | -0.140                         | -0.8        | 5.0         | -0.3        | 1.4              |
| 6400                             | AUCKLAND                           |            |             | see page 89      |               |                                | 3.1         | 2.8         | 0.8         | 0.4              |
| 6387                             | Parengarenga                       |            | 34 32       | 173 00           | +0.100        | +0.055                         | -1.8        | -1.7        | -0.4        | -0.1             |
| 6387a                            | Houhora Harbour                    |            | 34 49       | 173 07           | +0.100        | +0.035                         | -1.0        | -0.9        | -0.4        | -0.3             |
|                                  |                                    |            |             |                  |               |                                |             |             |             | 1.11             |

SEASONAL CHANGES IN MEAN LEVEL

| No.        | Jan. | Feb. | Mar. | Apr. | May  | June | July       | Aug.       | Sep. | Oct. | Nov. | Dec. | Jan. |
|------------|------|------|------|------|------|------|------------|------------|------|------|------|------|------|
| 5435       | 0.0  | +0.1 | +0.1 | 0.0  | 0.0  | 0.0  | -0.1       | -0.1       | -0.1 | 0.0  | 0.0  | 0.0  | 0.0  |
| 6306-6339  | 0.0  | +0.1 | +0.2 | +0.2 | 0.0  | -0.1 | -0.2       | -0.2       | -0.1 | 0.0  | 0.0  | 0.0  | 0.0  |
| 6341-6353  | +0.1 | +0.2 | +0.2 | +0.1 | 0.0  | -0.1 | -0.2       | -0.2       | -0.1 | 0.0  | 0.0  | +0.1 | +0.1 |
| 6355-6363  | +0.2 | +0.3 | +0.3 | +0.2 | 0.0  | -0.1 | -0.3       | -0.3       | -0.3 | -0.1 | 0.0  | +0.2 | +0.2 |
| 6366-6373  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | Negligible | Negligible | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 6374, 6375 | 0.0  | 0.0  | 0.0  | 0.0  | +0.1 | +0.1 | 0.0        | 0.0        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 0377-6526  | 0.0  | 0.0  | 0.0  | 0.0  | +0.1 | +0.1 | 0.0        | 0.0        | 0.0  | +0.1 | +0.1 | +0.1 | +0.1 |
| 6996       | 0.0  | 0.0  | -1.0 | -1.0 | -1.0 | -1.0 | 0.0        | 0.0        | 0.0  | +0.1 | +0.1 | 0.0  | 0.0  |

NEW ZEALAND

| No.   | PLACE                       | Lat.<br>S. | Long.<br>E. | TIME DIFFERENCES     |               | HEIGHT DIFFERENCES (IN METRES) |             |      |      | M.L.<br>Z.<br>m. |
|-------|-----------------------------|------------|-------------|----------------------|---------------|--------------------------------|-------------|------|------|------------------|
|       |                             |            |             | MHW<br>(Zone - 1200) | MLW           | MHWS                           | MHWN        | MLWN | MLWS |                  |
| 6400  | AUCKLAND.                   | .          | .           | see page 89          |               |                                | 3.1         | 2.8  | 0.8  | 0.4              |
|       | <i>Awanui River</i>         |            |             |                      |               |                                |             |      |      |                  |
| 6388  | Sheigis Beacon              | .          | 34 54       | 173 18               | +0105         | +0020                          | -0.0        | -0.9 | -0.3 | -0.1             |
| 6388a | Omata Island                | .          | 35 00       | 173 16               | +0135         | +0050                          | -0.8        | -0.8 | -0.3 | -0.2             |
| 6388b | Dairy Factory Wharf         | .          | 35 03       | 173 16               | +0200         | +0115                          | -0.9        | -0.8 | -0.3 | -0.2             |
| 6389  | Mangonui                    | .          | 34 59       | 173 32               | +0045         | +0037                          | -0.5        | -0.4 | 0.0  | +0.1             |
| 6390  | Whangaroa                   | .          | 35 01       | 173 45               | +0030         | +0020                          | -0.6        | -0.6 | 0.0  | +0.1             |
|       | <i>Motukawanui Island</i>   |            |             |                      |               |                                |             |      |      |                  |
| 6390a | Wailli Bay                  | .          | 35 01       | 173 56               | +0024         | +0015                          | -0.9        | -0.8 | -0.1 | +0.1             |
| 6391  | Russell                     | .          | 35 16       | 174 07               | +0010         | +0025                          | -0.7        | -0.7 | -0.2 | 0.0              |
| 6391a | Opua                        | .          | 35 19       | 174 07               | +0022         | +0020                          | -0.8        | -0.7 | -0.2 | -0.1             |
| 6391b | Whangamumu Harbour          | .          | 35 15       | 174 18               | +0030         | +0050                          | -1.0        | -0.9 | -0.2 | -0.1             |
| 6392  | Whangaruru Harbour          | .          | 35 22       | 174 21               | +0025         | +0035                          | -0.9        | -0.8 | -0.2 | -0.1             |
| 6393  | Tutukaka Harbour            | .          | 35 38       | 174 33               | 0000          | -0030                          | -0.8        | -0.8 | -0.2 | -0.1             |
|       | <i>Whangarei</i>            |            |             |                      |               |                                |             |      |      |                  |
| 6394  | Marsden Point               | Z          | 35 50       | 174 29               | +0005         | -0002                          | -0.5        | -0.5 | 0.0  | 0.0              |
| 6395  | Port Whangarei              | Z          | 35 46       | 174 21               | +0038         | +0012                          | -0.2        | -0.2 | +0.1 | +0.2             |
| 6396  | Mokohinu Island             | .          | 35 54       | 175 07               | -0022         | +0032                          | -0.8        | -0.7 | -0.2 | -0.1             |
|       | <i>Kawau Island</i>         |            |             |                      |               |                                |             |      |      |                  |
| 6397  | Bon Accord Harbour          | .          | 36 26       | 174 49               | -0022         | -0001                          | -0.5        | -0.5 | 0.0  | +0.1             |
| 6397a | Matakana River              | .          | 36 23       | 174 44               | -0018         | +0003                          | 0           | 0    | 0    | 0                |
| 6398  | Mahurangi Harbour           | .          | 36 29       | 174 43               | +0002         | +0012                          | 0           | 0    | 0    | 0                |
| 6398a | Tiritiri Matangi Island     | .          | 36 36       | 174 53               | +0015         | -0003                          | -0.2        | -0.2 | 0.0  | +0.1             |
| 6399  | Weiti River                 | .          | 36 39       | 174 44               | -0003         | +0007                          | -0.3        | -0.3 | +0.1 | +0.2             |
| 6400  | AUCKLAND                    | .          | 36 51       | 174 46               | STANDARD PORT |                                | See Table V |      |      |                  |
|       | <i>Waiheke Island</i>       |            |             |                      |               |                                |             |      |      |                  |
| 6401  | Man o' War Bay              | .          | 36 47       | 175 09               | -0021         | -0003                          | -0.1        | -0.1 | -0.1 | 1.63             |
| 6401a | Matiata Bay                 | .          | 36 47       | 174 59               | -0014         | -0006                          | -0.3        | -0.4 | -0.2 | -0.1             |
| 6404  | Rocky Point (Thames)        | .          | 37 06       | 175 31               | -0031         | -0024                          | +0.2        | +0.1 | +0.1 | 1.90             |
| 6405  | Coromandel Harbour          | .          | 36 47       | 175 25               | -0016         | -0006                          | -0.3        | -0.3 | +0.1 | 1.67             |
|       | <i>Great Barrier Island</i> |            |             |                      |               |                                |             |      |      |                  |
| 6406  | Nagle Cove                  | .          | 36 09       | 175 19               | -0024         | -0011                          | -0.8        | -0.7 | -0.3 | -0.1             |
| 6408  | Port Jackson                | .          | 36 29       | 175 20               | -0030         | -0012                          | -0.5        | -0.5 | -0.1 | 0.0              |
| 6411  | Mercury Bay (Whitianga)     | .          | 36 50       | 175 42               | -0012         | -0002                          | -1.0        | -0.9 | -0.1 | +0.1             |
| 6412  | Tairua                      | .          | 37 00       | 175 51               | -0025         | -0010                          | -1.2        | -1.0 | -0.3 | 0.0              |
| 6412a | Slipper Island              | .          | 37 04       | 175 57               | -0048         | -0014                          | -1.8        | -1.6 | -0.3 | 0.0              |
| 6415  | Tauranga                    | Z          | 37 39       | 176 11               | -0017         | 0009                           | -1.3        | -1.2 | -0.4 | -0.3             |
| 6417  | Whale Island                | .          | 37 54       | 176 58               | -0045         | -0045                          | -0.8        | -0.8 | +0.1 | 1.37             |
| 6418  | Ohiwa                       | .          | 37 59       | 177 07               | +0013         | -0004                          | -1.2        | -1.0 | -0.3 | 0.0              |
| 6419  | Motunui Island              | .          | 37 47       | 177 39               | -0040         | -0040                          | -1.0        | -0.9 | -0.1 | +0.1             |
| 6421  | Hicks Bay                   | .          | 37 35       | 178 19               | -0055         | -0035                          | -0.9        | -0.8 | 0.0  | +0.1             |
| 6422  | East Cape                   | .          | 37 41       | 178 33               | -0055         | -0045                          | -1.0        | -0.9 | -0.1 | +0.1             |
| 6423  | Waipiro Bay                 | .          | 38 02       | 178 20               | -0102         | -0102                          | -1.1        | -1.0 | -0.2 | +0.1             |
| 6424  | Tolaga Bay                  | .          | 38 22       | 178 19               | -0114         | -0114                          | -1.2        | -1.1 | -0.3 | +0.1             |
| 6490  | LYTTELTON                   | .          | .           | see page 1           |               |                                | 2.2         | 2.1  | 0.4  | 0.3              |
| 6425  | Gisborne                    | .          | 38 41       | 178 02               | +0125         | +0128                          | -0.4        | -0.4 | +0.1 | 1.15             |
| 6428  | Portland Island             | .          | 39 17       | 177 52               | +0115         | +0115                          | 0           | 0    | 0    | 0                |
| 6429  | Waikokopu                   | .          | 39 04       | 177 50               | +0125         | +0125                          | -0.6        | -0.6 | -0.1 | 0.9              |
|       | <i>Wairoa River</i>         |            |             |                      |               |                                |             |      |      |                  |
| 6430  | Clyde                       | .          | 39 03       | 177 26               | +0120         | +0120                          | -0.6        | -0.6 | -0.1 | 0.9              |

○ No data.

Z Tides predicted in New Zealand Tide Tables.

a Data approximate.

d Differences approximate.

p For predictions use harmonic constants (Part III) and N.P.159.

t Time differences approximate.

x M.L. inferred.

**NEW ZEALAND**

| No.   | PLACE                     | Lat.<br>S. | Long.<br>E. | TIME DIFFERENCES |                     | HEIGHT DIFFERENCES (IN METRES) |       |      |             | M.L.<br>Z<br>m |
|-------|---------------------------|------------|-------------|------------------|---------------------|--------------------------------|-------|------|-------------|----------------|
|       |                           |            |             | MHW              | MLW<br>(Zone -1200) | MHWS                           | MHWN  | MLWN | MLWS        |                |
| 6439  | WELLINGTON                | .          | .           | see page         | .                   | .                              | 1.4   | 1.3  | 0.5         | 0.4            |
|       | Napier                    |            |             |                  |                     |                                |       |      |             |                |
| 6432  | No. 3 Wharf               | .          | Z 39 29     | 176 55           | +0056               | +0056                          | +0.2  | +0.2 | -0.2        | 0.90           |
| 6436  | Castle Point              | .          | .           | 40 55            | 176 13              | +0015                          | +0015 | -0.2 | -0.2        | 0.61           |
| 6438  | Cape Palliser             | .          | .           | 41 37            | 175 17              | +0010                          | +0010 | +0.1 | +0.1        | 0.9            |
| 6439  | WELLINGTON                | .          | .           | 41 17            | 174 47              | STANDARD PORT                  |       |      | See Table V | 0.89           |
| 6526  | WESTPORT                  | .          | .           | see page         | .                   | .                              | 3.2   | 2.6  | 0.9         | 0.3            |
| 6441  | Oteranga Bay              | .          | .           | 41 18            | 174 37              | p                              | p     | -2.3 | -1.9        | 0.0            |
| 6442  | Makara Bay                | .          | .           | 41 13            | 174 42              | p                              | p     | -1.9 | -1.7        | 0.0            |
| 6443  | Porirua Harbour           | .          | .           | 41 04            | 174 51              | p                              | p     | -1.8 | -1.6        | 0.78           |
| 6445  | Manawatu River Entrance   | .          | .           | 40 28            | 175 13              | -0125                          | -0125 | -0.8 | 0.0         | 1.3            |
| 6447  | Wanganui River Entrance   | .          | .           | 39 57            | 174 59              | -0030                          | -0030 | -0.5 | -0.6        | 2.5            |
| 6449  | Patea                     | .          | .           | 39 47            | 174 29              | -0115                          | -0115 | -0.7 | -0.7        | 0.1            |
| 6451  | Opunake Bay               | .          | .           | 39 28            | 173 51              | -0110                          | -0110 | +0.1 | +0.1        | 0.0            |
|       | New Zealand, South Island |            |             |                  |                     |                                |       |      |             |                |
|       | Golden Bay                |            |             |                  |                     |                                |       |      |             |                |
| 6453  | Collingwood               | .          | .           | 40 40            | 172 40              | -0120                          | -0130 | +1.2 | +0.9        | 2.3            |
| 6454  | Motupipi River            | .          | .           | 40 50            | 172 51              | -0120                          | -0130 | +1.5 | +0.3        | 2.5            |
|       | Tasman Bay                |            |             |                  |                     |                                |       |      |             |                |
| 6455  | Astrolabe Road            | .          | Z 40 58     | 173 03           | -0115               | -0125                          | +1.6  | +1.2 | +0.3        | 2.5            |
| 6458  | Nelson                    | .          | Z 41 16     | 173 16           | -0053               | -0107                          | +0.5  | +0.3 | +0.2        | 1.99           |
| 6460  | Croisilles Harbour        | .          | .           | 41 05            | 173 42              | -0110                          | -0120 | +0.9 | +0.7        | 2.2            |
| 6462  | Greville Harbour          | .          | .           | 40 52            | 173 49              | -0115                          | -0125 | 0.0  | -0.2        | 2.63           |
| 6464  | Stephen's Island          | .          | .           | 40 40            | 174 01              | -0125                          | -0135 | -0.7 | -0.6        | 0.0            |
| 6466  | Elmelie Bay               | .          | .           | 40 56            | 173 51              | -0145                          | -0205 | -0.8 | -0.8        | 2.26           |
| 6467  | Pelorus Sound Entrance    | .          | .           | 40 55            | 173 59              | -0155                          | -0225 | -0.7 | -0.7        | 1.3            |
| 6471  | Havelock                  | .          | .           | 41 17            | 173 46              | -0050                          | -0100 | -0.6 | -0.6        | 1.42           |
|       | Queen Charlotte Sound     |            |             |                  |                     |                                |       |      |             |                |
| 6474  | Long Island               | .          | .           | 41 07            | 174 17              | -0200                          | -0248 | -1.7 | -1.6        | 0.73           |
| 6476  | East Bay                  | .          | .           | 41 14            | 174 08              | -0210                          | -0305 | -1.8 | -1.6        | 0.70           |
| 6477  | Picton                    | .          | Z 41 17     | 174 00           | -0157               | -0245                          | -1.7  | -1.6 | -0.3        | 0.73           |
| 6478  | Okiwa Bay                 | .          | .           | 41 17            | 173 55              | -0200                          | -0250 | -1.7 | -1.6        | 0.73           |
| 6478a | Whekenui                  | .          | .           | 41 12            | 174 18              | p                              | p     | -2.0 | -1.7        | -0.4           |
|       | Tory Channel              |            |             |                  |                     |                                |       |      |             |                |
| 6479  | Te Iro Bay                | .          | .           | 41 14            | 174 11              | -0215                          | -0255 | -2.9 | -1.7        | -0.3           |
| 6490  | LYTTTELTON                | .          | .           | see page         | .                   | .                              | 2.2   | 2.1  | 0.4         | 0.3            |
| 6481  | Lucky Bay                 | .          | .           | 41 16            | 174 17              | p                              | p     | -0.9 | -0.9        | +0.3           |
| 6482  | Port Underwood            | .          | .           | 41 20            | 174 06              | +0146                          | +0146 | -0.7 | -0.9        | +0.1           |
| 6484  | Lake Grassmere Entrance   | .          | .           | 41 42            | 174 11              | p                              | p     | -0.5 | -0.6        | 0.0            |
| 6485  | Cape Campbell             | .          | .           | 41 44            | 174 15              | p                              | p     | -0.5 | -0.5        | +0.1           |
| 6487  | Kaikoura Peninsula        | .          | .           | 42 25            | 173 42              | p                              | p     | -0.5 | -0.5        | +0.1           |
| 6490  | LYTTTELTON                | .          | .           | 43 36            | 172 43              | STANDARD PORT                  |       |      | See Table V | 1.23           |
| 6491  | Akaroa                    | .          | .           | 43 48            | 172 55              | -0045                          | -0040 | +0.2 | +0.3        | 1.49           |
| 6492  | Timaru                    | .          | .           | 44 24            | 171 15              | -0138                          | -0141 | 0.0  | +0.3        | 1.37           |
| 6504  | BLUFF                     | .          | .           | see page         | .                   | .                              | 2.6   | 2.3  | 0.9         | 0.6            |
| 6491  | Oamaru                    | .          | .           | 45 07            | 170 59              | +0105                          | +0127 | -0.5 | -0.5        | -0.1           |
|       | Otago Harbour             |            |             |                  |                     |                                |       |      |             |                |
| 6496  | Entrance                  | .          | .           | 45 47            | 170 44              | +0054                          | +0134 | -0.8 | -0.7        | -0.5           |
| 6497  | Port Chalmers             | .          | Z 45 49     | 170 39           | +0152               | +0201                          | -0.8  | -0.7 | -0.5        | 0.98           |
| 6498  | Dunedin                   | .          | Z 45 53     | 170 30           | +0227               | +0313                          | -0.8  | -0.7 | -0.4        | 0.99           |
| 6500  | Nugget Point              | .          | .           | 46 26            | 169 48              | +0100                          | +0100 | -0.3 | -0.2        | 0.0            |
| 6502  | Waipapa Point             | .          | .           | 46 39            | 168 51              | +0017                          | +0016 | +0.1 | +0.2        | 0.0            |
| 6504  | BLUFF                     | .          | .           | 46 36            | 168 21              | STANDARD PORT                  |       |      | See Table V | 1.61           |
| 6505  | New River Entrance        | .          | .           | 46 32            | 168 15              | -0022                          | -0022 | +0.2 | +0.2        | -0.2           |
| 6506  | Colac Bay                 | .          | .           | 46 22            | 167 54              | -0144                          | -0139 | -0.2 | -0.3        | -0.3           |
|       | Stewart Island            |            |             |                  |                     |                                |       |      |             |                |
| 6507  | Paterson Inlet            | .          | .           | 46 54            | 168 07              | -0008                          | -0010 | 0.0  | 0.0         | 1.58           |

SEASONAL CHANGES IN MEAN LEVEL

-118-

No. Jan. 1 Feb. 1 Mar. 1 Apr. 1 May 1 June 1 July 1 Aug. 1 Sep. 1 Oct. 1 Nov. 1 Dec. 1 Jan. 1

FIJI TO MARSHALL ISLANDS

| No.   | PLACE                            | Lat.<br>S. | Long.<br>W. | TIME DIFFERENCES<br>MHW MHW<br>(Zone -1200) |       |       | HEIGHT DIFFERENCES (IN METRES) |      |      | M.L.<br>Z.<br>m. |
|-------|----------------------------------|------------|-------------|---|-------|-------|--------------------------------|------|------|------------------|
|       |                                  |            |             | MHW   | MHWL  | MHWS  | MHWN                           | MLWN | MLWS |                  |
| 6705  | SUVA . . . . .                   | .          | .           | see page 1                                  |       |       | 1.6                            | 1.4  | 0.5  | 0.3              |
| 6728  | Wailagilala Island . . . . .     | 16 45      | 179 06      | -0020                                       | -0005 | -0.1  | -0.1                           | -0.1 | -0.1 | 0.83             |
| 6729  | Vanuabalavu Island . . . . .     | 17 17      | 178 59      | -0037                                       | -0030 | -0.1  | 0.0                            | 0.0  | 0.0  | 0.96             |
|       | Lakemba Island                   |            |             |   |       |       |                                |      |      | a                |
| 6730  | Tumbou . . . . .                 | 18 14      | 178 46      | -0002                                       | -0001 | 0.0   | 0.0                            | 0.0  | 0.0  | 0.94             |
| 6730a | Wainiyabia . . . . .             | 18 12      | 178 50      | -0004                                       | -0003 | -0.1  | 0.0                            | 0.0  | 0.0  | 0.94             |
|       | Totoya                           |            |             |   |       |       |                                |      |      | a                |
| 6732  | Herald Sound . . . . .           | .          | 18 59       | 179 52                                      | +0050 | +0050 | -0.3                           | -0.2 | -0.3 | -0.3             |
|       |                                  |            | S.          | E.  |       |       |                                |      |      | lx               |
|       | Moala                            |            |             |   |       |       |                                |      |      |                  |
| 6733  | Naroi . . . . .                  | 18 33      | 179 57      | -0002                                       | -0002 | 0.0   | 0.0                            | +0.1 | +0.1 | 1.00             |
| 6734  | Matuku Harbour . . . . .         | 19 10      | 179 45      | +0030                                       | +0015 | 0.0   | -0.1                           | 0.0  | 0.0  | 0.9              |
|       | Kandavu                          |            |             |   |       |       |                                |      |      | lx               |
| 6735  | Ngaloa Harbour . . . . .         | 19 05      | 178 11      | 0000  | -0015 | 0.0   | 0.0                            | -0.3 | -0.3 | 0.8              |
| 6735a | Namalata Bay . . . . .           | 19 03      | 178 09      | -0004                                       | -0004 | +0.1  | +0.1                           | +0.2 | +0.2 | 1.16             |
|       |                                  |            |             |   |       |       |                                |      |      | a                |
| 9760  | PUERTO MONTT . . . . .           | .          | .           | see page 102                                |       |       | 6.5                            | 4.7  | 2.4  | 0.7              |
|       |                                  |            | S.          | W.  |       |       |                                |      |      |                  |
| 6739  | Iles Wallis (Ile Urea) . . . . . | F 13 22    | 176 11      | -0815                                       | -0815 | -4.8  | -3.3                           | -1.8 | -0.4 | 0.98             |
|       |                                  |            | S.          | E.  |       |       |                                |      |      |                  |
| 6740  | Rotuma Island . . . . .          | 12 29      | 177 07      | -0825                                       | -0825 | -4.8  | -3.3                           | -1.6 | -0.3 | 1.07             |
|       | Tuvalu                           |            |             |   |       |       |                                |      |      |                  |
| 6744  | Funafuti . . . . .               | 8 31       | 179 12      | -0853                                       | -0852 | -4.7  | -3.4                           | -1.7 | -0.5 | 1.0              |
|       | Kiribati                         |            |             |   |       |       |                                |      |      | x                |
| 6750  | Arorae . . . . .                 | 2 39       | 176 50      | -0905                                       | -0905 | -4.7  | -3.4                           | -1.7 | -0.6 | 1.0              |
| 6752  | North Beru . . . . .             | 1 17       | 176 00      | -0935                                       | -0935 | -5.2  | -3.8                           | -2.0 | -0.7 | 0.62             |
| 6754  | Tabiteuea . . . . .              | 1 28       | 175 03      | -0935                                       | -0935 | -4.5  | -3.3                           | -1.7 | -0.6 | 1.05             |
| 6755  | Nonouti . . . . .                | 0 40       | 177 27      | -0935                                       | -0935 | -4.5  | -3.2                           | -1.8 | -0.5 | 1.00             |
|       |                                  |            | N.          | E.  |       |       |                                |      |      | t                |
| 6756  | Abemama . . . . .                | 0 29       | 173 52      | -0900                                       | -0900 | -4.5  | -3.3                           | -1.6 | -0.5 | 1.07             |
| 6759  | Tarawa . . . . .                 | 1 22       | 172 56      | -0935                                       | -0938 | -4.6  | -3.4                           | -1.7 | -0.6 | 1.00             |
| 6760  | Abaiang Atoll . . . . .          | 1 49       | 173 02      | -0915                                       | -0925 | -4.4  | -3.1                           | -1.4 | -0.3 | 1.25             |
| 6761  | Butaritari (Makin) . . . . .     | 3 02       | 172 48      | -0935                                       | -0938 | -4.6  | -3.4                           | -1.7 | -0.6 | 1.00             |
|       |                                  |            | S.          | E.  |       |       |                                |      |      | t                |
| 6763  | Ocean Island . . . . .           | 0 52       | 169 35      | -0917                                       | -0916 | -4.7  | -3.4                           | -1.6 | -0.4 | 1.04             |
| 6764  | Nauru . . . . .                  | 0 32       | 166 54      | -0938                                       | -0941 | -4.7  | -3.5                           | -1.6 | -0.5 | 1.0              |
|       |                                  |            |             |   |       |       |                                |      |      | x                |
| 5062  | DAVAO . . . . .                  | .          | .           | see page 2                                  |       |       | 1.6                            | 1.0  | 0.5  | -0.2             |
|       | Marshall Islands                 |            |             |   | N.    | E.    |                                |      |      |                  |
|       | Mili Atoll                       |            |             |   |       |       |                                |      |      |                  |
| 6766  | Port Rhin . . . . .              | 6 14       | 171 48      | -0121                                       | -0121 | +0.3  | +0.3                           | +0.2 | +0.3 | 1.01             |
|       | Arno Atoll                       |            |             |   |       |       |                                |      |      |                  |
| 6767  | Dodo Passage . . . . .           | 7 08       | 171 42      | -0129                                       | -0129 | +0.2  | +0.3                           | +0.1 | +0.4 | 0.97             |
|       | Majuro Atoll                     |            |             |   |       |       |                                |      |      |                  |
| 6768  | Djarrat . . . . .                | 7 08       | 171 21      | -0129                                       | -0129 | +0.2  | +0.2                           | +0.2 | +0.4 | 0.98             |
|       | Jaluit Atoll                     |            |             |   |       |       |                                |      |      |                  |
| 6769  | South-east Pass . . . . .        | 5 55       | 169 39      | -0133                                       | -0133 | 0.0   | +0.1                           | +0.2 | +0.4 | 0.88             |

△ Tide is usually diurnal.

▲ See notes on page 388.

F Tides predicted in French Tide Tables.

J Tides predicted in Japanese Tide Tables.

U Tides predicted in U.S. Tide Tables.

a Data approximate.

p For predictions use harmonic constants (Part III) and N.P.159.

t Time differences approximate.

x M.L. inferred.

**MARSHALL TO PALAU ISLANDS**

| No.              | PLACE               | Lat.<br>N. | Long.<br>E. | TIME DIFFERENCES |                     |            | HEIGHT DIFFERENCES (IN METRES) |             |             |             | M.L.<br>Zo<br>m. |
|------------------|---------------------|------------|-------------|------------------|---------------------|------------|--------------------------------|-------------|-------------|-------------|------------------|
|                  |                     |            |             | MHW              | MLW<br>(Zone -1200) | MHWS       | MHWN                           | MLWN        | MLWS        |             |                  |
| 5062             | DAVAO               | .          | .           | see page         |                     |            | 1.6                            | 1.0         | 0.5         | -0.2        |                  |
| 6771             | Ailinglaplap Atoll  | .          | 7 17        | 168 45           | -0117               | -0117      | +0.1                           | +0.1        | +0.2        | +0.4        | 0.92             |
| 6772             | Maloclap Atoll      | .          | 8 43        | 171 14           | -0129               | -0129      | +0.1                           | +0.2        | +0.2        | +0.3        | 0.90             |
| 6773             | Wotje Atoll         | .          | 9 28        | 170 14           | -0135               | -0135      | 0.0                            | +0.1        | +0.1        | +0.4        | 0.85             |
| 6776             | Kwajalein Atoll     | .          | U 8 44      | 167 44           | -0135               | -0130      | +0.1                           | +0.1        | +0.2        | +0.3        | 0.91             |
| 6776a            | Nimuru To           | .          | 9 27        | 167 29           | -0131               | -0132      | +0.1                           | +0.2        | +0.2        | +0.4        | 0.92             |
| 6777             | Likiep Atoll        | .          | 9 49        | 169 17           | -0125               | -0125      | 0.0                            | +0.2        | +0.2        | +0.4        | 0.92             |
| 6782             | Rongerik Atoll      | .          | 11 23       | 167 31           | -0138               | -0138      | 0.0                            | +0.2        | +0.2        | +0.4        | 0.90             |
| 6783             | Rongelap Atoll      | .          | 11 09       | 166 54           | -0131               | -0131      | 0.0                            | +0.1        | -0.2        | +0.4        | 0.86             |
| 6786             | Bikini Atoll        | .          | 11 36       | 165 33           | -0142               | -0142      | 0.0                            | +0.1        | +0.3        | +0.4        | 0.92             |
| 6787             | Enewetak Atoll      | .          | 11 26       | 162 23           | -0128               | -0129      | -0.3                           | -0.1        | +0.1        | +0.4        | 0.79             |
| 6787a            | Runit Island        | .          | 11 33       | 162 21           | -0133               | -0133      | -0.2                           | 0.0         | +0.1        | +0.4        | 0.79             |
| 6788             | Ujelang Atoll       | .          | 9 46        | 160 58           | -0121               | -0121      | -0.2                           | -0.2        | +0.1        | +0.4        | 0.80             |
| 6790             | Wake Island         | .          | 19 17       | 166 37           | -0200               | -0200      | -0.7                           | -0.4        | -0.2        | +0.1        | 0.43             |
| Caroline Islands |                     |            |             |                  |                     |            |                                |             |             |             |                  |
| 6792             | Kusaic Island       | .          | 5 20        | 163 01           | -0125               | -0125      | 0.0                            | +0.1        | +0.3        | +0.4        | 0.92             |
| (Zone -1100)     |                     |            |             |                  |                     |            |                                |             |             |             |                  |
| 6795             | Ponape Harbour      | .          | U 6 59      | 158 13           | -0243               | -0243      | -0.4                           | -0.2        | +0.1        | +0.4        | 0.70             |
| 6795a            | Matawanum Harbour   | .          | 6 52        | 158 23           | -0239               | -0240      | -0.2                           | -0.1        | +0.2        | +0.5        | 0.82             |
| 9644             | VALPARAISO          | .          | .           | see page         | HHW                 | LLW        | MHHW<br>1.5                    | MLHW<br>1.2 | MHLW<br>0.5 | MLLW<br>0.4 |                  |
| 6797             | Oroluk Island       | .          | 7 40        | 155 10           | -0737               | -0707      | -0.6                           | -0.6        | -0.1        | 0.0         | 0.59             |
| 6798             | Nomoi Islands       | .          | 5 20        | 153 44           | p                   | p          | -0.5                           | -0.6        | 0.0         | 0.0         | 0.62             |
| 6798a            | Moro Tu             | .          | 5 29        | 153 33           | p                   | p          | -0.5                           | -0.6        | 0.0         | 0.0         | 0.61             |
| 6800             | Hall Islands        | .          | 8 36        | 152 15           | p                   | p          | -0.7                           | -0.7        | 0.0         | 0.0         | 0.51             |
| 6800a            | Nomuuin To          | .          | 8 27        | 151 47           | p                   | p          | -0.8                           | -0.8        | -0.1        | -0.1        | 0.47             |
| 5599             | DREGER HARBOUR      | .          | .           | see page         |                     |            | 1.5                            | △           | △           | 0.9         |                  |
| 6801             | Truk Islands        | JU         | 7 22        | 151 33           | +0035               | -0052      | -0.8                           | △           | △           | -0.6        | 0.46             |
| 6802             | Namonuito Islands   | .          | 8 35        | 149 39           | -0122               | +0139      | -0.9                           | △           | △           | -0.7        | 0.37             |
| 6802a            | Onari To            | .          | 8 45        | 150 20           | -0057               | +0123      | -0.9                           | △           | △           | -0.7        | 0.19             |
| 6803             | Pulap Island        | .          | 7 39        | 149 25           | -0033               | +0110      | -0.9                           | △           | △           | -0.6        | 0.41             |
| 6804             | Puluwat Island      | .          | 7 22        | 149 13           | p                   | p          | -0.9                           | △           | △           | -0.7        | 0.4              |
| 7940             | YOKOHAMA            | .          | .           | see page         | MHW                 | LLW        | 2.7                            | 2.6         | 2.0         | 2.3         |                  |
| 6807             | Lamotrek            | .          | 7 28        | 146 23           | p                   | p          | -1.0                           | -0.9        | -5.0        | -2.1        | 0.52             |
| 6811             | Woleai Island       | .          | 7 22        | 143 54           | p                   | p          | -1.0                           | -0.9        | -4.0        | -0.2        | 0.51             |
| 6814             | Ulithi Islands      | .          | 9 55        | 139 40           | +0313               | +0307      | -0.5                           | -0.4        | -0.3        | -0.1        | 0.80             |
| 6814a            | Yasoro To           | .          | 10 02       | 139 46           | +0255               | +0256      | -0.5                           | -0.5        | -0.2        | 0.0         | 0.82             |
| 6815             | Yap Island          | .          | 9 30        | 138 08           | +0315               | +0310      | -0.6                           | -0.6        | -0.2        | 0.1         | 0.70             |
| 6816             | Ngulu Islet         | .          | 8 18        | 137 29           | +0324               | +0312      | -0.4                           | -0.3        | -0.3        | 0.0         | 0.86             |
| 7716             | NAHA KO             | .          | .           | see page         | MHW                 | MLW<br>2.0 | MHWS<br>2.0                    | MHWN<br>1.5 | MLWN<br>0.8 | MLWS<br>0.3 |                  |
| Palau Islands    |                     |            |             |                  |                     |            |                                |             |             |             |                  |
| (Zone -0900)     |                     |            |             |                  |                     |            |                                |             |             |             |                  |
| 6818             | Garukoru (Ngaregur) | .          | 7 45        | 134 38           | -0022               | -0022      | -0.2                           | -0.2        | -0.1        | 0.0         | 0.05             |
| 6819             | Toagel Mlungui      | .          | 7 30        | 134 31           | -0015               | -0015      | -0.2                           | -0.2        | -0.1        | 0.1         | 0.08             |
| 6820             | Malakal Harbour     | JU         | 7 20        | 134 28           | +0012               | +0012      | -0.1                           | -0.1        | 0.0         | 0.0         | 0.11             |
| 6821             | Ngesebus            | .          | 7 03        | 134 16           | +0012               | +0011      | -0.4                           | -0.2        | -0.1        | 0.1         | 0.00             |
| 6825             | Helen Reef          | .          | 2 59        | 131 49           | -0003               | -0001      | -0.2                           | -0.2        | -0.1        | 0.1         | 0.07             |

## SEASONAL CHANGES IN MEAN LEVEL

| No.        | Jan. | Feb. | Mar. | Apr. | May | June | July           | Aug. | Sep. | Oct. | Nov. | Dec. | Jan. |
|------------|------|------|------|------|-----|------|----------------|------|------|------|------|------|------|
| 5062       | 1.0- | 1.0- | 1.0- | 1.0- | 0.0 | 0.0  | 0.0            | 0.0  | 1.0+ | 1.0+ | 1.0+ | 0.0  | 1.0- |
| 5599       |      |      |      |      |     |      | Negligible     |      |      |      |      |      |      |
| 6705-6764  |      |      |      |      |     |      |                |      |      |      |      |      |      |
| 6766-6788  |      |      |      |      |     |      |                |      |      |      |      |      |      |
| 6790-6798a |      |      |      |      |     |      |                |      |      |      |      |      |      |
| 6800-6825  |      |      |      |      |     |      |                |      |      |      |      |      |      |
| 7716       |      |      |      |      |     |      |                |      |      |      |      |      |      |
| 7940       |      |      |      |      |     |      |                |      |      |      |      |      |      |
| 9644, 9700 |      |      |      |      |     |      | -12 Negligible |      |      |      |      |      |      |

CHINA: HONG KONG

| No.   | PLACE                              | Lat.<br>N. | Long.<br>E. | TIME DIFFERENCES    |               | HEIGHT DIFFERENCES (IN METRES) |             |      |      | M.L.<br>Z,<br>m. |
|-------|------------------------------------|------------|-------------|---------------------|---------------|--------------------------------|-------------|------|------|------------------|
|       |                                    |            |             | HHW<br>(Zone -0800) | LLW           | MHHW                           | MLHW        | MHLW | MLLW |                  |
| 7110  | HONG KONG                          | .          | .           | see page            | .             | 2.2                            | 1.5         | 1.2  | 0.8  |                  |
|       | <i>Zhu Jiang (Canton River)</i>    |            |             |                     |               |                                |             |      |      |                  |
| 7071  | Zhuhai (Kauchau)                   | .          | 22 19       | 113 36              | +0041         | +0035                          | +0.3        | +0.3 | +0.1 | 1.69             |
| 7073  | Chiwan                             | .          | 22 28       | 113 53              | +0145         | +0125                          | +0.6        | +0.7 | -0.1 | 1.68             |
| 7075  | Heng Men Haikou (Wangmun Entrance) | .          | 22 36       | 113 36              | +0230         | 0                              | -0.1        | 0    | 0    | 0                |
| 7076  | Tailung Channel                    | .          | 22 48       | 113 20              | +0420         | 0                              | -0.1        | 0    | 0    | 0                |
| 7078  | Chuanbi Jiao                       | .          | 22 45       | 113 40              | +0255         | 0                              | +0.2        | 0    | 0    | 0                |
| 7080  | Huang-pu (Whampoa Dock)            | C          | 23 05       | 113 25              | +0351         | +0406                          | +0.3        | +0.4 | -0.1 | 1.55             |
| 7081  | Kuang-chou (Canton)                | C          | 23 05       | 113 15              | +0519         | +0530                          | 0.0         | +0.2 | -0.2 | 1.34             |
| 7086  | Walingding Dao                     | .          | 22 06       | 114 02              | +0005         | +0008                          | -0.2        | -0.1 | -0.1 | 1.26             |
| 7087  | Wenwei Zhou                        | .          | 21 49       | 113 56              | +0013         | +0015                          | -0.5        | -0.4 | -0.3 | 1.1              |
| 7092  | Tsim Bei Tsui                      | .          | 22 29       | 114 01              | +0120         | +0216                          | +0.3        | +0.3 | -0.2 | 1.8              |
| 7093  | Tap Shek Kok                       | .          | 22 23       | 113 55              | +0127         | +0056                          | +0.2        | +0.3 | +0.2 | 1.6              |
| 7094  | Tsing Shan Wan                     | .          | 22 23       | 113 59              | +0031         | +0046                          | +0.1        | +0.1 | -0.2 | 1.47             |
| 7094½ | Tai Lam Kok                        | .          | 22 22       | 114 01              | +0103         | +0055                          | +0.1        | +0.2 | +0.1 | 1.5              |
| 7096  | Tai Mo To (West Brother)           | .          | 22 20       | 113 58              | +0052         | +0052                          | +0.2        | +0.2 | 0.0  | 1.52             |
| 7096a | Chek Lap Kok                       | .          | 22 19       | 113 56              | +0132         | +0103                          | +0.1        | +0.2 | -0.1 | 1.5              |
| 7097  | Tai O                              | .          | 22 15       | 113 51              | +0105         | +0052                          | +0.1        | +0.2 | +0.1 | 1.54             |
| 7098  | Shap Long Bay                      | .          | 22 14       | 114 00              | -0002         | -0004                          | +0.1        | +0.1 | 0.0  | 1.4              |
| 7102  | Tsing Yi                           | .          | 22 20       | 114 06              | +0006         | +0006                          | 0.0         | +0.1 | +0.1 | 1.44             |
| 7102a | Tsuen Wan                          | .          | 22 22       | 114 07              | +0023         | +0016                          | 0.0         | +0.1 | +0.1 | 1.47             |
| 7106  | Yung Shue Wan                      | .          | 22 14       | 114 06              | -0012         | -0006                          | -0.2        | -0.3 | 0.0  | 1.3              |
|       | <i>Hong Kong Island</i>            |            |             |                     |               |                                |             |      |      |                  |
| 7109  | Aberdeen                           | .          | 22 15       | 114 09              | -0004         | -0001                          | 0.0         | 0.0  | 0.0  | 1.4              |
| 7110  | HONG KONG HARBOUR                  | .          | 22 18       | 114 12              | STANDARD PORT |                                | See Table V |      |      |                  |
| 7115  | Aldrich Bay                        | .          | 22 17       | 114 13              | -0003         | +0004                          | -0.1        | 0.0  | 0.0  | 1.38             |
| 7122  | Waglan Island                      | .          | 22 11       | 114 18              | 0000          | 0000                           | -0.2        | -0.2 | 0.0  | 1.30             |
| 7124  | Sai Kung Hoi                       | .          | 22 23       | 114 17              | -0018         | -0007                          | -0.1        | 0.0  | +0.1 | 1.40             |
|       | <i>Mirs Bay</i>                    |            |             |                     |               |                                |             |      |      |                  |
| 7129  | Hoi Ha (Jones Cove)                | .          | 22 28       | 114 20              | -0022         | -0024                          | -0.2        | -0.1 | -0.1 | 1.28             |
| 7132  | Tai Po                             | .          | 22 28       | 114 11              | +0120         | +0035                          | 0.0         | 0.0  | 0.0  | 1.3              |
| 7133  | Tai Chau To Hoi (Double Haven)     | .          | 22 32       | 114 18              | +0019         | -0016                          | -0.1        | -0.1 | -0.2 | 1.30             |
| 7135  | Peng Chau                          | .          | 22 33       | 114 26              | -0002         | +0004                          | -0.1        | -0.1 | -0.2 | 1.3              |
| 7137  | Tuoning Leidao                     | .          | 22 27       | 114 38              | -0022         | -0015                          | -0.3        | -0.2 | -0.2 | 1.2              |
|       | <i>Daya Wan</i>                    |            |             |                     |               |                                |             |      |      |                  |
| 7141  | Tsang Chau                         | .          | 22 44       | 114 44              | -0031         | -0032                          | -0.2        | -0.1 | -0.1 | 1.31             |
| 7145  | Honghai Wan                        | .          | 22 44       | 115 11              | -0039         | -0027                          | -0.5        | -0.4 | -0.2 | 1.1              |
| 7146  | Shanwei Gang                       | C          | 22 45       | 115 21              | -0035         | -0027                          | -0.6        | -0.5 | -0.3 | 1.00             |
| 5137  | LABUAN                             | .          | .           | see page            | .             | 2.0                            | 1.5         | 1.4  | 0.7  |                  |
| 7147  | Jieshi Wan                         | .          | 22 48       | 115 40              | -0221         | -0215                          | -0.2        | -0.3 | 0.0  | 1.22             |
| 5147  | MIRI                               | .          | .           | see page            | .             | 1.6                            | △           | △    | 0.5  |                  |
| 7149  | Jiazi Jiao                         | .          | 22 49       | 116 06              | -0054         | -0118                          | -0.1        | △    | △    | 1.1              |
| 5137  | LABUAN                             | .          | .           | see page            | .             | 2.0                            | 1.5         | 1.4  | 0.7  |                  |
| 7151  | Shibcishan Jiao                    | .          | 22 56       | 116 29              | 0000          | +0006                          | -0.6        | -0.1 | -0.1 | 1.1              |
| 7152  | Pratas                             | .          | 20 42       | 116 43              | -0150         | -0118                          | -0.1        | -0.9 | -0.8 | 0.7              |

## SEASONAL CHANGES IN MEAN LEVEL

CHINA: KOREA

| No.  | PLACE                          | Lat.<br>N. | Long.<br>E. | TIME DIFFERENCES    |                     | HEIGHT DIFFERENCES (IN METRES) |             |             |             | M.L.<br>Z <sub>0</sub><br>m. |      |
|------|--------------------------------|------------|-------------|---------------------|---------------------|--------------------------------|-------------|-------------|-------------|------------------------------|------|
|      |                                |            |             | HHW<br>(Zone -0800) | LLW<br>(Zone -0800) | MHHW                           | MLHW        | MHLW        | MLLW        |                              |      |
| 5998 | BRISBANE BAR                   | .          | .           | see pag             | 85                  |                                |             |             |             |                              |      |
| 7388 | Huludao Gang                   | 40 43      | 120 59      | -0407               | -0408               | +1.0                           | +0.7        | +0.4        | +0.5        | 1.84                         |      |
|      | <i>Liao He</i>                 |            |             |                     |                     |                                |             |             |             |                              |      |
| 7392 | Bar                            | 40 32      | 122 04      | -0449               | -0448               | +1.1                           | +0.7        | +0.1        | +0.1        | 1.7                          |      |
| 7393 | Bar Signal Station             | 40 38      | 122 10      | -0427               | -0426               | +1.2                           | +0.8        | +0.1        | +0.1        | 1.74                         |      |
| 7394 | Yingkou                        | 40 41      | 122 16      | -0458               | -0504               | +1.4                           | +0.8        | -0.1        | -0.1        | 1.7                          |      |
| 7397 | Daitze Shan                    | 40 18      | 122 06      | -0509               | -0511               | +1.9                           | +1.3        | +0.6        | +0.6        | 2.30                         |      |
| 7401 | Changxing Dao                  | 39 39      | 121 28      | -0629               | -0654               | +0.1                           | -0.2        | +0.3        | +0.3        | 1.31                         |      |
| 7403 | Xizhong Dao                    | 39 24      | 121 17      | -0824               | -0850               | -0.2                           | -0.3        | +0.4        | +0.1        | 1.18                         |      |
|      | <i>Pulandian Wan</i>           |            |             |                     |                     |                                |             |             |             |                              |      |
| 7405 | Boji Dao                       | 39 23      | 121 45      | -0802               | -0810               | +0.2                           | +0.2        | +0.4        | +0.1        | 1.42                         |      |
| 7407 | Hulu Dao                       | 39 16      | 121 36      | -0847               | -0906               | +0.2                           | 0.0         | +0.5        | +0.1        | 1.40                         |      |
| 7486 | INCH'ON                        | .          | .           | see page            | 93                  | MHW                            | MHWS<br>8.6 | MHWN<br>6.5 | MLWN<br>2.8 | MLWS<br>0.4                  |      |
|      | <i>BOHAI HAJXIA</i>            |            |             |                     |                     |                                |             |             |             |                              |      |
| 7411 | Yingzhengzi Wan                | 38 58      | 121 18      | p                   | p                   | -6.7                           | -4.9        | -2.0        | 0.0         | 1.18                         |      |
| 7414 | Chang Zui                      | 38 47      | 121 08      | +0613               | +0613               | -6.7                           | -5.0        | -2.1        | -0.1        | 1.07                         |      |
| 7416 | Lushun Gang                    | 38 48      | 121 15      | +0531               | +0531               | -6.0                           | -4.4        | -1.9        | 0.0         | 1.49                         |      |
| 7417 | Xiaobing Dao                   | 38 49      | 121 31      | +0523               | +0523               | -5.9                           | -4.3        | -1.9        | 0.0         | 1.57                         |      |
| 7418 | Yu Yan                         | 38 34      | 121 39      | +0511               | +0515               | -5.8                           | -4.3        | -1.8        | 0.0         | 1.6                          |      |
|      | <i>YALU GULF</i>               |            |             |                     |                     |                                |             |             |             |                              |      |
| 7421 | Dalian Gang (Dairen Ko)        | CJ         | 38 56       | 121 39              | +0511               | +0511                          | -5.7        | -4.2        | -1.9        | -0.1                         | 1.63 |
| 7424 | Changjiang Ao                  | .          | 39 08       | 122 06              | +0442               | +0442                          | -5.1        | -3.7        | -1.6        | +0.1                         | 2.01 |
| 7427 | Dachangshan Dao                | .          | 39 16       | 122 35              | +0421               | +0421                          | -4.5        | -3.3        | -1.4        | +0.2                         | 2.32 |
| 7429 | Haiyang Dao                    | .          | 39 04       | 123 09              | +0356               | +0356                          | -4.6        | -3.3        | -1.3        | +0.2                         | 2.32 |
| 7432 | Dwangjia Dao                   | .          | 39 27       | 123 03              | +0402               | +0406                          | -3.9        | -2.7        | -1.3        | +0.2                         | 2.64 |
| 7435 | Dalu Dao                       | .          | 39 45       | 123 45              | +0338               | +0338                          | -3.1        | -2.1        | -1.1        | +0.2                         | 3.05 |
| 7436 | Takushan                       | .          | 39 46       | 123 33              | +0405               | +0405                          | -3.3        | -2.0        | -1.3        | +0.2                         | 2.96 |
|      | <i>Yalu Jiang (Amnok Kang)</i> |            |             |                     |                     |                                |             |             |             |                              |      |
| 7439 | Sin Do                         | .          | 39 48       | 124 16              | +0342               | +0342                          | -2.2        | -1.6        | -0.7        | +0.2                         | 3.50 |
| 7440 | Chao-shih-kou                  | .          | 39 53       | 124 12              | +0340               | +0442                          | -3.0        | -2.1        | -1.1        | +0.1                         | 3.05 |
| 7441 | Tuyup'o                        | .          | 39 56       | 124 20              | +0353               | +0513                          | -3.7        | -2.5        | -1.2        | +0.2                         | 2.78 |
| 7442 | San-tao-lang-t'ou              | .          | 40 03       | 124 20              | +0430               | +0620                          | ○           | ○           | ○           | ○                            | *d   |
| 7443 | An-tung                        | .          | 40 07       | 124 24              | +0605               | +0640                          | -5.8        | -4.2        | -1.8        | +0.1                         | 1.65 |
| 7445 | Suun Do                        | .          | 39 42       | 124 25              | +0325               | +0331                          | -2.5        | -1.7        | -0.8        | +0.3                         | 3.37 |
|      | <i>Korea, West Coast</i>       |            |             |                     |                     |                                |             |             |             |                              |      |
|      |                                |            |             |                     |                     | (Zone -0900)                   |             |             |             |                              |      |
| 7448 | Tan-do (Tan Do)                | .          | 39 31       | 124 40              | +0423               | +0423                          | -2.4        | -1.7        | -0.8        | +0.3                         | 3.45 |
| 7450 | Nap To                         | .          | 39 16       | 124 43              | +0407               | +0407                          | -2.7        | -2.0        | -0.7        | +0.3                         | 3.30 |
| 7452 | Unmu Do                        | .          | 39 25       | 125 07              | +0423               | +0423                          | -1.9        | -1.3        | -0.5        | +0.4                         | 3.76 |
|      | <i>Taedong Gang</i>            |            |             |                     |                     |                                |             |             |             |                              |      |
| 7457 | Sok To                         | .          | 38 38       | 125 00              | +0331               | +0331                          | -3.8        | -2.8        | -1.1        | +0.2                         | 2.70 |
| 7458 | P'i Do                         | K          | 38 40       | 125 10              | +0346               | +0346                          | -2.9        | -1.8        | -1.1        | +0.3                         | 3.20 |
| 7468 | Monggum P'o.                   | .          | 38 11       | 124 47              | +0232               | +0233                          | -5.0        | -3.7        | -1.5        | +0.1                         | 2.14 |
|      | <i>HUANG HAI (YELLOW SEA)</i>  |            |             |                     |                     |                                |             |             |             |                              |      |
| 7469 | Wollae Do (Getsnai Tau)        | K          | 38 03       | 124 49              | +0108               | +0110                          | -5.1        | -3.8        | -1.5        | +0.2                         | 2.05 |
| 7470 | Taeryonggi Bong                | K          | 35 57       | 124 44              | +0122               | +0124                          | -4.8        | -3.6        | -1.1        | +0.4                         | 2.30 |
| 7471 | Taechong Do                    | K          | 37 50       | 124 43              | +0100               | +0100                          | -5.2        | -3.9        | -1.4        | +0.1                         | 1.99 |
| 7474 | Sunwi Do                       | K          | 37 45       | 125 20              | +0033               | +0033                          | -3.7        | -2.8        | -1.0        | +0.2                         | 2.88 |
| 7475 | Mu Do                          | K          | 37 44       | 125 35              | +0022               | +0022                          | -2.5        | -1.9        | -0.7        | +0.3                         | 3.59 |
| 7477 | Taeyonp'yong Do                | K          | 37 40       | 125 43              | +0026               | +0021                          | -2.0        | -1.6        | -0.3        | +0.4                         | 3.70 |

○ No data.

\* See notes on page 388.

C Tides predicted in Chinese Tide Tables.

J Tides predicted in Japanese Tide Tables.

K Tides predicted in Korean Tide Tables.

d Differences approximate.

p For predictions use harmonic constants (Part III) and N.P.-159.

t Time differences approximate.

x M.L. inferred.

KOREA

| No.   | PLACE                     | Lat.<br>N. | Long.<br>E. | TIME DIFFERENCES<br>MHW MLW<br>(Zone -0900) |        | HEIGHT DIFFERENCES (IN METRES) |       |             |      | M.L.<br>Z <sub>0</sub><br>m. |      |
|-------|---------------------------|------------|-------------|---|--------|--------------------------------|-------|-------------|------|------------------------------|------|
|       |                           |            |             | MHWS  | MHWN   | MLWN                           | MLWS  |             |      |                              |      |
| 7486  | INCH'ON                   |            |             | see page 93                                 |        | 8.6                            | 6.5   | 2.8         | 0.4  |                              |      |
|       | <i>Han Gan</i>            |            |             |   |        |                                |       |             |      |                              |      |
| 7479  | Chumun Do                 | .          | K           | 37 39                                       | 126 14 | +0017                          | +0018 | -0.5        | -0.4 | +0.3                         | 4.39 |
| 7480  | Oepori                    | .          | K           | 37 42                                       | 126 23 | +0043                          | +0041 | -0.5        | -0.5 | +0.5                         | 4.50 |
| 7482  | Seoul                     | .          | K           | 37 33                                       | 126 57 | +0430                          | 0     | 0           | 0    | 0                            | 0    |
|       | <i>Yom Ha</i>             |            |             |   |        |                                |       |             |      |                              |      |
| 7484  | Sun Tol Mok               | .          | .           | 37 40                                       | 126 32 | +0055                          | 0     | 0           | 0    | 0                            | 0    |
| 7486  | INCH'ON (CHEMULPHO)       | .          | .           | 37 28                                       | 126 37 | STANDARD PORT                  |       | See Table V |      |                              | 4.68 |
| 7487  | Taemuni Do                | .          | .           | 37 23                                       | 126 27 | -0006                          | -0006 | -0.2        | -0.2 | +0.3                         | 4.53 |
| 7489  | Tokchok To                | .          | K           | 37 15                                       | 126 07 | -0018                          | -0014 | -0.9        | -0.7 | +0.5                         | 4.30 |
| 7492  | Asan Myoji (Gazan Byochi) | .          | K           | 36 58                                       | 126 47 | -0008                          | -0008 | +0.3        | +0.3 | +0.3                         | 4.82 |
| 7494  | Umu Do                    | .          | .           | 37 02                                       | 126 27 | -0027                          | -0027 | -0.8        | -0.6 | +0.3                         | 4.24 |
| 7497  | Manli Po                  | .          | .           | 36 47                                       | 126 08 | -0055                          | -0055 | -2.0        | -1.5 | +0.2                         | 3.63 |
| 7500  | Sachang-po (Chung Do)     | .          | .           | 36 23                                       | 126 26 | -0108                          | -0108 | -1.7        | -1.3 | +0.2                         | 3.76 |
| 7501  | Daecheon Hang             | .          | K           | 36 20                                       | 126 30 | -0133                          | -0056 | -2.9        | -2.2 | +0.3                         | 3.20 |
| 7503  | Eocheong Do               | .          | K           | 36 07                                       | 125 59 | -0141                          | -0141 | -2.9        | -2.3 | +0.1                         | 3.10 |
| 7504  | Kunsan (Outer Port)       | .          | K           | 35 58                                       | 126 38 | -0203                          | -0130 | -1.9        | -1.4 | +0.5                         | 3.61 |
| 7505  | Kunsan                    | .          | JK          | 35 59                                       | 126 43 | -0109                          | -0108 | -1.5        | -1.8 | +0.3                         | 3.41 |
| 7507  | Gogunsan Gundo            | .          | .           | 35 49                                       | 126 24 | -0153                          | -0153 | -2.5        | -1.8 | +0.2                         | 3.36 |
| 7280  | LUHUASHAN                 |            |             |   |        |                                | 4.3   | 3.3         | 2.0  | 0.9                          |      |
| 7510  | Amma Do                   | .          | K           | 35 21                                       | 126 01 | +0457                          | +0457 | +0.7        | +0.6 | -0.3                         | 2.80 |
| 7512  | Hampyeong Man             | .          | .           | 35 09                                       | 126 21 | +0449                          | +0449 | +1.3        | +1.1 | -0.2                         | 3.15 |
| 7515  | Buggang Sudo              | .          | .           | 34 53                                       | 126 06 | +0400                          | +0400 | +0.1        | +0.1 | -0.4                         | 2.47 |
| 7517  | Mokp'o Hang               | .          | K           | 34 47                                       | 126 23 | +0452                          | +0552 | -0.5        | -0.3 | -0.4                         | 2.15 |
| 7519  | Sih'a Do                  | .          | .           | 34 42                                       | 126 15 | +0400                          | +0400 | -0.5        | -0.2 | -0.3                         | 2.27 |
| 7521  | Hatae Do                  | .          | .           | 34 32                                       | 126 03 | +0300                          | +0301 | -0.8        | -0.6 | -0.4                         | 2.02 |
| 7523  | Bigeum Sudo               | .          | .           | 34 43                                       | 125 56 | +0334                          | +0334 | -0.4        | -0.3 | -0.4                         | 2.18 |
|       | <i>Daheungsan Gundo</i>   |            |             |   |        |                                |       |             |      |                              |      |
| 7525  | Daeheungsan Do            | .          | K           | 34 41                                       | 125 26 | +0351                          | +0348 | -1.0        | -0.7 | -0.5                         | 1.87 |
| 7529  | Usuyong                   | .          | K           | 34 35                                       | 126 19 | +0336                          | +0333 | -0.7        | -0.4 | -0.3                         | 2.10 |
| 7530  | Hajo Do                   | .          | K           | 34 18                                       | 126 03 | +0326                          | +0309 | -1.3        | -1.0 | -0.3                         | 1.80 |
| 7531  | Pyokpajin                 | .          | .           | 34 32                                       | 126 20 | +0132                          | +0217 | -0.8        | -0.7 | -0.4                         | 2.00 |
| 7532  | Sangma Do (Joma To)       | .          | .           | 34 27                                       | 126 25 | +0127                          | +0127 | -0.6        | -0.5 | -0.3                         | 2.15 |
| 7533  | Oran Jin                  | .          | .           | 34 21                                       | 126 29 | +0107                          | +0120 | -0.7        | -0.7 | -0.4                         | 2.02 |
|       | <i>KOREA STRAIT</i>       |            |             |   |        |                                |       |             |      |                              |      |
|       | <i>Jeju Do</i>            |            |             |   |        |                                |       |             |      |                              |      |
| 7534  | Chuk-to (Shaki To)        | .          | .           | 33 18                                       | 126 09 | +0053                          | +0055 | -1.7        | -1.3 | -0.4                         | 1.54 |
| 7535  | Hoasgunpo                 | .          | .           | 33 14                                       | 126 20 | +0009                          | +0022 | -1.6        | -1.3 | -0.4                         | 1.60 |
| 7536  | Sogwi-po (Seikiho Ko)     | .          | K           | 33 14                                       | 126 33 | -0015                          | -0014 | -1.7        | -1.3 | -0.5                         | 1.53 |
| 7538  | U Do                      | .          | .           | 33 30                                       | 126 54 | -0011                          | -0010 | -2.0        | -1.6 | -0.5                         | 1.36 |
| 7539  | Jeju Hang                 | .          | K           | 33 31                                       | 126 32 | +0057                          | +0056 | -1.9        | -1.5 | -0.5                         | 1.42 |
|       | <i>Chuja Gundo</i>        |            |             |   |        |                                |       |             |      |                              |      |
| 7541  | Sangchuja Do              | .          | .           | 33 58                                       | 126 18 | +0111                          | +0124 | -1.4        | -1.1 | -0.4                         | 1.70 |
| 7542  | Soan Do                   | .          | .           | 34 09                                       | 126 38 | +0032                          | +0044 | -0.9        | -0.8 | -0.4                         | 1.94 |
| 7543  | Wan Do                    | .          | K           | 34 19                                       | 126 45 | +0056                          | +0123 | -0.8        | -0.7 | -0.3                         | 2.05 |
| 7543a | Cheongsan Do              | .          | .           | 34 11                                       | 126 51 | +0015                          | +0028 | -1.1        | -0.9 | -0.4                         | 1.82 |
| 7544  | Geumdang Do               | .          | .           | 34 25                                       | 127 05 | -0007                          | +0005 | -0.7        | -0.6 | -0.3                         | 2.10 |
| 7545  | Geomun Do                 | .          | K           | 34 01                                       | 127 19 | -0028                          | -0028 | -1.2        | -0.7 | -0.5                         | 1.76 |
| 7548  | Nogdong                   | .          | K           | 34 31                                       | 127 08 | -0010                          | -0010 | -0.6        | -0.6 | -0.4                         | 2.11 |

SEASONAL CHANGES IN MEAN LEVEL

| No.       | Jan. 1 | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1 | Aug. 1 | Sep. 1 | Oct. 1 | Nov. 1 | Dec. 1 | Jan. 1 |
|-----------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| 5998      | 0.0    | 0.0    | 0.0    | +0.1   | +0.1  | 0.0    | 0.0    | 0.0    | -0.1   | -0.1   | -0.1   | 0.0    | 0.0    |
| 7280      | -0.1   | -0.2   | -0.2   | -0.1   | 0.0   | 0.0    | 0.0    | +0.1   | +0.2   | +0.2   | +0.1   | 0.0    | -0.1   |
| 7388-7468 | -0.2   | -0.2   | -0.2   | -0.1   | 0.0   | +0.1   | +0.2   | +0.3   | +0.2   | +0.1   | -0.1   | -0.2   | -0.2   |
| 7469-7533 | -0.2   | -0.2   | -0.1   | -0.1   | 0.0   | 0.0    | +0.1   | +0.2   | +0.2   | +0.1   | 0.0    | -0.1   | -0.2   |
| 7534-7548 | -0.1   | -0.1   | -0.1   | -0.1   | 0.0   | 0.0    | +0.1   | +0.1   | +0.1   | +0.1   | 0.0    | -0.1   | -0.1   |

KOREA

| No.                     | PLACE                     | Lat.<br>N. | Long.<br>E. | TIME DIFFERENCES<br>MHW<br>(Zone -0900) |        |               | HEIGHT DIFFERENCES (IN METRES) |      |             | M.L.<br>Z.<br>m. |
|-------------------------|---------------------------|------------|-------------|---|--------|---------------|--------------------------------|------|-------------|------------------|
|                         |                           |            |             | MHW                                     | MLW    | MHWS          | MHWN                           | MLWN | MLWS        |                  |
| 7486                    | INCH'ON                   | .          | .           | see page 93                             |        |               | 8.6                            | 6.5  | 2.8         | 0.4              |
| <i>Han Gan</i>          |                           |            |             |   |        |               |                                |      |             |                  |
| 7479                    | Chumun Do                 | .          | K           | 37 39                                   | 126 14 | +0017         | +0018                          | -0.5 | -0.4        | +0.3             |
| 7480                    | Oepori                    | .          | K           | 37 42                                   | 126 23 | +0043         | +0041                          | -0.5 | -0.5        | +0.5             |
| 7482                    | Seoul                     | .          | .           | 37 33                                   | 126 57 | +0430         | 0                              | 0    | 0           | 0                |
| <i>Yom Ha</i>           |                           |            |             |   |        |               |                                |      |             |                  |
| 7484                    | Sun Tol Mok               | .          | .           | 37 40                                   | 126 32 | +0055         | 0                              | 0    | 0           | 0                |
| 7486                    | INCH'ON (CHEMULPHO)       | .          | .           | 37 28                                   | 126 37 | STANDARD PORT |                                |      | See Table V | 4.68             |
| 7487                    | Taemuni Do                | .          | .           | 37 23                                   | 126 27 | -0006         | -0006                          | -0.2 | -0.2        | +0.3             |
| 7489                    | Tokchok To                | .          | K           | 37 15                                   | 126 07 | -0018         | -0014                          | -0.9 | -0.7        | +0.5             |
| 7492                    | Asan Myoji (Gazan Byochi) | .          | .           | 36 58                                   | 126 47 | -0008         | -0008                          | +0.3 | +0.1        | +0.3             |
| 7494                    | Umu Do                    | .          | .           | 37 02                                   | 126 27 | -0027         | -0027                          | -0.8 | -0.6        | +0.3             |
| 7497                    | Manli Po                  | .          | .           | 36 47                                   | 126 08 | -0055         | -0055                          | -2.0 | -1.5        | -0.6             |
| 7500                    | Sachang-po (Chung Do)     | .          | .           | 36 23                                   | 126 26 | -0108         | -0108                          | -1.7 | -1.3        | +0.2             |
| 7501                    | Dacheon Hang              | .          | K           | 36 20                                   | 126 30 | -0133         | -0056                          | -2.9 | -2.2        | +0.3             |
| 7503                    | Eocheong Do               | .          | K           | 36 07                                   | 125 59 | -0141         | -0141                          | -2.9 | -2.3        | +0.1             |
| 7504                    | Kunsan (Outer Port)       | .          | K           | 35 58                                   | 126 38 | -0203         | -0130                          | -1.9 | -1.4        | -0.5             |
| 7505                    | Kunsan                    | .          | JK          | 35 59                                   | 126 43 | -0109         | -0108                          | -1.5 | -1.8        | +0.3             |
| 7507                    | Gogunsan Gundo            | .          | .           | 35 49                                   | 126 24 | -0153         | -0153                          | -2.5 | -1.8        | +0.2             |
| 7280                    | LUHUASHAN                 | .          | .           | see page                                |        |               | 4.3                            | 3.3  | 2.0         | 0.9              |
| 7510                    | Arima Do                  | .          | K           | 35 21                                   | 126 01 | +0457         | +0457                          | +0.7 | +0.6        | -0.3             |
| 7512                    | Hampyong Man              | .          | .           | 35 09                                   | 126 21 | +0449         | +0449                          | +1.1 | +1.1        | -0.2             |
| 7515                    | Buggang Sudo              | .          | .           | 34 53                                   | 126 06 | +0400         | +0400                          | +0.1 | +0.1        | -0.4             |
| 7517                    | Mokp'o Hang               | .          | K           | 34 47                                   | 126 23 | +0452         | +0552                          | -0.5 | -0.3        | -0.4             |
| 7519                    | Siha Do                   | .          | .           | 34 42                                   | 126 15 | +0400         | +0400                          | -0.5 | -0.2        | -0.3             |
| 7521                    | Hatae Do                  | .          | .           | 34 32                                   | 126 03 | +0300         | +0301                          | -0.8 | -0.6        | -0.4             |
| 7523                    | Bigcum Sudo               | .          | .           | 34 43                                   | 125 56 | +0334         | +0334                          | -0.4 | -0.3        | -0.4             |
| <i>Daeheugsan Gundo</i> |                           |            |             |   |        |               |                                |      |             |                  |
| 7525                    | Daeheugsan Do             | .          | K           | 34 41                                   | 125 26 | +0351         | +0348                          | -1.0 | -0.7        | -0.8             |
| 7529                    | Usuyong                   | .          | K           | 34 35                                   | 126 19 | +0336         | +0333                          | -0.7 | -0.4        | -0.3             |
| 7530                    | Hajo Do                   | .          | K           | 34 18                                   | 126 03 | +0326         | +0309                          | -1.3 | -1.0        | -0.3             |
| 7531                    | Pyokpajin                 | .          | .           | 34 32                                   | 126 20 | +0132         | +0217                          | -0.8 | -0.7        | -0.6             |
| 7532                    | Sangma Do (Joma To)       | .          | .           | 34 27                                   | 126 25 | +0127         | +0127                          | -0.6 | -0.5        | -0.3             |
| 7533                    | Oran Jin                  | .          | .           | 34 21                                   | 126 29 | +0107         | +0220                          | -0.7 | -0.7        | -0.4             |
| <i>KOREA STRAIT</i>     |                           |            |             |   |        |               |                                |      |             |                  |
| <i>Jeju Do</i>          |                           |            |             |   |        |               |                                |      |             |                  |
| 7534                    | Chuk-to (Shaki To)        | .          | .           | 33 18                                   | 126.09 | +0053         | +0055                          | -1.7 | -1.3        | -0.4             |
| 7535                    | Hoasguapo                 | .          | .           | 33 14                                   | 126 20 | +0009         | +0022                          | -1.6 | -1.3        | -0.4             |
| 7536                    | Sogwi-po (Seikiho Ko)     | .          | K           | 33 14                                   | 126 33 | -0015         | -0014                          | -1.7 | -1.3        | -0.5             |
| 7538                    | U Do                      | .          | .           | 33 30                                   | 126 54 | -0011         | -0010                          | -2.0 | -1.6        | -0.5             |
| 7539                    | Jeju Hang                 | .          | K           | 33 31                                   | 126 32 | +0057         | +0056                          | -1.9 | -1.5        | -0.5             |
| <i>Chuja Gundo</i>      |                           |            |             |   |        |               |                                |      |             |                  |
| 7541                    | Sangchuja Do              | .          | .           | 33 58                                   | 126 18 | +0111         | +0124                          | -1.4 | -1.1        | -0.8             |
| 7542                    | Soan Do                   | .          | .           | 34 09                                   | 126 38 | +0032         | +0044                          | -0.9 | -0.8        | -0.6             |
| 7543                    | Wan Do                    | .          | K           | 34 19                                   | 126 45 | +0056         | +0123                          | -0.8 | -0.7        | -0.5             |
| 7543                    | Cheungsan Do              | .          | .           | 34 11                                   | 126 51 | +0015         | +0028                          | -1.1 | -0.9        | -0.4             |
| 7544                    | Geumdang Do               | .          | .           | 34 25                                   | 127 05 | -0007         | +0005                          | -0.7 | -0.6        | -0.3             |
| 7545                    | Geumun Do                 | .          | K           | 34 01                                   | 127 19 | -0028         | -0028                          | -1.2 | -0.7        | -0.5             |
| 7548                    | Nogdong                   | .          | K           | 34 31                                   | 127 08 | -0010         | -0010                          | -0.6 | -0.6        | -0.4             |

SEASONAL CHANGES IN MEAN LEVEL

| No.       | Jan. | Feb. | Mar. | Apr. | May  | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Jan. |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 5998      | 0.0  | 0.0  | 0.0  | +0.1 | +0.1 | 0.0  | 0.0  | 0.0  | -0.1 | -0.1 | -0.1 | 0.0  | 0.0  |
| 7280      | -0.1 | -0.2 | -0.2 | -0.1 | 0.0  | 0.0  | 0.0  | +0.1 | +0.2 | +0.2 | +0.1 | -0.1 | -0.1 |
| 7388-7468 | -0.2 | -0.2 | -0.2 | -0.1 | 0.0  | +0.1 | +0.2 | +0.3 | +0.2 | +0.1 | -0.1 | -0.2 | -0.2 |
| 7469-7533 | -0.2 | -0.2 | -0.1 | -0.1 | 0.0  | 0.0  | +0.1 | +0.2 | +0.2 | +0.1 | 0.0  | 0.0  | -0.1 |
| 7534-7548 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0  | 0.0  | 0.0  | +0.1 | +0.1 | +0.1 | 0.0  | 0.0  | -0.1 |

## JAPAN

| No.  | PLACE                | Lat.<br>N. | Long.<br>E. | TIME DIFFERENCES    |                     | HEIGHT DIFFERENCES (IN METRES) |             |             |             | M.L.<br>Z.<br>m. |
|------|----------------------|------------|-------------|---------------------|---------------------|--------------------------------|-------------|-------------|-------------|------------------|
|      |                      |            |             | HHW<br>(Zone -0900) | LLW<br>(Zone -0900) | MHHW                           | MLHW        | MLLW        |             |                  |
| 7056 | NAOZHOU DAO          | .          | .           | see page 171        |                     | 3.1                            | 2.2         | 1.4         | 0.8         |                  |
| 8020 | Tappi Saki           | 41 16      | 140 20      | -0745               | -0747               | -2.6                           | -1.8        | -1.1        | -0.7        | 0.33             |
| 7994 | KAMAISHI             | .          | .           | see page 171        |                     | 1.3                            | 1.2         | 0.8         | 0.3         |                  |
|      | Honshu, West Coast   |            |             |                     |                     |                                |             |             |             |                  |
| 8021 | Kodomari Wan         | 41 08      | 140 18      | +1150               | +1120               | -1.0                           | -0.9        | -0.6        | -0.2        | 0.20             |
| 8025 | Iwasaki              | 40 35      | 139 55      | +1144               | +1230               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.18             |
| 8027 | Toga Ko              | 39 57      | 139 42      | +1143               | +1217               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.17             |
| 8029 | Akita Ku             | 39 45      | 140 04      | +1108               | +1131               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.19             |
| 8033 | Kamo Ko              | 38 48      | 139 44      | +1150               | +1121               | -1.0                           | -0.9        | -0.6        | -0.2        | 0.22             |
| 8034 | Awa Shima            | 38 28      | 139 15      | +1124               | +1230               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.20             |
|      | Sado                 |            |             |                     |                     |                                |             |             |             |                  |
| 8035 | Ryotsu (Yebisu) Ko   | 38 05      | 138 26      | +1122               | +1138               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.18             |
| 8037 | Niigata Ko           | 37 57      | 139 04      | +1120               | +1207               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.17             |
| 8040 | Naoetsu              | 37 11      | 138 15      | +1120               | +1157               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.18             |
| 8043 | Fushiki              | 36 48      | 137 04      | +1118               | +1111               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.20             |
| 8046 | Wajima               | 37 24      | 136 54      | +1120               | +1159               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.18             |
| 8049 | Mikuni Ko            | 36 13      | 136 08      | +1058               | +1136               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.18             |
| 8052 | Maizuru Ko           | 35 29      | 135 24      | +1059               | +1137               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.19             |
| 8055 | Shibayama            | 35 40      | 134 40      | +1103               | +1054               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.17             |
| 8057 | Akasaki              | 35 31      | 133 40      | +1104               | +1130               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.19             |
| 8058 | Sakai                | 35 33      | 133 15      | +1103               | +1102               | -1.1                           | -1.1        | -0.7        | -0.3        | 0.10             |
|      | Dogo                 |            |             |                     |                     |                                |             |             |             |                  |
| 8059 | Saigo Ko             | 36 12      | 133 20      | +1104               | +1143               | -1.0                           | -1.0        | -0.6        | -0.2        | 0.18             |
| 4963 | CEBU                 | .          | .           | see page 173        |                     | 1.5                            | 1.9         | 0.4         | 0.2         |                  |
| 8064 | Sagi Ura             | 35 27      | 132 41      | +0231               | +0224               | -1.2                           | -0.7        | -0.3        | 0.0         | 0.19             |
| 7110 | HONG KONG            | .          | .           | see page 171        |                     | 2.2                            | 1.5         | 1.2         | 0.8         |                  |
| 8066 | Hamada               | 34 55      | 132 04      | +0259               | +0302               | -1.8                           | -1.2        | -0.6        | -0.6        | 0.28             |
| 8067 | Esaki Ko             | 34 39      | 131 39      | +0218               | +0210               | -1.6                           | -1.1        | -0.9        | -0.6        | 0.36             |
| 4963 | CEBU                 | .          | .           | see page 173        |                     | 1.5                            | 0.9         | 0.4         | 0.2         |                  |
| 8069 | Hagi Ko              | 34 28      | 131 25      | +0017               | +0018               | -0.8                           | -0.4        | -0.1        | +0.1        | 0.48             |
| 7056 | NAOZHOU DAO          | .          | .           | see page 171        |                     | 3.1                            | 2.2         | 1.4         | 0.8         |                  |
| 8070 | Odomari              | 34 24      | 131 11      | -0006               | -0008               | -2.2                           | -1.6        | -1.0        | -0.5        | 0.52             |
| 8072 | Yuya Wan             | 34 24      | 130 57      | -0033               | -0046               | -2.2                           | -1.5        | -1.0        | -0.5        | 0.58             |
| 7716 | NAHA KO              | .          | .           | see page 191        | MHW                 | MHWS<br>2.0                    | MHWN<br>1.5 | MLWN<br>0.8 | MLWS<br>0.3 |                  |
| 8073 | Kottoi               | 34 19      | 130 54      | +0303               | +0302               | -0.8                           | -0.6        | -0.2        | 0.0         | 0.73             |
| 8076 | Yoshimo              | 34 05      | 130 52      | +0244               | +0242               | -0.8                           | -0.6        | -0.3        | -1.0        | 0.71             |
| 7056 | NAOZHOU DAO          | .          | .           | see page 171        | HHW                 | LLW<br>3.1                     | MHHW<br>2.2 | MLHW<br>1.4 | MLLW<br>0.8 |                  |
|      | Hokkaido, East Coast |            |             |                     |                     |                                |             |             |             |                  |
|      | Tsugaru Kaikyo       |            |             |                     |                     |                                |             |             |             |                  |
| 8078 | Yoshioka             | 41 27      | 140 14      | -0714               | -0704               | -2.5                           | -1.7        | -1.1        | -0.6        | 0.39             |
| 8080 | Wakimoto             | 41 34      | 140 25      | -0743               | -0733               | -2.2                           | -1.6        | -0.9        | -0.6        | 0.55             |

△ Tide is usually diurnal.

\* See notes on page 388.

J Tides predicted in Japanese Tide Tables.

P For predictions use harmonic constants (Part III) and N.P.159.

t Time differences approximate.

## ALASKA

| No.  | PLACE             | Lat.<br>N. | Long.<br>W.    | TIME DIFFERENCES    |                     | HEIGHT DIFFERENCES (IN METRES) |             |             |             | M.L.<br>Z <sub>0</sub><br>m. |
|------|-------------------|------------|----------------|---------------------|---------------------|--------------------------------|-------------|-------------|-------------|------------------------------|
|      |                   |            |                | HHW<br>(Zone +0900) | LLW<br>(Zone +0900) | MHHW                           | MLHW        | MHLW        | MLLW        |                              |
| 9050 | TOFINO            |            |                |                     |                     | 3.4                            | 3.0         | 1.4         | 0.7         |                              |
|      | Valdez Arm        |            |                |                     |                     |                                |             |             |             |                              |
| 8604 | Rocky Point       | . . . . .  | 60 57 146 46   | +0055               | +0052               | +0.2                           | +0.1        | -0.4        | -0.7        | 1.92                         |
| 8605 | Valdez            | . . . . .  | 61 08 146 21   | +0044               | +0041               | +0.2                           | 0.0         | -0.4        | -0.7        | 1.92                         |
|      | Orca Bay          |            |                |                     |                     |                                |             |             |             |                              |
| 8608 | Windy Bay         | . . . . .  | 60 34 145 58   | +0022               | +0050               | +0.1                           | +0.1        | -0.5        | -0.7        | 1.92                         |
| 8610 | Port Etches       | . . . . .  | 60 20 146 33   | +0050               | +0050               | 0.0                            | -0.1        | -0.5        | -0.7        | 1.8 dx                       |
|      | Orca Inlet        |            |                |                     |                     |                                |             |             |             |                              |
| 8612 | Whitshed Point    | . . . . .  | U 60 28 145 55 | +0108               | +0106               | +0.1                           | 0.0         | -0.2        | -0.7        | 1.98                         |
| 8613 | Cordova           | . . . . .  | 60 33 145 46   | +0044               | +0046               | +0.3                           | +0.2        | -0.4        | -0.7        | 2.01                         |
| 8614 | Middleton Island  | . . . . .  | 59 28 146 19   | +0137               | +0037               | -0.4                           | -0.3        | -0.5        | -0.7        | 1.67 d                       |
| 8617 | Controller Bay    | . . . . .  | 60 05 144 48   | +0037               | +0037               | -0.5                           | -0.5        | -0.5        | -0.7        | 1.6 dx                       |
| 8622 | Yakutat Bay       | . . . . .  | 59 34 139 46   | +0029               | +0029               | -0.4                           | -0.5        | -0.5        | -0.7        | 1.62                         |
| 8626 | Lituya Bay        | . . . . .  | 58 37 137 37   | +0115               | Θ                   | -0.8                           | -0.7        | Θ           | Θ           | 1.4 dx                       |
| 8628 | Cape Spencer      | . . . . .  | 58 12 136 40   | +0015               | +0015               | -0.3                           | -0.3        | -0.5        | -0.7        | 1.7 dx                       |
| 8629 | Surveyor Seamount | . . . . .  | 56 05 144 20   | +0023               | +0026               | -0.7                           | -0.7        | -0.5        | -0.7        | 1.5 x                        |
| 8850 | PRINCE RUPERT     | . . . . .  | see page 99    | MHW                 | MLW                 | MHWS<br>6.5                    | MHWN<br>5.2 | MLWN<br>2.5 | MLWS<br>1.2 |                              |
|      | Glacier Bay       |            |                |                     |                     |                                |             |             |             |                              |
| 8633 | Bartlett Cove     | . . . . .  | 58 27 135 54   | -0005               | -0005               | -1.4                           | -1.6        | -1.3        | -1.2        | 2.4 x                        |
| 8636 | Swanson Harbour   | . . . . .  | 58 13 135 07   | -0030               | -0030               | -1.5                           | -1.4        | -1.2        | -1.1        | 2.5 x                        |
| 8639 | William Henry Bay | . . . . .  | 58 43 135 14   | -0030               | -0030               | -1.5                           | -1.5        | -1.3        | -1.2        | 2.5 dx                       |
| 8641 | Pyramid Harbour   | . . . . .  | 59 11 135 28   | -0025               | -0025               | -1.4                           | -1.4        | -1.2        | -1.2        | 2.6 dx                       |
| 8643 | Skagway           | . . . . .  | 59 27 135 18   | -0023               | -0023               | -1.2                           | -1.2        | -1.2        | -1.2        | 2.65 t                       |
| 8648 | Fritz Cove        | . . . . .  | 58 19 134 36   | -0020               | -0020               | -1.5                           | -1.5        | -1.3        | -1.3        | 2.5 dx                       |
| 8649 | Juneau            | . . . . .  | U 58 18 134 24 | -0027               | -0027               | -1.2                           | -1.3        | -1.2        | -1.2        | 2.05                         |
|      | Stephens Passage  |            |                |                     |                     |                                |             |             |             |                              |
| 8651 | Taku Point        | . . . . .  | 58 24 134 01   | -0010               | -0010               | -1.2                           | -1.2        | -1.2        | -1.2        | 2.6 dx                       |
| 8652 | Taku Harbour      | . . . . .  | 58 04 134 00   | -0030               | -0030               | -1.4                           | -1.4        | -1.2        | -1.2        | 2.4 dx                       |
| 8655 | Windham Bay       | . . . . .  | 57 33 133 30   | -0035               | -0035               | -1.5                           | -1.4        | -1.3        | -1.2        | 2.5 dx                       |
| 8656 | Cleveland Passage | . . . . .  | 57 13 133 30   | -0040               | -0040               | -1.7                           | -1.5        | -1.3        | -1.2        | 2.4 dx                       |
| 9050 | TOFINO            |            |                |                     |                     | MHHW<br>3.4                    | MLHW<br>3.0 | MHLW<br>1.4 | MLLW<br>0.7 |                              |
|      | Chicagoof Island  |            |                |                     |                     | HHW                            | LLW         |             |             |                              |
| 8658 | Slocum Arm        | . . . . .  | 57 33 135 56   | +0010               | +0010               | -0.3                           | -0.4        | -0.5        | -0.7        | 1.6 x                        |
| 8659 | Kimshan Cove      | . . . . .  | 57 41 136 06   | +0020               | +0020               | -0.4                           | -0.5        | -0.4        | -0.7        | 1.65                         |
| 8661 | Lisianski Strait  | . . . . .  | 58 00 136 20   | +0025               | +0025               | -0.3                           | -0.3        | -0.5        | -0.7        | 1.7 x                        |
| 8662 | Takanis Bay       | . . . . .  | 57 55 136 31   | +0015               | +0015               | -0.5                           | -0.5        | -0.5        | -0.7        | 1.6 x                        |
|      | Cross Sound       |            |                |                     |                     |                                |             |             |             |                              |
| 8664 | Port Althorp      | . . . . .  | 58 07 136 17   | 0000                | -0003               | -0.4                           | -0.3        | -0.4        | -0.7        | 1.71                         |
| 8665 | Granite Cove      | . . . . .  | 58 12 136 24   | +0026               | +0023               | -0.2                           | -0.3        | -0.5        | -0.7        | 1.71                         |
| 8850 | PRINCE RUPERT     | . . . . .  | see page 99    | MHW                 | MLW                 | MHWS<br>6.5                    | MHWN<br>5.2 | MLWN<br>2.5 | MLWS<br>1.2 |                              |
|      | Icy Strait        |            |                |                     |                     |                                |             |             |             |                              |
| 8668 | Lemesurier Island | . . . . .  | 58 19 136 02   | -0035               | -0035               | -2.3                           | -2.0        | -1.4        | -1.1        | 2.1 dx                       |
| 8670 | Hoonah            | . . . . .  | 58 07 135 27   | -0024               | -0024               | -1.6                           | -1.5        | -1.3        | -1.2        | 2.44                         |
|      | Chatham Strait    |            |                |                     |                     |                                |             |             |             |                              |
| 8673 | Freshwater Bay    | . . . . .  | 57 51 135 01   | -0025               | -0025               | -2.0                           | -1.7        | -1.4        | -1.1        | 2.3 dx                       |

Θ No data.

U Tides predicted in U.S. Tide Tables.

d Differences approximate.

t Time differences approximate.

x M.L. inferred.

## ALASKA

| No.  | PLACE                                  | Lat.<br>N. | Long.<br>W. | TIME DIFFERENCES    |       | HEIGHT DIFFERENCES (IN METRES) |             |             |             | M.L.<br>Zo<br>m. |
|------|--|------------|-------------|---------------------|-------|--------------------------------|-------------|-------------|-------------|------------------|
|      |  |            |             | HHW<br>(Zone +0900) | LLW   | MHHW                           | MLHW        | MHLW        | MLLW        |                  |
| 9050 | TOFINO                                 |            |             |                     |       | 3'4                            | 3'0         | 1'4         | 0'7         |                  |
|      | <i>Peril Strait</i>                    |            |             |                     |       |                                |             |             |             |                  |
| 8679 | Sergius Narrows                        | 57 24      | 135 38      | +0037               | +0031 | +0'1                           | +0'3        | -0'3        | -0'7        | 2'13             |
| 8680 | Kakul Narrows                          | 57 22      | 135 41      | +0020               | +0020 | -0'4                           | -0'5        | -0'5        | -0'7        | 1'6              |
|      | x                                      |            |             |                     |       |                                |             |             |             |                  |
| 8850 | PRINCE RUPERT                          |            |             | see pag 99          | MHW   | MLW                            | MHWS<br>6'5 | MHWN<br>5'2 | MLWN<br>2'5 | MLWS<br>1'2      |
|      | <i>Baranof Island</i>                  |            |             |                     |       |                                |             |             |             |                  |
| 8681 | Nismeni Cove                           | 57 34      | 135 25      | -0020               | -0020 | -1'8                           | -1'7        | -1'3        | -1'2        | 2'3              |
| 8684 | Fairway Island                         | 57 27      | 134 53      | -0035               | -0035 | -2'0                           | -1'8        | -1'3        | -1'1        | 2'3              |
|      | <i>Chatham Strait</i>                  |            |             |                     |       |                                |             |             |             |                  |
| 8686 | Kasnyku Bay                            | 57 13      | 134 52      | -0030               | -0030 | -2'0                           | -1'8        | -1'4        | -1'1        | 2'3              |
|      | dx                                     |            |             |                     |       |                                |             |             |             |                  |
| 9050 | TOFINO                                 |            |             |                     | HHW   | LLW                            | MHHW<br>3'4 | MLHW<br>3'0 | MHLW<br>1'4 | MLLW<br>0'7      |
| 8690 | Port Walter                            | 56 23      | 134 40      | +0020               | +0020 | 0'0                            | -0'1        | -0'5        | -0'7        | 1'8              |
| 8692 | Cape Ommaney                           | 56 10      | 134 40      | +0005               | +0005 | -0'5                           | -0'5        | -0'5        | -0'7        | 1'6              |
|      | x                                      |            |             |                     |       |                                |             |             |             |                  |
| 8695 | Port Banks                             | 56 34      | 134 59      | +0005               | +0005 | -0'5                           | -0'5        | -0'5        | -0'7        | 1'6              |
|      | x                                      |            |             |                     |       |                                |             |             |             |                  |
|      | <i>Sitka Sound</i>                     |            |             |                     |       |                                |             |             |             |                  |
| 8698 | Biorka Island                          | 56 51      | 135 31      | 0000                | 0000  | -0'5                           | -0'5        | -0'5        | -0'7        | 1'6              |
| 8700 | Sitka                                  | 57 03      | 135 20      | +0012               | +0012 | -0'5                           | -0'5        | -0'5        | -0'7        | 1'58             |
|      | x                                      |            |             |                     |       |                                |             |             |             |                  |
| 8703 | Whitestone Narrows                     | 57 15      | 135 34      | +0015               | +0015 | -0'5                           | -0'5        | -0'5        | -0'7        | 1'6              |
|      | x                                      |            |             |                     |       |                                |             |             |             |                  |
|      | <i>Kruzof Island</i>                   |            |             |                     |       |                                |             |             |             |                  |
| 8706 | Gilmer Bay                             | 57 13      | 135 50      | +0010               | +0010 | -0'4                           | -0'4        | -0'5        | -0'7        | 1'6              |
|      | x                                      |            |             |                     |       |                                |             |             |             |                  |
| 8850 | PRINCE RUPERT                          |            |             | see pag 99          | MHW   | MLW                            | MHWS<br>6'5 | MHWN<br>5'2 | MLWN<br>2'5 | MLWS<br>1'2      |
|      | <i>Admiralty Island</i>                |            |             |                     |       |                                |             |             |             |                  |
| 8711 | <i>Chatham Strait</i><br>Favourite Bay | 57 29      | 134 32      | -0010               | -0010 | -2'3                           | -1'9        | -1'5        | -1'1        | 2'1              |
|      | dx                                     |            |             |                     |       |                                |             |             |             |                  |
|      | <i>Lynn Canal</i>                      |            |             |                     |       |                                |             |             |             |                  |
| 8714 | Funter Bay                             | 58 15      | 134 55      | -0020               | -0020 | -1'7                           | -1'6        | -1'3        | -1'2        | 2'4              |
| 8716 | Barlow Cove                            | 58 20      | 134 53      | -0030               | -0030 | -1'6                           | -1'5        | -1'3        | -1'2        | 2'5              |
|      | dx                                     |            |             |                     |       |                                |             |             |             |                  |
|      | <i>Stephens Passage</i>                |            |             |                     |       |                                |             |             |             |                  |
| 8722 | Windfall Harbour                       | 57 52      | 134 16      | -0005               | -0005 | -1'4                           | -1'4        | -1'2        | -1'2        | 2'6              |
| 8723 | Gambier Bay                            | 57 29      | 133 54      | -0035               | -0035 | -1'7                           | -1'6        | -1'4        | -1'3        | 2'3              |
|      | dx                                     |            |             |                     |       |                                |             |             |             |                  |
| 8724 | Pybus Bay                              | 57 19      | 134 00      | -0040               | -0040 | -1'8                           | -1'6        | -1'4        | -1'1        | 2'3              |
|      | dx                                     |            |             |                     |       |                                |             |             |             |                  |
|      | <i>Kuiu Island</i>                     |            |             |                     |       |                                |             |             |             |                  |
| 8728 | Security Bay                           | 56 51      | 134 21      | -0050               | -0050 | -2'2                           | -1'9        | -1'5        | -1'1        | 2'2              |
|      | dx                                     |            |             |                     |       |                                |             |             |             |                  |
| 9050 | TOFINO                                 |            |             |                     | HHW   | LLW                            | MHHW<br>3'4 | MLHW<br>3'0 | MHLW<br>1'4 | MLLW<br>0'7      |
| 8732 | Table Bay                              | 56 10      | 134 15      | 0000                | 0000  | -0'1                           | -0'1        | -0'5        | -0'7        | 1'8              |
|      | x                                      |            |             |                     |       |                                |             |             |             |                  |
|      | <i>Summer Strait</i>                   |            |             |                     |       |                                |             |             |             |                  |
| 8734 | Port McArthur                          | 56 04      | 134 07      | +0005               | +0005 | -0'6                           | -0'3        | -0'5        | -0'7        | 1'7              |
| 8738 | Seclusion Harbour                      | 56 33      | 133 52      | +0020               | +0020 | +0'3                           | +0'2        | +0'5        | +0'7        | 2'0              |
|      | dx                                     |            |             |                     |       |                                |             |             |             |                  |
| 8850 | PRINCE RUPERT                          |            |             | see pag 99          | MHW   | MLW                            | MHWS<br>6'5 | MHWN<br>5'2 | MLWN<br>2'5 | MLWS<br>1'2      |
|      | <i>Kupreanof Island</i>                |            |             |                     |       |                                |             |             |             |                  |
| 8743 | Hamilton Bay                           | 56 55      | 133 50      | -0045               | -0045 | -2'1                           | -1'8        | -1'4        | -1'1        | 2'2              |
|      | dx                                     |            |             |                     |       |                                |             |             |             |                  |

## SEASONAL CHANGES IN MEAN LEVEL

| No.       | Jan. 1 | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1 | Aug. 1 | Sep. 1 | Oct. 1 | Nov. 1 | Dec. 1 | Jan. 1 |
|-----------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| 8604-8743 | +0'1   | 0'0    | 0'0    | 0'0    | -0'1  | -0'1   | -0'1   | -0'1   | 0'0    | 0'0    | +0'1   | +0'1   | +0'1   |
| 8850      | +0'1   | +0'1   | 0'0    | 0'0    | 0'0   | -0'1   | -0'1   | -0'1   | 0'0    | 0'0    | +0'1   | +0'1   | +0'1   |
| 9050      | 0'0    | +0'1   | +0'1   | +0'1   | 0'0   | 0'0    | 0'0    | -0'1   | -0'1   | -0'1   | 0'0    | 0'0    | 0'0    |

## NICARAGUA TO ECUADOR

| No.                                    | PLACE                   | Lat.<br>N. | Long.<br>W.  | TIME DIFFERENCES    |               | HEIGHT DIFFERENCES (IN METRES) |      |             |      | M.L.<br>Z.<br>m. |  |  |  |  |
|--|-------------------------|------------|--------------|---------------------|---------------|--------------------------------|------|-------------|------|------------------|--|--|--|--|
|  |                         |            |              | MHW<br>(Zone +0600) | MLW           | MHWS                           | MHWN | MLWN        | MLWS |                  |  |  |  |  |
| <b>9448 LA UNION</b>                   |                         |            |              |                     |               |                                |      |             |      |                  |  |  |  |  |
| Nicaragua                              |                         |            |              |                     |               |                                |      |             |      |                  |  |  |  |  |
| 9453                                   | Puerto Corinto          | .          | 12 29        | 87 10               | -0010         | -0010                          | -0.7 | -0.4        | -0.4 | +0.1             |  |  |  |  |
| 9455                                   | San Juan del Sur        | .          | 11 15        | 85 53               | -0021         | -0006                          | -0.7 | -0.6        | -0.1 | +0.2             |  |  |  |  |
| Costa Rica                             |                         |            |              |                     |               |                                |      |             |      |                  |  |  |  |  |
| 9456                                   | Bahia Elena             | .          | 10 56        | 85 49               | -0010         | -0010                          | -0.2 | -0.3        | -0.1 | +0.1             |  |  |  |  |
| 9457                                   | Puerto Culebra          | .          | 10 38        | 85 40               | -0010         | -0010                          | -0.2 | -0.3        | 0.0  | +0.1             |  |  |  |  |
| Golfo de Nicoya                        |                         |            |              |                     |               |                                |      |             |      |                  |  |  |  |  |
| 9460                                   | Puntarenas              | U          | 9 58         | 84 50               | -0014         | -0008                          | -0.2 | -0.3        | 0.0  | +0.1             |  |  |  |  |
| 9462                                   | Puerto Herradura        | .          | 9 38         | 84 39               | -0015         | -0015                          | -0.2 | -0.3        | 0.0  | +0.1             |  |  |  |  |
| 9464                                   | Bahia Uvita             | .          | 9 09         | 83 45               | -0030         | -0030                          | -0.2 | -0.3        | 0.0  | +0.1             |  |  |  |  |
| Golfo Dulce                            |                         |            |              |                     |               |                                |      |             |      |                  |  |  |  |  |
| 9467                                   | Bahia del Rincon        | .          | 8 42         | 83 29               | -0010         | -0010                          | -0.2 | -0.3        | 0.0  | +0.1             |  |  |  |  |
| Isla del Coco                          |                         |            |              |                     |               |                                |      |             |      |                  |  |  |  |  |
| 9470                                   | Chatham Bay             | .          | 5 33         | 87 03               | -0035         | -0035                          | -0.5 | -0.5        | +0.2 | +0.3             |  |  |  |  |
| 9487                                   | BALBOA                  | .          | see page 101 |                     |               |                                | 4.9  | 3.8         | 1.1  | -0.1             |  |  |  |  |
| Panama                                 |                         |            |              |                     |               |                                |      |             |      |                  |  |  |  |  |
|  |                         |            |              |                     |               | (Zone +0500)                   |      |             |      |                  |  |  |  |  |
| 9471                                   | Puerto Armuelles        | .          | 8 16         | 82 51               | -0010         | -0010                          | -1.9 | -1.5        | -0.3 | +0.2             |  |  |  |  |
| 9474                                   | Isla Parida             | .          | 8 08         | 82 19               | -0005         | -0005                          | -1.6 | -1.3        | -0.2 | +0.2             |  |  |  |  |
| 9477                                   | Bahia Honda             | .          | 7 46         | 81 31               | -0005         | -0005                          | -1.6 | -1.3        | -0.2 | +0.1             |  |  |  |  |
| 9478                                   | Isla Coiba              | .          | 7 24         | 81 39               | -0005         | -0005                          | -1.4 | -1.1        | -0.2 | +0.2             |  |  |  |  |
| 9480                                   | Isla Cebaco             | .          | 7 31         | 81 13               | -0005         | -0005                          | -1.6 | -1.3        | -0.2 | +0.1             |  |  |  |  |
| 9484                                   | Cabo Maia               | .          | 7 28         | 80 00               | -0005         | -0005                          | -1.6 | -1.4        | -0.2 | +0.2             |  |  |  |  |
| 9487                                   | BALBOA                  | .          | 8 57         | 79 34               | STANDARD PORT |                                | -1.6 | See Table V |      | 1.7              |  |  |  |  |
| 9488                                   | Rio Chepo               | .          | 8 59         | 79 07               | 0000          | 0000                           | -0.1 | +0.1        | +0.3 | 2.5              |  |  |  |  |
| 9492                                   | Punta Garachiné         | .          | 8 05         | 78 25               | -0005         | -0005                          | -0.7 | -0.5        | 0.0  | +0.3             |  |  |  |  |
| Isla del Rey                           |                         |            |              |                     |               |                                |      |             |      |                  |  |  |  |  |
| 9493                                   | St. Elmo Bay            | .          | 8 18         | 78 54               | -0005         | -0005                          | -0.7 | -0.5        | 0.0  | +0.3             |  |  |  |  |
| 9496                                   | Bahia Piñas             | .          | 7 34         | 78 11               | -0005         | -0005                          | -0.8 | -0.6        | 0.0  | +0.3             |  |  |  |  |
| Colombia                               |                         |            |              |                     |               |                                |      |             |      |                  |  |  |  |  |
| 9498                                   | Bahia Octavia           | .          | 6 52         | 77 40               | +0005         | -0005                          | -0.9 | -0.7        | -0.2 | +0.1             |  |  |  |  |
| 9501                                   | Puerto Utria            | .          | 6 00         | 77 21               | +0015         | 0000                           | -1.0 | -0.8        | -0.2 | +0.1             |  |  |  |  |
| 9503                                   | Puerto Cuevita (Cabita) | .          | 5 28         | 77 31               | +0020         | 0000                           | -1.0 | -0.8        | -0.2 | +0.1             |  |  |  |  |
| 9505                                   | Punta Chirambira        | .          | 4 17         | 77 30               | +0020         | 0000                           | -1.1 | -0.8        | -0.2 | +0.1             |  |  |  |  |
| 9507                                   | Buenaventura            | EU         | 3 54         | 77 05               | +0025         | +0004                          | -0.9 | -0.7        | -0.2 | +0.1             |  |  |  |  |
| 9510                                   | Rio Sanguanga           | .          | 2 40         | 78 19               | +0020         | +0006                          | -1.0 | -0.8        | -0.1 | +0.2             |  |  |  |  |
| 9511                                   | Puerto Tumaco           | .          | 1 50         | 78 44               | +0015         | 0000                           | -1.1 | -0.8        | -0.2 | +0.1             |  |  |  |  |
| 9448                                   | LA UNION                |            |              |                     |               |                                | 3.0  | 2.5         | 0.6  | -0.1             |  |  |  |  |
| Ecuador                                |                         |            |              |                     |               |                                |      |             |      |                  |  |  |  |  |
|  |                         |            |              |                     |               | (Zone +0600)                   |      |             |      |                  |  |  |  |  |
| Archipelago de Colon (Islas Galapagos) |                         |            |              |                     |               |                                |      |             |      |                  |  |  |  |  |
| 9517                                   | Bahia Darwin            | .          | 0 19         | 89 57               | -0020         | -0008                          | -1.0 | -1.0        | -0.2 | +0.1             |  |  |  |  |
|  |                         |            | S.           | W.                  |               |                                |      |             | 0.9  | dx               |  |  |  |  |
| 9519                                   | Caleta Iguana           | .          | 0 58         | 91 27               | -0020         | 0                              | -1.2 | 0           | 0    | d                |  |  |  |  |
| 9521                                   | Caleta Aeolian          | .          | 0 26         | 90 17               | -0019         | -0003                          | -1.2 | -1.1        | -0.2 | +0.1             |  |  |  |  |
| 9522                                   | Bahia Post Office       | .          | 1 15         | 90 27               | -0015         | -0007                          | -1.5 | -1.3        | -0.3 | +0.1             |  |  |  |  |
| 9524                                   | Bahia Agua Dulce        | E          | 0 54         | 89 37               | -0017         | -0001                          | -1.0 | -0.9        | 0.0  | +0.3             |  |  |  |  |
|  |                         |            |              |                     |               |                                |      |             | 0.8  | dx               |  |  |  |  |

⊙ No data.

\* See notes on page 388.

C Tides predicted in Chilean Tide Tables.

E Tides predicted in Ecuador Tide Tables.

P Tides predicted in Peruvian Tide Tables.

U Tides predicted in U.S. Tide Tables.

d Differences approximate.

t Time differences approximate.

x M.L. inferred.

ECUADOR TO CHILE

| No.   | PLACE                        | Lat.<br>N. | Long.<br>W. | TIME DIFFERENCES<br>MHW<br>(Zone +0500) |       | HEIGHT DIFFERENCES (IN METRES) |      |             |             | M.L.<br>Z <sub>0</sub><br>m. |             |
|-------|------------------------------|------------|-------------|---|-------|--------------------------------|------|-------------|-------------|------------------------------|-------------|
|       |                              |            |             | MHWS                                    | MLW   | MHWN                           | MLWN | MLWS        |             |                              |             |
| 9487  | BALBOA                       | .          | .           | see page 10                             |       | 4.9                            | 3.8  | 1.1         | -0.1        |                              |             |
| 9525  | San Lorenzo                  | E          | 1 18        | 78 51                                   | +0020 | +0023                          | -1.2 | -0.8        | 0.0         | +0.5                         | 2.02        |
| 9527  | Esmeraldas                   | E          | 1 00        | 79 39                                   | -0008 | -0010                          | -1.7 | -1.2        | -0.2        | +0.4                         | 1.76        |
| 9528  | Bahia Atacames               | E          | 0 53        | 79 52                                   | +0025 | +0025                          | -1.0 | -0.8        | -0.1        | +0.2                         | 2.0         |
| 9530  | Muisne                       | E          | 0 37        | 80 01                                   | +0017 | +0017                          | -1.9 | -1.5        | -0.2        | +0.4                         | 1.63        |
|       |                              |            |             | S.                                      | W.    |                                |      |             |             |                              |             |
| 9533  | Cabo Pasado                  | E          | 0 22        | 80 30                                   | +0005 | +0005                          | -1.8 | -1.3        | -0.5        | +0.1                         | 1.6         |
| 9534  | Bahia de Caraquez            | E          | 0 35        | 80 26                                   | +0011 | +0009                          | -2.2 | -1.6        | -0.3        | +0.4                         | 1.51        |
| 9535  | Manta                        | E          | 0 57        | 80 44                                   | -0002 | -0003                          | -2.3 | -1.7        | -0.3        | +0.4                         | 1.46        |
| 9538  | Puerto Lopez                 | E          | 1 34        | 80 50                                   | +0004 | +0003                          | -2.0 | -1.5        | -0.2        | +0.4                         | 1.62        |
| 9539  | La Libertad                  | E          | 2 12        | 80 55                                   | -0008 | -0007                          | -2.8 | -2.2        | -0.6        | +0.1                         | 1.07        |
|       |                              |            |             |   |       |                                |      |             |             |                              |             |
|       | Golfo de Guayaquil           |            |             |   |       |                                |      |             |             |                              |             |
| 9540  | Posorja                      | E          | 2 43        | 80 14                                   | +0130 | +0127                          | -2.4 | -1.7        | -0.5        | +0.3                         | 1.34        |
| 9540a | Puerto Maritimo de Guayaquil | E          | 2 17        | 79 55                                   | +0301 | +0252                          | -0.9 | -0.5        | +0.1        | +0.5                         | 2.30        |
| 9541  | Isla Santa Clara             | E          | 3 10        | 80 26                                   | 0000  | 0                              | -3.0 | -2.4        | -0.8        | -0.1                         | 0.9         |
| 9543  | Puna                         | E          | 2 44        | 79 55                                   | +0156 | +0155                          | -1.3 | -0.8        | -0.1        | +0.5                         | 2.0         |
| 9544  | Guayaquil                    | EU         | 2 12        | 79 52                                   | +0423 | +0511                          | -0.8 | -0.4        | -0.1        | +0.4                         | 2.20        |
| 9545  | Puerto Bolivar               | E          | 3 18        | 80 00                                   | +0154 | +0139                          | -2.0 | -1.5        | -0.2        | +0.4                         | 1.61        |
|       |                              |            |             |   |       |                                |      |             |             |                              |             |
|       | Peru                         |            |             |   |       |                                |      |             |             |                              |             |
| 9547  | Caleta Zorritos              | P          | 3 39        | 80 40                                   | +0104 | +0054                          | -3.2 | -2.4        | -0.6        | +0.3                         | 0.97        |
| 7280  | LUHUASHAN                    |            |             |   |       |                                | 4.3  | 3.3         | 2.0         | 0.9                          |             |
| 9548  | Lobitos                      | P          | 4 27        | 81 17                                   | +0616 | +0628                          | -2.7 | -2.1        | -0.3        | -0.8                         | 0.86        |
| 9549  | Bahia de Talara              | EP         | 4 35        | 81 17                                   | +0616 | +0628                          | -2.8 | -2.1        | -1.6        | -0.9                         | 0.79        |
| 9551  | Puerto de Paita              | P          | 5 05        | 81 07                                   | +0624 | +0636                          | -2.9 | -2.2        | -1.6        | -0.8                         | 0.77        |
| 9553  | Puerto Bayovar               | P          | 5 48        | 81 02                                   | +0634 | +0647                          | -3.0 | -2.3        | -1.6        | -0.8                         | 0.73        |
| 9554  | Lobos de Tierra              | P          | 6 26        | 80 50                                   | +0710 | 0                              | -2.9 | 0           | 0           | 0                            | 0.7         |
|       |                              |            |             |   |       |                                |      |             |             |                              | dx*         |
| 9644  | VALPARAISO                   |            |             |   |       | HHW                            | LLW  | MHHW<br>1.5 | MLHW<br>1.2 | MHLW<br>0.5                  | MLLW<br>0.4 |
| 9557  | Puerto Eten                  | P          | 6 57        | 79 52                                   | -0603 | -0620                          | -0.4 | -0.4        | -0.2        | -0.2                         | 0.62        |
| 9560  | Puerto Chicama               | P          | 7 42        | 79 27                                   | -0548 | -0605                          | -0.5 | -0.4        | -0.2        | -0.2                         | 0.56        |
| 9562  | Salaverry                    | P          | 8 13        | 78 59                                   | -0534 | -0637                          | -0.5 | -0.4        | -0.2        | -0.2                         | 0.58        |
| 9563  | Chimbote                     | P          | 9 05        | 78 37                                   | -0521 | -0540                          | -0.4 | -0.4        | 0.0         | -0.1                         | 0.68        |
| 9564  | Bahia Ferrol                 | P          | 9 08        | 78 36                                   | -0506 | -0526                          | -0.4 | -0.3        | -0.1        | -0.2                         | 0.67        |
| 9566  | Bahia Huarmey                | P          | 10 05       | 78 09                                   | -0508 | -0527                          | -0.7 | -0.6        | -0.2        | -0.3                         | 0.48        |
| 9568  | Puerto Bermejo               | P          | 10 33       | 77 53                                   | -0500 | 0                              | -0.4 | 0           | 0           | 0                            | 0.7         |
| 9570  | Puerto Huacho                | P          | 11 08       | 77 37                                   | -0443 | -0553                          | -0.7 | -0.7        | -0.3        | -0.3                         | 0.42        |
| 9573  | Callao                       | EP         | 12 04       | 77 10                                   | -0418 | -0531                          | -0.6 | -0.6        | -0.2        | -0.2                         | 0.52        |
| 9575  | Caleta Pucusana (Chilca)     | P          | 12 30       | 76 50                                   | -0410 | 0                              | -0.7 | 0           | 0           | 0                            | 0.5         |
| 9577  | Puerto Cerro Azul            | P          | 13 03       | 76 31                                   | -0400 | 0                              | -0.7 | 0           | 0           | 0                            | 0.5         |
| 9579  | Pisco                        | P          | 13 43       | 76 14                                   | -0342 | -0400                          | -0.8 | -0.7        | -0.3        | -0.3                         | 0.40        |
| 9580  | Bahia Independencia          | P          | 14 18       | 76 08                                   | -0445 | 0                              | -0.7 | 0           | 0           | 0                            | 0.5         |
| 9583  | San Juan                     | P          | 15 21       | 75 09                                   | -0249 | -0240                          | -0.7 | -0.8        | -0.4        | -0.3                         | 0.37        |
| 9584  | Punta Lomas                  | P          | 15 33       | 74 52                                   | -0300 | 0                              | -0.7 | 0           | 0           | 0                            | 0.5         |
| 9586  | Rada Atico                   | P          | 16 13       | 73 43                                   | -0210 | 0                              | -0.7 | 0           | 0           | 0                            | 0.5         |
| 9588  | Caleta Quilca                | P          | 16 42       | 72 27                                   | -0205 | 0                              | -0.6 | 0           | 0           | 0                            | 0.5         |
| 9589  | Matarani                     | EP         | 17 00       | 72 07                                   | -0214 | -0219                          | -0.6 | -0.6        | -0.4        | -0.3                         | 0.43        |
| 9591  | Puerto de Ilo                | P          | 17 38       | 71 21                                   | -0215 | -0216                          | -0.6 | -0.6        | -0.4        | -0.3                         | 0.44        |
|       |                              |            |             |   |       |                                |      |             |             |                              |             |
|       | Chile                        |            |             |   |       | (Zone +0400)                   |      |             |             |                              |             |
| 9594  | Arica                        | C          | 18 28       | 70 20                                   | -0108 | -0117                          | -0.2 | -0.2        | 0.0         | 0.0                          | 0.80        |
| 9597  | Caleta Junin                 | C          | 19 39       | 70 11                                   | -0110 | -0110                          | -0.3 | -0.3        | -0.3        | 0.6                          |             |
| 9599  | Iquique                      | C          | 20 13       | 70 09                                   | -0108 | -0102                          | -0.2 | -0.2        | 0.0         | 0.80                         |             |
|       |                              |            |             |   |       |                                |      |             |             |                              |             |

SEASONAL CHANGES IN MEAN LEVEL

| No.       | Jan. 1 | Feb. 1 | Mar. 1 | Apr. 1 | May 1 | June 1 | July 1 | Aug. 1     | Sep. 1 | Oct. 1 | Nov. 1 | Dec. 1 | Jan. 1 |
|-----------|--------|--------|--------|--------|-------|--------|--------|------------|--------|--------|--------|--------|--------|
| 7280      | -0.1   | -0.2   | -0.2   | -0.1   | 0.0   | 0.0    | 0.0    | +0.1       | +0.2   | +0.2   | +0.1   | 0.0    | -0.1   |
| 9448-9480 | 0.0    | 0.0    | -0.1   | -0.1   | 0.0   | 0.0    | +0.1   | +0.1       | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 9484-9496 | 0.0    | -0.2   | -0.2   | -0.1   | 0.0   | 0.0    | +0.1   | 0.0        | 0.0    | +0.1   | +0.1   | 0.0    | 0.0    |
| 9498-9511 | 0.0    | -0.1   | -0.1   | -0.1   | 0.0   | 0.0    | 0.0    | 0.0        | 0.0    | +0.1   | +0.1   | 0.0    | 0.0    |
| 9415-9644 |        |        |        |        |       |        |        | Negligible |        |        |        |        |        |

JAPAN

| No.  | PLACE                           | Lat.<br>N. | Long.<br>E. | TIME DIFFERENCES    |                     | HEIGHT DIFFERENCES (IN METRES) |      |      |      | M.L.<br>Z.<br>m. |      |
|------|---------------------------------|------------|-------------|---------------------|---------------------|--------------------------------|------|------|------|------------------|------|
|      |                                 |            |             | HHW<br>(Zone -0900) | LLW<br>(Zone -0900) | MHHW                           | MLLW | MHLW | MLLW |                  |      |
| 7994 | KAMAISHI                        | .          | .           | see page            |                     | 1.3                            | 1.2  | 0.8  | 0.3  |                  |      |
| 8083 | Hakodate                        | J          | 41 47       | 140 44              | +0007               | +0025                          | -0.4 | -0.4 | -0.3 | 0.57             |      |
| 8085 | Shiokubi Misaki                 | .          | 41 43       | 140 58              | -0001               | +0025                          | 0.0  | -0.1 | 1.0+ | 0.88             |      |
| 8088 | Usujiri                         | .          | 41 56       | 140 57              | -0032               | -0008                          | -0.1 | -0.1 | 0.0  | 0.82             |      |
|      | Iburi Wan                       |            |             |                     |                     |                                |      |      |      |                  |      |
| 8090 | Mori Ko                         | .          | 42 07       | 140 36              | -0033               | -0009                          | -0.1 | -0.1 | 0.0  | 0.84             |      |
| 8093 | Usu Wan                         | .          | 42 31       | 140 46              | -0028               | -0002                          | 0.0  | 0.0  | 0.0  | 0.92             |      |
| 8094 | Muroran Ko                      | J          | 42 21       | 140 57              | -0006               | -0014                          | +0.1 | +0.1 | 1.0+ | 1.01             |      |
| 8097 | Uraoka                          | J          | 42 10       | 142 46              | -0016               | -0017                          | +0.1 | 0.0  | 1.0+ | 0.96             |      |
| 8098 | Utaro                           | .          | 41 58       | 143 12              | -0034               | -0005                          | -0.1 | -0.1 | 0.0  | 0.86             |      |
| 8102 | Rupeshibetsu                    | .          | 42 13       | 143 20              | -0042               | -0007                          | -0.3 | -0.1 | 0.0  | 0.82             |      |
| 8105 | Kushiro Ko                      | J          | 42 58       | 144 22              | -0038               | -0010                          | -0.1 | 0.0  | 0.0  | 0.87             |      |
| 8106 | Akkeshi Wan                     | .          | 43 02       | 144 52              | -0027               | -0045                          | 0.0  | -0.1 | 0.0  | 0.86             |      |
| 8107 | Hamanaka Wan                    | .          | 43 04       | 145 10              | -0045               | -0011                          | -0.1 | -0.2 | 0.0  | 0.81             |      |
| 8109 | Hanasaki                        | .          | 43 17       | 145 35              | -0036               | -0044                          | 0.0  | -0.1 | 0.0  | 0.86             |      |
| 8111 | Nemuro Ko                       | .          | 43 20       | 145 35              | -0025               | -0043                          | 0.0  | -0.1 | 0.0  | 0.87             |      |
| 1137 | LABUAN                          | .          | .           | see page            |                     | 2.0                            | 2.5  | 2.4  | 2.0  |                  |      |
|      | Hokkaido, North-east Coast      |            |             |                     |                     |                                |      |      |      |                  |      |
| 8115 | Koiseboi                        | .          | 44 03       | 144 57              | -0841               | -0850                          | -1.0 | -0.8 | -0.8 | 0.64             |      |
| 8117 | Abashiri Ko                     | .          | 44 01       | 144 17              | -0835               | -0837                          | -0.9 | -0.8 | -0.8 | 0.68             |      |
| 8119 | Monbetsu Ko                     | J          | 44 21       | 143 22              | -0909               | -0904                          | -0.9 | -0.7 | -0.7 | 0.71             |      |
| 8121 | Omura Ko                        | .          | 44 35       | 142 58              | -0904               | -0906                          | -1.1 | -0.8 | -0.7 | 0.65             |      |
| 8123 | Esashi Ko                       | .          | 44 57       | 142 35              | -0838               | -0854                          | -1.2 | -0.3 | -0.8 | 0.57             |      |
| 6632 | BANGKOK BAR                     | .          | .           | see page            |                     | 3.5                            | 3.0  | 2.3  | 2.2  |                  |      |
| 8125 | Soya Misaki                     | .          | 45 31       | 141 57              | -0221               | -0205                          | -3.2 | -2.8 | -2.1 | -1.1             | 0.19 |
| 5147 | MIRI                            | .          | .           | see page            |                     | 2.6                            | Δ    | Δ    | 0.5  |                  |      |
|      | Hokkaido, West Coast            |            |             |                     |                     |                                |      |      |      |                  |      |
| 8126 | Wakkanai                        | .          | 45 25       | 141 41              | +0339               | +0329                          | -1.3 | Δ    | Δ    | -0.4             | 0.18 |
| 8128 | Rishiri Shima<br>Oshidomari Wan | .          | 45 14       | 141 14              | +0354               | +0345                          | -1.4 | Δ    | Δ    | -0.4             | 0.17 |
| 7994 | KAMAISHI                        | .          | .           | see page            |                     | 2.3                            | 2.2  | 0.8  | 0.3  |                  |      |
| 8132 | Tomamai                         | J          | 44 19       | 141 39              | +1213               | +1307                          | -1.1 | -1.0 | -0.6 | -0.2             | 0.19 |
| 8136 | Otaru                           | J          | 43 13       | 141 01              | +1159               | +1258                          | -1.1 | -1.0 | -0.6 | -0.3             | 0.16 |
| 8138 | Kamoi Misaki                    | .          | 43 20       | 140 24              | +1158               | +1247                          | -1.1 | -1.0 | -0.6 | -0.2             | 0.17 |
| 8141 | Setana Ko                       | .          | 42 28       | 139 50              | +1145               | +1253                          | -1.0 | -0.9 | -0.6 | -0.2             | 0.20 |
|      | Okushiri Shima<br>Aonae Wan     | .          | 42 04       | 139 27              | +1157               | +1240                          | -1.0 | -0.9 | -0.6 | -0.2             | 0.22 |
| 8145 | Matsumae Ko.                    | .          | 41 25       | 140 06              | p                   | p                              | -0.9 | -1.0 | -0.6 | -0.2             | 0.23 |

SEASONAL CHANGES IN MEAN LEVEL

| No.       | Jan.  | Feb.  | Mar.  | Apr.  | May   | June  | July  | Aug.  | Sep.  | Oct.  | Nov. | Dec. | Jan.  |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|-------|
| 4963      | -1.0- | -1.0- | -1.0- | 0.0   | 0.0   | 0.0   | 0.0   | 0.0+  | 1.0+  | 1.0+  | 0.0  | 0.0  | -1.0- |
| 5137      | 0.0-  | 0.0-  | 0.0-  | 1.0-  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0+  | 1.0- | 1.0+ | 0.0-  |
| 5147      | +0.1  | 0.0   | 0.0   | -1.0- | 1.0-  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0+  | 1.0- | 1.0+ | 1.0+  |
| 6882      | +0.2  | +0.1  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | -2.0- | -2.0- | -2.0- | +0.2 | +0.2 | +0.2  |
| 7056      | 0.0   | -1.0- | 1.0-  | 1.0-  | 1.0-  | 1.0-  | 1.0-  | 1.0-  | 1.0-  | 1.0-  | +0.2 | +0.2 | 0.0   |
| 7110      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1.0-  | 1.0-  | 1.0+  | +0.2 | +0.2 | 0.0   |
| 7716      | -1.0- | -1.0- | -1.0- | -1.0- | -1.0- | 0.0   | 0.0   | +0.1  | +0.1  | +0.1  | 0.0  | 0.0  | -1.0- |
| 7994      | 0.0   | 0.0   | 0.0   | 1.0-  | 1.0-  | 1.0-  | 1.0-  | 1.0+  | 1.0+  | 1.0+  | 0.0  | 0.0  | 0.0   |
| 8020-8049 | 0.0   | 0.0   | 1.0-  | 1.0-  | 2.0-  | 2.0-  | 2.0-  | +0.1  | +0.1  | +0.1  | 1.0+ | 1.0+ | 1.0+  |
| 8052-8076 | -1.0- | -1.0- | -1.0- | -2.0- | -2.0- | -1.0- | -1.0- | +0.1  | +0.1  | +0.1  | 0.0  | 0.0  | -1.0- |
| 8078-8085 | 0.0   | -1.0- | 1.0-  | 1.0-  | 1.0-  | 1.0-  | 1.0-  | +0.1  | +0.1  | +0.1  | 0.0  | 0.0  | 0.0   |
| 8088-8125 | 0.0   | 0.0   | 0.0   | -1.0- | -1.0- | 0.0   | 0.0   | +0.1  | +0.1  | +0.1  | 0.0  | 0.0  | 0.0   |
| 8126-8145 | 0.0   | -1.0- | -1.0- | -1.0- | -1.0- | 0.0   | 0.0   | +0.1  | +0.1  | +0.1  | 0.0  | 0.0  | 0.0   |

Secondary Port TidesSecondary Port Tides

|                |      |
|----------------|------|
| Standard Port  | Date |
| Secondary Port |      |

|      |
|------|
| Time |
|------|

**TIMES**

Standard Port Pred

Sec. Port Diffs

Sec. Port Preds

**HEIGHTS**

Range

Standard Port Pred

St. Port S/C

Standard Port Pred

Sec. Port Diffs

Sec. Port Preds

Sec. Port S/C

Sec Port Pred

Differences

Time Required =

Time To Apply =

**Time**

Differences

Time Required =

Time To Apply =

**Ht**

M WS

Diff

M WN

Diff

Diff

Ht Required =

**Ht**

M WS

Diff

M WN

Diff

Diff

Ht Required =

Answer: \_\_\_\_\_

