

**TABLES FOR THE DESIGN OF STABLE ALLUVIAL CHANNELS**

W R White BSc PhD C Eng MICE

E Paris Ingegnere Civile

R Bettess BSc PhD

Report No. IT 208

April 1981

Crown Copyright

|                    |         |
|--------------------|---------|
| WALLINGFORD, OXON. |         |
| 26 SEP 1988        |         |
| CLAS No.           | .....   |
| ACC No.            | 88/9/95 |

**Hydraulics Research Station**  
**Wallingford**  
**England**

**hy**



**ABSTRACT** Tables are presented for the determination of the geometric and flow characteristics of stable alluvial channels. These relate the discharge, velocity, depth, slope, surface width, sediment size and sediment concentration. If the sediment size and the values of two other variables are known, the remaining four variables can be determined.





|                 |                            |                                                         |
|-----------------|----------------------------|---------------------------------------------------------|
| <b>NOTATION</b> | <b>A</b>                   | Value of $F_{gr}$ at initial motion (Ackers and White)  |
|                 | <b>B (m)</b>               | Surface width of channel                                |
|                 | <b>C</b>                   | Parameter in Ackers and White sediment transport theory |
|                 | <b>D (m)</b>               | Sediment diameter                                       |
|                 | <b>D<sub>35</sub> (m)</b>  | Sediment diameter for which 35% of the sample is finer  |
|                 | <b>d (m)</b>               | Depth of flow                                           |
|                 | <b>F<sub>gr</sub></b>      | Sediment mobility (Ackers and White)                    |
|                 | <b>F<sub>f</sub></b>       | Sediment mobility, fine grains (Ackers and White)       |
|                 | <b>G<sub>gr</sub></b>      | Dimensionless sediment transport (Ackers and White)     |
|                 | <b>g (m/s<sup>2</sup>)</b> | Acceleration due to gravity                             |
|                 | <b>m</b>                   | Parameter in Ackers and White sediment transport theory |
|                 | <b>n</b>                   | Transition exponent (Ackers and White)                  |
|                 | <b>Q (m<sup>3</sup>/s)</b> | Discharge                                               |
|                 | <b>R (m)</b>               | Hydraulic radius                                        |
|                 | <b>S</b>                   | Slope                                                   |
|                 | <b>s</b>                   | Specific gravity of sediment                            |
|                 | <b>V (m/s)</b>             | Velocity of flow                                        |
|                 | <b>v<sub>*</sub> (m/s)</b> | Shear velocity                                          |
|                 | <b>W (m)</b>               | Average width of channel (Q/Vd)                         |
|                 | <b>X</b>                   | Sediment concentration                                  |
|                 | <b>λ</b>                   | Friction factor $8(v_*/V)^2$                            |
|                 | <b>ν (m<sup>2</sup>/s)</b> | Kinematic viscosity                                     |



|                                   |   |
|-----------------------------------|---|
| INTRODUCTION                      | 1 |
| DESCRIPTION OF THE TABLES         | 2 |
| EXAMPLES OF THE USE OF THE TABLES | 2 |
| ACKNOWLEDGEMENTS                  | 3 |
| REFERENCES                        | 3 |
| APPENDIX    Summary of equations  | 5 |

## TABLES

|    |                                                                                     |
|----|-------------------------------------------------------------------------------------|
| 1  | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.06\text{mm}$ ) |
| 2  | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.10\text{mm}$ ) |
| 3  | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.15\text{mm}$ ) |
| 4  | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.20\text{mm}$ ) |
| 5  | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.25\text{mm}$ ) |
| 6  | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.30\text{mm}$ ) |
| 7  | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.35\text{mm}$ ) |
| 8  | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.40\text{mm}$ ) |
| 9  | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.45\text{mm}$ ) |
| 10 | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.50\text{mm}$ ) |
| 11 | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.60\text{mm}$ ) |
| 12 | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.70\text{mm}$ ) |
| 13 | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.80\text{mm}$ ) |
| 14 | Geometric and flow characteristics of alluvial channel ( $D_{35} = 0.90\text{mm}$ ) |
| 15 | Geometric and flow characteristics of alluvial channel ( $D_{35} = 1.0\text{mm}$ )  |
| 16 | Geometric and flow characteristics of alluvial channel ( $D_{35} = 2.0\text{mm}$ )  |
| 17 | Geometric and flow characteristics of alluvial channel ( $D_{35} = 3.0\text{mm}$ )  |
| 18 | Geometric and flow characteristics of alluvial channel ( $D_{35} = 4.0\text{mm}$ )  |
| 19 | Geometric and flow characteristics of alluvial channel ( $D_{35} = 5.0\text{mm}$ )  |
| 20 | Geometric and flow characteristics of alluvial channel ( $D_{35} = 6.0\text{mm}$ )  |
| 21 | Geometric and flow characteristics of alluvial channel ( $D_{35} = 8.0\text{mm}$ )  |

## **CONTENTS (Cont'd)**

- 22   Geometric and flow characteristics of alluvial channel ( $D_{35} = 10.0\text{mm}$ )**
- 23   Geometric and flow characteristics of alluvial channel ( $D_{35} = 20.0\text{mm}$ )**
- 24   Geometric and flow characteristics of alluvial channel ( $D_{35} = 40.0\text{mm}$ )**
- 25   Geometric and flow characteristics of alluvial channel ( $D_{35} = 60.0\text{mm}$ )**
- 26   Geometric and flow characteristics of alluvial channel ( $D_{35} = 80.0\text{mm}$ )**
- 27   Geometric and flow characteristics of alluvial channel ( $D_{35} = 100\text{mm}$ )**

## INTRODUCTION

The problem of determining the dimensions of stable alluvial channels has a long history. Early approaches involved the empirical correlation of data from stable channels (eg Kennedy, 1895) and this type of analysis has resulted in the well known regime relationships for channel design. The approach is, however, not based on an understanding of the physical processes and hence extrapolation beyond the range of data on which the equations are based is unwise and is likely to result in serious errors.

More recently attempts have been made to identify the dominant physical processes in the formation of stable channels and the authors believe that the results of this alternative approach should be of more general application. White, Paris and Bettess, (1980a), have put forward a new solution based on the physical processes and have proved the validity of the approach by making extensive comparisons with data from sand and gravel channels. They used a description of the sediment transporting capacity of channels (Ackers and White, 1973), a description of the frictional characteristics of alluvial channels (White, Paris and Bettess, 1980b) and made the additional assumption that the dimensions of channels are such that the sediment transporting capacity is maximised.

The Ackers and White sediment transport theory, described in the appendix, was developed using a range of flume data. It has since been comprehensively tested on an extensive range of both field and flume data and compared favourably with other sediment transport theories (White, Milli and Crabbe, 1975). A similar approach was used by White, Paris and Bettess in deriving a method for predicting frictional characteristics, see Appendix. The method has been demonstrated to be an improvement on other similar methods (White, Paris and Bettess, 1980b).

For a given size of sediment, we regard the geometric and flow characteristics of the channel to be specified by values of the discharge (Q), sediment concentration (X), velocity (V), surface width (B), depth (d) and slope (S). Thus there are six relevant variables, Q, X, V, B, d and S. The Ackers and White sediment transport theory, the White, Paris and Bettess frictional characteristics theory and the assumption that sediment transport should be maximised provide three sets of equations linking these variables. A fourth relationship is provided by the continuity relationship

$$Q = W V d \quad (1)$$

where W is the average width and by the assumption that the channel is trapezoidal in cross-section with side slopes given by Smith's relationships (Smith, 1974). We thus have four sets of equations relating six variables. Hence, by specifying two of these variables it is possible to determine the remaining four. If Q and X are known it is possible to calculate V, B, d and S, or, if Q and S are known it is possible to calculate V, B, d and X. Since the sediment transport and the frictional characteristics depend upon the sediment diameter, the relationships vary with sediment diameter which should be regarded as an extra parameter. A computer program has been written to solve the equations for a large number of cases and the results have been arranged in the following sequence of tables. The friction factor ( $\lambda$ ), defined by  $\lambda = 8(v_*/V)^2$ , was also determined for convenience. For the calculations it was assumed that the specific gravity of the sediment was 2.65 and that the kinematic viscosity was  $0.00000114 \text{ m}^2/\text{s}$  corresponding to value at  $15^\circ\text{C}$ .

The tables should only be used for channels through homogeneous alluvium and should not be used where the composition of the bed and banks are markedly different nor where there are constraints on the width or depth such as the presence of inerodible material.

A full description of the approach and the calculation procedure is given in White, Paris and Bettess, (1980a).

## DESCRIPTION OF THE TABLES

There is a separate table for each particle size. The  $D_{35}$  size should be taken as the representative diameter and so once the  $D_{35}$  size has been determined the user should turn to the table with the particle diameter closest to the given  $D_{35}$  size. Along the top of each table there are values of discharge in  $m^3/s$  and down the left hand side of the table are values of sediment concentration in parts per million, (ppm). The intersection of a row and a column give the values of velocity in black, slope in red, depth in blue, width in green and friction factor in brown, associated with the sediment concentration shown on the left of the row and the discharge shown at the top of the column. Thus in Table 1, appropriate for a  $D_{35}$  size of 0.06mm, the characteristics of a stable channel with a discharge of  $50m^3/s$  and a sediment concentration of 80ppm are given at the intersection of the seventh column and the fifth row and indicate that the channel should have an average velocity of 0.77m/s, a slope of 0.03/1000, a depth of 3.23m, a surface width of 20.1m and a friction factor of 0.123. It is, however, possible to use the tables in a number of different ways; if sediment size and any two values from the list; discharge, sediment concentration, velocity, slope, depth and width, are specified then the remaining values can be determined, see the examples in the following section.

## EXAMPLES OF USE OF THE TABLES

- 1) A channel is required to carry a discharge of  $50m^3/s$  with a sediment concentration of 60ppm. The  $D_{35}$  size of the bed material is 0.25mm. What is the appropriate velocity, slope, depth and width?

Turn to Table 5, the appropriate table for a sand size of 0.25mm. The intersection of the column corresponding to  $50m^3/s$  and the row corresponding to 60ppm gives

|               |                       |
|---------------|-----------------------|
| velocity      | 0.78m/s               |
| slope         | $0.13 \times 10^{-3}$ |
| depth         | 2.57m                 |
| surface width | 25.1m                 |

- 2) A channel is required to carry a discharge of  $10m^3/s$  at a slope of  $0.2 \times 10^{-3}$ , the  $D_{35}$  of the bed material being 0.35mm. What are suitable stable dimensions for the channel?

Since the  $D_{35}$  value is 0.35mm the appropriate table is Table 7. If one looks down the column corresponding to a discharge of  $10m^3/s$  one can see that the slopes corresponding to sediment concentrations of 10, 20, 40 and 60ppm are  $0.09 \times 10^{-3}$ ,  $0.13 \times 10^{-3}$ ,  $0.19 \times 10^{-3}$  and  $0.24 \times 10^{-3}$ .

The slope  $0.19 \times 10^{-3}$  is closest to the required slope of  $0.2 \times 10^{-3}$  corresponding to a sediment concentration of 40ppm. So an approximation to the required channel characteristics are given by

|                        |         |
|------------------------|---------|
| velocity               | 0.63m/s |
| depth                  | 1.32m   |
| surface width          | 12.1m   |
| sediment concentration | 40ppm   |

Interpolation within the table could be used to refine this estimate.

- 3) An irrigation offtake abstracts water with a sediment concentration of 40ppm. The water flows down a channel, the bed material of which has a  $D_{35}$  size of 0.7mm, at a slope of  $0.35 \times 10^{-3}$ . What must be the dimensions of, and flow in the channel for it to be stable?

If  $D_{35} = 0.7mm$  then the appropriate table is Table 12. Looking at the row corresponding to a sediment concentration of 40ppm we see that for a channel slope of  $0.35 \times 10^{-3}$  we have

|               |                      |
|---------------|----------------------|
| discharge     | 2.0m <sup>3</sup> /s |
| velocity      | 0.57m/s              |
| depth         | 0.62m                |
| surface width | 5.6m                 |

Again, interpolation could be used to refine this estimate.

**ACKNOWLEDGEMENTS** The work described, of which this is the official HRS account, was carried out in Mr A J M Harrison's Fluvial Hydraulics Division by Dr W R White's section. Mrs P M Brown was responsible for producing and collating the tables.

- REFERENCES** ACKERS P and WHITE W R, 1973. Sediment transport: a new approach and analysis, Proc ASCE, JHD, 99, HY11, pp 2041-2060.
- KENNEDY R G, 1895. On the prevention of silting in irrigation channels. Minutes of Proc ICE, 119.
- SMITH K V H, 1974. Comparison of prediction techniques with records of observations on the Lower Chenab canal system. University of Southampton CE/5/74.
- WHITE W R, MILLI H and CRABBE A D, 1975. Sediment transport theories: a review, Proc ICE, Part 2, 59, pp 265-292.
- WHITE W R, PARIS E and BETTESS R, 1980a. River regime based on sediment transport concepts, Hydraulics Research Station, Report IT 201.
- WHITE W R, PARIS E and BETTESS R, 1980b. The frictional characteristics of alluvial streams: a new approach, Proc ICE, Part 2, 69, pp 737-750.





## **Appendix**



**APPENDIX Summary of equations of Ackers and White sediment transport theory and the White, Paris and Bettess method for determining the frictional characteristics**

**Basic parameters** 1) Dimensionless grain size

$$D_{gr} = D \left( \frac{g(s-1)}{\nu^2} \right)^{1/3},$$

where

D is the sediment diameter ( $D = D_{35}$  for graded sediments)

g is the acceleration due to gravity

s is the specific gravity

and

$\nu$  is the kinematic viscosity

2) Particle mobility

$$F_{gr} = \frac{v_*^n}{\sqrt{(gD(s-1))}} \frac{V}{\sqrt{32 \log_{10} (10d/D)}}^{1-n},$$

where

$v_*$  is the shear velocity defined by  $v_* = \sqrt{(gR)S}$

V is the velocity of flow

d is the depth of flow

3) Particle mobility, fine grains

$$F_{fk} = \frac{v_*}{\sqrt{(gD(s-1))}},$$

4) Sediment transport

$$G_{gr} = \frac{Xd}{sD} \left( \frac{v_*}{V} \right)^n,$$

where

X is the sediment concentration

**n, A, m and C in terms of**

$D_{gr}$  1)  $D_{gr} > 60$ , coarse sediments

$$n = 0.000$$

$$A = 0.170$$

$$m = 1.500$$

$$C = 0.025$$

2)  $60 \geq D_{gr} \geq 1$  transitional sizes

$$n = 1.00 - 0.56 \log_{10} D_{gr}$$

$$A = \frac{0.23}{\sqrt{D_{gr}}} + 0.14$$

$$m = \frac{9.66}{D_{gr}} + 1.34$$

$$C = 10^{(2.86 \log_{10} D_{gr} - (\log_{10} D_{gr})^2 - 3.53)}$$

**General function of Ackers and White sediment transport theory**

$$G_{gr} = C \left( \frac{F_{gr}}{A} - 1 \right)^m$$

**White, Paris and Bettess method for determining frictional characteristics**

$$\frac{F_{gr} - A}{F_{fk} - A} = 1 - 0.76 \left( 1 - \frac{1}{\exp [(\log_{10} D_{gr})^{1.7}]} \right)$$



## **Tables**



TABLE 1

SAND SIZE 0.06 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)

SLOPE \*1000

DEPTH (METRES)

WIDTH (METRES)

FRICTION FACTOR \*10

TABLE 1

|      | 0.5                                   | 1.0                                   | 2.0                                   | 5.0                                   | 10.0                                  | 20.0                                   | 50.0                                   | 100.0                                  | 200.0                                  | 500.0                                  | 1000.0                                   |
|------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|------------------------------------------|
| 10   | 0.50<br>0.150<br>0.50<br>2.0<br>0.161 | 0.53<br>0.113<br>0.70<br>2.7<br>0.153 | 0.55<br>0.085<br>0.94<br>3.9<br>0.145 | 0.59<br>0.059<br>1.37<br>6.2<br>0.136 | 0.61<br>0.044<br>1.83<br>8.9<br>0.130 | 0.64<br>0.033<br>2.42<br>12.9<br>0.124 | 0.68<br>0.023<br>3.46<br>21.3<br>0.117 | 0.71<br>0.017<br>4.58<br>30.7<br>0.112 | 0.74<br>0.013<br>5.85<br>46.2<br>0.108 | 0.78<br>0.009<br>8.16<br>78.1<br>0.102 | 0.82<br>0.007<br>10.42<br>117.2<br>0.098 |
| 20   | 0.52<br>0.168<br>0.50<br>1.9<br>0.164 | 0.55<br>0.127<br>0.70<br>2.6<br>0.155 | 0.57<br>0.095<br>0.91<br>3.8<br>0.148 | 0.61<br>0.066<br>1.33<br>6.1<br>0.138 | 0.64<br>0.050<br>1.78<br>8.8<br>0.132 | 0.67<br>0.038<br>2.36<br>12.7<br>0.126 | 0.71<br>0.026<br>3.38<br>20.9<br>0.119 | 0.74<br>0.020<br>4.42<br>30.6<br>0.114 | 0.77<br>0.015<br>5.73<br>45.2<br>0.110 | 0.82<br>0.010<br>7.98<br>76.4<br>0.104 | 0.86<br>0.008<br>10.19<br>114.7<br>0.100 |
| 40   | 0.54<br>0.188<br>0.48<br>1.9<br>0.167 | 0.57<br>0.142<br>0.67<br>2.6<br>0.158 | 0.60<br>0.107<br>0.90<br>3.7<br>0.150 | 0.63<br>0.074<br>1.31<br>6.0<br>0.141 | 0.66<br>0.056<br>1.74<br>8.6<br>0.135 | 0.70<br>0.043<br>2.29<br>12.5<br>0.129 | 0.74<br>0.030<br>3.37<br>20.0<br>0.121 | 0.77<br>0.022<br>4.31<br>30.1<br>0.116 | 0.81<br>0.017<br>5.59<br>44.3<br>0.111 | 0.86<br>0.012<br>7.80<br>74.8<br>0.106 | 0.90<br>0.009<br>9.95<br>112.0<br>0.102  |
| 60   | 0.56<br>0.201<br>0.48<br>1.9<br>0.168 | 0.59<br>0.153<br>0.67<br>2.5<br>0.160 | 0.61<br>0.115<br>0.88<br>3.7<br>0.152 | 0.65<br>0.080<br>1.28<br>6.0<br>0.142 | 0.68<br>0.060<br>1.71<br>8.6<br>0.136 | 0.71<br>0.046<br>2.27<br>12.3<br>0.130 | 0.76<br>0.032<br>3.26<br>20.3<br>0.122 | 0.79<br>0.024<br>4.21<br>29.6<br>0.117 | 0.83<br>0.018<br>5.45<br>43.7<br>0.113 | 0.88<br>0.013<br>7.69<br>73.8<br>0.107 | 0.92<br>0.010<br>9.81<br>110.6<br>0.102  |
| 80   | 0.57<br>0.212<br>0.50<br>1.8<br>0.170 | 0.59<br>0.160<br>0.65<br>2.6<br>0.161 | 0.62<br>0.121<br>0.87<br>3.7<br>0.153 | 0.66<br>0.084<br>1.28<br>5.9<br>0.144 | 0.69<br>0.064<br>1.70<br>8.5<br>0.137 | 0.73<br>0.048<br>2.25<br>12.2<br>0.131 | 0.77<br>0.034<br>3.23<br>20.1<br>0.123 | 0.81<br>0.026<br>4.21<br>29.4<br>0.118 | 0.85<br>0.019<br>5.45<br>43.4<br>0.113 | 0.90<br>0.014<br>7.60<br>73.2<br>0.107 | 0.94<br>0.010<br>9.71<br>109.4<br>0.103  |
| 100  | 0.57<br>0.220<br>0.47<br>1.9<br>0.171 | 0.60<br>0.166<br>0.65<br>2.6<br>0.162 | 0.63<br>0.126<br>0.87<br>3.7<br>0.154 | 0.67<br>0.087<br>1.27<br>5.9<br>0.144 | 0.70<br>0.066<br>1.69<br>8.4<br>0.138 | 0.74<br>0.050<br>2.23<br>12.2<br>0.132 | 0.78<br>0.035<br>3.20<br>19.9<br>0.124 | 0.82<br>0.027<br>4.16<br>29.3<br>0.119 | 0.86<br>0.020<br>5.41<br>43.0<br>0.114 | 0.91<br>0.014<br>7.55<br>72.5<br>0.108 | 0.96<br>0.011<br>9.64<br>108.6<br>0.104  |
| 200  | 0.60<br>0.249<br>0.46<br>1.8<br>0.174 | 0.63<br>0.189<br>0.65<br>2.4<br>0.165 | 0.66<br>0.143<br>0.84<br>3.6<br>0.157 | 0.70<br>0.100<br>1.23<br>5.8<br>0.147 | 0.74<br>0.076<br>1.64<br>8.3<br>0.140 | 0.77<br>0.058<br>2.17<br>11.9<br>0.134 | 0.82<br>0.040<br>3.12<br>19.5<br>0.126 | 0.86<br>0.031<br>4.07<br>28.5<br>0.121 | 0.90<br>0.023<br>5.28<br>41.9<br>0.116 | 0.96<br>0.016<br>7.36<br>70.7<br>0.110 | 1.00<br>0.012<br>9.40<br>106.0<br>0.105  |
| 400  | 0.62<br>0.282<br>0.45<br>1.8<br>0.177 | 0.66<br>0.215<br>0.61<br>2.5<br>0.168 | 0.69<br>0.163<br>0.82<br>3.5<br>0.159 | 0.73<br>0.114<br>1.21<br>5.6<br>0.149 | 0.77<br>0.087<br>1.61<br>8.0<br>0.142 | 0.81<br>0.066<br>2.11<br>11.7<br>0.136 | 0.86<br>0.046<br>3.03<br>19.2<br>0.128 | 0.90<br>0.035<br>3.96<br>27.9<br>0.123 | 0.95<br>0.027<br>5.14<br>41.0<br>0.118 | 1.01<br>0.019<br>7.17<br>69.1<br>0.111 | 1.06<br>0.014<br>9.16<br>103.2<br>0.107  |
| 600  | 0.64<br>0.305<br>0.44<br>1.8<br>0.179 | 0.67<br>0.232<br>0.60<br>2.5<br>0.169 | 0.71<br>0.177<br>0.81<br>3.5<br>0.161 | 0.76<br>0.123<br>1.18<br>5.6<br>0.151 | 0.79<br>0.094<br>1.57<br>8.0<br>0.144 | 0.83<br>0.072<br>2.08<br>11.5<br>0.137 | 0.89<br>0.050<br>2.99<br>18.8<br>0.129 | 0.93<br>0.038<br>3.90<br>27.5<br>0.124 | 0.98<br>0.029<br>5.06<br>40.4<br>0.119 | 1.04<br>0.020<br>7.06<br>68.0<br>0.112 | 1.09<br>0.016<br>9.02<br>101.8<br>0.108  |
| 800  | 0.65<br>0.322<br>0.43<br>1.8<br>0.180 | 0.69<br>0.245<br>0.60<br>2.4<br>0.171 | 0.72<br>0.187<br>0.80<br>3.5<br>0.162 | 0.77<br>0.130<br>1.17<br>5.5<br>0.152 | 0.81<br>0.099<br>1.56<br>7.9<br>0.145 | 0.85<br>0.076<br>2.06<br>11.4<br>0.138 | 0.91<br>0.053<br>2.96<br>18.7<br>0.130 | 0.95<br>0.041<br>3.86<br>27.2<br>0.125 | 1.00<br>0.031<br>5.00<br>40.1<br>0.119 | 1.06<br>0.022<br>6.98<br>67.4<br>0.113 | 1.11<br>0.017<br>8.92<br>100.6<br>0.109  |
| 1000 | 0.66<br>0.336<br>0.43<br>1.8<br>0.181 | 0.70<br>0.256<br>0.59<br>2.4<br>0.172 | 0.73<br>0.195<br>0.79<br>3.4<br>0.163 | 0.78<br>0.136<br>1.16<br>5.5<br>0.153 | 0.82<br>0.104<br>1.55<br>7.9<br>0.146 | 0.87<br>0.080<br>2.05<br>11.2<br>0.139 | 0.92<br>0.056<br>2.93<br>18.5<br>0.131 | 0.97<br>0.043<br>3.82<br>27.1<br>0.125 | 1.01<br>0.032<br>4.96<br>39.8<br>0.120 | 1.08<br>0.023<br>6.92<br>66.8<br>0.114 | 1.13<br>0.017<br>8.84<br>99.7<br>0.109   |
| 2000 | 0.70<br>0.386<br>0.42<br>1.7<br>0.184 | 0.73<br>0.294<br>0.57<br>2.4<br>0.175 | 0.77<br>0.224<br>0.77<br>3.4<br>0.166 | 0.82<br>0.157<br>1.13<br>5.4<br>0.155 | 0.86<br>0.120<br>1.50<br>7.7<br>0.148 | 0.91<br>0.092<br>1.99<br>11.1<br>0.141 | 0.97<br>0.064<br>2.85<br>18.1<br>0.133 | 1.02<br>0.049<br>3.72<br>26.4<br>0.127 | 1.07<br>0.038<br>4.84<br>38.5<br>0.122 | 1.14<br>0.027<br>6.74<br>64.8<br>0.115 | 1.20<br>0.020<br>8.60<br>97.1<br>0.111   |
| 4000 | 0.73<br>0.443<br>0.41<br>1.7<br>0.187 | 0.77<br>0.338<br>0.56<br>2.3<br>0.178 | 0.81<br>0.258<br>0.75<br>3.3<br>0.169 | 0.87<br>0.181<br>1.10<br>5.2<br>0.158 | 0.91<br>0.139<br>1.48<br>7.4<br>0.150 | 0.96<br>0.106<br>1.92<br>10.9<br>0.143 | 1.02<br>0.075<br>2.76<br>17.7<br>0.135 | 1.08<br>0.057<br>3.61<br>25.7<br>0.129 | 1.13<br>0.044<br>4.69<br>37.7<br>0.124 | 1.21<br>0.031<br>6.55<br>63.3<br>0.117 | 1.27<br>0.024<br>8.36<br>94.4<br>0.112   |





TABLE 2

SAND SIZE 0.10 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

TABLE 2

|      | 0.5                                   | 1.0                                   | 2.0                                   | 5.0                                   | 10.0                                  | 20.0                                   | 50.0                                   | 100.0                                  | 200.0                                  | 500.0                                  | 1000.0                                   |
|------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|------------------------------------------|
| 10   | 0.46<br>0.174<br>0.50<br>2.2<br>0.233 | 0.48<br>0.134<br>0.69<br>3.0<br>0.224 | 0.51<br>0.103<br>0.93<br>4.2<br>0.215 | 0.54<br>0.073<br>1.35<br>6.8<br>0.204 | 0.57<br>0.057<br>1.80<br>9.7<br>0.197 | 0.59<br>0.044<br>2.39<br>14.1<br>0.194 | 0.64<br>0.032<br>3.44<br>22.8<br>0.184 | 0.68<br>0.025<br>4.59<br>32.2<br>0.178 | 0.71<br>0.019<br>5.84<br>48.5<br>0.173 | 0.76<br>0.014<br>8.18<br>80.8<br>0.166 | 0.80<br>0.011<br>10.48<br>119.9<br>0.161 |
| 20   | 0.48<br>0.204<br>0.49<br>2.1<br>0.244 | 0.51<br>0.158<br>0.67<br>3.0<br>0.234 | 0.53<br>0.122<br>0.90<br>4.2<br>0.225 | 0.57<br>0.087<br>1.32<br>6.7<br>0.213 | 0.60<br>0.068<br>1.74<br>9.6<br>0.205 | 0.63<br>0.053<br>2.32<br>13.7<br>0.201 | 0.67<br>0.038<br>3.31<br>22.4<br>0.192 | 0.71<br>0.030<br>4.35<br>32.4<br>0.186 | 0.75<br>0.023<br>5.64<br>47.3<br>0.180 | 0.80<br>0.017<br>7.91<br>78.6<br>0.173 | 0.85<br>0.013<br>10.13<br>116.5<br>0.168 |
| 40   | 0.50<br>0.242<br>0.47<br>2.1<br>0.255 | 0.53<br>0.188<br>0.65<br>2.9<br>0.245 | 0.56<br>0.146<br>0.86<br>4.1<br>0.235 | 0.60<br>0.105<br>1.27<br>6.6<br>0.223 | 0.63<br>0.082<br>1.69<br>9.4<br>0.218 | 0.67<br>0.064<br>2.23<br>13.5<br>0.210 | 0.72<br>0.046<br>3.21<br>21.8<br>0.200 | 0.76<br>0.036<br>4.19<br>31.6<br>0.194 | 0.80<br>0.029<br>5.45<br>45.9<br>0.187 | 0.86<br>0.021<br>7.63<br>76.4<br>0.180 | 0.91<br>0.016<br>9.79<br>112.6<br>0.174  |
| 60   | 0.52<br>0.268<br>0.46<br>2.1<br>0.262 | 0.54<br>0.209<br>0.63<br>2.9<br>0.254 | 0.58<br>0.162<br>0.85<br>4.1<br>0.241 | 0.62<br>0.117<br>1.25<br>6.5<br>0.233 | 0.65<br>0.092<br>1.65<br>9.3<br>0.223 | 0.69<br>0.072<br>2.19<br>13.3<br>0.215 | 0.74<br>0.052<br>3.13<br>21.5<br>0.205 | 0.78<br>0.041<br>4.10<br>31.0<br>0.198 | 0.83<br>0.032<br>5.32<br>45.3<br>0.192 | 0.89<br>0.024<br>7.67<br>74.9<br>0.184 | 0.95<br>0.019<br>9.61<br>109.3<br>0.178  |
| 80   | 0.53<br>0.289<br>0.46<br>2.1<br>0.267 | 0.56<br>0.225<br>0.62<br>2.9<br>0.256 | 0.59<br>0.176<br>0.84<br>4.0<br>0.245 | 0.63<br>0.127<br>1.22<br>6.5<br>0.237 | 0.67<br>0.099<br>1.63<br>9.2<br>0.227 | 0.71<br>0.078<br>2.21<br>12.7<br>0.219 | 0.76<br>0.057<br>3.09<br>21.2<br>0.209 | 0.81<br>0.045<br>4.04<br>30.7<br>0.202 | 0.85<br>0.035<br>5.25<br>44.7<br>0.195 | 0.92<br>0.026<br>7.36<br>73.9<br>0.187 | 0.97<br>0.020<br>9.43<br>109.0<br>0.181  |
| 100  | 0.54<br>0.307<br>0.45<br>2.1<br>0.271 | 0.57<br>0.239<br>0.62<br>2.8<br>0.259 | 0.60<br>0.187<br>0.84<br>4.0<br>0.252 | 0.65<br>0.135<br>1.21<br>6.4<br>0.239 | 0.68<br>0.106<br>1.61<br>9.1<br>0.230 | 0.72<br>0.083<br>2.12<br>13.0<br>0.222 | 0.78<br>0.061<br>3.05<br>21.0<br>0.212 | 0.82<br>0.048<br>3.98<br>30.5<br>0.204 | 0.87<br>0.038<br>5.19<br>44.2<br>0.197 | 0.94<br>0.028<br>7.27<br>73.1<br>0.189 | 1.00<br>0.022<br>9.32<br>107.7<br>0.183  |
| 200  | 0.57<br>0.370<br>0.43<br>2.0<br>0.283 | 0.61<br>0.290<br>0.59<br>2.8<br>0.271 | 0.64<br>0.227<br>0.80<br>3.9<br>0.265 | 0.69<br>0.165<br>1.16<br>6.2<br>0.250 | 0.73<br>0.130<br>1.54<br>8.9<br>0.240 | 0.77<br>0.102<br>2.04<br>12.7<br>0.231 | 0.83<br>0.075<br>2.93<br>20.5<br>0.220 | 0.88<br>0.059<br>3.84<br>29.5<br>0.212 | 0.94<br>0.047<br>4.98<br>42.9<br>0.205 | 1.01<br>0.035<br>6.99<br>70.6<br>0.196 | 1.07<br>0.027<br>8.95<br>104.1<br>0.190  |
| 400  | 0.61<br>0.452<br>0.42<br>2.0<br>0.296 | 0.64<br>0.355<br>0.57<br>2.7<br>0.283 | 0.68<br>0.279<br>0.76<br>3.9<br>0.275 | 0.73<br>0.204<br>1.12<br>6.1<br>0.260 | 0.78<br>0.161<br>1.49<br>8.6<br>0.250 | 0.83<br>0.127<br>1.96<br>12.3<br>0.240 | 0.90<br>0.093<br>2.82<br>19.8<br>0.228 | 0.95<br>0.074<br>3.68<br>28.6<br>0.220 | 1.01<br>0.059<br>4.79<br>41.4<br>0.213 | 1.09<br>0.043<br>6.70<br>68.3<br>0.203 | 1.16<br>0.035<br>8.60<br>100.1<br>0.196  |
| 600  | 0.63<br>0.509<br>0.41<br>1.9<br>0.303 | 0.66<br>0.401<br>0.56<br>2.7<br>0.295 | 0.71<br>0.316<br>0.75<br>3.8<br>0.281 | 0.76<br>0.231<br>1.09<br>6.0<br>0.266 | 0.81<br>0.183<br>1.44<br>8.5<br>0.255 | 0.86<br>0.145<br>1.91<br>12.1<br>0.245 | 0.93<br>0.107<br>2.74<br>19.5<br>0.233 | 0.99<br>0.085<br>3.59<br>28.0<br>0.225 | 1.06<br>0.067<br>4.66<br>40.6<br>0.217 | 1.14<br>0.050<br>6.55<br>66.7<br>0.207 | 1.23<br>0.040<br>8.43<br>96.6<br>0.200   |
| 800  | 0.65<br>0.556<br>0.41<br>1.9<br>0.312 | 0.68<br>0.437<br>0.55<br>2.7<br>0.299 | 0.73<br>0.345<br>0.73<br>3.8<br>0.286 | 0.79<br>0.253<br>1.07<br>6.0<br>0.270 | 0.84<br>0.200<br>1.42<br>8.4<br>0.259 | 0.89<br>0.159<br>1.87<br>12.0<br>0.248 | 0.97<br>0.117<br>2.70<br>19.2<br>0.237 | 1.03<br>0.093<br>3.53<br>27.6<br>0.228 | 1.09<br>0.074<br>4.59<br>40.0<br>0.220 | 1.18<br>0.055<br>6.44<br>65.6<br>0.210 | 1.26<br>0.044<br>8.24<br>96.4<br>0.203   |
| 1000 | 0.66<br>0.594<br>0.39<br>1.9<br>0.312 | 0.70<br>0.468<br>0.54<br>2.6<br>0.302 | 0.75<br>0.371<br>0.74<br>3.6<br>0.289 | 0.81<br>0.272<br>1.05<br>5.9<br>0.274 | 0.86<br>0.215<br>1.40<br>8.3<br>0.263 | 0.91<br>0.171<br>1.85<br>11.9<br>0.252 | 0.99<br>0.126<br>2.66<br>19.0<br>0.240 | 1.05<br>0.100<br>3.47<br>27.4<br>0.231 | 1.12<br>0.080<br>4.53<br>39.5<br>0.222 | 1.22<br>0.059<br>6.35<br>64.8<br>0.212 | 1.29<br>0.047<br>8.13<br>95.1<br>0.205   |
| 2000 | 0.70<br>0.736<br>0.38<br>1.9<br>0.330 | 0.75<br>0.583<br>0.52<br>2.6<br>0.315 | 0.80<br>0.462<br>0.69<br>3.6<br>0.301 | 0.87<br>0.340<br>1.01<br>5.7<br>0.284 | 0.92<br>0.271<br>1.34<br>8.1<br>0.272 | 0.98<br>0.215<br>1.78<br>11.4<br>0.261 | 1.07<br>0.160<br>2.54<br>18.4<br>0.248 | 1.14<br>0.127<br>3.33<br>26.3<br>0.238 | 1.21<br>0.102<br>4.32<br>38.1<br>0.230 | 1.32<br>0.076<br>6.07<br>62.3<br>0.219 | 1.41<br>0.061<br>7.77<br>91.5<br>0.211   |
| 4000 | 0.76<br>0.919<br>0.36<br>1.8<br>0.342 | 0.81<br>0.730<br>0.50<br>2.5<br>0.327 | 0.86<br>0.580<br>0.66<br>3.5<br>0.312 | 0.94<br>0.429<br>0.97<br>5.5<br>0.294 | 1.00<br>0.343<br>1.30<br>7.7<br>0.282 | 1.07<br>0.273<br>1.70<br>11.1<br>0.270 | 1.16<br>0.203<br>2.44<br>17.7<br>0.256 | 1.24<br>0.162<br>3.18<br>25.4<br>0.246 | 1.32<br>0.130<br>4.14<br>36.5<br>0.237 | 1.44<br>0.097<br>5.80<br>59.9<br>0.225 | 1.54<br>0.078<br>7.44<br>87.5<br>0.217   |





TABLE 3

SAND SIZE 0.15 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

|      | 0.5                                   | 1.0                                   | 2.0                                   | 5.0                                   | 10.0                                   | 20.0                                   | 50.0                                   | 100.0                                  | 200.0                                  | 500.0                                  | 1000.0                                   |
|------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|------------------------------------------|
| 10   | 0.44<br>0.192<br>0.49<br>2.3<br>0.286 | 0.46<br>0.150<br>0.67<br>3.2<br>0.277 | 0.49<br>0.118<br>0.90<br>4.6<br>0.269 | 0.52<br>0.087<br>1.32<br>7.3<br>0.259 | 0.55<br>0.069<br>1.74<br>10.4<br>0.253 | 0.58<br>0.055<br>2.30<br>14.9<br>0.247 | 0.63<br>0.041<br>3.31<br>24.1<br>0.240 | 0.67<br>0.033<br>4.40<br>34.0<br>0.235 | 0.70<br>0.026<br>5.64<br>50.4<br>0.230 | 0.76<br>0.020<br>7.91<br>83.1<br>0.224 | 0.80<br>0.016<br>10.22<br>121.9<br>0.223 |
| 20   | 0.46<br>0.234<br>0.47<br>2.3<br>0.308 | 0.48<br>0.186<br>0.64<br>3.2<br>0.298 | 0.51<br>0.147<br>0.86<br>4.5<br>0.290 | 0.55<br>0.109<br>1.25<br>7.2<br>0.279 | 0.59<br>0.087<br>1.67<br>10.2<br>0.272 | 0.62<br>0.070<br>2.20<br>14.6<br>0.266 | 0.67<br>0.052<br>3.16<br>23.5<br>0.258 | 0.71<br>0.042<br>4.14<br>33.9<br>0.252 | 0.76<br>0.034<br>5.37<br>49.1<br>0.246 | 0.82<br>0.026<br>7.59<br>80.5<br>0.243 | 0.87<br>0.021<br>9.76<br>117.7<br>0.238  |
| 40   | 0.48<br>0.292<br>0.45<br>2.3<br>0.332 | 0.51<br>0.233<br>0.62<br>3.2<br>0.322 | 0.54<br>0.186<br>0.82<br>4.5<br>0.312 | 0.59<br>0.139<br>1.20<br>7.1<br>0.301 | 0.63<br>0.112<br>1.59<br>10.1<br>0.293 | 0.67<br>0.090<br>2.19<br>13.6<br>0.290 | 0.72<br>0.068<br>3.01<br>22.9<br>0.276 | 0.77<br>0.055<br>3.93<br>33.1<br>0.269 | 0.82<br>0.045<br>5.12<br>47.5<br>0.263 | 0.89<br>0.034<br>7.23<br>77.8<br>0.259 | 0.95<br>0.028<br>9.28<br>113.5<br>0.253  |
| 60   | 0.50<br>0.335<br>0.44<br>2.3<br>0.347 | 0.53<br>0.268<br>0.59<br>3.2<br>0.336 | 0.57<br>0.215<br>0.80<br>4.4<br>0.326 | 0.61<br>0.161<br>1.16<br>7.0<br>0.314 | 0.65<br>0.130<br>1.54<br>9.9<br>0.305  | 0.70<br>0.105<br>2.03<br>14.2<br>0.297 | 0.76<br>0.080<br>2.92<br>22.6<br>0.287 | 0.81<br>0.065<br>3.82<br>32.3<br>0.280 | 0.86<br>0.053<br>4.98<br>46.8<br>0.277 | 0.94<br>0.041<br>7.02<br>76.0<br>0.269 | 1.00<br>0.033<br>9.02<br>110.6<br>0.262  |
| 80   | 0.51<br>0.370<br>0.43<br>2.3<br>0.358 | 0.55<br>0.297<br>0.58<br>3.1<br>0.347 | 0.58<br>0.238<br>0.78<br>4.4<br>0.336 | 0.63<br>0.180<br>1.13<br>7.0<br>0.323 | 0.68<br>0.146<br>1.55<br>9.4<br>0.314  | 0.72<br>0.118<br>1.99<br>14.0<br>0.306 | 0.78<br>0.090<br>2.85<br>22.4<br>0.295 | 0.84<br>0.073<br>3.74<br>31.9<br>0.287 | 0.89<br>0.060<br>4.88<br>46.0<br>0.284 | 0.98<br>0.046<br>6.95<br>73.2<br>0.275 | 1.04<br>0.038<br>8.83<br>108.6<br>0.269  |
| 100  | 0.53<br>0.401<br>0.43<br>2.2<br>0.367 | 0.56<br>0.322<br>0.57<br>3.1<br>0.355 | 0.60<br>0.259<br>0.76<br>4.4<br>0.344 | 0.65<br>0.196<br>1.12<br>6.9<br>0.330 | 0.69<br>0.159<br>1.48<br>9.8<br>0.321  | 0.74<br>0.129<br>1.96<br>13.8<br>0.312 | 0.81<br>0.098<br>2.80<br>22.1<br>0.301 | 0.86<br>0.081<br>3.66<br>31.8<br>0.296 | 0.92<br>0.066<br>4.80<br>45.5<br>0.290 | 1.00<br>0.051<br>6.74<br>73.9<br>0.280 | 1.08<br>0.042<br>8.68<br>107.1<br>0.274  |
| 200  | 0.56<br>0.517<br>0.40<br>2.2<br>0.394 | 0.60<br>0.418<br>0.54<br>3.1<br>0.381 | 0.64<br>0.339<br>0.73<br>4.3<br>0.369 | 0.70<br>0.258<br>1.05<br>6.7<br>0.354 | 0.75<br>0.210<br>1.40<br>9.5<br>0.343  | 0.80<br>0.172<br>1.85<br>13.5<br>0.333 | 0.88<br>0.132<br>2.67<br>21.4<br>0.325 | 0.94<br>0.108<br>3.49<br>30.5<br>0.316 | 1.01<br>0.089<br>4.53<br>43.8<br>0.307 | 1.11<br>0.069<br>6.39<br>70.7<br>0.297 | 1.19<br>0.057<br>8.21<br>102.3<br>0.289  |
| 400  | 0.61<br>0.676<br>0.38<br>2.2<br>0.423 | 0.65<br>0.550<br>0.52<br>3.0<br>0.408 | 0.70<br>0.448<br>0.69<br>4.2<br>0.394 | 0.77<br>0.343<br>1.00<br>6.5<br>0.377 | 0.82<br>0.281<br>1.32<br>9.2<br>0.365  | 0.88<br>0.231<br>1.74<br>13.1<br>0.354 | 0.96<br>0.179<br>2.52<br>20.6<br>0.344 | 1.04<br>0.147<br>3.28<br>29.4<br>0.334 | 1.11<br>0.122<br>4.29<br>41.8<br>0.325 | 1.23<br>0.095<br>6.03<br>67.5<br>0.312 | 1.32<br>0.079<br>7.74<br>97.7<br>0.303   |
| 600  | 0.64<br>0.796<br>0.37<br>2.1<br>0.440 | 0.68<br>0.650<br>0.50<br>2.9<br>0.424 | 0.73<br>0.531<br>0.66<br>4.1<br>0.409 | 0.81<br>0.408<br>0.96<br>6.4<br>0.391 | 0.87<br>0.335<br>1.28<br>9.0<br>0.378  | 0.93<br>0.276<br>1.69<br>12.8<br>0.371 | 1.02<br>0.214<br>2.43<br>20.1<br>0.356 | 1.10<br>0.177<br>3.18<br>28.6<br>0.345 | 1.18<br>0.147<br>4.13<br>40.9<br>0.334 | 1.31<br>0.115<br>5.82<br>65.6<br>0.321 | 1.41<br>0.095<br>7.49<br>94.6<br>0.312   |
| 800  | 0.66<br>0.896<br>0.36<br>2.1<br>0.453 | 0.71<br>0.732<br>0.49<br>2.9<br>0.436 | 0.76<br>0.601<br>0.64<br>4.1<br>0.425 | 0.84<br>0.463<br>0.94<br>6.3<br>0.401 | 0.90<br>0.381<br>1.24<br>8.9<br>0.387  | 0.97<br>0.314<br>1.65<br>12.5<br>0.380 | 1.07<br>0.244<br>2.36<br>19.9<br>0.364 | 1.15<br>0.202<br>3.10<br>28.1<br>0.352 | 1.24<br>0.168<br>4.04<br>40.0<br>0.341 | 1.38<br>0.132<br>5.75<br>62.9<br>0.327 | 1.48<br>0.109<br>7.31<br>92.5<br>0.318   |
| 1000 | 0.68<br>0.983<br>0.35<br>2.1<br>0.462 | 0.73<br>0.805<br>0.48<br>2.9<br>0.445 | 0.78<br>0.661<br>0.63<br>4.0<br>0.428 | 0.87<br>0.510<br>0.92<br>6.3<br>0.408 | 0.93<br>0.421<br>1.22<br>8.8<br>0.400  | 1.00<br>0.347<br>1.62<br>12.4<br>0.387 | 1.10<br>0.271<br>2.32<br>19.5<br>0.370 | 1.20<br>0.225<br>3.10<br>26.9<br>0.358 | 1.28<br>0.186<br>3.96<br>39.4<br>0.347 | 1.42<br>0.146<br>5.56<br>63.3<br>0.332 | 1.53<br>0.122<br>7.17<br>91.0<br>0.322   |
| 2000 | 0.74<br>1.323<br>0.33<br>2.0<br>0.492 | 0.80<br>1.088<br>0.45<br>2.8<br>0.472 | 0.86<br>0.897<br>0.59<br>3.9<br>0.454 | 0.95<br>0.697<br>0.87<br>6.0<br>0.438 | 1.03<br>0.578<br>1.16<br>8.4<br>0.422  | 1.11<br>0.478<br>1.52<br>11.9<br>0.407 | 1.24<br>0.375<br>2.23<br>18.1<br>0.388 | 1.33<br>0.311<br>2.86<br>26.4<br>0.375 | 1.43<br>0.260<br>3.72<br>37.5<br>0.363 | 1.59<br>0.204<br>5.24<br>60.0<br>0.347 | 1.72<br>0.171<br>6.73<br>86.2<br>0.336   |
| 4000 | 0.82<br>1.800<br>0.31<br>1.9<br>0.521 | 0.89<br>1.486<br>0.42<br>2.7<br>0.500 | 0.95<br>1.230<br>0.57<br>3.7<br>0.486 | 1.05<br>0.960<br>0.82<br>5.8<br>0.462 | 1.14<br>0.797<br>1.08<br>8.1<br>0.444  | 1.23<br>0.663<br>1.43<br>11.4<br>0.427 | 1.37<br>0.521<br>2.05<br>17.8<br>0.407 | 1.49<br>0.435<br>2.68<br>25.1<br>0.392 | 1.61<br>0.363<br>3.49<br>35.5<br>0.378 | 1.79<br>0.287<br>4.91<br>56.8<br>0.361 | 1.94<br>0.241<br>6.31<br>81.7<br>0.349   |



SAND SIZE 0.20 MILLIMETRES

| SEDIMENT CONCENTRATION (PPM) |       | DISCHARGE (CUMecs) |       |       |       |       |       |       |       |       |       |
|------------------------------|-------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                              |       | 0.5                | 1.0   | 2.0   | 5.0   | 10.0  | 20.0  | 50.0  | 100.0 | 200.0 | 500.0 |
| 10                           | 0.43  | 0.45               | 0.48  | 0.51  | 0.54  | 0.58  | 0.62  | 0.66  | 0.70  | 0.76  | 0.82  |
|                              | 0.201 | 0.160              | 0.128 | 0.095 | 0.077 | 0.063 | 0.048 | 0.039 | 0.032 | 0.025 | 0.021 |
|                              | 0.49  | 0.66               | 0.87  | 1.28  | 1.69  | 2.24  | 3.20  | 4.17  | 5.42  | 7.65  | 9.86  |
|                              | 2.4   | 3.4                | 4.8   | 7.6   | 10.9  | 15.5  | 25.1  | 36.3  | 52.5  | 85.5  | 124.3 |
| 20                           | 0.314 | 0.307              | 0.298 | 0.291 | 0.287 | 0.283 | 0.279 | 0.275 | 0.273 | 0.269 | 0.267 |
|                              | 0.45  | 0.47               | 0.50  | 0.55  | 0.58  | 0.62  | 0.67  | 0.71  | 0.76  | 0.84  | 0.90  |
|                              | 0.253 | 0.204              | 0.164 | 0.124 | 0.101 | 0.083 | 0.064 | 0.053 | 0.044 | 0.035 | 0.029 |
|                              | 0.46  | 0.63               | 0.83  | 1.20  | 1.60  | 2.10  | 3.01  | 3.94  | 5.13  | 7.23  | 9.41  |
| 40                           | 2.4   | 3.4                | 4.8   | 7.6   | 10.8  | 15.4  | 24.8  | 35.5  | 51.0  | 82.8  | 117.5 |
|                              | 0.347 | 0.340              | 0.333 | 0.322 | 0.317 | 0.312 | 0.307 | 0.303 | 0.299 | 0.294 | 0.291 |
|                              | 0.47  | 0.50               | 0.53  | 0.58  | 0.62  | 0.67  | 0.73  | 0.78  | 0.84  | 0.92  | 0.99  |
|                              | 0.327 | 0.265              | 0.216 | 0.166 | 0.136 | 0.113 | 0.088 | 0.073 | 0.061 | 0.049 | 0.041 |
| 60                           | 0.44  | 0.59               | 0.78  | 1.13  | 1.50  | 1.97  | 2.84  | 3.71  | 4.82  | 6.81  | 8.77  |
|                              | 2.4   | 3.4                | 4.8   | 7.5   | 10.7  | 15.2  | 24.2  | 34.5  | 49.5  | 79.7  | 114.9 |
|                              | 0.385 | 0.376              | 0.368 | 0.356 | 0.350 | 0.344 | 0.337 | 0.332 | 0.327 | 0.320 | 0.316 |
|                              | 0.49  | 0.52               | 0.56  | 0.61  | 0.65  | 0.70  | 0.77  | 0.83  | 0.89  | 0.98  | 1.06  |
| 80                           | 0.383 | 0.312              | 0.256 | 0.198 | 0.164 | 0.136 | 0.107 | 0.089 | 0.075 | 0.060 | 0.051 |
|                              | 0.42  | 0.57               | 0.76  | 1.09  | 1.44  | 1.91  | 2.72  | 3.57  | 4.65  | 6.44  | 8.44  |
|                              | 2.4   | 3.4                | 4.7   | 7.5   | 10.6  | 15.0  | 23.9  | 33.9  | 48.4  | 78.0  | 112.1 |
|                              | 0.408 | 0.399              | 0.390 | 0.376 | 0.370 | 0.363 | 0.355 | 0.349 | 0.343 | 0.336 | 0.330 |
| 100                          | 0.50  | 0.54               | 0.58  | 0.63  | 0.68  | 0.73  | 0.80  | 0.86  | 0.93  | 1.03  | 1.11  |
|                              | 0.431 | 0.353              | 0.290 | 0.226 | 0.187 | 0.156 | 0.123 | 0.103 | 0.087 | 0.070 | 0.059 |
|                              | 0.41  | 0.55               | 0.74  | 1.06  | 1.40  | 1.85  | 2.66  | 3.46  | 4.53  | 6.37  | 8.20  |
|                              | 2.4   | 3.4                | 4.7   | 7.4   | 10.6  | 14.9  | 23.5  | 33.6  | 47.7  | 76.6  | 110.1 |
| 200                          | 0.425 | 0.415              | 0.407 | 0.392 | 0.384 | 0.377 | 0.368 | 0.361 | 0.355 | 0.347 | 0.340 |
|                              | 0.52  | 0.55               | 0.59  | 0.65  | 0.70  | 0.75  | 0.83  | 0.89  | 0.97  | 1.06  | 1.15  |
|                              | 0.473 | 0.389              | 0.321 | 0.250 | 0.208 | 0.174 | 0.138 | 0.116 | 0.098 | 0.078 | 0.067 |
|                              | 0.40  | 0.54               | 0.71  | 1.04  | 1.37  | 1.82  | 2.60  | 3.40  | 4.52  | 6.23  | 8.03  |
| 400                          | 2.4   | 3.4                | 4.7   | 7.4   | 10.4  | 14.6  | 23.3  | 33.1  | 45.6  | 75.5  | 108.2 |
|                              | 0.439 | 0.429              | 0.417 | 0.404 | 0.396 | 0.388 | 0.378 | 0.371 | 0.364 | 0.355 | 0.348 |
|                              | 0.56  | 0.60               | 0.65  | 0.71  | 0.77  | 0.83  | 0.92  | 0.99  | 1.07  | 1.18  | 1.30  |
|                              | 0.641 | 0.532              | 0.442 | 0.349 | 0.292 | 0.246 | 0.197 | 0.166 | 0.141 | 0.114 | 0.098 |
| 600                          | 0.38  | 0.50               | 0.67  | 0.97  | 1.29  | 1.69  | 2.42  | 3.17  | 4.13  | 5.84  | 7.56  |
|                              | 2.4   | 3.3                | 4.6   | 7.2   | 10.1  | 14.3  | 22.6  | 31.8  | 45.0  | 72.3  | 102.1 |
|                              | 0.484 | 0.472              | 0.456 | 0.442 | 0.432 | 0.422 | 0.410 | 0.401 | 0.392 | 0.389 | 0.378 |
|                              | 0.61  | 0.65               | 0.71  | 0.79  | 0.85  | 0.92  | 1.03  | 1.11  | 1.20  | 1.34  | 1.46  |
| 800                          | 0.886 | 0.741              | 0.621 | 0.494 | 0.417 | 0.353 | 0.284 | 0.242 | 0.207 | 0.168 | 0.144 |
|                              | 0.35  | 0.47               | 0.62  | 0.91  | 1.19  | 1.57  | 2.26  | 2.95  | 3.86  | 5.44  | 7.01  |
|                              | 2.4   | 3.2                | 4.5   | 7.0   | 9.8   | 13.8  | 21.6  | 30.4  | 43.2  | 68.4  | 97.4  |
|                              | 0.532 | 0.517              | 0.498 | 0.481 | 0.469 | 0.457 | 0.442 | 0.431 | 0.428 | 0.412 | 0.402 |
| 1000                         | 0.64  | 0.70               | 0.76  | 0.84  | 0.91  | 0.99  | 1.10  | 1.20  | 1.29  | 1.45  | 1.58  |
|                              | 1.080 | 0.906              | 0.764 | 0.610 | 0.517 | 0.438 | 0.355 | 0.303 | 0.259 | 0.212 | 0.182 |
|                              | 0.34  | 0.45               | 0.61  | 0.87  | 1.15  | 1.51  | 2.15  | 2.83  | 3.69  | 5.20  | 6.71  |
|                              | 2.3   | 3.2                | 4.4   | 6.9   | 9.6   | 13.5  | 21.1  | 29.6  | 41.8  | 66.3  | 94.1  |
| 2000                         | 0.561 | 0.539              | 0.524 | 0.504 | 0.490 | 0.477 | 0.460 | 0.448 | 0.442 | 0.427 | 0.416 |
|                              | 0.67  | 0.73               | 0.79  | 0.88  | 0.95  | 1.04  | 1.16  | 1.25  | 1.37  | 1.53  | 1.67  |
|                              | 1.247 | 1.049              | 0.885 | 0.710 | 0.603 | 0.513 | 0.416 | 0.356 | 0.305 | 0.250 | 0.215 |
|                              | 0.33  | 0.44               | 0.58  | 0.84  | 1.11  | 1.46  | 2.09  | 2.74  | 3.58  | 5.04  | 6.50  |
| 4000                         | 2.3   | 3.1                | 4.4   | 6.8   | 9.5   | 13.2  | 20.7  | 29.1  | 40.9  | 64.7  | 92.0  |
|                              | 0.582 | 0.558              | 0.541 | 0.521 | 0.506 | 0.491 | 0.473 | 0.466 | 0.454 | 0.437 | 0.425 |
|                              | 0.69  | 0.75               | 0.82  | 0.91  | 0.99  | 1.08  | 1.21  | 1.31  | 1.42  | 1.60  | 1.75  |
|                              | 1.396 | 1.177              | 0.995 | 0.801 | 0.680 | 0.580 | 0.471 | 0.404 | 0.347 | 0.284 | 0.245 |
|                              | 0.32  | 0.43               | 0.57  | 0.81  | 1.08  | 1.42  | 2.05  | 2.68  | 3.48  | 4.93  | 6.35  |
|                              | 2.3   | 3.1                | 4.3   | 6.8   | 9.3   | 13.1  | 20.3  | 28.6  | 40.4  | 63.4  | 90.0  |
|                              | 0.598 | 0.573              | 0.555 | 0.534 | 0.517 | 0.502 | 0.483 | 0.476 | 0.462 | 0.445 | 0.432 |
|                              | 0.77  | 0.84               | 0.91  | 1.02  | 1.12  | 1.22  | 1.36  | 1.49  | 1.63  | 1.84  | 2.01  |
|                              | 2.002 | 1.698              | 1.443 | 1.169 | 0.999 | 0.856 | 0.699 | 0.602 | 0.518 | 0.426 | 0.369 |
|                              | 0.29  | 0.40               | 0.53  | 0.76  | 1.00  | 1.31  | 1.90  | 2.47  | 3.24  | 4.56  | 5.87  |
|                              | 2.2   | 3.0                | 4.2   | 6.4   | 8.9   | 12.6  | 19.3  | 27.2  | 37.9  | 59.7  | 84.7  |
|                              | 0.642 | 0.619              | 0.599 | 0.572 | 0.554 | 0.536 | 0.521 | 0.504 | 0.489 | 0.468 | 0.454 |
|                              | 0.86  | 0.95               | 1.03  | 1.17  | 1.26  | 1.38  | 1.56  | 1.72  | 1.88  | 2.12  | 2.33  |
|                              | 2.909 | 2.480              | 2.118 | 1.727 | 1.480 | 1.273 | 1.045 | 0.904 | 0.779 | 0.644 | 0.558 |
|                              | 0.27  | 0.37               | 0.49  | 0.71  | 0.93  | 1.23  | 1.76  | 2.31  | 2.99  | 4.20  | 5.44  |
|                              | 2.1   | 2.8                | 4.0   | 6.0   | 8.5   | 11.8  | 18.3  | 25.2  | 35.6  | 56.1  | 78.8  |
|                              | 0.692 | 0.665              | 0.641 | 0.610 | 0.597 | 0.576 | 0.550 | 0.531 | 0.513 | 0.491 | 0.474 |

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10



TABLE 5

SAND SIZE 0.25 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

TABLE 5

|      | 0.5                                   | 1.0                                   | 2.0                                   | 5.0                                   | 10.0                                   | 20.0                                   | 50.0                                   | 100.0                                  | 200.0                                  | 500.0                                  | 1000.0                                  |
|------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|-----------------------------------------|
| 10   | 0.42<br>0.207<br>0.48<br>2.5<br>0.325 | 0.45<br>0.166<br>0.65<br>3.4<br>0.320 | 0.47<br>0.134<br>0.86<br>4.9<br>0.316 | 0.51<br>0.101<br>1.24<br>7.9<br>0.312 | 0.54<br>0.083<br>1.65<br>11.3<br>0.310 | 0.57<br>0.068<br>2.17<br>16.2<br>0.309 | 0.62<br>0.053<br>3.09<br>26.2<br>0.307 | 0.66<br>0.044<br>4.02<br>37.7<br>0.303 | 0.70<br>0.037<br>5.26<br>54.0<br>0.303 | 0.77<br>0.029<br>7.39<br>88.1<br>0.302 | 0.82<br>0.025<br>9.53<br>127.6<br>0.302 |
| 20   | 0.44<br>0.265<br>0.45<br>2.5<br>0.366 | 0.47<br>0.215<br>0.61<br>3.5<br>0.361 | 0.50<br>0.176<br>0.80<br>5.0<br>0.357 | 0.54<br>0.136<br>1.17<br>7.9<br>0.352 | 0.57<br>0.112<br>1.54<br>11.3<br>0.350 | 0.61<br>0.093<br>2.02<br>16.2<br>0.348 | 0.67<br>0.074<br>2.90<br>25.9<br>0.346 | 0.72<br>0.062<br>3.77<br>36.9<br>0.340 | 0.77<br>0.053<br>4.91<br>53.0<br>0.339 | 0.84<br>0.043<br>6.89<br>85.9<br>0.337 | 0.91<br>0.036<br>8.92<br>123.3<br>0.335 |
| 40   | 0.47<br>0.351<br>0.42<br>2.5<br>0.407 | 0.50<br>0.289<br>0.56<br>3.6<br>0.402 | 0.53<br>0.238<br>0.75<br>5.0<br>0.403 | 0.58<br>0.187<br>1.09<br>7.9<br>0.398 | 0.62<br>0.157<br>1.42<br>11.3<br>0.393 | 0.66<br>0.132<br>1.88<br>16.0<br>0.391 | 0.73<br>0.106<br>2.69<br>25.5<br>0.387 | 0.79<br>0.090<br>3.50<br>36.3<br>0.380 | 0.85<br>0.077<br>4.57<br>51.5<br>0.377 | 0.94<br>0.063<br>6.43<br>82.7<br>0.373 | 1.02<br>0.054<br>8.30<br>118.3<br>0.370 |
| 60   | 0.49<br>0.418<br>0.40<br>2.5<br>0.438 | 0.52<br>0.346<br>0.54<br>3.5<br>0.431 | 0.56<br>0.289<br>0.71<br>5.0<br>0.426 | 0.61<br>0.228<br>1.04<br>7.9<br>0.426 | 0.65<br>0.192<br>1.37<br>11.2<br>0.422 | 0.70<br>0.163<br>1.80<br>15.9<br>0.418 | 0.78<br>0.132<br>2.57<br>25.1<br>0.408 | 0.84<br>0.113<br>3.36<br>35.6<br>0.404 | 0.91<br>0.097<br>4.37<br>50.6<br>0.400 | 1.02<br>0.080<br>6.27<br>78.3<br>0.395 | 1.09<br>0.069<br>7.94<br>115.4<br>0.391 |
| 80   | 0.50<br>0.477<br>0.39<br>2.6<br>0.460 | 0.54<br>0.397<br>0.53<br>3.5<br>0.454 | 0.58<br>0.332<br>0.69<br>5.0<br>0.448 | 0.63<br>0.264<br>1.01<br>7.9<br>0.447 | 0.68<br>0.224<br>1.33<br>11.1<br>0.442 | 0.73<br>0.190<br>1.74<br>15.7<br>0.437 | 0.81<br>0.155<br>2.47<br>25.0<br>0.426 | 0.88<br>0.133<br>3.25<br>35.1<br>0.422 | 0.95<br>0.114<br>4.23<br>49.9<br>0.417 | 1.06<br>0.095<br>5.95<br>79.6<br>0.410 | 1.15<br>0.082<br>7.67<br>113.4<br>0.405 |
| 100  | 0.52<br>0.529<br>0.38<br>2.5<br>0.479 | 0.55<br>0.442<br>0.51<br>3.5<br>0.472 | 0.59<br>0.371<br>0.68<br>5.0<br>0.465 | 0.65<br>0.297<br>0.98<br>7.9<br>0.464 | 0.70<br>0.252<br>1.29<br>11.1<br>0.458 | 0.75<br>0.215<br>1.70<br>15.6<br>0.453 | 0.83<br>0.176<br>2.43<br>24.7<br>0.446 | 0.92<br>0.151<br>3.21<br>34.0<br>0.436 | 0.99<br>0.131<br>4.12<br>49.3<br>0.430 | 1.10<br>0.108<br>5.80<br>78.3<br>0.422 | 1.20<br>0.094<br>7.48<br>111.5<br>0.416 |
| 200  | 0.56<br>0.745<br>0.35<br>2.6<br>0.540 | 0.60<br>0.629<br>0.47<br>3.5<br>0.530 | 0.65<br>0.534<br>0.62<br>4.9<br>0.521 | 0.71<br>0.433<br>0.91<br>7.7<br>0.518 | 0.77<br>0.371<br>1.19<br>10.8<br>0.510 | 0.84<br>0.319<br>1.56<br>15.3<br>0.502 | 0.94<br>0.263<br>2.23<br>23.8<br>0.486 | 1.02<br>0.228<br>2.92<br>33.4<br>0.478 | 1.12<br>0.199<br>3.79<br>47.2<br>0.470 | 1.25<br>0.166<br>5.35<br>74.9<br>0.464 | 1.37<br>0.145<br>6.91<br>105.2<br>0.450 |
| 400  | 0.61<br>1.074<br>0.33<br>2.5<br>0.606 | 0.66<br>0.916<br>0.44<br>3.5<br>0.593 | 0.71<br>0.785<br>0.57<br>4.9<br>0.593 | 0.80<br>0.643<br>0.83<br>7.5<br>0.574 | 0.87<br>0.556<br>1.09<br>10.6<br>0.563 | 0.95<br>0.482<br>1.43<br>14.7<br>0.546 | 1.07<br>0.401<br>2.05<br>22.8<br>0.531 | 1.17<br>0.350<br>2.67<br>32.1<br>0.520 | 1.29<br>0.307<br>3.55<br>43.6<br>0.509 | 1.44<br>0.258<br>4.92<br>70.4<br>0.494 | 1.59<br>0.227<br>6.34<br>99.4<br>0.483  |
| 600  | 0.65<br>1.343<br>0.31<br>2.5<br>0.646 | 0.70<br>1.153<br>0.42<br>3.4<br>0.640 | 0.76<br>0.992<br>0.55<br>4.8<br>0.626 | 0.85<br>0.819<br>0.79<br>7.5<br>0.607 | 0.94<br>0.710<br>1.04<br>10.3<br>0.588 | 1.02<br>0.618<br>1.36<br>14.4<br>0.574 | 1.15<br>0.516<br>1.95<br>22.2<br>0.557 | 1.26<br>0.452<br>2.54<br>31.1<br>0.544 | 1.39<br>0.397<br>3.32<br>43.4<br>0.531 | 1.57<br>0.336<br>4.66<br>68.2<br>0.515 | 1.72<br>0.296<br>6.06<br>95.9<br>0.509  |
| 800  | 0.68<br>1.581<br>0.30<br>2.5<br>0.675 | 0.73<br>1.361<br>0.40<br>3.4<br>0.668 | 0.80<br>1.175<br>0.53<br>4.7<br>0.652 | 0.90<br>0.973<br>0.76<br>7.3<br>0.631 | 0.98<br>0.847<br>0.99<br>10.2<br>0.610 | 1.08<br>0.739<br>1.32<br>14.0<br>0.595 | 1.22<br>0.620<br>1.88<br>21.8<br>0.576 | 1.34<br>0.544<br>2.46<br>30.3<br>0.561 | 1.48<br>0.478<br>3.20<br>42.3<br>0.547 | 1.66<br>0.405<br>4.52<br>66.5<br>0.536 | 1.83<br>0.359<br>5.83<br>93.6<br>0.523  |
| 1000 | 0.70<br>1.799<br>0.29<br>2.4<br>0.697 | 0.76<br>1.553<br>0.39<br>3.3<br>0.689 | 0.83<br>1.343<br>0.51<br>4.7<br>0.672 | 0.94<br>1.115<br>0.74<br>7.2<br>0.643 | 1.03<br>0.972<br>0.97<br>10.0<br>0.626 | 1.12<br>0.851<br>1.27<br>14.1<br>0.616 | 1.28<br>0.714<br>1.83<br>21.4<br>0.590 | 1.40<br>0.628<br>2.38<br>29.9<br>0.574 | 1.55<br>0.553<br>3.11<br>41.6<br>0.559 | 1.75<br>0.470<br>4.40<br>65.0<br>0.547 | 1.93<br>0.416<br>5.67<br>91.4<br>0.533  |
| 2000 | 0.79<br>2.713<br>0.27<br>2.4<br>0.779 | 0.86<br>2.358<br>0.36<br>3.2<br>0.757 | 0.95<br>2.055<br>0.47<br>4.5<br>0.735 | 1.08<br>1.720<br>0.68<br>6.8<br>0.698 | 1.18<br>1.507<br>0.89<br>9.5<br>0.678  | 1.30<br>1.324<br>1.17<br>13.1<br>0.658 | 1.48<br>1.120<br>1.67<br>20.2<br>0.632 | 1.63<br>0.989<br>2.18<br>28.2<br>0.613 | 1.79<br>0.875<br>2.85<br>39.1<br>0.604 | 2.04<br>0.746<br>4.02<br>60.8<br>0.580 | 2.26<br>0.663<br>5.18<br>85.4<br>0.562  |
| 4000 | 0.90<br>4.168<br>0.25<br>2.2<br>0.853 | 0.98<br>3.632<br>0.33<br>3.1<br>0.825 | 1.10<br>3.184<br>0.44<br>4.1<br>0.787 | 1.24<br>2.682<br>0.62<br>6.5<br>0.753 | 1.37<br>2.363<br>0.82<br>8.9<br>0.728  | 1.51<br>2.084<br>1.07<br>12.4<br>0.704 | 1.71<br>1.771<br>1.53<br>19.0<br>0.683 | 1.90<br>1.570<br>2.01<br>26.1<br>0.660 | 2.12<br>1.394<br>2.66<br>35.4<br>0.637 | 2.41<br>1.192<br>3.67<br>56.5<br>0.611 | 2.71<br>1.063<br>4.82<br>76.6<br>0.589  |



+

TABLE 6

SAND SIZE 0.30 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

TABLE 6

|      | 0.5                                   | 1.0                                   | 2.0                                   | 5.0                                   | 10.0                                   | 20.0                                   | 50.0                                   | 100.0                                  | 200.0                                  | 500.0                                  | 1000.0                                  |
|------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|-----------------------------------------|
| 10   | 0.43<br>0.212<br>0.47<br>2.5<br>0.328 | 0.45<br>0.171<br>0.64<br>3.5<br>0.325 | 0.47<br>0.138<br>0.85<br>5.0<br>0.322 | 0.51<br>0.106<br>1.22<br>8.0<br>0.321 | 0.54<br>0.087<br>1.60<br>11.6<br>0.321 | 0.57<br>0.073<br>2.15<br>16.2<br>0.323 | 0.62<br>0.057<br>3.01<br>26.8<br>0.323 | 0.66<br>0.048<br>3.92<br>38.7<br>0.325 | 0.70<br>0.041<br>5.10<br>55.8<br>0.326 | 0.78<br>0.033<br>7.32<br>87.9<br>0.331 | 0.82<br>0.029<br>9.26<br>131.0<br>0.331 |
| 20   | 0.45<br>0.275<br>0.44<br>2.6<br>0.369 | 0.47<br>0.225<br>0.59<br>3.6<br>0.366 | 0.50<br>0.185<br>0.78<br>5.1<br>0.364 | 0.54<br>0.145<br>1.13<br>8.2<br>0.363 | 0.57<br>0.121<br>1.50<br>11.7<br>0.371 | 0.61<br>0.102<br>1.96<br>16.7<br>0.371 | 0.67<br>0.082<br>2.78<br>26.9<br>0.370 | 0.72<br>0.070<br>3.62<br>38.6<br>0.371 | 0.77<br>0.060<br>4.73<br>55.0<br>0.372 | 0.85<br>0.050<br>6.65<br>88.6<br>0.373 | 0.92<br>0.043<br>8.57<br>127.4<br>0.374 |
| 40   | 0.47<br>0.369<br>0.41<br>2.6<br>0.424 | 0.50<br>0.306<br>0.55<br>3.6<br>0.421 | 0.53<br>0.256<br>0.72<br>5.2<br>0.419 | 0.58<br>0.204<br>1.04<br>8.2<br>0.417 | 0.62<br>0.173<br>1.37<br>11.7<br>0.417 | 0.67<br>0.148<br>1.79<br>16.7<br>0.416 | 0.73<br>0.121<br>2.57<br>26.6<br>0.422 | 0.79<br>0.105<br>3.34<br>37.9<br>0.422 | 0.85<br>0.091<br>4.34<br>53.9<br>0.421 | 0.95<br>0.076<br>6.11<br>86.3<br>0.420 | 1.03<br>0.067<br>7.89<br>122.8<br>0.419 |
| 60   | 0.49<br>0.446<br>0.39<br>2.6<br>0.460 | 0.52<br>0.373<br>0.52<br>3.7<br>0.457 | 0.56<br>0.314<br>0.69<br>5.2<br>0.454 | 0.61<br>0.254<br>0.98<br>8.3<br>0.452 | 0.66<br>0.217<br>1.30<br>11.7<br>0.450 | 0.71<br>0.186<br>1.71<br>16.6<br>0.449 | 0.78<br>0.154<br>2.44<br>26.4<br>0.457 | 0.85<br>0.134<br>3.23<br>36.4<br>0.454 | 0.91<br>0.117<br>4.13<br>53.0<br>0.451 | 1.02<br>0.099<br>5.81<br>84.4<br>0.448 | 1.12<br>0.087<br>7.89<br>119.7<br>0.441 |
| 80   | 0.50<br>0.512<br>0.38<br>2.6<br>0.488 | 0.54<br>0.433<br>0.52<br>3.5<br>0.486 | 0.58<br>0.366<br>0.66<br>5.2<br>0.481 | 0.63<br>0.297<br>0.95<br>8.3<br>0.478 | 0.68<br>0.256<br>1.25<br>11.8<br>0.475 | 0.74<br>0.221<br>1.64<br>16.5<br>0.474 | 0.81<br>0.183<br>2.35<br>26.2<br>0.478 | 0.88<br>0.160<br>3.05<br>37.1<br>0.475 | 0.96<br>0.141<br>3.96<br>52.7<br>0.471 | 1.08<br>0.119<br>5.60<br>83.0<br>0.468 | 1.18<br>0.106<br>7.16<br>117.4<br>0.460 |
| 100  | 0.51<br>0.573<br>0.37<br>2.7<br>0.510 | 0.55<br>0.486<br>0.49<br>3.7<br>0.506 | 0.59<br>0.413<br>0.65<br>5.2<br>0.503 | 0.65<br>0.337<br>0.93<br>8.3<br>0.498 | 0.71<br>0.291<br>1.22<br>11.7<br>0.496 | 0.76<br>0.252<br>1.62<br>16.3<br>0.503 | 0.84<br>0.211<br>2.28<br>26.0<br>0.496 | 0.92<br>0.185<br>2.97<br>36.7<br>0.493 | 1.00<br>0.163<br>3.86<br>51.9<br>0.489 | 1.13<br>0.139<br>5.43<br>81.6<br>0.479 | 1.23<br>0.123<br>7.00<br>115.7<br>0.474 |
| 200  | 0.56<br>0.830<br>0.34<br>2.7<br>0.586 | 0.60<br>0.713<br>0.44<br>3.8<br>0.580 | 0.65<br>0.614<br>0.59<br>5.2<br>0.574 | 0.72<br>0.509<br>0.84<br>8.2<br>0.566 | 0.79<br>0.444<br>1.11<br>11.5<br>0.561 | 0.86<br>0.389<br>1.45<br>16.1<br>0.555 | 0.95<br>0.329<br>2.07<br>25.3<br>0.555 | 1.04<br>0.291<br>2.69<br>35.6<br>0.548 | 1.15<br>0.258<br>3.51<br>49.7<br>0.536 | 1.30<br>0.222<br>4.95<br>77.8<br>0.526 | 1.43<br>0.199<br>6.38<br>109.7<br>0.518 |
| 400  | 0.61<br>1.237<br>0.31<br>2.7<br>0.669 | 0.67<br>1.074<br>0.41<br>3.7<br>0.660 | 0.72<br>0.936<br>0.54<br>5.2<br>0.650 | 0.81<br>0.787<br>0.76<br>8.1<br>0.637 | 0.89<br>0.692<br>1.01<br>11.2<br>0.628 | 0.96<br>0.612<br>1.32<br>15.7<br>0.627 | 1.10<br>0.524<br>1.92<br>23.6<br>0.614 | 1.20<br>0.466<br>2.45<br>33.8<br>0.598 | 1.33<br>0.416<br>3.19<br>47.3<br>0.587 | 1.51<br>0.361<br>4.49<br>73.7<br>0.573 | 1.67<br>0.324<br>5.79<br>103.5<br>0.561 |
| 600  | 0.65<br>1.581<br>0.29<br>2.7<br>0.721 | 0.71<br>1.380<br>0.38<br>3.7<br>0.708 | 0.78<br>1.211<br>0.51<br>5.0<br>0.696 | 0.87<br>1.024<br>0.72<br>8.0<br>0.682 | 0.95<br>0.906<br>0.95<br>11.0<br>0.682 | 1.04<br>0.804<br>1.25<br>15.3<br>0.665 | 1.19<br>0.690<br>1.78<br>23.7<br>0.649 | 1.31<br>0.618<br>2.31<br>33.0<br>0.629 | 1.45<br>0.554<br>3.01<br>45.7<br>0.616 | 1.66<br>0.481<br>4.25<br>71.0<br>0.599 | 1.84<br>0.434<br>5.49<br>99.0<br>0.585  |
| 800  | 0.69<br>1.892<br>0.28<br>2.6<br>0.759 | 0.74<br>1.657<br>0.37<br>3.6<br>0.751 | 0.82<br>1.458<br>0.48<br>5.1<br>0.729 | 0.92<br>1.239<br>0.70<br>7.7<br>0.711 | 1.01<br>1.099<br>0.91<br>10.9<br>0.705 | 1.11<br>0.979<br>1.20<br>15.1<br>0.692 | 1.27<br>0.843<br>1.71<br>23.1<br>0.666 | 1.40<br>0.756<br>2.22<br>32.2<br>0.651 | 1.55<br>0.679<br>2.89<br>44.8<br>0.637 | 1.78<br>0.592<br>4.07<br>69.1<br>0.617 | 1.97<br>0.534<br>5.27<br>96.3<br>0.602  |
| 1000 | 0.71<br>2.178<br>0.27<br>2.6<br>0.788 | 0.78<br>1.914<br>0.36<br>3.6<br>0.772 | 0.85<br>1.690<br>0.47<br>4.9<br>0.755 | 0.96<br>1.439<br>0.68<br>7.7<br>0.749 | 1.05<br>1.280<br>0.89<br>10.7<br>0.729 | 1.16<br>1.142<br>1.15<br>15.0<br>0.711 | 1.33<br>0.987<br>1.65<br>22.9<br>0.684 | 1.47<br>0.886<br>2.15<br>31.5<br>0.668 | 1.63<br>0.797<br>2.80<br>43.7<br>0.652 | 1.87<br>0.696<br>3.94<br>67.7<br>0.631 | 2.07<br>0.629<br>5.15<br>93.8<br>0.626  |
| 2000 | 0.80<br>3.421<br>0.24<br>2.6<br>0.882 | 0.89<br>3.033<br>0.33<br>3.4<br>0.876 | 0.95<br>2.699<br>0.42<br>5.0<br>0.862 | 1.11<br>2.316<br>0.61<br>7.4<br>0.819 | 1.22<br>2.072<br>0.80<br>10.2<br>0.798 | 1.36<br>1.859<br>1.05<br>14.0<br>0.768 | 1.57<br>1.618<br>1.50<br>21.2<br>0.739 | 1.73<br>1.458<br>1.95<br>29.6<br>0.719 | 1.93<br>1.317<br>2.53<br>40.9<br>0.698 | 2.21<br>1.156<br>3.57<br>63.4<br>0.681 | 2.47<br>1.048<br>4.63<br>87.5<br>0.661  |
| 4000 | 0.92<br>5.470<br>0.22<br>2.5<br>0.977 | 1.02<br>4.885<br>0.29<br>3.4<br>0.946 | 1.12<br>4.359<br>0.38<br>4.6<br>0.930 | 1.29<br>3.775<br>0.55<br>7.0<br>0.889 | 1.44<br>3.395<br>0.73<br>9.6<br>0.855  | 1.60<br>3.060<br>0.95<br>13.2<br>0.828 | 1.85<br>2.675<br>1.35<br>20.0<br>0.793 | 2.06<br>2.424<br>1.79<br>27.2<br>0.781 | 2.28<br>2.195<br>2.30<br>38.1<br>0.753 | 2.66<br>1.934<br>3.27<br>57.6<br>0.720 | 2.96<br>1.757<br>4.20<br>80.6<br>0.697  |

+



TABLE 7

SAND SIZE 0.35 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMecs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

|      | 0.5                                   | 1.0                                   | 2.0                                   | 5.0                                   | 10.0                                   | 20.0                                   | 50.0                                   | 100.0                                  | 200.0                                  | 500.0                                  | 1000.0                                  |
|------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|-----------------------------------------|
| 10   | 0.43<br>0.218<br>0.47<br>2.5<br>0.328 | 0.45<br>0.176<br>0.63<br>3.5<br>0.326 | 0.48<br>0.143<br>0.83<br>5.1<br>0.324 | 0.51<br>0.110<br>1.20<br>8.1<br>0.325 | 0.54<br>0.091<br>1.57<br>11.7<br>0.326 | 0.57<br>0.076<br>2.07<br>16.9<br>0.331 | 0.63<br>0.061<br>2.98<br>26.8<br>0.334 | 0.66<br>0.052<br>3.83<br>39.5<br>0.338 | 0.71<br>0.044<br>4.97<br>57.0<br>0.342 | 0.77<br>0.037<br>6.97<br>93.0<br>0.348 | 0.83<br>0.032<br>8.96<br>134.5<br>0.350 |
| 20   | 0.45<br>0.284<br>0.43<br>2.6<br>0.373 | 0.48<br>0.233<br>0.58<br>3.6<br>0.371 | 0.50<br>0.193<br>0.77<br>5.2<br>0.371 | 0.55<br>0.152<br>1.10<br>8.3<br>0.372 | 0.58<br>0.128<br>1.44<br>12.0<br>0.374 | 0.62<br>0.109<br>1.89<br>17.1<br>0.377 | 0.68<br>0.089<br>2.69<br>27.5<br>0.381 | 0.72<br>0.077<br>3.49<br>39.6<br>0.385 | 0.78<br>0.067<br>4.52<br>56.8<br>0.388 | 0.86<br>0.056<br>6.37<br>91.2<br>0.392 | 0.92<br>0.050<br>8.25<br>131.3<br>0.404 |
| 40   | 0.47<br>0.384<br>0.40<br>2.6<br>0.433 | 0.50<br>0.321<br>0.54<br>3.7<br>0.432 | 0.54<br>0.271<br>0.70<br>5.3<br>0.433 | 0.58<br>0.218<br>1.01<br>8.5<br>0.434 | 0.63<br>0.187<br>1.32<br>12.1<br>0.436 | 0.67<br>0.162<br>1.72<br>17.3<br>0.438 | 0.74<br>0.135<br>2.44<br>27.7<br>0.441 | 0.80<br>0.118<br>3.18<br>39.3<br>0.444 | 0.87<br>0.104<br>4.13<br>55.9<br>0.446 | 0.96<br>0.089<br>5.79<br>89.5<br>0.448 | 1.04<br>0.079<br>7.51<br>127.9<br>0.458 |
| 60   | 0.49<br>0.468<br>0.38<br>2.7<br>0.474 | 0.52<br>0.395<br>0.51<br>3.8<br>0.473 | 0.56<br>0.336<br>0.67<br>5.4<br>0.473 | 0.61<br>0.275<br>0.95<br>8.6<br>0.474 | 0.65<br>0.238<br>1.24<br>12.3<br>0.481 | 0.71<br>0.207<br>1.63<br>17.3<br>0.477 | 0.79<br>0.174<br>2.31<br>27.5<br>0.479 | 0.85<br>0.154<br>3.00<br>39.1<br>0.480 | 0.93<br>0.136<br>3.89<br>55.5<br>0.481 | 1.04<br>0.117<br>5.48<br>87.7<br>0.481 | 1.13<br>0.105<br>7.09<br>125.0<br>0.488 |
| 80   | 0.50<br>0.542<br>0.37<br>2.7<br>0.506 | 0.54<br>0.461<br>0.49<br>3.8<br>0.505 | 0.58<br>0.395<br>0.64<br>5.4<br>0.504 | 0.64<br>0.325<br>0.91<br>8.6<br>0.505 | 0.68<br>0.283<br>1.19<br>12.2<br>0.505 | 0.74<br>0.248<br>1.55<br>17.4<br>0.506 | 0.82<br>0.210<br>2.22<br>27.3<br>0.507 | 0.90<br>0.186<br>2.88<br>38.7<br>0.507 | 0.98<br>0.166<br>3.74<br>54.8<br>0.507 | 1.10<br>0.144<br>5.24<br>86.8<br>0.505 | 1.20<br>0.129<br>6.80<br>122.8<br>0.511 |
| 100  | 0.51<br>0.610<br>0.36<br>2.7<br>0.532 | 0.55<br>0.522<br>0.47<br>3.8<br>0.530 | 0.59<br>0.450<br>0.62<br>5.5<br>0.529 | 0.65<br>0.372<br>0.89<br>8.6<br>0.529 | 0.71<br>0.325<br>1.16<br>12.2<br>0.530 | 0.77<br>0.286<br>1.51<br>17.3<br>0.529 | 0.86<br>0.243<br>2.15<br>27.2<br>0.529 | 0.93<br>0.217<br>2.79<br>38.5<br>0.528 | 1.02<br>0.194<br>3.62<br>54.3<br>0.527 | 1.14<br>0.169<br>5.10<br>86.1<br>0.534 | 1.25<br>0.152<br>6.57<br>121.5<br>0.528 |
| 200  | 0.56<br>0.903<br>0.32<br>2.8<br>0.620 | 0.60<br>0.784<br>0.43<br>3.9<br>0.617 | 0.66<br>0.686<br>0.57<br>5.4<br>0.615 | 0.73<br>0.578<br>0.80<br>8.7<br>0.610 | 0.79<br>0.512<br>1.04<br>12.2<br>0.607 | 0.86<br>0.455<br>1.36<br>17.0<br>0.604 | 0.97<br>0.392<br>1.93<br>26.6<br>0.599 | 1.06<br>0.353<br>2.51<br>37.4<br>0.595 | 1.17<br>0.319<br>3.25<br>52.5<br>0.590 | 1.32<br>0.279<br>4.60<br>82.1<br>0.590 | 1.46<br>0.254<br>5.94<br>115.2<br>0.584 |
| 400  | 0.61<br>1.382<br>0.29<br>2.8<br>0.719 | 0.66<br>1.215<br>0.38<br>3.9<br>0.720 | 0.73<br>1.074<br>0.50<br>5.5<br>0.706 | 0.82<br>0.920<br>0.72<br>8.5<br>0.697 | 0.89<br>0.824<br>0.93<br>12.1<br>0.690 | 0.98<br>0.739<br>1.22<br>16.6<br>0.682 | 1.12<br>0.645<br>1.73<br>25.8<br>0.671 | 1.23<br>0.585<br>2.25<br>36.1<br>0.662 | 1.36<br>0.531<br>2.94<br>50.2<br>0.662 | 1.55<br>0.470<br>4.13<br>77.9<br>0.648 | 1.73<br>0.430<br>5.32<br>108.5<br>0.630 |
| 600  | 0.65<br>1.795<br>0.27<br>2.8<br>0.782 | 0.72<br>1.591<br>0.36<br>3.9<br>0.772 | 0.78<br>1.414<br>0.47<br>5.5<br>0.762 | 0.88<br>1.221<br>0.67<br>8.4<br>0.749 | 0.97<br>1.097<br>0.87<br>11.8<br>0.737 | 1.07<br>0.991<br>1.14<br>16.4<br>0.728 | 1.22<br>0.869<br>1.63<br>25.2<br>0.713 | 1.34<br>0.791<br>2.12<br>35.1<br>0.711 | 1.49<br>0.722<br>2.75<br>48.8<br>0.698 | 1.72<br>0.642<br>3.86<br>75.4<br>0.673 | 1.92<br>0.588<br>5.00<br>104.2<br>0.660 |
| 800  | 0.68<br>2.174<br>0.26<br>2.8<br>0.827 | 0.75<br>1.933<br>0.34<br>3.9<br>0.815 | 0.83<br>1.729<br>0.45<br>5.3<br>0.803 | 0.93<br>1.498<br>0.64<br>8.3<br>0.787 | 1.03<br>1.352<br>0.84<br>11.5<br>0.774 | 1.14<br>1.223<br>1.10<br>16.1<br>0.761 | 1.29<br>1.078<br>1.56<br>24.8<br>0.753 | 1.43<br>0.984<br>2.01<br>34.7<br>0.738 | 1.60<br>0.899<br>2.63<br>47.4<br>0.716 | 1.85<br>0.801<br>3.70<br>73.1<br>0.696 | 2.06<br>0.737<br>4.78<br>101.5<br>0.680 |
| 1000 | 0.71<br>2.529<br>0.25<br>2.8<br>0.864 | 0.78<br>2.256<br>0.33<br>3.9<br>0.849 | 0.86<br>2.022<br>0.43<br>5.4<br>0.835 | 0.98<br>1.761<br>0.62<br>8.2<br>0.816 | 1.08<br>1.591<br>0.81<br>11.4<br>0.801 | 1.20<br>1.444<br>1.06<br>15.7<br>0.785 | 1.36<br>1.276<br>1.51<br>24.3<br>0.776 | 1.51<br>1.165<br>1.96<br>33.8<br>0.760 | 1.69<br>1.068<br>2.52<br>46.9<br>0.735 | 1.96<br>0.953<br>3.58<br>71.4<br>0.713 | 2.19<br>0.877<br>4.62<br>98.7<br>0.695  |
| 2000 | 0.81<br>4.104<br>0.22<br>2.8<br>0.979 | 0.89<br>3.695<br>0.30<br>3.8<br>0.957 | 1.00<br>3.339<br>0.39<br>5.1<br>0.935 | 1.14<br>2.934<br>0.56<br>7.9<br>0.906 | 1.26<br>2.672<br>0.73<br>10.8<br>0.901 | 1.40<br>2.437<br>0.95<br>15.1<br>0.875 | 1.61<br>2.169<br>1.35<br>22.9<br>0.846 | 1.81<br>1.990<br>1.75<br>31.6<br>0.815 | 2.03<br>1.831<br>2.29<br>43.0<br>0.792 | 2.35<br>1.642<br>3.21<br>66.3<br>0.763 | 2.64<br>1.516<br>4.15<br>91.3<br>0.741  |
| 4000 | 0.93<br>6.791<br>0.20<br>2.7<br>1.098 | 1.04<br>6.161<br>0.26<br>3.7<br>1.066 | 1.16<br>5.598<br>0.35<br>5.0<br>1.035 | 1.33<br>4.959<br>0.49<br>7.6<br>0.995 | 1.48<br>4.541<br>0.64<br>10.5<br>0.980 | 1.66<br>4.161<br>0.85<br>14.2<br>0.950 | 1.94<br>3.723<br>1.21<br>21.3<br>0.902 | 2.19<br>3.433<br>1.59<br>28.8<br>0.872 | 2.44<br>3.163<br>2.04<br>40.2<br>0.846 | 2.84<br>2.853<br>2.90<br>60.7<br>0.820 | 3.18<br>2.639<br>3.73<br>84.2<br>0.795  |



+

TABLE 8

SAND SIZE 0.40 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

TABLE 8

|      | 0.5                                   | 1.0                                   | 2.0                                   | 5.0                                   | 10.0                                   | 20.0                                   | 50.0                                   | 100.0                                  | 200.0                                  | 500.0                                  | 1000.0                                  |
|------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|-----------------------------------------|
| 10   | 0.44<br>0.223<br>0.46<br>2.5<br>0.327 | 0.46<br>0.180<br>0.62<br>3.5<br>0.325 | 0.48<br>0.147<br>0.82<br>5.0<br>0.324 | 0.52<br>0.114<br>1.19<br>8.2<br>0.328 | 0.55<br>0.095<br>1.54<br>11.7<br>0.324 | 0.58<br>0.079<br>2.02<br>17.0<br>0.327 | 0.63<br>0.064<br>2.86<br>27.7<br>0.333 | 0.67<br>0.055<br>3.71<br>40.2<br>0.339 | 0.72<br>0.047<br>4.81<br>58.0<br>0.345 | 0.78<br>0.039<br>6.74<br>94.6<br>0.353 | 0.84<br>0.035<br>8.68<br>136.9<br>0.359 |
| 20   | 0.45<br>0.292<br>0.43<br>2.6<br>0.373 | 0.48<br>0.241<br>0.57<br>3.7<br>0.373 | 0.51<br>0.200<br>0.76<br>5.2<br>0.374 | 0.55<br>0.159<br>1.08<br>8.4<br>0.378 | 0.58<br>0.135<br>1.41<br>12.1<br>0.381 | 0.62<br>0.115<br>1.83<br>17.5<br>0.386 | 0.68<br>0.095<br>2.61<br>28.2<br>0.393 | 0.73<br>0.083<br>3.38<br>40.6<br>0.398 | 0.78<br>0.073<br>4.38<br>58.3<br>0.404 | 0.87<br>0.062<br>5.12<br>94.4<br>0.411 | 0.94<br>0.056<br>6.12<br>136.0<br>0.416 |
| 40   | 0.48<br>0.399<br>0.42<br>2.5<br>0.452 | 0.51<br>0.335<br>0.52<br>3.8<br>0.439 | 0.54<br>0.284<br>0.69<br>5.4<br>0.441 | 0.59<br>0.231<br>0.97<br>8.7<br>0.445 | 0.63<br>0.200<br>1.28<br>12.4<br>0.450 | 0.68<br>0.174<br>1.67<br>17.8<br>0.454 | 0.74<br>0.147<br>2.35<br>28.6<br>0.460 | 0.80<br>0.130<br>3.04<br>40.9<br>0.465 | 0.88<br>0.116<br>4.06<br>55.7<br>0.471 | 0.97<br>0.101<br>5.53<br>93.0<br>0.475 | 1.06<br>0.091<br>7.13<br>132.3<br>0.478 |
| 60   | 0.49<br>0.488<br>0.37<br>2.7<br>0.483 | 0.52<br>0.415<br>0.49<br>3.9<br>0.483 | 0.56<br>0.355<br>0.65<br>5.5<br>0.486 | 0.62<br>0.293<br>0.92<br>8.8<br>0.490 | 0.66<br>0.256<br>1.20<br>12.6<br>0.494 | 0.71<br>0.226<br>1.55<br>18.1<br>0.498 | 0.79<br>0.192<br>2.21<br>28.6<br>0.504 | 0.86<br>0.172<br>2.86<br>40.7<br>0.507 | 0.93<br>0.154<br>3.70<br>57.8<br>0.510 | 1.05<br>0.135<br>4.98<br>92.1<br>0.513 | 1.15<br>0.123<br>6.69<br>130.0<br>0.515 |
| 80   | 0.51<br>0.568<br>0.36<br>2.8<br>0.517 | 0.54<br>0.486<br>0.47<br>3.9<br>0.518 | 0.58<br>0.421<br>0.62<br>5.6<br>0.520 | 0.64<br>0.350<br>0.88<br>8.9<br>0.525 | 0.69<br>0.308<br>1.15<br>12.7<br>0.528 | 0.74<br>0.272<br>1.49<br>18.0<br>0.531 | 0.83<br>0.235<br>2.13<br>28.2<br>0.536 | 0.90<br>0.210<br>2.70<br>40.6<br>0.538 | 0.98<br>0.190<br>3.54<br>57.4<br>0.540 | 1.11<br>0.167<br>4.95<br>91.0<br>0.542 | 1.22<br>0.153<br>6.38<br>128.7<br>0.547 |
| 100  | 0.52<br>0.643<br>0.34<br>2.8<br>0.546 | 0.55<br>0.553<br>0.46<br>4.0<br>0.547 | 0.59<br>0.481<br>0.60<br>5.6<br>0.549 | 0.66<br>0.403<br>0.85<br>8.9<br>0.553 | 0.71<br>0.356<br>1.11<br>12.7<br>0.555 | 0.77<br>0.317<br>1.44<br>18.1<br>0.558 | 0.86<br>0.274<br>2.03<br>28.7<br>0.561 | 0.95<br>0.247<br>2.68<br>39.4<br>0.563 | 1.03<br>0.224<br>3.41<br>57.1<br>0.564 | 1.16<br>0.198<br>4.78<br>90.1<br>0.563 | 1.28<br>0.181<br>6.16<br>126.9<br>0.562 |
| 200  | 0.56<br>0.967<br>0.31<br>2.9<br>0.645 | 0.60<br>0.847<br>0.41<br>4.1<br>0.645 | 0.65<br>0.748<br>0.53<br>5.8<br>0.645 | 0.73<br>0.640<br>0.76<br>9.1<br>0.645 | 0.79<br>0.573<br>0.99<br>12.8<br>0.645 | 0.87<br>0.516<br>1.28<br>18.1<br>0.644 | 0.98<br>0.453<br>1.81<br>28.2<br>0.643 | 1.07<br>0.412<br>2.35<br>39.6<br>0.641 | 1.18<br>0.377<br>3.04<br>55.5<br>0.637 | 1.35<br>0.338<br>4.25<br>87.0<br>0.631 | 1.50<br>0.312<br>5.48<br>121.8<br>0.626 |
| 400  | 0.61<br>1.513<br>0.28<br>3.0<br>0.778 | 0.67<br>1.342<br>0.36<br>4.1<br>0.755 | 0.73<br>1.202<br>0.48<br>5.7<br>0.751 | 0.82<br>1.045<br>0.67<br>9.0<br>0.746 | 0.90<br>0.947<br>0.87<br>12.7<br>0.741 | 0.99<br>0.862<br>1.13<br>17.9<br>0.736 | 1.13<br>0.766<br>1.61<br>27.5<br>0.727 | 1.25<br>0.703<br>2.09<br>38.3<br>0.720 | 1.38<br>0.649<br>2.69<br>53.6<br>0.711 | 1.60<br>0.585<br>3.80<br>82.5<br>0.699 | 1.77<br>0.543<br>4.91<br>115.1<br>0.698 |
| 600  | 0.65<br>1.993<br>0.26<br>3.0<br>0.851 | 0.71<br>1.782<br>0.34<br>4.1<br>0.824 | 0.78<br>1.605<br>0.44<br>5.7<br>0.817 | 0.89<br>1.411<br>0.64<br>8.8<br>0.807 | 0.98<br>1.283<br>0.82<br>12.5<br>0.799 | 1.08<br>1.174<br>1.06<br>17.5<br>0.789 | 1.24<br>1.050<br>1.50<br>27.0<br>0.777 | 1.37<br>0.970<br>1.92<br>38.0<br>0.766 | 1.53<br>0.896<br>2.52<br>51.9<br>0.754 | 1.76<br>0.812<br>3.55<br>80.2<br>0.747 | 1.96<br>0.756<br>4.58<br>111.3<br>0.734 |
| 800  | 0.68<br>2.433<br>0.25<br>3.0<br>0.893 | 0.75<br>2.190<br>0.32<br>4.2<br>0.881 | 0.83<br>1.982<br>0.42<br>5.8<br>0.865 | 0.94<br>1.749<br>0.60<br>8.9<br>0.851 | 1.04<br>1.599<br>0.78<br>12.4<br>0.841 | 1.15<br>1.468<br>1.01<br>17.1<br>0.829 | 1.33<br>1.318<br>1.44<br>26.1<br>0.813 | 1.47<br>1.218<br>1.85<br>36.8<br>0.798 | 1.64<br>1.130<br>2.39<br>51.1<br>0.783 | 1.89<br>1.027<br>3.38<br>78.0<br>0.774 | 2.12<br>0.958<br>4.37<br>107.9<br>0.758 |
| 1000 | 0.72<br>2.854<br>0.24<br>2.9<br>0.927 | 0.79<br>2.579<br>0.31<br>4.0<br>0.915 | 0.87<br>2.342<br>0.41<br>5.6<br>0.903 | 0.99<br>2.073<br>0.57<br>8.9<br>0.886 | 1.09<br>1.901<br>0.75<br>12.2<br>0.873 | 1.21<br>1.748<br>0.97<br>17.0<br>0.859 | 1.40<br>1.574<br>1.38<br>25.9<br>0.838 | 1.56<br>1.458<br>1.78<br>36.0<br>0.823 | 1.73<br>1.355<br>2.31<br>50.0<br>0.818 | 2.01<br>1.234<br>3.25<br>76.8<br>0.795 | 2.25<br>1.153<br>4.15<br>106.9<br>0.769 |
| 2000 | 0.81<br>4.757<br>0.21<br>2.9<br>1.063 | 0.90<br>4.339<br>0.27<br>4.1<br>1.043 | 1.00<br>3.975<br>0.36<br>5.6<br>1.022 | 1.16<br>3.559<br>0.51<br>8.4<br>0.993 | 1.28<br>3.285<br>0.66<br>11.7<br>0.972 | 1.44<br>3.043<br>0.87<br>15.9<br>0.949 | 1.66<br>2.757<br>1.21<br>24.8<br>0.920 | 1.86<br>2.569<br>1.59<br>33.7<br>0.909 | 2.08<br>2.395<br>2.06<br>46.7<br>0.887 | 2.37<br>2.193<br>2.79<br>75.8<br>0.870 | 2.76<br>2.054<br>3.74<br>96.8<br>0.823  |
| 4000 | 0.94<br>8.097<br>0.18<br>2.9<br>1.204 | 1.05<br>7.445<br>0.24<br>3.9<br>1.173 | 1.17<br>6.872<br>0.31<br>5.5<br>1.142 | 1.36<br>6.196<br>0.45<br>8.2<br>1.101 | 1.52<br>5.752<br>0.58<br>11.3<br>1.070 | 1.72<br>5.361<br>0.78<br>14.9<br>1.051 | 2.00<br>4.880<br>1.09<br>22.9<br>1.012 | 2.24<br>4.561<br>1.40<br>31.8<br>0.982 | 2.54<br>4.270<br>1.82<br>43.2<br>0.941 | 2.99<br>3.925<br>2.57<br>64.9<br>0.901 | 3.38<br>3.686<br>3.32<br>89.3<br>0.873  |

+





TABLE 9

SAND SIZE 0.45 MILLIMETRES

| SEDIMENT<br>CONCENTRATION<br>(PPM) | DISCHARGE (CUMECs)                    |                                       |                                       |                                       |                                        |                                        |                                        |                                        |                                        |                                        | VELOCITY (METRES/SEC)                   |                                                                        |
|------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|-----------------------------------------|------------------------------------------------------------------------|
|                                    | 0.5                                   | 1.0                                   | 2.0                                   | 5.0                                   | 10.0                                   | 20.0                                   | 50.0                                   | 100.0                                  | 200.0                                  | 500.0                                  | 1000.0                                  | SLOPE *1000<br>DEPTH (METRES)<br>WIDTH (METRES)<br>FRICTION FACTOR *10 |
| 10                                 | 0.44<br>0.230<br>0.46<br>2.5<br>0.325 | 0.46<br>0.186<br>0.62<br>3.5<br>0.323 | 0.49<br>0.151<br>0.82<br>5.0<br>0.323 | 0.53<br>0.117<br>1.16<br>8.2<br>0.321 | 0.56<br>0.098<br>1.52<br>11.8<br>0.324 | 0.59<br>0.082<br>1.98<br>17.1<br>0.329 | 0.64<br>0.067<br>2.81<br>28.0<br>0.337 | 0.68<br>0.058<br>3.63<br>40.7<br>0.343 | 0.72<br>0.050<br>4.68<br>59.2<br>0.350 | 0.79<br>0.042<br>6.57<br>96.3<br>0.361 | 0.85<br>0.037<br>8.45<br>139.6<br>0.369 |                                                                        |
|                                    | 0.46<br>0.300<br>0.42<br>2.6<br>0.373 | 0.49<br>0.248<br>0.57<br>3.6<br>0.373 | 0.51<br>0.207<br>0.74<br>5.2<br>0.375 | 0.55<br>0.165<br>1.06<br>8.5<br>0.380 | 0.59<br>0.141<br>1.38<br>12.3<br>0.385 | 0.63<br>0.121<br>1.80<br>17.7<br>0.391 | 0.68<br>0.101<br>2.54<br>28.8<br>0.400 | 0.73<br>0.088<br>3.29<br>41.4<br>0.408 | 0.79<br>0.078<br>4.25<br>59.7<br>0.415 | 0.87<br>0.068<br>5.31<br>96.7<br>0.425 | 0.94<br>0.061<br>7.60<br>139.6<br>0.432 |                                                                        |
|                                    | 0.48<br>0.412<br>0.39<br>2.7<br>0.440 | 0.51<br>0.347<br>0.51<br>3.8<br>0.442 | 0.54<br>0.296<br>0.67<br>5.5<br>0.446 | 0.59<br>0.243<br>0.95<br>8.9<br>0.453 | 0.63<br>0.211<br>1.24<br>12.8<br>0.458 | 0.68<br>0.185<br>1.62<br>18.2<br>0.465 | 0.75<br>0.158<br>2.27<br>29.4<br>0.474 | 0.81<br>0.141<br>2.94<br>42.1<br>0.481 | 0.88<br>0.127<br>3.78<br>60.5<br>0.488 | 0.98<br>0.112<br>4.93<br>96.0<br>0.496 | 1.07<br>0.102<br>6.80<br>137.7<br>0.501 |                                                                        |
| 60                                 | 0.50<br>0.506<br>0.37<br>2.8<br>0.487 | 0.53<br>0.432<br>0.48<br>3.9<br>0.490 | 0.57<br>0.372<br>0.63<br>5.6<br>0.495 | 0.62<br>0.310<br>0.90<br>9.0<br>0.502 | 0.66<br>0.273<br>1.16<br>13.0<br>0.508 | 0.72<br>0.242<br>1.50<br>18.6<br>0.514 | 0.80<br>0.209<br>2.12<br>29.6<br>0.522 | 0.86<br>0.188<br>2.74<br>42.3<br>0.528 | 0.94<br>0.171<br>3.53<br>60.3<br>0.534 | 1.05<br>0.152<br>4.93<br>96.2<br>0.540 | 1.16<br>0.140<br>6.33<br>136.8<br>0.543 |                                                                        |
|                                    | 0.50<br>0.593<br>0.35<br>2.9<br>0.529 | 0.54<br>0.510<br>0.46<br>4.0<br>0.528 | 0.58<br>0.443<br>0.60<br>5.7<br>0.532 | 0.64<br>0.373<br>0.85<br>9.2<br>0.539 | 0.69<br>0.330<br>1.10<br>13.1<br>0.545 | 0.75<br>0.295<br>1.43<br>18.7<br>0.551 | 0.83<br>0.257<br>2.01<br>29.9<br>0.558 | 0.91<br>0.233<br>2.60<br>42.4<br>0.563 | 0.99<br>0.212<br>3.36<br>60.1<br>0.567 | 1.12<br>0.190<br>4.69<br>95.4<br>0.572 | 1.23<br>0.175<br>6.03<br>135.1<br>0.574 |                                                                        |
|                                    | 0.52<br>0.672<br>0.34<br>2.9<br>0.555 | 0.56<br>0.582<br>0.44<br>4.0<br>0.559 | 0.60<br>0.509<br>0.58<br>5.8<br>0.563 | 0.66<br>0.432<br>0.81<br>9.3<br>0.569 | 0.71<br>0.384<br>1.06<br>13.2<br>0.575 | 0.77<br>0.345<br>1.38<br>18.8<br>0.580 | 0.86<br>0.302<br>1.94<br>29.9<br>0.587 | 0.94<br>0.275<br>2.50<br>42.5<br>0.590 | 1.05<br>0.253<br>3.34<br>58.9<br>0.595 | 1.17<br>0.226<br>4.51<br>94.8<br>0.597 | 1.29<br>0.209<br>5.80<br>133.8<br>0.597 |                                                                        |
| 200                                | 0.56<br>1.026<br>0.30<br>2.9<br>0.664 | 0.61<br>0.905<br>0.39<br>4.2<br>0.666 | 0.65<br>0.805<br>0.51<br>6.0<br>0.669 | 0.74<br>0.699<br>0.73<br>9.3<br>0.674 | 0.80<br>0.630<br>0.94<br>13.4<br>0.676 | 0.87<br>0.574<br>1.21<br>19.0<br>0.678 | 0.98<br>0.511<br>1.70<br>30.0<br>0.679 | 1.08<br>0.470<br>2.41<br>41.9<br>0.679 | 1.19<br>0.435<br>2.85<br>57.9<br>0.678 | 1.36<br>0.395<br>3.98<br>92.1<br>0.674 | 1.51<br>0.369<br>5.11<br>129.2<br>0.670 |                                                                        |
|                                    | 0.61<br>1.626<br>0.27<br>3.1<br>0.789 | 0.67<br>1.460<br>0.33<br>4.3<br>0.788 | 0.73<br>1.318<br>0.45<br>6.1<br>0.788 | 0.82<br>1.163<br>0.64<br>9.5<br>0.786 | 0.90<br>1.064<br>0.81<br>13.8<br>0.783 | 0.99<br>0.979<br>1.06<br>18.9<br>0.781 | 1.14<br>0.885<br>1.51<br>28.9<br>0.775 | 1.26<br>0.821<br>2.10<br>41.1<br>0.770 | 1.40<br>0.766<br>2.50<br>57.2<br>0.763 | 1.61<br>0.702<br>3.49<br>88.9<br>0.752 | 1.80<br>0.660<br>4.48<br>123.9<br>0.741 |                                                                        |
|                                    | 0.65<br>2.166<br>0.25<br>3.1<br>0.870 | 0.72<br>1.960<br>0.32<br>4.3<br>0.866 | 0.79<br>1.786<br>0.42<br>6.0<br>0.862 | 0.89<br>1.587<br>0.59<br>9.5<br>0.856 | 0.99<br>1.463<br>0.77<br>13.2<br>0.850 | 1.09<br>1.353<br>0.99<br>18.6<br>0.844 | 1.26<br>1.230<br>1.41<br>28.2<br>0.834 | 1.39<br>1.146<br>1.79<br>40.3<br>0.823 | 1.54<br>1.074<br>2.30<br>56.5<br>0.812 | 1.79<br>0.988<br>3.25<br>85.7<br>0.796 | 2.01<br>0.932<br>4.18<br>118.9<br>0.782 |                                                                        |
| 800                                | 0.69<br>2.674<br>0.24<br>3.0<br>0.931 | 0.75<br>2.430<br>0.30<br>4.4<br>0.924 | 0.83<br>2.222<br>0.40<br>6.1<br>0.917 | 0.95<br>1.992<br>0.57<br>9.7<br>0.907 | 1.04<br>1.840<br>0.72<br>13.3<br>0.898 | 1.16<br>1.708<br>0.93<br>18.5<br>0.888 | 1.34<br>1.557<br>1.32<br>28.4<br>0.873 | 1.49<br>1.457<br>1.70<br>39.5<br>0.860 | 1.67<br>1.368<br>2.20<br>54.7<br>0.846 | 1.93<br>1.264<br>3.07<br>84.2<br>0.826 | 2.17<br>1.194<br>3.93<br>117.5<br>0.810 |                                                                        |
|                                    | 0.71<br>3.155<br>0.22<br>3.2<br>0.978 | 0.79<br>2.880<br>0.29<br>4.3<br>0.970 | 0.87<br>2.643<br>0.38<br>6.1<br>0.960 | 0.99<br>2.376<br>0.53<br>9.5<br>0.947 | 1.09<br>2.203<br>0.69<br>13.2<br>0.943 | 1.22<br>2.051<br>0.90<br>18.2<br>0.922 | 1.41<br>1.875<br>1.26<br>28.1<br>0.904 | 1.58<br>1.759<br>1.64<br>38.6<br>0.888 | 1.77<br>1.653<br>2.10<br>53.8<br>0.872 | 2.06<br>1.530<br>2.96<br>82.1<br>0.849 | 2.32<br>1.447<br>3.80<br>113.6<br>0.831 |                                                                        |
|                                    | 0.81<br>5.385<br>0.19<br>3.2<br>1.134 | 0.90<br>4.960<br>0.25<br>4.4<br>1.117 | 1.00<br>4.595<br>0.33<br>6.1<br>1.098 | 1.17<br>4.179<br>0.48<br>9.0<br>1.079 | 1.30<br>3.902<br>0.61<br>12.7<br>1.050 | 1.45<br>3.656<br>0.79<br>17.5<br>1.028 | 1.69<br>3.370<br>1.11<br>26.6<br>0.998 | 1.89<br>3.175<br>1.43<br>36.9<br>0.975 | 2.15<br>3.004<br>1.88<br>49.5<br>0.949 | 2.49<br>2.791<br>2.61<br>76.8<br>0.932 | 2.82<br>2.647<br>3.37<br>105.5<br>0.907 |                                                                        |
| 4000                               | 0.94<br>9.371<br>0.17<br>3.1<br>1.298 | 1.05<br>8.716<br>0.22<br>4.3<br>1.268 | 1.18<br>8.137<br>0.29<br>5.9<br>1.237 | 1.37<br>7.458<br>0.41<br>8.9<br>1.196 | 1.54<br>7.007<br>0.53<br>12.3<br>1.164 | 1.73<br>6.603<br>0.68<br>17.0<br>1.133 | 2.04<br>6.117<br>0.97<br>25.3<br>1.089 | 2.32<br>5.791<br>1.29<br>33.3<br>1.069 | 2.62<br>5.491<br>1.66<br>45.8<br>1.038 | 3.09<br>5.128<br>2.31<br>70.2<br>0.986 | 3.49<br>4.876<br>2.95<br>97.0<br>0.956  |                                                                        |

TABLE 9





TABLE 10

SAND SIZE 0.50 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

TABLE 10

|      | 0.5                                    | 1.0                                   | 2.0                                   | 5.0                                    | 10.0                                   | 20.0                                   | 50.0                                   | 100.0                                  | 200.0                                  | 500.0                                   | 1000.0                                  |
|------|----------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|-----------------------------------------|-----------------------------------------|
| 10   | 0.45<br>0.237<br>0.46<br>2.4           | 0.47<br>0.191<br>0.62<br>3.4          | 0.50<br>0.156<br>0.81<br>5.0          | 0.53<br>0.121<br>1.15<br>8.2           | 0.56<br>0.101<br>1.51<br>11.8          | 0.60<br>0.086<br>1.96<br>17.1          | 0.64<br>0.070<br>2.76<br>28.2          | 0.68<br>0.060<br>3.57<br>41.0          | 0.73<br>0.053<br>4.59<br>59.8          | 0.81<br>0.045<br>6.60<br>93.8           | 0.86<br>0.040<br>8.24<br>141.9          |
| 20   | 0.323<br>0.47<br>0.309<br>0.42<br>2.5  | 0.321<br>0.49<br>0.256<br>0.56<br>3.6 | 0.322<br>0.52<br>0.214<br>0.73<br>5.3 | 0.320<br>0.56<br>0.171<br>1.05<br>8.5  | 0.324<br>0.60<br>0.146<br>1.36<br>12.4 | 0.329<br>0.63<br>0.126<br>1.76<br>17.9 | 0.338<br>0.69<br>0.106<br>2.47<br>29.3 | 0.346<br>0.74<br>0.094<br>3.20<br>42.2 | 0.354<br>0.79<br>0.083<br>4.12<br>61.1 | 0.370<br>0.88<br>0.073<br>5.74<br>99.2  | 0.376<br>0.95<br>0.066<br>7.35<br>143.3 |
| 40   | 0.372<br>0.49<br>0.425<br>0.38<br>2.7  | 0.372<br>0.52<br>0.360<br>0.51<br>3.8 | 0.375<br>0.55<br>0.307<br>0.66<br>5.5 | 0.381<br>0.60<br>0.253<br>0.93<br>9.0  | 0.387<br>0.64<br>0.222<br>1.21<br>13.0 | 0.395<br>0.68<br>0.196<br>1.57<br>18.6 | 0.405<br>0.75<br>0.168<br>2.20<br>30.2 | 0.415<br>0.81<br>0.151<br>2.84<br>43.3 | 0.424<br>0.88<br>0.137<br>3.64<br>62.3 | 0.436<br>0.98<br>0.122<br>5.06<br>100.4 | 0.445<br>1.09<br>0.113<br>6.67<br>137.7 |
| 60   | 0.441<br>0.50<br>0.524<br>0.36<br>2.8  | 0.445<br>0.53<br>0.449<br>0.47<br>4.0 | 0.449<br>0.57<br>0.389<br>0.61<br>5.7 | 0.457<br>0.62<br>0.326<br>0.87<br>9.2  | 0.465<br>0.67<br>0.289<br>1.13<br>13.2 | 0.473<br>0.72<br>0.258<br>1.46<br>19.1 | 0.485<br>0.80<br>0.225<br>2.03<br>30.8 | 0.494<br>0.87<br>0.204<br>2.63<br>43.8 | 0.502<br>0.94<br>0.187<br>3.38<br>62.6 | 0.513<br>1.06<br>0.168<br>4.70<br>100.3 | 0.522<br>1.16<br>0.156<br>6.02<br>143.0 |
| 80   | 0.490<br>0.51<br>0.615<br>0.34<br>2.9  | 0.494<br>0.55<br>0.532<br>0.45<br>4.0 | 0.500<br>0.59<br>0.464<br>0.59<br>5.8 | 0.509<br>0.66<br>0.395<br>0.87<br>8.8  | 0.517<br>0.69<br>0.351<br>1.07<br>13.5 | 0.526<br>0.75<br>0.316<br>1.38<br>19.3 | 0.536<br>0.84<br>0.278<br>1.93<br>31.0 | 0.545<br>0.91<br>0.254<br>2.48<br>44.3 | 0.553<br>0.99<br>0.234<br>3.20<br>62.8 | 0.561<br>1.12<br>0.211<br>4.46<br>99.9  | 0.567<br>1.24<br>0.197<br>5.71<br>141.8 |
| 100  | 0.529<br>0.52<br>0.699<br>0.33<br>2.9  | 0.534<br>0.57<br>0.611<br>0.45<br>3.9 | 0.540<br>0.60<br>0.536<br>0.56<br>5.9 | 0.554<br>0.66<br>0.458<br>0.79<br>9.5  | 0.557<br>0.72<br>0.412<br>1.02<br>13.8 | 0.565<br>0.78<br>0.371<br>1.32<br>19.5 | 0.576<br>0.87<br>0.328<br>1.85<br>31.1 | 0.583<br>0.95<br>0.302<br>2.38<br>44.3 | 0.589<br>1.04<br>0.279<br>3.05<br>63.1 | 0.597<br>1.18<br>0.253<br>4.26<br>99.7  | 0.600<br>1.30<br>0.237<br>5.47<br>140.9 |
| 200  | 0.562<br>0.56<br>1.078<br>0.29<br>3.0  | 0.571<br>0.61<br>0.958<br>0.38<br>4.3 | 0.573<br>0.66<br>0.858<br>0.49<br>6.2 | 0.582<br>0.73<br>0.751<br>0.69<br>9.9  | 0.589<br>0.80<br>0.684<br>0.89<br>14.0 | 0.597<br>0.87<br>0.628<br>1.15<br>19.9 | 0.607<br>0.99<br>0.566<br>1.61<br>31.6 | 0.613<br>1.08<br>0.526<br>2.06<br>44.8 | 0.618<br>1.20<br>0.491<br>2.67<br>62.5 | 0.624<br>1.37<br>0.452<br>3.72<br>98.1  | 0.627<br>1.52<br>0.426<br>4.76<br>137.9 |
| 400  | 0.677<br>0.62<br>1.734<br>0.26<br>3.2  | 0.682<br>0.66<br>1.572<br>0.32<br>4.8 | 0.687<br>0.73<br>1.427<br>0.43<br>6.3 | 0.694<br>0.83<br>1.274<br>0.61<br>10.0 | 0.700<br>0.91<br>1.176<br>0.78<br>14.2 | 0.704<br>1.00<br>1.092<br>1.00<br>20.0 | 0.709<br>1.14<br>0.998<br>1.39<br>31.6 | 0.711<br>1.27<br>0.938<br>1.81<br>43.4 | 0.712<br>1.41<br>0.882<br>2.32<br>61.5 | 0.711<br>1.62<br>0.819<br>3.23<br>95.3  | 0.709<br>1.81<br>0.778<br>4.14<br>133.2 |
| 600  | 0.813<br>0.64<br>2.336<br>0.23<br>3.4  | 0.829<br>0.72<br>2.127<br>0.31<br>4.5 | 0.817<br>0.79<br>1.951<br>0.40<br>6.4 | 0.820<br>0.89<br>1.757<br>0.56<br>10.1 | 0.820<br>0.98<br>1.633<br>0.71<br>14.2 | 0.820<br>1.09<br>1.527<br>0.93<br>19.7 | 0.817<br>1.25<br>1.403<br>1.29<br>31.1 | 0.813<br>1.39<br>1.323<br>1.66<br>43.3 | 0.808<br>1.55<br>1.252<br>2.13<br>60.4 | 0.798<br>1.80<br>1.169<br>2.95<br>94.1  | 0.789<br>2.03<br>1.113<br>3.82<br>129.1 |
| 800  | 0.919<br>0.70<br>2.897<br>0.23<br>3.1  | 0.902<br>0.74<br>2.660<br>0.29<br>4.7 | 0.900<br>0.83<br>2.449<br>0.37<br>6.5 | 0.897<br>0.94<br>2.220<br>0.52<br>10.2 | 0.894<br>1.05<br>2.074<br>0.68<br>14.0 | 0.889<br>1.16<br>1.943<br>0.87<br>19.8 | 0.881<br>1.35<br>1.797<br>1.23<br>30.0 | 0.873<br>1.50<br>1.697<br>1.57<br>42.6 | 0.863<br>1.68<br>1.609<br>2.01<br>59.2 | 0.848<br>1.95<br>1.507<br>2.81<br>91.2  | 0.836<br>2.19<br>1.438<br>3.61<br>126.4 |
| 1000 | 0.970<br>0.71<br>3.438<br>0.21<br>3.3  | 0.986<br>0.79<br>3.166<br>0.28<br>4.5 | 0.970<br>0.85<br>2.937<br>0.35<br>6.7 | 0.954<br>1.00<br>2.670<br>0.50<br>9.9  | 0.947<br>1.10<br>2.498<br>0.64<br>14.1 | 0.939<br>1.20<br>2.349<br>0.79<br>21.1 | 0.926<br>1.42<br>2.176<br>1.16<br>30.5 | 0.915<br>1.58<br>2.061<br>1.49<br>42.3 | 0.902<br>1.79<br>1.960<br>1.94<br>57.7 | 0.883<br>2.08<br>1.838<br>2.69<br>89.5  | 0.867<br>2.34<br>1.756<br>3.45<br>123.9 |
| 2000 | 1.021<br>0.81<br>5.973<br>0.18<br>3.4  | 1.016<br>0.90<br>5.557<br>0.24<br>4.7 | 1.030<br>1.00<br>5.197<br>0.31<br>6.5 | 0.998<br>1.16<br>4.788<br>0.43<br>10.1 | 0.989<br>1.29<br>4.516<br>0.56<br>13.9 | 0.987<br>1.46<br>4.275<br>0.72<br>19.1 | 0.962<br>1.70<br>3.993<br>1.01<br>29.3 | 0.948<br>1.84<br>3.807<br>1.22<br>44.4 | 0.932<br>2.16<br>3.631<br>1.67<br>55.4 | 0.910<br>2.53<br>3.425<br>2.33<br>84.6  | 0.891<br>2.88<br>3.286<br>3.03<br>114.4 |
| 4000 | 1.196<br>0.94<br>10.608<br>0.16<br>3.3 | 1.181<br>1.05<br>9.963<br>0.21<br>4.6 | 1.164<br>1.18<br>9.392<br>0.26<br>6.4 | 1.140<br>1.37<br>8.738<br>0.37<br>9.9  | 1.129<br>1.55<br>8.285<br>0.48<br>13.4 | 1.099<br>1.74<br>7.886<br>0.62<br>18.6 | 1.070<br>2.06<br>7.410<br>0.87<br>27.9 | 1.061<br>2.32<br>7.088<br>1.12<br>38.3 | 1.022<br>2.71<br>6.794<br>1.52<br>48.7 | 0.989<br>3.13<br>6.433<br>2.04<br>78.1  | 0.962<br>3.54<br>6.185<br>2.64<br>107.1 |
|      | 1.382                                  | 1.352                                 | 1.323                                 | 1.282                                  | 1.250                                  | 1.218                                  | 1.174                                  | 1.141                                  | 1.102                                  | 1.063                                   | 1.045                                   |





TABLE 11

SAND SIZE 0.60 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

|      | 0.5                                    | 1.0                                    | 2.0                                    | 5.0                                     | 10.0                                    | 20.0                                    | 50.0                                    | 100.0                                  | 200.0                                  | 500.0                                   | 1000.0                                  |
|------|----------------------------------------|----------------------------------------|----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|----------------------------------------|----------------------------------------|-----------------------------------------|-----------------------------------------|
| 10   | 0.46<br>0.252<br>0.45<br>2.4<br>0.320  | 0.49<br>0.204<br>0.61<br>3.4<br>0.319  | 0.51<br>0.166<br>0.80<br>4.9<br>0.319  | 0.55<br>0.129<br>1.13<br>8.1<br>0.322   | 0.58<br>0.108<br>1.47<br>11.8<br>0.322  | 0.61<br>0.092<br>1.96<br>16.7<br>0.337  | 0.66<br>0.075<br>2.68<br>28.3<br>0.339  | 0.70<br>0.065<br>3.46<br>41.3<br>0.348 | 0.74<br>0.058<br>4.43<br>60.6<br>0.359 | 0.81<br>0.050<br>6.14<br>100.2<br>0.373 | 0.87<br>0.045<br>7.85<br>146.4<br>0.385 |
| 20   | 0.48<br>0.328<br>0.42<br>2.5<br>0.369  | 0.50<br>0.272<br>0.55<br>3.6<br>0.371  | 0.53<br>0.227<br>0.72<br>5.2<br>0.374  | 0.57<br>0.183<br>1.02<br>8.6<br>0.381   | 0.61<br>0.157<br>1.32<br>12.4<br>0.389  | 0.65<br>0.137<br>1.71<br>18.1<br>0.398  | 0.70<br>0.116<br>2.38<br>31.3<br>0.411  | 0.75<br>0.103<br>3.05<br>45.6<br>0.422 | 0.80<br>0.093<br>3.90<br>63.7<br>0.438 | 0.89<br>0.082<br>5.41<br>103.6<br>0.450 | 0.96<br>0.076<br>6.91<br>150.3<br>0.462 |
| 40   | 0.50<br>0.452<br>0.37<br>2.7<br>0.441  | 0.53<br>0.384<br>0.49<br>3.9<br>0.445  | 0.56<br>0.330<br>0.64<br>5.6<br>0.452  | 0.61<br>0.274<br>0.90<br>9.1<br>0.463   | 0.65<br>0.242<br>1.16<br>13.3<br>0.472  | 0.70<br>0.215<br>1.49<br>19.3<br>0.483  | 0.77<br>0.187<br>2.08<br>31.3<br>0.499  | 0.83<br>0.171<br>2.67<br>45.5<br>0.511 | 0.89<br>0.157<br>3.41<br>63.8<br>0.523 | 1.00<br>0.142<br>4.70<br>107.0<br>0.538 | 1.08<br>0.132<br>5.97<br>154.7<br>0.548 |
| 60   | 0.51<br>0.560<br>0.35<br>2.8<br>0.492  | 0.54<br>0.482<br>0.46<br>4.0<br>0.499  | 0.58<br>0.420<br>0.59<br>5.8<br>0.506  | 0.63<br>0.356<br>0.83<br>9.5<br>0.519   | 0.68<br>0.318<br>1.07<br>13.7<br>0.530  | 0.73<br>0.287<br>1.38<br>19.8<br>0.541  | 0.81<br>0.254<br>1.91<br>32.4<br>0.556  | 0.88<br>0.234<br>2.43<br>45.9<br>0.568 | 0.95<br>0.216<br>3.12<br>67.1<br>0.580 | 1.07<br>0.198<br>4.30<br>108.6<br>0.593 | 1.17<br>0.186<br>5.43<br>156.3<br>0.602 |
| 80   | 0.52<br>0.659<br>0.33<br>2.9<br>0.534  | 0.56<br>0.575<br>0.45<br>4.0<br>0.545  | 0.60<br>0.505<br>0.56<br>6.0<br>0.550  | 0.65<br>0.433<br>0.78<br>9.7<br>0.563   | 0.72<br>0.392<br>1.06<br>13.2<br>0.579  | 0.76<br>0.355<br>1.30<br>20.3<br>0.586  | 0.85<br>0.317<br>1.80<br>32.9<br>0.601  | 0.92<br>0.293<br>2.29<br>47.4<br>0.612 | 1.00<br>0.274<br>2.92<br>68.4<br>0.622 | 1.13<br>0.253<br>4.00<br>110.9<br>0.633 | 1.24<br>0.239<br>5.13<br>157.1<br>0.641 |
| 100  | 0.53<br>0.753<br>0.32<br>2.9<br>0.569  | 0.57<br>0.660<br>0.42<br>4.2<br>0.577  | 0.61<br>0.585<br>0.54<br>6.1<br>0.586  | 0.67<br>0.507<br>0.75<br>9.9<br>0.600   | 0.73<br>0.460<br>0.96<br>14.4<br>0.610  | 0.78<br>0.421<br>1.22<br>20.9<br>0.627  | 0.88<br>0.378<br>1.71<br>33.4<br>0.636  | 0.96<br>0.352<br>2.18<br>48.0<br>0.647 | 1.04<br>0.330<br>2.78<br>69.0<br>0.656 | 1.18<br>0.305<br>3.81<br>111.1<br>0.666 | 1.30<br>0.290<br>4.84<br>159.1<br>0.672 |
| 200  | 0.57<br>1.178<br>0.28<br>3.1<br>0.696  | 0.62<br>1.058<br>0.37<br>4.4<br>0.705  | 0.66<br>0.956<br>0.46<br>6.5<br>0.713  | 0.74<br>0.850<br>0.64<br>10.5<br>0.726  | 0.80<br>0.785<br>0.82<br>15.2<br>0.735  | 0.88<br>0.729<br>1.05<br>21.6<br>0.744  | 0.99<br>0.669<br>1.45<br>34.7<br>0.755  | 1.09<br>0.631<br>1.85<br>49.7<br>0.761 | 1.20<br>0.599<br>2.35<br>71.0<br>0.766 | 1.37<br>0.563<br>3.25<br>112.0<br>0.769 | 1.52<br>0.538<br>4.13<br>159.2<br>0.771 |
| 400  | 0.62<br>1.933<br>0.24<br>3.4<br>0.848  | 0.68<br>1.768<br>0.31<br>4.8<br>0.855  | 0.74<br>1.630<br>0.40<br>6.8<br>0.862  | 0.83<br>1.479<br>0.55<br>11.0<br>0.870  | 0.91<br>1.386<br>0.71<br>15.5<br>0.876  | 1.00<br>1.305<br>0.89<br>22.4<br>0.879  | 1.14<br>1.218<br>1.23<br>35.5<br>0.884  | 1.26<br>1.159<br>1.57<br>50.6<br>0.882 | 1.40<br>1.110<br>1.98<br>72.2<br>0.881 | 1.62<br>1.053<br>2.74<br>112.7<br>0.876 | 1.81<br>1.016<br>3.49<br>158.7<br>0.870 |
| 600  | 0.65<br>2.637<br>0.21<br>3.8<br>0.938  | 0.72<br>2.433<br>0.28<br>4.9<br>0.954  | 0.79<br>2.263<br>0.36<br>7.0<br>0.958  | 0.89<br>2.075<br>0.50<br>11.3<br>0.961  | 0.99<br>1.959<br>0.64<br>15.9<br>0.963  | 1.09<br>1.856<br>0.81<br>22.7<br>0.963  | 1.26<br>1.745<br>1.13<br>35.2<br>0.960  | 1.39<br>1.669<br>1.43<br>50.5<br>0.955 | 1.55<br>1.605<br>1.81<br>71.4<br>0.949 | 1.79<br>1.531<br>2.49<br>112.1<br>0.938 | 2.01<br>1.482<br>3.17<br>157.1<br>0.927 |
| 800  | 0.69<br>3.306<br>0.20<br>3.6<br>1.026  | 0.76<br>3.072<br>0.26<br>5.0<br>1.029  | 0.84<br>2.875<br>0.34<br>7.0<br>1.030  | 0.95<br>2.657<br>0.47<br>11.2<br>1.026  | 1.05<br>2.515<br>0.59<br>16.2<br>1.024  | 1.06<br>2.410<br>0.64<br>29.6<br>1.055  | 1.33<br>2.259<br>1.04<br>36.0<br>1.015  | 1.49<br>2.170<br>1.32<br>50.8<br>1.007 | 1.68<br>2.095<br>1.72<br>69.0<br>0.996 | 1.94<br>2.002<br>2.33<br>110.6<br>0.981 | 2.18<br>1.942<br>2.96<br>155.5<br>0.967 |
| 1000 | 0.71<br>3.959<br>0.19<br>3.6<br>1.085  | 0.79<br>3.697<br>0.25<br>5.1<br>1.085  | 0.87<br>3.471<br>0.32<br>7.2<br>1.084  | 0.99<br>3.223<br>0.44<br>11.4<br>1.080  | 1.11<br>3.068<br>0.58<br>15.6<br>1.074  | 1.22<br>2.925<br>0.71<br>23.0<br>1.071  | 1.41<br>2.767<br>0.98<br>36.2<br>1.056  | 1.58<br>2.666<br>1.26<br>50.2<br>1.047 | 1.76<br>2.574<br>1.60<br>71.0<br>1.034 | 2.06<br>2.469<br>2.20<br>110.6<br>1.015 | 2.34<br>2.401<br>2.85<br>150.1<br>0.997 |
| 2000 | 0.81<br>7.075<br>0.16<br>3.8<br>1.293  | 0.90<br>6.688<br>0.21<br>5.4<br>1.282  | 1.00<br>6.346<br>0.27<br>7.5<br>1.270  | 1.15<br>5.967<br>0.37<br>11.8<br>1.251  | 1.28<br>5.722<br>0.47<br>16.7<br>1.235  | 1.44<br>5.502<br>0.60<br>23.1<br>1.217  | 1.68<br>5.252<br>0.83<br>35.9<br>1.194  | 1.89<br>5.086<br>1.06<br>50.0<br>1.172 | 2.14<br>4.939<br>1.36<br>68.9<br>1.148 | 2.50<br>4.763<br>1.86<br>107.6<br>1.124 | 2.85<br>4.647<br>2.39<br>146.6<br>1.089 |
| 4000 | 0.94<br>12.979<br>0.14<br>3.9<br>1.518 | 1.05<br>12.368<br>0.18<br>5.4<br>1.493 | 1.17<br>11.844<br>0.23<br>7.6<br>1.466 | 1.36<br>11.247<br>0.31<br>11.9<br>1.428 | 1.52<br>10.898<br>0.39<br>16.9<br>1.399 | 1.73<br>10.498<br>0.51<br>22.9<br>1.370 | 2.02<br>10.090<br>0.69<br>35.7<br>1.328 | 2.31<br>9.829<br>0.90<br>47.8<br>1.291 | 2.60<br>9.561<br>1.14<br>67.6<br>1.260 | 3.04<br>9.271<br>1.54<br>106.7<br>1.217 | 3.51<br>9.060<br>2.02<br>141.4<br>1.178 |

TABLE 11







TABLE 12

SAND SIZE 0.70 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

|      | 0.5                                    | 1.0                                    | 2.0                                    | 5.0                                     | 10.0                                    | 20.0                                    | 50.0                                    | 100.0                                   | 200.0                                    | 500.0                                    | 1000.0                                   |
|------|----------------------------------------|----------------------------------------|----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|
| 10   | 0.48<br>0.268<br>0.45<br>2.3<br>0.315  | 0.50<br>0.217<br>0.60<br>3.3<br>0.316  | 0.52<br>0.177<br>0.79<br>4.8<br>0.317  | 0.56<br>0.137<br>1.12<br>8.0<br>0.320   | 0.59<br>0.115<br>1.45<br>11.6<br>0.320  | 0.63<br>0.098<br>1.87<br>17.1<br>0.327  | 0.68<br>0.081<br>2.62<br>28.3<br>0.339  | 0.72<br>0.071<br>3.36<br>41.6<br>0.349  | 0.76<br>0.063<br>4.29<br>61.1<br>0.360   | 0.83<br>0.054<br>5.93<br>101.5<br>0.377  | 0.89<br>0.049<br>7.54<br>149.4<br>0.389  |
| 20   | 0.49<br>0.349<br>0.41<br>2.5<br>0.368  | 0.52<br>0.289<br>0.54<br>3.6<br>0.369  | 0.55<br>0.242<br>0.71<br>5.2<br>0.372  | 0.59<br>0.196<br>0.99<br>8.6<br>0.380   | 0.62<br>0.169<br>1.29<br>12.4<br>0.389  | 0.66<br>0.147<br>1.66<br>18.2<br>0.399  | 0.72<br>0.125<br>2.30<br>30.1<br>0.414  | 0.77<br>0.113<br>2.94<br>44.3<br>0.427  | 0.82<br>0.102<br>3.75<br>64.8<br>0.440   | 0.91<br>0.091<br>5.12<br>107.9<br>0.458  | 0.98<br>0.085<br>6.53<br>156.7<br>0.472  |
| 40   | 0.51<br>0.481<br>0.37<br>2.7<br>0.441  | 0.54<br>0.409<br>0.48<br>3.8<br>0.445  | 0.57<br>0.353<br>0.62<br>5.6<br>0.452  | 0.62<br>0.295<br>0.88<br>9.2<br>0.465   | 0.66<br>0.261<br>1.12<br>13.4<br>0.476  | 0.71<br>0.234<br>1.44<br>19.6<br>0.489  | 0.78<br>0.206<br>1.98<br>32.5<br>0.506  | 0.84<br>0.189<br>2.53<br>47.1<br>0.521  | 0.91<br>0.175<br>3.21<br>68.9<br>0.535   | 1.01<br>0.160<br>4.38<br>113.4<br>0.553  | 1.09<br>0.159<br>5.54<br>165.1<br>0.566  |
| 60   | 0.52<br>0.597<br>0.34<br>2.8<br>0.494  | 0.56<br>0.516<br>0.45<br>4.0<br>0.501  | 0.59<br>0.451<br>0.58<br>5.9<br>0.510  | 0.65<br>0.386<br>0.80<br>9.7<br>0.524   | 0.69<br>0.346<br>1.03<br>14.0<br>0.537  | 0.74<br>0.314<br>1.31<br>20.4<br>0.551  | 0.82<br>0.281<br>1.81<br>33.7<br>0.569  | 0.89<br>0.261<br>2.29<br>49.2<br>0.583  | 0.96<br>0.244<br>2.90<br>71.7<br>0.596   | 1.08<br>0.227<br>3.96<br>116.8<br>0.614  | 1.18<br>0.215<br>4.99<br>170.2<br>0.626  |
| 80   | 0.53<br>0.704<br>0.33<br>2.9<br>0.537  | 0.57<br>0.616<br>0.42<br>4.2<br>0.545  | 0.61<br>0.544<br>0.54<br>6.0<br>0.556  | 0.67<br>0.471<br>0.75<br>10.0<br>0.571  | 0.72<br>0.427<br>0.96<br>14.6<br>0.584  | 0.78<br>0.392<br>1.26<br>20.4<br>0.601  | 0.86<br>0.354<br>1.69<br>34.6<br>0.617  | 0.93<br>0.331<br>2.13<br>50.5<br>0.630  | 1.01<br>0.312<br>2.70<br>73.3<br>0.643   | 1.14<br>0.291<br>3.66<br>120.4<br>0.657  | 1.24<br>0.279<br>4.59<br>175.4<br>0.667  |
| 100  | 0.54<br>0.806<br>0.31<br>3.0<br>0.574  | 0.58<br>0.711<br>0.40<br>4.3<br>0.583  | 0.62<br>0.634<br>0.51<br>6.3<br>0.593  | 0.68<br>0.553<br>0.72<br>10.2<br>0.610  | 0.74<br>0.506<br>0.91<br>14.9<br>0.624  | 0.79<br>0.479<br>1.16<br>21.8<br>0.637  | 0.89<br>0.424<br>1.59<br>35.4<br>0.656  | 0.96<br>0.399<br>2.01<br>51.5<br>0.669  | 1.05<br>0.378<br>2.55<br>74.8<br>0.681   | 1.18<br>0.355<br>3.45<br>122.5<br>0.693  | 1.30<br>0.341<br>4.33<br>177.7<br>0.702  |
| 200  | 0.58<br>1.275<br>0.27<br>3.2<br>0.708  | 0.62<br>1.150<br>0.35<br>4.6<br>0.718  | 0.68<br>1.050<br>0.44<br>6.7<br>0.731  | 0.75<br>0.943<br>0.60<br>11.1<br>0.748  | 0.81<br>0.878<br>0.77<br>16.0<br>0.760  | 0.88<br>0.825<br>0.96<br>23.5<br>0.769  | 1.00<br>0.766<br>1.32<br>37.9<br>0.784  | 1.09<br>0.730<br>1.67<br>54.8<br>0.794  | 1.20<br>0.700<br>2.10<br>79.5<br>0.802   | 1.36<br>0.668<br>2.83<br>130.1<br>0.810  | 1.50<br>0.648<br>3.54<br>188.4<br>0.814  |
| 400  | 0.63<br>2.121<br>0.23<br>3.4<br>0.873  | 0.68<br>1.956<br>0.29<br>5.0<br>0.883  | 0.74<br>1.818<br>0.37<br>7.3<br>0.890  | 0.83<br>1.672<br>0.51<br>11.8<br>0.903  | 0.91<br>1.581<br>0.64<br>17.2<br>0.912  | 1.01<br>1.507<br>0.82<br>24.3<br>0.921  | 1.14<br>1.424<br>1.09<br>40.3<br>0.928  | 1.25<br>1.329<br>1.37<br>58.3<br>0.932  | 1.38<br>1.329<br>1.72<br>84.0<br>0.934   | 1.58<br>1.281<br>2.31<br>136.8<br>0.933  | 1.75<br>1.251<br>2.86<br>199.5<br>0.931  |
| 600  | 0.66<br>2.916<br>0.20<br>3.7<br>0.979  | 0.73<br>2.718<br>0.26<br>5.2<br>0.989  | 0.79<br>2.552<br>0.33<br>7.6<br>0.996  | 0.90<br>2.374<br>0.45<br>12.3<br>1.006  | 0.98<br>2.263<br>0.57<br>17.9<br>1.011  | 1.09<br>2.171<br>0.72<br>25.5<br>1.015  | 1.31<br>2.068<br>0.97<br>41.8<br>1.017  | 1.47<br>2.004<br>1.22<br>60.2<br>1.016  | 1.53<br>1.951<br>1.55<br>84.5<br>1.013   | 1.75<br>1.889<br>2.06<br>139.3<br>1.007  | 1.94<br>1.851<br>2.56<br>201.8<br>1.000  |
| 800  | 0.69<br>3.687<br>0.19<br>3.8<br>1.065  | 0.76<br>3.460<br>0.24<br>5.5<br>1.071  | 0.84<br>3.273<br>0.32<br>7.5<br>1.078  | 0.94<br>3.063<br>0.42<br>12.7<br>1.082  | 1.05<br>2.938<br>0.54<br>17.8<br>1.084  | 1.15<br>2.826<br>0.66<br>26.4<br>1.084  | 1.31<br>2.706<br>0.89<br>42.8<br>1.082  | 1.47<br>2.632<br>1.13<br>60.5<br>1.077  | 1.62<br>2.567<br>1.40<br>87.9<br>1.071   | 1.87<br>2.496<br>1.88<br>142.9<br>1.060  | 2.12<br>2.455<br>2.42<br>194.4<br>1.047  |
| 1000 | 0.72<br>4.443<br>0.18<br>3.9<br>1.134  | 0.79<br>4.190<br>0.23<br>5.6<br>1.138  | 0.86<br>3.978<br>0.29<br>8.1<br>1.141  | 0.97<br>3.751<br>0.39<br>13.4<br>1.167  | 1.10<br>3.602<br>0.50<br>18.2<br>1.142  | 1.20<br>3.477<br>0.62<br>27.0<br>1.139  | 1.38<br>3.342<br>0.84<br>43.0<br>1.132  | 1.53<br>3.256<br>1.04<br>62.5<br>1.125  | 1.71<br>3.183<br>1.31<br>89.7<br>1.116   | 1.99<br>3.104<br>1.77<br>142.2<br>1.100  | 2.21<br>3.051<br>2.19<br>207.0<br>1.087  |
| 2000 | 0.81<br>8.103<br>0.15<br>4.2<br>1.370  | 0.89<br>7.741<br>0.19<br>6.0<br>1.363  | 0.98<br>7.438<br>0.23<br>8.7<br>1.355  | 1.13<br>7.094<br>0.32<br>13.9<br>1.343  | 1.26<br>6.881<br>0.40<br>19.9<br>1.331  | 1.40<br>6.701<br>0.50<br>28.9<br>1.317  | 1.62<br>6.496<br>0.67<br>45.8<br>1.295  | 1.81<br>6.377<br>0.86<br>64.2<br>1.301  | 2.06<br>6.260<br>1.08<br>89.5<br>1.254   | 2.36<br>6.136<br>1.42<br>148.9<br>1.228  | 2.71<br>6.064<br>1.84<br>200.2<br>1.200  |
| 4000 | 0.92<br>15.194<br>0.12<br>4.5<br>1.631 | 1.02<br>14.666<br>0.15<br>6.4<br>1.610 | 1.15<br>14.226<br>0.19<br>8.9<br>1.585 | 1.32<br>13.694<br>0.26<br>14.6<br>1.555 | 1.48<br>13.375<br>0.32<br>21.0<br>1.529 | 1.64<br>13.106<br>0.40<br>30.6<br>1.502 | 1.93<br>12.791<br>0.54<br>47.7<br>1.462 | 2.15<br>12.596<br>0.68<br>68.7<br>1.432 | 2.39<br>12.434<br>0.82<br>102.0<br>1.404 | 2.83<br>12.239<br>1.13<br>157.1<br>1.358 | 3.15<br>12.122<br>1.38<br>229.9<br>1.328 |

TABLE 12





SAND SIZE 0.80 MILLIMETRES

| SEDIMENT<br>CONCENTRATION<br>(PPM) | DISCHARGE (CUMECs) |        |        |        |        |        |        |        |        |        |        |
|------------------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                    | 0.5                | 1.0    | 2.0    | 5.0    | 10.0   | 20.0   | 50.0   | 100.0  | 200.0  | 500.0  | 1000.0 |
| 10                                 | 0.49               | 0.51   | 0.54   | 0.58   | 0.60   | 0.64   | 0.69   | 0.73   | 0.78   | 0.85   | 0.91   |
|                                    | 0.286              | 0.231  | 0.189  | 0.146  | 0.123  | 0.105  | 0.087  | 0.076  | 0.067  | 0.059  | 0.054  |
|                                    | 0.45               | 0.59   | 0.81   | 1.10   | 1.43   | 1.83   | 2.55   | 3.28   | 4.18   | 5.75   | 7.28   |
|                                    | 2.3                | 3.3    | 4.5    | 7.9    | 11.6   | 17.0   | 28.3   | 41.6   | 61.3   | 102.3  | 151.3  |
|                                    | 0.315              | 0.312  | 0.320  | 0.319  | 0.326  | 0.326  | 0.338  | 0.349  | 0.361  | 0.378  | 0.392  |
| 20                                 | 0.50               | 0.53   | 0.56   | 0.60   | 0.64   | 0.68   | 0.74   | 0.79   | 0.84   | 0.92   | 0.99   |
|                                    | 0.371              | 0.307  | 0.258  | 0.209  | 0.181  | 0.158  | 0.135  | 0.122  | 0.111  | 0.100  | 0.094  |
|                                    | 0.41               | 0.54   | 0.70   | 0.98   | 1.25   | 1.62   | 2.24   | 2.85   | 3.61   | 4.92   | 6.18   |
|                                    | 2.5                | 3.5    | 5.1    | 8.5    | 12.5   | 18.2   | 30.4   | 44.7   | 65.8   | 110.1  | 162.9  |
|                                    | 0.373              | 0.368  | 0.372  | 0.380  | 0.388  | 0.399  | 0.415  | 0.429  | 0.444  | 0.463  | 0.478  |
| 40                                 | 0.52               | 0.55   | 0.59   | 0.64   | 0.68   | 0.72   | 0.79   | 0.85   | 0.92   | 1.02   | 1.11   |
|                                    | 0.513              | 0.436  | 0.376  | 0.316  | 0.281  | 0.253  | 0.224  | 0.207  | 0.193  | 0.178  | 0.169  |
|                                    | 0.38               | 0.48   | 0.61   | 0.85   | 1.09   | 1.39   | 1.91   | 2.40   | 3.05   | 4.12   | 5.16   |
|                                    | 2.5                | 3.8    | 5.6    | 9.2    | 13.5   | 19.8   | 33.1   | 48.9   | 71.4   | 119.1  | 175.5  |
|                                    | 0.445              | 0.446  | 0.453  | 0.467  | 0.478  | 0.492  | 0.512  | 0.527  | 0.543  | 0.563  | 0.577  |
| 60                                 | 0.53               | 0.57   | 0.60   | 0.66   | 0.70   | 0.76   | 0.83   | 0.90   | 0.97   | 1.09   | 1.18   |
|                                    | 0.635              | 0.551  | 0.483  | 0.415  | 0.375  | 0.342  | 0.308  | 0.288  | 0.271  | 0.254  | 0.244  |
|                                    | 0.34               | 0.43   | 0.56   | 0.78   | 0.99   | 1.26   | 1.72   | 2.17   | 2.72   | 3.65   | 4.54   |
|                                    | 2.8                | 4.1    | 5.9    | 9.7    | 14.4   | 20.9   | 34.8   | 51.2   | 75.4   | 126.1  | 186.6  |
|                                    | 0.495              | 0.502  | 0.512  | 0.528  | 0.541  | 0.557  | 0.577  | 0.593  | 0.608  | 0.626  | 0.639  |
| 80                                 | 0.54               | 0.58   | 0.62   | 0.68   | 0.73   | 0.78   | 0.87   | 0.94   | 1.02   | 1.14   | 1.24   |
|                                    | 0.751              | 0.658  | 0.585  | 0.508  | 0.464  | 0.428  | 0.390  | 0.367  | 0.348  | 0.329  | 0.317  |
|                                    | 0.32               | 0.41   | 0.52   | 0.73   | 0.93   | 1.17   | 1.60   | 2.00   | 2.51   | 3.37   | 4.18   |
|                                    | 2.9                | 4.2    | 6.2    | 10.1   | 14.8   | 21.9   | 36.1   | 53.0   | 78.1   | 130.2  | 192.9  |
|                                    | 0.539              | 0.548  | 0.558  | 0.576  | 0.591  | 0.606  | 0.628  | 0.641  | 0.656  | 0.675  | 0.687  |
| 100                                | 0.56               | 0.59   | 0.63   | 0.70   | 0.75   | 0.81   | 0.90   | 0.98   | 1.06   | 1.18   | 1.29   |
|                                    | 0.861              | 0.761  | 0.682  | 0.600  | 0.551  | 0.511  | 0.470  | 0.446  | 0.424  | 0.403  | 0.390  |
|                                    | 0.31               | 0.39   | 0.50   | 0.69   | 0.87   | 1.10   | 1.49   | 1.90   | 2.35   | 3.14   | 3.90   |
|                                    | 2.9                | 4.3    | 6.3    | 10.4   | 15.3   | 22.5   | 37.5   | 53.8   | 80.5   | 134.5  | 198.3  |
|                                    | 0.579              | 0.587  | 0.599  | 0.617  | 0.632  | 0.648  | 0.666  | 0.683  | 0.696  | 0.714  | 0.725  |
| 200                                | 0.59               | 0.63   | 0.64   | 0.76   | 0.82   | 0.89   | 0.99   | 1.09   | 1.19   | 1.34   | 1.47   |
|                                    | 1.370              | 1.243  | 1.148  | 1.033  | 0.969  | 0.916  | 0.861  | 0.827  | 0.799  | 0.770  | 0.753  |
|                                    | 0.26               | 0.33   | 0.37   | 0.57   | 0.71   | 0.90   | 1.20   | 1.52   | 1.88   | 2.49   | 3.06   |
|                                    | 3.3                | 4.7    | 8.4    | 11.5   | 17.3   | 24.8   | 41.9   | 60.3   | 89.2   | 149.8  | 222.9  |
|                                    | 0.716              | 0.728  | 0.750  | 0.761  | 0.772  | 0.789  | 0.806  | 0.819  | 0.830  | 0.842  | 0.848  |
| 400                                | 0.64               | 0.69   | 0.75   | 0.82   | 0.92   | 1.00   | 1.13   | 1.24   | 1.35   | 1.53   | 1.68   |
|                                    | 2.302              | 2.136  | 2.000  | 1.861  | 1.770  | 1.699  | 1.625  | 1.579  | 1.541  | 1.503  | 1.480  |
|                                    | 0.22               | 0.28   | 0.35   | 0.45   | 0.59   | 0.73   | 0.99   | 1.21   | 1.48   | 1.94   | 2.35   |
|                                    | 3.5                | 5.2    | 7.7    | 13.5   | 18.6   | 27.4   | 44.7   | 67.0   | 99.7   | 168.5  | 253.2  |
|                                    | 0.891              | 0.899  | 0.912  | 0.946  | 0.941  | 0.952  | 0.964  | 0.971  | 0.976  | 0.979  | 0.978  |
| 600                                | 0.67               | 0.74   | 0.80   | 0.89   | 0.98   | 1.07   | 1.22   | 1.33   | 1.46   | 1.70   | 1.84   |
|                                    | 3.188              | 2.995  | 2.831  | 2.660  | 2.557  | 2.471  | 2.383  | 2.328  | 2.284  | 2.243  | 2.214  |
|                                    | 0.19               | 0.26   | 0.31   | 0.41   | 0.52   | 0.64   | 0.86   | 1.04   | 1.28   | 1.73   | 2.05   |
|                                    | 3.9                | 5.3    | 8.2    | 13.6   | 19.7   | 29.2   | 47.9   | 71.7   | 107.2  | 170.3  | 265.2  |
|                                    | 1.004              | 1.020  | 1.027  | 1.048  | 1.049  | 1.056  | 1.062  | 1.065  | 1.066  | 1.061  | 1.059  |
| 800                                | 0.70               | 0.76   | 0.84   | 0.94   | 1.03   | 1.13   | 1.28   | 1.41   | 1.54   | 1.76   | 1.92   |
|                                    | 4.054              | 3.832  | 3.649  | 3.455  | 3.337  | 3.240  | 3.139  | 3.078  | 3.028  | 2.979  | 2.950  |
|                                    | 0.18               | 0.22   | 0.29   | 0.38   | 0.47   | 0.58   | 0.77   | 0.94   | 1.14   | 1.49   | 1.77   |
|                                    | 4.0                | 5.9    | 8.2    | 14.0   | 20.6   | 30.5   | 50.8   | 75.9   | 113.6  | 190.7  | 294.7  |
|                                    | 1.096              | 1.105  | 1.126  | 1.124  | 1.130  | 1.133  | 1.135  | 1.135  | 1.137  | 1.124  | 1.119  |
| 1000                               | 0.72               | 0.79   | 0.86   | 1.01   | 1.10   | 1.18   | 1.34   | 1.50   | 1.63   | 1.82   | 1.99   |
|                                    | 4.906              | 4.662  | 4.460  | 4.251  | 4.119  | 4.008  | 3.896  | 3.834  | 3.777  | 3.721  | 3.691  |
|                                    | 0.17               | 0.21   | 0.26   | 0.38   | 0.46   | 0.54   | 0.70   | 0.89   | 1.06   | 1.33   | 1.58   |
|                                    | 4.2                | 6.1    | 8.9    | 13.1   | 20.0   | 31.7   | 53.0   | 74.8   | 116.6  | 205.9  | 317.7  |
|                                    | 1.171              | 1.178  | 1.185  | 1.194  | 1.195  | 1.202  | 1.194  | 1.186  | 1.182  | 1.174  | 1.167  |
| 2000                               | 0.80               | 0.88   | 0.97   | 1.14   | 1.22   | 1.34   | 1.51   | 1.69   | 1.84   | 2.04   | 2.33   |
|                                    | 9.083              | 8.748  | 8.472  | 8.196  | 7.999  | 7.855  | 7.709  | 7.633  | 7.551  | 7.486  | 7.452  |
|                                    | 0.14               | 0.17   | 0.21   | 0.29   | 0.34   | 0.41   | 0.53   | 0.65   | 0.77   | 0.95   | 1.23   |
|                                    | 4.6                | 6.7    | 9.9    | 14.9   | 24.2   | 36.0   | 62.8   | 91.2   | 141.2  | 259.3  | 349.7  |
|                                    | 1.430              | 1.427  | 1.424  | 1.414  | 1.406  | 1.397  | 1.383  | 1.367  | 1.357  | 1.339  | 1.321  |
| 4000                               | 0.91               | 1.00   | 1.10   | 1.26   | 1.40   | 1.54   | 1.72   | 1.98   | 2.07   | 2.27   | 2.39   |
|                                    | 17.313             | 16.847 | 16.469 | 16.056 | 15.818 | 15.627 | 15.439 | 15.357 | 15.244 | 15.171 | 15.136 |
|                                    | 0.11               | 0.13   | 0.16   | 0.21   | 0.26   | 0.31   | 0.39   | 0.51   | 0.55   | 0.66   | 0.73   |
|                                    | 5.1                | 7.5    | 11.1   | 18.5   | 27.5   | 41.5   | 74.1   | 99.4   | 175.5  | 335.7  | 576.5  |
|                                    | 1.723              | 1.704  | 1.686  | 1.660  | 1.640  | 1.619  | 1.592  | 1.556  | 1.546  | 1.522  | 1.500  |

TABLE 13

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10



TABLE 14

SAND SIZE 0.90 MILLIMETRES

| SEDIMENT<br>CONCENTRATION<br>(PPM) | DISCHARGE (CUMECs) |        |        |        |        |        |        |        |        |        | VELOCITY (METRES/SEC) |  |
|------------------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------------------|--|
|                                    |                    |        |        |        |        |        |        |        |        |        | SLOPE *1000           |  |
|                                    |                    |        |        |        |        |        |        |        |        |        | DEPTH (METRES)        |  |
|                                    |                    |        |        |        |        |        |        |        |        |        | WIDTH (METRES)        |  |
|                                    |                    |        |        |        |        |        |        |        |        |        | FRICTION FACTOR *10   |  |
|                                    | 0.5                | 1.0    | 2.0    | 5.0    | 10.0   | 20.0   | 50.0   | 100.0  | 200.0  | 500.0  | 1000.0                |  |
| 10                                 | 0.50               | 0.53   | 0.55   | 0.59   | 0.62   | 0.66   | 0.71   | 0.75   | 0.80   | 0.87   | 0.93                  |  |
|                                    | 0.305              | 0.246  | 0.200  | 0.156  | 0.131  | 0.112  | 0.092  | 0.081  | 0.073  | 0.064  | 0.058                 |  |
|                                    | 2.3                | 3.2    | 4.7    | 7.8    | 11.4   | 16.8   | 28.1   | 41.5   | 61.2   | 102.8  | 152.9                 |  |
| 20                                 | 0.316              | 0.313  | 0.312  | 0.319  | 0.323  | 0.325  | 0.337  | 0.348  | 0.361  | 0.379  | 0.394                 |  |
|                                    | 0.51               | 0.54   | 0.57   | 0.62   | 0.65   | 0.70   | 0.75   | 0.80   | 0.86   | 0.94   | 1.01                  |  |
|                                    | 0.395              | 0.328  | 0.274  | 0.222  | 0.193  | 0.170  | 0.145  | 0.132  | 0.121  | 0.109  | 0.103                 |  |
| 40                                 | 0.40               | 0.47   | 0.69   | 0.96   | 1.23   | 1.63   | 2.18   | 2.76   | 3.50   | 4.73   | 5.93                  |  |
|                                    | 0.374              | 0.379  | 0.372  | 0.380  | 0.389  | 0.403  | 0.416  | 0.431  | 0.446  | 0.467  | 0.483                 |  |
|                                    | 0.53               | 0.56   | 0.60   | 0.65   | 0.69   | 0.74   | 0.81   | 0.87   | 0.93   | 1.03   | 1.12                  |  |
| 60                                 | 0.544              | 0.464  | 0.401  | 0.339  | 0.301  | 0.272  | 0.242  | 0.225  | 0.211  | 0.196  | 0.188                 |  |
|                                    | 0.36               | 0.47   | 0.60   | 0.83   | 1.06   | 1.35   | 1.84   | 2.32   | 2.90   | 3.90   | 4.84                  |  |
|                                    | 0.441              | 0.447  | 0.454  | 0.471  | 0.480  | 0.495  | 0.515  | 0.531  | 0.548  | 0.569  | 0.585                 |  |
| 80                                 | 0.55               | 0.58   | 0.62   | 0.67   | 0.72   | 0.77   | 0.85   | 0.91   | 0.99   | 1.10   | 1.19                  |  |
|                                    | 0.676              | 0.587  | 0.516  | 0.445  | 0.403  | 0.370  | 0.335  | 0.315  | 0.298  | 0.281  | 0.272                 |  |
|                                    | 0.33               | 0.43   | 0.59   | 0.76   | 0.96   | 1.21   | 1.65   | 2.07   | 2.58   | 3.42   | 4.22                  |  |
| 100                                | 0.496              | 0.504  | 0.514  | 0.530  | 0.545  | 0.560  | 0.583  | 0.600  | 0.615  | 0.636  | 0.651                 |  |
|                                    | 0.56               | 0.59   | 0.63   | 0.69   | 0.74   | 0.80   | 0.88   | 0.95   | 1.03   | 1.15   | 1.24                  |  |
|                                    | 0.800              | 0.702  | 0.625  | 0.547  | 0.501  | 0.464  | 0.426  | 0.403  | 0.384  | 0.366  | 0.355                 |  |
| 200                                | 0.32               | 0.40   | 0.51   | 0.71   | 0.89   | 1.12   | 1.50   | 1.89   | 2.35   | 3.11   | 3.81                  |  |
|                                    | 0.542              | 0.550  | 0.562  | 0.581  | 0.596  | 0.612  | 0.632  | 0.650  | 0.667  | 0.687  | 0.701                 |  |
|                                    | 0.57               | 0.60   | 0.65   | 0.71   | 0.76   | 0.82   | 0.91   | 0.98   | 1.09   | 1.19   | 1.29                  |  |
| 400                                | 0.917              | 0.814  | 0.731  | 0.647  | 0.596  | 0.556  | 0.515  | 0.490  | 0.471  | 0.450  | 0.438                 |  |
|                                    | 0.30               | 0.38   | 0.49   | 0.66   | 0.84   | 1.06   | 1.41   | 1.75   | 2.28   | 2.87   | 3.51                  |  |
|                                    | 0.580              | 0.591  | 0.603  | 0.622  | 0.639  | 0.656  | 0.676  | 0.692  | 0.712  | 0.728  | 0.741                 |  |
| 600                                | 0.60               | 0.65   | 0.69   | 0.77   | 0.83   | 0.91   | 1.00   | 1.08   | 1.18   | 1.32   | 1.43                  |  |
|                                    | 1.467              | 1.338  | 1.231  | 1.123  | 1.058  | 1.009  | 0.953  | 0.922  | 0.896  | 0.870  | 0.856                 |  |
|                                    | 0.25               | 0.33   | 0.41   | 0.55   | 0.69   | 0.88   | 1.13   | 1.37   | 1.70   | 2.19   | 2.63                  |  |
| 800                                | 0.723              | 0.738  | 0.751  | 0.771  | 0.787  | 0.806  | 0.823  | 0.836  | 0.850  | 0.862  | 0.871                 |  |
|                                    | 0.63               | 0.69   | 0.71   | 0.84   | 0.92   | 1.00   | 1.12   | 1.23   | 1.33   | 1.47   | 1.58                  |  |
|                                    | 2.483              | 2.316  | 2.194  | 2.039  | 1.957  | 1.888  | 1.819  | 1.782  | 1.749  | 1.718  | 1.702                 |  |
| 1000                               | 0.21               | 0.26   | 0.28   | 0.44   | 0.55   | 0.67   | 0.88   | 1.09   | 1.29   | 1.61   | 1.88                  |  |
|                                    | 0.931              | 0.935  | 0.943  | 0.949  | 0.964  | 0.976  | 0.990  | 0.999  | 1.005  | 1.012  | 1.014                 |  |
|                                    | 0.68               | 0.74   | 0.80   | 0.90   | 0.97   | 1.07   | 1.19   | 1.31   | 1.41   | 1.55   | 1.65                  |  |
| 2000                               | 3.458              | 3.263  | 3.104  | 2.940  | 2.848  | 2.766  | 2.687  | 2.645  | 2.609  | 2.577  | 2.560                 |  |
|                                    | 0.19               | 0.23   | 0.29   | 0.39   | 0.47   | 0.58   | 0.74   | 0.92   | 1.07   | 1.31   | 1.50                  |  |
|                                    | 1.024              | 1.037  | 1.058  | 1.067  | 1.098  | 1.087  | 1.095  | 1.100  | 1.104  | 1.106  | 1.107                 |  |
| 4000                               | 0.70               | 0.76   | 0.83   | 0.93   | 1.02   | 1.12   | 1.24   | 1.36   | 1.46   | 1.59   | 1.69                  |  |
|                                    | 4.415              | 4.196  | 4.020  | 3.836  | 3.729  | 3.645  | 3.558  | 3.512  | 3.475  | 3.442  | 3.427                 |  |
|                                    | 0.17               | 0.21   | 0.26   | 0.35   | 0.42   | 0.52   | 0.65   | 0.80   | 0.92   | 1.11   | 1.24                  |  |
| 6000                               | 1.120              | 1.132  | 1.143  | 1.163  | 1.165  | 1.169  | 1.175  | 1.177  | 1.179  | 1.177  | 1.176                 |  |
|                                    | 0.72               | 0.79   | 0.86   | 0.96   | 1.05   | 1.13   | 1.29   | 1.41   | 1.50   | 1.63   | 1.71                  |  |
|                                    | 5.361              | 5.123  | 4.931  | 4.734  | 4.623  | 4.533  | 4.434  | 4.386  | 4.348  | 4.315  | 4.300                 |  |
| 8000                               | 0.16               | 0.20   | 0.24   | 0.31   | 0.39   | 0.45   | 0.59   | 0.72   | 0.82   | 0.96   | 1.05                  |  |
|                                    | 1.200              | 1.210  | 1.219  | 1.228  | 1.240  | 1.255  | 1.239  | 1.239  | 1.237  | 1.235  | 1.223                 |  |
|                                    | 0.80               | 0.87   | 0.96   | 1.07   | 1.21   | 1.27   | 1.41   | 1.50   | 1.57   | 1.64   | 1.81                  |  |
| 10000                              | 10.038             | 9.726  | 9.477  | 9.229  | 9.102  | 8.971  | 8.869  | 8.818  | 8.784  | 8.759  | 8.760                 |  |
|                                    | 0.15               | 0.19   | 0.24   | 0.31   | 0.39   | 0.45   | 0.59   | 0.72   | 0.82   | 0.96   | 1.05                  |  |
|                                    | 1.478              | 1.479  | 1.476  | 1.473  | 1.467  | 1.465  | 1.456  | 1.449  | 1.445  | 1.441  | 1.427                 |  |
| 15000                              | 0.89               | 0.98   | 1.06   | 1.19   | 1.27   | 1.39   | 1.50   | 1.57   | 1.62   | 1.66   | 1.67                  |  |
|                                    | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
|                                    | 0.10               | 0.14   | 0.17   | 0.20   | 0.23   | 0.25   | 0.27   | 0.30   | 0.32   | 0.33   | 0.34                  |  |
| 20000                              | 1.798              | 1.784  | 1.772  | 1.752  | 1.736  | 1.726  | 1.710  | 1.701  | 1.694  | 1.691  | 1.690                 |  |
|                                    | 0.89               | 0.98   | 1.06   | 1.19   | 1.27   | 1.39   | 1.50   | 1.57   | 1.62   | 1.66   | 1.67                  |  |
|                                    | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
| 25000                              | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
|                                    | 0.10               | 0.14   | 0.17   | 0.20   | 0.23   | 0.25   | 0.27   | 0.30   | 0.32   | 0.33   | 0.34                  |  |
|                                    | 1.798              | 1.784  | 1.772  | 1.752  | 1.736  | 1.726  | 1.710  | 1.701  | 1.694  | 1.691  | 1.690                 |  |
| 30000                              | 0.89               | 0.98   | 1.06   | 1.19   | 1.27   | 1.39   | 1.50   | 1.57   | 1.62   | 1.66   | 1.67                  |  |
|                                    | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
|                                    | 0.10               | 0.14   | 0.17   | 0.20   | 0.23   | 0.25   | 0.27   | 0.30   | 0.32   | 0.33   | 0.34                  |  |
| 35000                              | 1.798              | 1.784  | 1.772  | 1.752  | 1.736  | 1.726  | 1.710  | 1.701  | 1.694  | 1.691  | 1.690                 |  |
|                                    | 0.89               | 0.98   | 1.06   | 1.19   | 1.27   | 1.39   | 1.50   | 1.57   | 1.62   | 1.66   | 1.67                  |  |
|                                    | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
| 40000                              | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
|                                    | 0.10               | 0.14   | 0.17   | 0.20   | 0.23   | 0.25   | 0.27   | 0.30   | 0.32   | 0.33   | 0.34                  |  |
|                                    | 1.798              | 1.784  | 1.772  | 1.752  | 1.736  | 1.726  | 1.710  | 1.701  | 1.694  | 1.691  | 1.690                 |  |
| 45000                              | 0.89               | 0.98   | 1.06   | 1.19   | 1.27   | 1.39   | 1.50   | 1.57   | 1.62   | 1.66   | 1.67                  |  |
|                                    | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
|                                    | 0.10               | 0.14   | 0.17   | 0.20   | 0.23   | 0.25   | 0.27   | 0.30   | 0.32   | 0.33   | 0.34                  |  |
| 50000                              | 1.798              | 1.784  | 1.772  | 1.752  | 1.736  | 1.726  | 1.710  | 1.701  | 1.694  | 1.691  | 1.690                 |  |
|                                    | 0.89               | 0.98   | 1.06   | 1.19   | 1.27   | 1.39   | 1.50   | 1.57   | 1.62   | 1.66   | 1.67                  |  |
|                                    | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
| 55000                              | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
|                                    | 0.10               | 0.14   | 0.17   | 0.20   | 0.23   | 0.25   | 0.27   | 0.30   | 0.32   | 0.33   | 0.34                  |  |
|                                    | 1.798              | 1.784  | 1.772  | 1.752  | 1.736  | 1.726  | 1.710  | 1.701  | 1.694  | 1.691  | 1.690                 |  |
| 60000                              | 0.89               | 0.98   | 1.06   | 1.19   | 1.27   | 1.39   | 1.50   | 1.57   | 1.62   | 1.66   | 1.67                  |  |
|                                    | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
|                                    | 0.10               | 0.14   | 0.17   | 0.20   | 0.23   | 0.25   | 0.27   | 0.30   | 0.32   | 0.33   | 0.34                  |  |
| 65000                              | 1.798              | 1.784  | 1.772  | 1.752  | 1.736  | 1.726  | 1.710  | 1.701  | 1.694  | 1.691  | 1.690                 |  |
|                                    | 0.89               | 0.98   | 1.06   | 1.19   | 1.27   | 1.39   | 1.50   | 1.57   | 1.62   | 1.66   | 1.67                  |  |
|                                    | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
| 70000                              | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
|                                    | 0.10               | 0.14   | 0.17   | 0.20   | 0.23   | 0.25   | 0.27   | 0.30   | 0.32   | 0.33   | 0.34                  |  |
|                                    | 1.798              | 1.784  | 1.772  | 1.752  | 1.736  | 1.726  | 1.710  | 1.701  | 1.694  | 1.691  | 1.690                 |  |
| 75000                              | 0.89               | 0.98   | 1.06   | 1.19   | 1.27   | 1.39   | 1.50   | 1.57   | 1.62   | 1.66   | 1.67                  |  |
|                                    | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
|                                    | 0.10               | 0.14   | 0.17   | 0.20   | 0.23   | 0.25   | 0.27   | 0.30   | 0.32   | 0.33   | 0.34                  |  |
| 80000                              | 1.798              | 1.784  | 1.772  | 1.752  | 1.736  | 1.726  | 1.710  | 1.701  | 1.694  | 1.691  | 1.690                 |  |
|                                    | 0.89               | 0.98   | 1.06   | 1.19   | 1.27   | 1.39   | 1.50   | 1.57   | 1.62   | 1.66   | 1.67                  |  |
|                                    | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
| 85000                              | 19.343             | 18.959 | 18.644 | 18.343 | 18.187 | 18.047 | 17.946 | 17.900 | 17.872 | 17.853 | 17.846                |  |
|                                    | 0.10               | 0.14   | 0.17   | 0.20   | 0.23   | 0.25   | 0.27   | 0.30   | 0.32   | 0.33   | 0.34                  |  |
|                                    |                    |        |        |        |        |        |        |        |        |        |                       |  |



TABLE 15

SAND SIZE 1.00 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

TABLE 15

|     | 0.5                                  | 1.0                                  | 2.0                                  | 5.0                                   | 10.0                                  | 20.0                                  | 50.0                                  | 100.0                                 | 200.0                                  | 500.0                                  | 1000.0                                 |
|-----|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| 10  | 0.52<br>0.33<br>0.44<br>2.2<br>0.319 | 0.54<br>0.26<br>0.58<br>3.2<br>0.314 | 0.57<br>0.21<br>0.76<br>4.6<br>0.313 | 0.60<br>0.17<br>1.07<br>7.7<br>0.319  | 0.64<br>0.14<br>1.39<br>11.3<br>0.324 | 0.68<br>0.12<br>1.78<br>16.6<br>0.326 | 0.73<br>0.10<br>2.46<br>27.9<br>0.337 | 0.77<br>0.09<br>3.14<br>41.3<br>0.349 | 0.82<br>0.08<br>3.98<br>61.4<br>0.361  | 0.89<br>0.07<br>5.45<br>103.4<br>0.380 | 0.95<br>0.06<br>6.87<br>153.6<br>0.395 |
| 20  | 0.52<br>0.42<br>0.40<br>2.4<br>0.375 | 0.55<br>0.35<br>0.52<br>3.5<br>0.375 | 0.59<br>0.29<br>0.68<br>5.0<br>0.373 | 0.63<br>0.24<br>0.95<br>8.3<br>0.381  | 0.67<br>0.21<br>1.21<br>12.3<br>0.389 | 0.71<br>0.18<br>1.54<br>18.3<br>0.400 | 0.77<br>0.16<br>2.13<br>30.4<br>0.417 | 0.82<br>0.14<br>2.69<br>45.2<br>0.432 | 0.88<br>0.13<br>3.39<br>67.3<br>0.447  | 0.96<br>0.12<br>4.57<br>114.0<br>0.469 | 1.03<br>0.11<br>5.70<br>170.6<br>0.486 |
| 30  | 0.54<br>0.50<br>0.37<br>2.5<br>0.409 | 0.57<br>0.42<br>0.49<br>3.6<br>0.413 | 0.60<br>0.36<br>0.63<br>5.3<br>0.418 | 0.65<br>0.30<br>0.87<br>8.8<br>0.429  | 0.69<br>0.27<br>1.11<br>13.0<br>0.441 | 0.74<br>0.24<br>1.41<br>19.2<br>0.454 | 0.80<br>0.21<br>1.93<br>32.4<br>0.473 | 0.86<br>0.19<br>2.41<br>48.5<br>0.489 | 0.92<br>0.18<br>3.04<br>71.6<br>0.507  | 1.01<br>0.17<br>4.06<br>121.9<br>0.528 | 1.09<br>0.16<br>5.03<br>183.2<br>0.545 |
| 40  | 0.54<br>0.58<br>0.35<br>2.6<br>0.443 | 0.58<br>0.49<br>0.46<br>3.7<br>0.449 | 0.61<br>0.43<br>0.59<br>5.5<br>0.456 | 0.66<br>0.36<br>0.82<br>9.2<br>0.469  | 0.71<br>0.32<br>1.04<br>13.6<br>0.482 | 0.76<br>0.29<br>1.32<br>20.1<br>0.497 | 0.83<br>0.26<br>1.79<br>33.9<br>0.518 | 0.88<br>0.24<br>2.24<br>50.5<br>0.535 | 0.95<br>0.23<br>2.78<br>75.6<br>0.551  | 1.05<br>0.21<br>3.68<br>129.8<br>0.573 | 1.13<br>0.21<br>4.56<br>194.2<br>0.590 |
| 50  | 0.55<br>0.65<br>0.34<br>2.7<br>0.473 | 0.58<br>0.56<br>0.44<br>3.9<br>0.478 | 0.62<br>0.49<br>0.56<br>5.7<br>0.488 | 0.68<br>0.42<br>0.78<br>9.5<br>0.503  | 0.72<br>0.38<br>0.98<br>14.2<br>0.517 | 0.77<br>0.35<br>1.24<br>20.9<br>0.533 | 0.85<br>0.31<br>1.68<br>35.2<br>0.555 | 0.91<br>0.29<br>2.10<br>52.5<br>0.573 | 0.98<br>0.28<br>2.60<br>78.6<br>0.589  | 1.08<br>0.26<br>3.43<br>135.3<br>0.611 | 1.16<br>0.25<br>4.20<br>205.0<br>0.627 |
| 60  | 0.56<br>0.72<br>0.33<br>2.7<br>0.499 | 0.59<br>0.62<br>0.42<br>4.0<br>0.506 | 0.64<br>0.55<br>0.57<br>5.5<br>0.523 | 0.69<br>0.48<br>0.74<br>9.8<br>0.533  | 0.73<br>0.43<br>0.94<br>14.5<br>0.548 | 0.79<br>0.40<br>1.17<br>21.7<br>0.564 | 0.86<br>0.36<br>1.59<br>36.4<br>0.587 | 0.93<br>0.34<br>1.98<br>54.2<br>0.603 | 1.00<br>0.33<br>2.45<br>81.3<br>0.621  | 1.11<br>0.31<br>3.22<br>140.5<br>0.643 | 1.19<br>0.30<br>3.93<br>213.6<br>0.659 |
| 80  | 0.57<br>0.85<br>0.31<br>2.9<br>0.544 | 0.61<br>0.75<br>0.40<br>4.2<br>0.554 | 0.65<br>0.67<br>0.50<br>6.1<br>0.565 | 0.71<br>0.59<br>0.70<br>10.0<br>0.587 | 0.76<br>0.54<br>0.87<br>15.2<br>0.601 | 0.81<br>0.50<br>1.09<br>22.7<br>0.618 | 0.89<br>0.46<br>1.45<br>38.7<br>0.639 | 0.96<br>0.44<br>1.78<br>58.2<br>0.656 | 1.04<br>0.42<br>2.22<br>86.5<br>0.674  | 1.15<br>0.40<br>2.90<br>149.9<br>0.696 | 1.24<br>0.39<br>3.50<br>229.9<br>0.710 |
| 100 | 0.58<br>0.98<br>0.29<br>2.9<br>0.584 | 0.62<br>0.87<br>0.38<br>4.3<br>0.595 | 0.66<br>0.78<br>0.48<br>6.4<br>0.607 | 0.72<br>0.69<br>0.65<br>10.7<br>0.627 | 0.77<br>0.64<br>0.80<br>16.2<br>0.642 | 0.83<br>0.60<br>1.02<br>23.6<br>0.660 | 0.92<br>0.56<br>1.35<br>40.2<br>0.683 | 0.99<br>0.54<br>1.66<br>60.6<br>0.701 | 1.07<br>0.52<br>2.03<br>92.0<br>0.717  | 1.21<br>0.50<br>2.76<br>149.6<br>0.742 | 1.28<br>0.49<br>3.18<br>245.8<br>0.750 |
| 120 | 0.59<br>1.10<br>0.28<br>3.0<br>0.620 | 0.63<br>0.98<br>0.36<br>4.5<br>0.630 | 0.67<br>0.89<br>0.46<br>6.5<br>0.644 | 0.74<br>0.80<br>0.61<br>11.1<br>0.665 | 0.79<br>0.75<br>0.76<br>16.5<br>0.679 | 0.85<br>0.70<br>0.94<br>25.0<br>0.696 | 0.94<br>0.66<br>1.27<br>41.7<br>0.722 | 1.02<br>0.63<br>1.56<br>62.8<br>0.739 | 1.10<br>0.61<br>1.90<br>95.7<br>0.755  | 1.21<br>0.59<br>2.44<br>169.3<br>0.773 | 1.30<br>0.58<br>2.90<br>264.6<br>0.784 |
| 140 | 0.59<br>1.22<br>0.27<br>3.1<br>0.649 | 0.63<br>1.10<br>0.35<br>4.6<br>0.662 | 0.68<br>1.00<br>0.44<br>6.6<br>0.678 | 0.75<br>0.90<br>0.59<br>11.4<br>0.703 | 0.81<br>0.85<br>0.73<br>16.9<br>0.714 | 0.87<br>0.80<br>0.91<br>25.4<br>0.731 | 0.96<br>0.76<br>1.20<br>43.1<br>0.755 | 1.04<br>0.73<br>1.47<br>65.3<br>0.771 | 1.12<br>0.71<br>1.79<br>99.4<br>0.787  | 1.24<br>0.69<br>2.29<br>176.0<br>0.803 | 1.33<br>0.77<br>2.71<br>277.0<br>0.815 |
| 160 | 0.60<br>1.34<br>0.26<br>3.2<br>0.678 | 0.64<br>1.21<br>0.34<br>4.6<br>0.692 | 0.69<br>1.11<br>0.42<br>6.9<br>0.706 | 0.76<br>1.01<br>0.57<br>11.6<br>0.726 | 0.82<br>0.95<br>0.70<br>17.3<br>0.745 | 0.88<br>0.90<br>0.87<br>26.0<br>0.762 | 0.98<br>0.85<br>1.13<br>45.1<br>0.783 | 1.07<br>0.83<br>1.42<br>65.8<br>0.802 | 1.14<br>0.80<br>1.70<br>102.9<br>0.816 | 1.26<br>0.78<br>2.16<br>183.7<br>0.831 | 1.35<br>0.77<br>2.54<br>290.1<br>0.842 |
| 180 | 0.61<br>1.45<br>0.26<br>3.2<br>0.706 | 0.65<br>1.32<br>0.32<br>4.9<br>0.715 | 0.70<br>1.22<br>0.41<br>7.1<br>0.734 | 0.77<br>1.11<br>0.55<br>11.7<br>0.755 | 0.83<br>1.05<br>0.68<br>17.8<br>0.772 | 0.89<br>1.00<br>0.82<br>27.5<br>0.786 | 0.99<br>0.95<br>1.09<br>45.9<br>0.811 | 1.07<br>0.92<br>1.32<br>70.6<br>0.826 | 1.19<br>0.90<br>1.70<br>99.0<br>0.845  | 1.28<br>0.87<br>2.04<br>191.0<br>0.856 | 1.37<br>0.86<br>2.40<br>303.4<br>0.866 |
| 200 | 0.61<br>1.57<br>0.25<br>3.3<br>0.734 | 0.66<br>1.43<br>0.31<br>4.9<br>0.743 | 0.71<br>1.32<br>0.39<br>7.2<br>0.759 | 0.77<br>1.22<br>0.53<br>12.3<br>0.798 | 0.84<br>1.15<br>0.66<br>18.1<br>0.797 | 0.90<br>1.10<br>0.80<br>27.8<br>0.829 | 1.01<br>1.04<br>1.05<br>47.0<br>0.836 | 1.09<br>1.02<br>1.28<br>71.9<br>0.851 | 1.17<br>0.99<br>1.53<br>111.8<br>0.862 | 1.33<br>0.97<br>2.05<br>182.9<br>0.882 | 1.39<br>0.96<br>2.27<br>317.4<br>0.888 |



TABLE 16

SAND SIZE 2.00 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

TABLE 16

|     | 0.5                                  | 1.0                                  | 2.0                                  | 5.0                                   | 10.0                                  | 20.0                                  | 50.0                                  | 100.0                                  | 200.0                                  | 500.0                                  | 1000.0                                 |
|-----|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| 10  | 0.61<br>0.55<br>0.41<br>2.0<br>0.353 | 0.64<br>0.45<br>0.53<br>2.9<br>0.343 | 0.68<br>0.36<br>0.69<br>4.3<br>0.339 | 0.73<br>0.29<br>0.96<br>7.1<br>0.338  | 0.77<br>0.24<br>1.24<br>10.5<br>0.341 | 0.82<br>0.21<br>1.57<br>15.6<br>0.350 | 0.89<br>0.18<br>2.14<br>26.4<br>0.354 | 0.94<br>0.16<br>2.69<br>39.7<br>0.365  | 1.00<br>0.14<br>3.38<br>59.3<br>0.377  | 1.08<br>0.13<br>4.51<br>102.5<br>0.396 | 1.15<br>0.12<br>5.57<br>156.2<br>0.411 |
| 20  | 0.63<br>0.71<br>0.37<br>2.2<br>0.408 | 0.66<br>0.59<br>0.48<br>3.2<br>0.404 | 0.70<br>0.50<br>0.61<br>4.7<br>0.407 | 0.76<br>0.41<br>0.84<br>7.8<br>0.415  | 0.81<br>0.36<br>1.06<br>11.7<br>0.413 | 0.87<br>0.32<br>1.40<br>16.3<br>0.429 | 0.93<br>0.28<br>1.80<br>29.8<br>0.440 | 0.99<br>0.26<br>2.23<br>45.1<br>0.454  | 1.06<br>0.24<br>2.75<br>68.7<br>0.470  | 1.15<br>0.23<br>3.57<br>121.9<br>0.489 | 1.22<br>0.22<br>4.28<br>191.4<br>0.505 |
| 30  | 0.63<br>0.85<br>0.34<br>2.3<br>0.461 | 0.67<br>0.72<br>0.44<br>3.4<br>0.454 | 0.72<br>0.62<br>0.56<br>5.0<br>0.450 | 0.78<br>0.53<br>0.75<br>8.5<br>0.464  | 0.83<br>0.47<br>0.96<br>12.5<br>0.469 | 0.89<br>0.43<br>1.20<br>18.9<br>0.482 | 0.96<br>0.39<br>1.58<br>32.9<br>0.500 | 1.05<br>0.36<br>2.04<br>46.8<br>0.523  | 1.10<br>0.34<br>2.37<br>76.9<br>0.532  | 1.19<br>0.33<br>3.02<br>139.1<br>0.554 | 1.26<br>0.32<br>3.56<br>223.1<br>0.570 |
| 40  | 0.64<br>0.98<br>0.32<br>2.4<br>0.494 | 0.69<br>0.85<br>0.42<br>3.5<br>0.487 | 0.74<br>0.74<br>0.53<br>5.2<br>0.492 | 0.80<br>0.64<br>0.71<br>8.9<br>0.502  | 0.85<br>0.58<br>0.87<br>13.5<br>0.513 | 0.91<br>0.53<br>1.09<br>20.2<br>0.528 | 0.99<br>0.49<br>1.44<br>35.3<br>0.549 | 1.05<br>0.46<br>1.75<br>54.4<br>0.564  | 1.12<br>0.44<br>2.09<br>85.4<br>0.581  | 1.21<br>0.43<br>2.60<br>159.0<br>0.602 | 1.28<br>0.42<br>3.05<br>256.0<br>0.617 |
| 50  | 0.66<br>1.11<br>0.30<br>2.5<br>0.516 | 0.70<br>0.97<br>0.39<br>3.7<br>0.519 | 0.74<br>0.86<br>0.49<br>5.5<br>0.526 | 0.76<br>0.76<br>0.56<br>11.7<br>0.541 | 0.86<br>0.68<br>0.82<br>14.1<br>0.552 | 0.92<br>0.64<br>1.00<br>21.6<br>0.567 | 1.01<br>0.59<br>1.32<br>37.5<br>0.588 | 1.07<br>0.56<br>1.60<br>58.3<br>0.605  | 1.14<br>0.54<br>1.90<br>92.0<br>0.622  | 1.23<br>0.53<br>2.33<br>174.5<br>0.642 | 1.29<br>0.52<br>2.66<br>292.0<br>0.655 |
| 60  | 0.66<br>1.23<br>0.29<br>2.6<br>0.544 | 0.71<br>1.08<br>0.38<br>3.7<br>0.551 | 0.75<br>0.97<br>0.47<br>5.7<br>0.557 | 0.82<br>0.85<br>0.63<br>9.6<br>0.573  | 0.88<br>0.79<br>0.78<br>14.6<br>0.593 | 0.94<br>0.74<br>0.95<br>22.4<br>0.602 | 1.02<br>0.69<br>1.21<br>40.5<br>0.622 | 1.09<br>0.66<br>1.48<br>62.3<br>0.641  | 1.16<br>0.64<br>1.74<br>99.3<br>0.657  | 1.24<br>0.63<br>2.11<br>191.1<br>0.676 | 1.30<br>0.62<br>2.37<br>325.3<br>0.689 |
| 80  | 0.67<br>1.47<br>0.27<br>2.7<br>0.594 | 0.73<br>1.31<br>0.35<br>3.9<br>0.605 | 0.77<br>1.18<br>0.43<br>6.1<br>0.611 | 0.84<br>1.06<br>0.57<br>10.4<br>0.629 | 0.90<br>0.99<br>0.71<br>15.6<br>0.646 | 0.96<br>0.94<br>0.85<br>24.4<br>0.660 | 1.05<br>0.89<br>1.09<br>44.0<br>0.683 | 1.11<br>0.86<br>1.28<br>70.3<br>0.699  | 1.17<br>0.84<br>1.48<br>115.4<br>0.713 | 1.31<br>0.83<br>1.94<br>196.6<br>0.744 | 1.31<br>0.82<br>1.96<br>389.6<br>0.743 |
| 100 | 0.68<br>1.69<br>0.26<br>2.9<br>0.637 | 0.73<br>1.53<br>0.33<br>4.2<br>0.653 | 0.79<br>1.40<br>0.41<br>6.2<br>0.660 | 0.86<br>1.27<br>0.53<br>10.9<br>0.678 | 0.92<br>1.19<br>0.65<br>16.9<br>0.691 | 0.99<br>1.14<br>0.79<br>25.6<br>0.711 | 1.06<br>1.09<br>0.98<br>47.9<br>0.732 | 1.14<br>1.06<br>1.17<br>75.5<br>0.749  | 1.21<br>1.05<br>1.36<br>122.3<br>0.766 | 1.25<br>1.03<br>1.51<br>264.5<br>0.777 | 1.29<br>1.02<br>1.62<br>477.2<br>0.785 |
| 120 | 0.69<br>1.91<br>0.24<br>3.0<br>0.676 | 0.75<br>1.74<br>0.32<br>4.2<br>0.692 | 0.79<br>1.60<br>0.38<br>6.6<br>0.700 | 0.87<br>1.47<br>0.49<br>11.7<br>0.717 | 0.93<br>1.40<br>0.60<br>17.8<br>0.735 | 0.99<br>1.34<br>0.72<br>28.0<br>0.752 | 1.09<br>1.29<br>0.92<br>50.3<br>0.777 | 1.14<br>1.26<br>1.04<br>84.1<br>0.790  | 1.19<br>1.24<br>1.17<br>143.3<br>0.803 | 1.29<br>1.23<br>1.41<br>274.9<br>0.824 | 1.30<br>1.23<br>1.46<br>526.3<br>0.827 |
| 140 | 0.70<br>2.13<br>0.23<br>3.1<br>0.711 | 0.75<br>1.95<br>0.29<br>4.6<br>0.722 | 0.82<br>1.81<br>0.38<br>6.5<br>0.743 | 0.88<br>1.67<br>0.47<br>12.1<br>0.756 | 0.94<br>1.60<br>0.56<br>19.0<br>0.778 | 1.01<br>1.54<br>0.68<br>29.5<br>0.790 | 1.09<br>1.49<br>0.82<br>55.9<br>0.810 | 1.14<br>1.46<br>0.94<br>93.0<br>0.830  | 1.21<br>1.45<br>1.08<br>152.8<br>0.840 | 1.26<br>1.43<br>1.19<br>334.9<br>0.850 | 1.28<br>1.43<br>1.25<br>628.1<br>0.856 |
| 160 | 0.71<br>2.35<br>0.22<br>3.2<br>0.742 | 0.76<br>2.16<br>0.28<br>4.8<br>0.755 | 0.81<br>2.02<br>0.35<br>7.1<br>0.775 | 0.84<br>1.89<br>0.38<br>15.4<br>0.775 | 0.95<br>1.80<br>0.53<br>19.8<br>0.807 | 1.02<br>1.74<br>0.65<br>30.2<br>0.827 | 1.09<br>1.69<br>0.77<br>59.4<br>0.844 | 1.15<br>1.67<br>0.87<br>100.4<br>0.858 | 1.19<br>1.65<br>0.96<br>175.1<br>0.868 | 1.24<br>1.64<br>1.05<br>386.0<br>0.879 | 1.26<br>1.63<br>1.09<br>728.4<br>0.883 |
| 180 | 0.71<br>2.56<br>0.21<br>3.3<br>0.774 | 0.76<br>2.37<br>0.27<br>4.9<br>0.785 | 0.82<br>2.22<br>0.33<br>7.4<br>0.799 | 0.90<br>2.08<br>0.42<br>13.1<br>0.821 | 0.96<br>2.00<br>0.51<br>20.4<br>0.839 | 1.02<br>1.94<br>0.59<br>33.1<br>0.855 | 1.11<br>1.89<br>0.73<br>61.5<br>0.877 | 1.16<br>1.87<br>0.81<br>106.8<br>0.887 | 1.19<br>1.85<br>0.88<br>190.0<br>0.897 | 1.23<br>1.84<br>0.95<br>427.0<br>0.906 | 1.25<br>1.84<br>0.98<br>815.4<br>0.910 |
| 200 | 0.72<br>2.77<br>0.21<br>3.4<br>0.802 | 0.77<br>2.58<br>0.26<br>5.1<br>0.812 | 0.83<br>2.43<br>0.32<br>7.6<br>0.828 | 0.92<br>2.28<br>0.42<br>12.9<br>0.855 | 0.98<br>2.21<br>0.50<br>20.3<br>0.873 | 1.03<br>2.14<br>0.56<br>34.5<br>0.883 | 1.10<br>2.09<br>0.67<br>68.0<br>0.902 | 1.15<br>2.07<br>0.74<br>116.8<br>0.904 | 1.20<br>2.06<br>0.83<br>200.2<br>0.925 | 1.23<br>2.05<br>0.88<br>459.8<br>0.932 | 1.25<br>2.04<br>0.91<br>886.6<br>0.936 |





TABLE 17

SAND SIZE 3.00 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

|     | 0.5                                  | 1.0                                  | 2.0                                  | 5.0                                   | 10.0                                  | 20.0                                  | 50.0                                  | 100.0                                  | 200.0                                  | 500.0                                  | 1000.0                                 |
|-----|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| 10  | 0.68<br>0.81<br>0.39<br>1.9<br>0.392 | 0.72<br>0.65<br>0.51<br>2.7<br>0.379 | 0.77<br>0.53<br>0.66<br>4.0<br>0.367 | 0.83<br>0.42<br>0.91<br>6.6<br>0.362  | 0.88<br>0.35<br>1.16<br>9.8<br>0.363  | 0.93<br>0.30<br>1.48<br>14.5<br>0.367 | 1.00<br>0.25<br>2.03<br>24.6<br>0.380 | 1.07<br>0.23<br>2.55<br>36.7<br>0.383  | 1.14<br>0.21<br>3.18<br>55.4<br>0.395  | 1.23<br>0.19<br>4.20<br>96.7<br>0.412  | 1.31<br>0.17<br>5.21<br>146.4<br>0.428 |
| 20  | 0.70<br>1.03<br>0.35<br>2.1<br>0.445 | 0.75<br>0.86<br>0.45<br>3.0<br>0.437 | 0.79<br>0.72<br>0.58<br>4.4<br>0.434 | 0.86<br>0.59<br>0.80<br>7.3<br>0.441  | 0.91<br>0.52<br>1.01<br>10.9<br>0.447 | 0.97<br>0.46<br>1.26<br>16.3<br>0.448 | 1.06<br>0.41<br>1.69<br>28.0<br>0.463 | 1.12<br>0.38<br>2.08<br>42.8<br>0.476  | 1.20<br>0.35<br>2.57<br>64.7<br>0.492  | 1.30<br>0.33<br>3.32<br>115.7<br>0.513 | 1.38<br>0.32<br>3.97<br>182.2<br>0.528 |
| 30  | 0.72<br>1.23<br>0.32<br>2.2<br>0.490 | 0.76<br>1.04<br>0.42<br>3.1<br>0.486 | 0.81<br>0.90<br>0.53<br>4.7<br>0.491 | 0.88<br>0.76<br>0.72<br>7.8<br>0.490  | 0.94<br>0.68<br>0.90<br>11.8<br>0.498 | 1.00<br>0.62<br>1.12<br>17.9<br>0.508 | 1.09<br>0.55<br>1.49<br>30.7<br>0.528 | 1.16<br>0.52<br>1.82<br>47.2<br>0.543  | 1.24<br>0.50<br>2.20<br>73.4<br>0.559  | 1.34<br>0.47<br>2.77<br>135.3<br>0.579 | 1.41<br>0.46<br>3.22<br>220.2<br>0.594 |
| 40  | 0.72<br>1.42<br>0.30<br>2.3<br>0.534 | 0.77<br>1.22<br>0.39<br>3.3<br>0.532 | 0.82<br>1.06<br>0.50<br>4.9<br>0.533 | 0.90<br>0.91<br>0.67<br>8.3<br>0.535  | 0.96<br>0.83<br>0.83<br>12.5<br>0.546 | 1.02<br>0.76<br>1.03<br>19.0<br>0.559 | 1.11<br>0.70<br>1.33<br>33.8<br>0.578 | 1.19<br>0.66<br>1.63<br>51.5<br>0.596  | 1.26<br>0.64<br>1.95<br>81.1<br>0.611  | 1.36<br>0.61<br>2.41<br>152.3<br>0.632 | 1.43<br>0.60<br>2.76<br>252.9<br>0.646 |
| 50  | 0.73<br>1.59<br>0.29<br>2.4<br>0.568 | 0.78<br>1.39<br>0.37<br>3.4<br>0.559 | 0.84<br>1.23<br>0.48<br>5.0<br>0.566 | 0.92<br>1.07<br>0.63<br>8.7<br>0.576  | 0.96<br>0.98<br>0.76<br>13.8<br>0.599 | 1.04<br>0.91<br>0.96<br>20.1<br>0.601 | 1.13<br>0.84<br>1.24<br>35.7<br>0.623 | 1.20<br>0.81<br>1.47<br>56.3<br>0.637  | 1.27<br>0.78<br>1.72<br>91.1<br>0.652  | 1.37<br>0.76<br>2.14<br>170.3<br>0.676 | 1.44<br>0.75<br>2.41<br>289.0<br>0.688 |
| 60  | 0.74<br>1.76<br>0.28<br>2.4<br>0.590 | 0.79<br>1.55<br>0.35<br>3.6<br>0.591 | 0.85<br>1.38<br>0.44<br>5.3<br>0.597 | 0.89<br>1.23<br>0.52<br>10.9<br>0.596 | 0.99<br>1.13<br>0.73<br>13.8<br>0.623 | 1.06<br>1.06<br>0.91<br>20.8<br>0.640 | 1.16<br>0.99<br>1.18<br>36.3<br>0.662 | 1.22<br>0.95<br>1.37<br>59.9<br>0.676  | 1.29<br>0.92<br>1.60<br>96.8<br>0.692  | 1.38<br>0.90<br>1.89<br>192.7<br>0.709 | 1.42<br>0.89<br>2.07<br>338.5<br>0.719 |
| 80  | 0.75<br>2.09<br>0.26<br>2.6<br>0.643 | 0.81<br>1.86<br>0.33<br>3.8<br>0.647 | 0.86<br>1.69<br>0.41<br>5.7<br>0.655 | 0.95<br>1.51<br>0.55<br>9.5<br>0.673  | 1.02<br>1.42<br>0.68<br>14.5<br>0.689 | 1.08<br>1.34<br>0.80<br>23.1<br>0.702 | 1.18<br>1.27<br>1.04<br>40.8<br>0.726 | 1.25<br>1.24<br>1.19<br>67.4<br>0.740  | 1.31<br>1.21<br>1.37<br>111.8<br>0.754 | 1.48<br>1.20<br>1.84<br>183.5<br>0.791 | 1.48<br>1.18<br>1.86<br>363.6<br>0.790 |
| 100 | 0.76<br>2.41<br>0.24<br>2.7<br>0.689 | 0.82<br>2.17<br>0.31<br>4.0<br>0.695 | 0.88<br>1.99<br>0.38<br>6.0<br>0.705 | 0.94<br>1.81<br>0.48<br>11.1<br>0.731 | 1.03<br>1.70<br>0.61<br>16.0<br>0.739 | 1.07<br>1.63<br>0.71<br>26.5<br>0.776 | 1.19<br>1.56<br>0.91<br>46.2<br>0.776 | 1.25<br>1.52<br>1.05<br>76.0<br>0.791  | 1.34<br>1.50<br>1.23<br>121.7<br>0.809 | 1.39<br>1.48<br>1.37<br>262.3<br>0.822 | 1.42<br>1.47<br>1.45<br>484.8<br>0.828 |
| 120 | 0.77<br>2.72<br>0.23<br>2.8<br>0.732 | 0.83<br>2.47<br>0.29<br>4.2<br>0.738 | 0.89<br>2.28<br>0.36<br>6.3<br>0.749 | 0.96<br>2.09<br>0.47<br>11.1<br>0.796 | 1.04<br>1.99<br>0.56<br>17.1<br>0.783 | 1.11<br>1.91<br>0.67<br>26.9<br>0.800 | 1.17<br>1.85<br>0.79<br>53.7<br>0.830 | 1.27<br>1.81<br>0.95<br>83.3<br>0.837  | 1.32<br>1.79<br>1.05<br>144.4<br>0.849 | 1.37<br>1.77<br>1.16<br>313.7<br>0.861 | 1.40<br>1.76<br>1.22<br>585.9<br>0.867 |
| 140 | 0.78<br>3.03<br>0.22<br>2.9<br>0.770 | 0.84<br>2.77<br>0.27<br>4.3<br>0.776 | 0.90<br>2.57<br>0.34<br>6.6<br>0.789 | 0.98<br>2.38<br>0.44<br>11.6<br>0.807 | 1.03<br>2.28<br>0.50<br>19.5<br>0.811 | 1.11<br>2.20<br>0.62<br>28.9<br>0.858 | 1.21<br>2.13<br>0.76<br>54.9<br>0.861 | 1.26<br>2.10<br>0.85<br>93.0<br>0.875  | 1.33<br>2.08<br>0.97<br>155.7<br>0.889 | 1.37<br>2.06<br>1.04<br>350.2<br>0.899 | 1.39<br>2.05<br>1.08<br>667.5<br>0.904 |
| 160 | 0.79<br>3.33<br>0.21<br>3.0<br>0.805 | 0.84<br>3.07<br>0.26<br>4.5<br>0.814 | 0.91<br>2.86<br>0.32<br>7.4<br>0.825 | 0.99<br>2.67<br>0.42<br>12.1<br>0.845 | 1.06<br>2.56<br>0.50<br>18.7<br>0.863 | 1.13<br>2.48<br>0.59<br>30.1<br>0.880 | 1.22<br>2.42<br>0.71<br>57.4<br>0.900 | 1.27<br>2.38<br>0.78<br>100.8<br>0.911 | 1.31<br>2.36<br>0.85<br>180.1<br>0.921 | 1.35<br>2.35<br>0.91<br>407.6<br>0.929 | 1.36<br>2.34<br>0.94<br>779.9<br>0.934 |
| 180 | 0.79<br>3.63<br>0.20<br>3.1<br>0.838 | 0.85<br>3.36<br>0.25<br>4.7<br>0.848 | 0.91<br>3.15<br>0.31<br>7.1<br>0.861 | 1.01<br>2.95<br>0.41<br>12.2<br>0.883 | 1.07<br>2.85<br>0.47<br>20.1<br>0.895 | 1.14<br>2.77<br>0.55<br>31.9<br>0.914 | 1.21<br>2.70<br>0.65<br>63.4<br>0.931 | 1.26<br>2.67<br>0.71<br>110.8<br>0.933 | 1.31<br>2.65<br>0.79<br>192.5<br>0.953 | 1.34<br>2.64<br>0.83<br>447.7<br>0.961 | 1.35<br>2.64<br>0.85<br>868.2<br>0.964 |
| 200 | 0.80<br>3.93<br>0.20<br>3.2<br>0.869 | 0.86<br>3.65<br>0.24<br>4.8<br>0.879 | 0.92<br>3.44<br>0.29<br>7.4<br>0.890 | 1.01<br>3.24<br>0.38<br>13.2<br>0.911 | 1.07<br>3.13<br>0.44<br>21.1<br>0.927 | 1.15<br>3.06<br>0.53<br>32.5<br>0.946 | 1.24<br>2.99<br>0.63<br>63.8<br>0.967 | 1.26<br>2.96<br>0.67<br>118.0<br>0.973 | 1.29<br>2.94<br>0.71<br>217.7<br>0.980 | 1.32<br>2.93<br>0.75<br>506.6<br>0.986 | 1.37<br>2.93<br>0.81<br>897.5<br>0.997 |



TABLE 17



TABLE 18

SAND SIZE 4.00 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

|     | 0.5                                  | 1.0                                  | 2.0                                  | 5.0                                   | 10.0                                  | 20.0                                  | 50.0                                  | 100.0                                 | 200.0                                  | 500.0                                  | 1000.0                                 |
|-----|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| 10  | 0.74<br>1.05<br>0.38<br>1.8<br>0.416 | 0.79<br>0.83<br>0.50<br>2.5<br>0.400 | 0.83<br>0.67<br>0.66<br>3.7<br>0.389 | 0.90<br>0.52<br>0.93<br>6.0<br>0.381  | 0.95<br>0.43<br>1.17<br>9.0<br>0.372  | 1.02<br>0.37<br>1.55<br>12.7<br>0.378 | 1.09<br>0.30<br>2.05<br>22.4<br>0.381 | 1.16<br>0.27<br>2.58<br>33.5<br>0.390 | 1.22<br>0.24<br>3.25<br>50.5<br>0.405  | 1.33<br>0.21<br>4.33<br>86.9<br>0.416  | 1.41<br>0.20<br>5.35<br>132.6<br>0.431 |
| 20  | 0.76<br>1.30<br>0.34<br>1.9<br>0.467 | 0.81<br>1.07<br>0.45<br>2.7<br>0.456 | 0.86<br>0.89<br>0.60<br>3.9<br>0.452 | 0.93<br>0.72<br>0.81<br>6.7<br>0.448  | 0.99<br>0.62<br>1.02<br>10.0<br>0.451 | 1.04<br>0.54<br>1.29<br>14.8<br>0.463 | 1.14<br>0.47<br>1.73<br>25.3<br>0.469 | 1.21<br>0.43<br>2.15<br>38.3<br>0.483 | 1.29<br>0.40<br>2.68<br>57.8<br>0.499  | 1.40<br>0.37<br>3.51<br>101.7<br>0.522 | 1.49<br>0.35<br>4.24<br>158.6<br>0.540 |
| 30  | 0.77<br>1.53<br>0.32<br>2.0<br>0.512 | 0.82<br>1.28<br>0.42<br>2.9<br>0.504 | 0.88<br>1.09<br>0.54<br>4.3<br>0.501 | 0.95<br>0.90<br>0.74<br>7.1<br>0.504  | 1.01<br>0.79<br>0.93<br>10.7<br>0.516 | 1.08<br>0.71<br>1.16<br>16.0<br>0.518 | 1.17<br>0.63<br>1.55<br>27.5<br>0.536 | 1.25<br>0.59<br>1.91<br>41.8<br>0.553 | 1.33<br>0.55<br>2.33<br>64.4<br>0.570  | 1.44<br>0.52<br>2.98<br>116.6<br>0.594 | 1.52<br>0.50<br>3.52<br>186.4<br>0.610 |
| 40  | 0.78<br>1.74<br>0.31<br>2.1<br>0.550 | 0.83<br>1.47<br>0.40<br>3.0<br>0.545 | 0.89<br>1.27<br>0.50<br>4.5<br>0.544 | 0.97<br>1.07<br>0.70<br>7.4<br>0.558  | 1.04<br>0.96<br>0.87<br>11.1<br>0.559 | 1.10<br>0.87<br>1.07<br>17.0<br>0.569 | 1.20<br>0.79<br>1.41<br>29.7<br>0.590 | 1.29<br>0.74<br>1.77<br>43.9<br>0.611 | 1.36<br>0.71<br>2.09<br>70.4<br>0.627  | 1.47<br>0.67<br>2.64<br>129.2<br>0.650 | 1.55<br>0.66<br>3.07<br>210.3<br>0.668 |
| 50  | 0.79<br>1.93<br>0.29<br>2.2<br>0.585 | 0.84<br>1.66<br>0.38<br>3.1<br>0.581 | 0.90<br>1.45<br>0.48<br>4.7<br>0.588 | 0.98<br>1.24<br>0.65<br>7.8<br>0.589  | 1.05<br>1.12<br>0.81<br>11.8<br>0.599 | 1.12<br>1.03<br>1.00<br>17.8<br>0.614 | 1.22<br>0.95<br>1.33<br>30.8<br>0.638 | 1.29<br>0.89<br>1.58<br>48.9<br>0.654 | 1.37<br>0.86<br>1.87<br>77.9<br>0.670  | 1.49<br>0.83<br>2.36<br>142.3<br>0.697 | 1.56<br>0.81<br>2.72<br>235.7<br>0.714 |
| 60  | 0.80<br>2.12<br>0.28<br>2.2<br>0.615 | 0.85<br>1.84<br>0.36<br>3.3<br>0.620 | 0.91<br>1.62<br>0.45<br>4.8<br>0.613 | 1.00<br>1.41<br>0.63<br>7.9<br>0.628  | 1.06<br>1.28<br>0.77<br>12.2<br>0.639 | 1.13<br>1.19<br>0.94<br>18.8<br>0.653 | 1.23<br>1.21<br>1.22<br>33.1<br>0.676 | 1.33<br>1.05<br>1.52<br>49.4<br>0.701 | 1.39<br>1.01<br>1.75<br>82.1<br>0.713  | 1.49<br>0.98<br>2.11<br>159.1<br>0.735 | 1.55<br>0.96<br>2.37<br>272.7<br>0.753 |
| 80  | 0.81<br>2.49<br>0.26<br>2.3<br>0.676 | 0.87<br>2.19<br>0.34<br>3.4<br>0.667 | 0.93<br>1.96<br>0.42<br>5.1<br>0.673 | 1.01<br>1.73<br>0.56<br>8.7<br>0.688  | 1.08<br>1.60<br>0.70<br>13.3<br>0.703 | 1.16<br>1.50<br>0.86<br>20.2<br>0.721 | 1.28<br>1.41<br>1.13<br>34.7<br>0.748 | 1.34<br>1.35<br>1.31<br>57.0<br>0.764 | 1.41<br>1.32<br>1.52<br>93.2<br>0.781  | 1.51<br>1.29<br>1.80<br>184.5<br>0.802 | 1.58<br>0.81<br>2.04<br>310.6<br>0.819 |
| 100 | 0.82<br>2.84<br>0.25<br>2.4<br>0.715 | 0.88<br>2.53<br>0.32<br>3.6<br>0.717 | 0.94<br>2.28<br>0.39<br>5.4<br>0.725 | 1.02<br>2.04<br>0.52<br>9.3<br>0.748  | 1.10<br>1.91<br>0.64<br>14.2<br>0.758 | 1.17<br>1.81<br>0.78<br>21.9<br>0.777 | 1.28<br>1.71<br>0.99<br>39.4<br>0.801 | 1.35<br>1.66<br>1.16<br>63.7<br>0.820 | 1.45<br>1.63<br>1.38<br>100.0<br>0.843 | 1.52<br>1.59<br>1.58<br>208.6<br>0.859 | 1.56<br>1.58<br>1.71<br>374.6<br>0.869 |
| 120 | 0.83<br>3.18<br>0.24<br>2.5<br>0.759 | 0.89<br>2.86<br>0.30<br>3.8<br>0.761 | 0.95<br>2.60<br>0.37<br>5.7<br>0.771 | 1.04<br>2.36<br>0.49<br>9.8<br>0.790  | 1.11<br>2.22<br>0.60<br>15.0<br>0.814 | 1.19<br>2.11<br>0.73<br>22.8<br>0.826 | 1.28<br>2.01<br>0.91<br>43.0<br>0.856 | 1.37<br>1.97<br>1.06<br>68.8<br>0.870 | 1.43<br>1.93<br>1.20<br>116.2<br>0.885 | 1.50<br>1.90<br>1.36<br>243.5<br>0.902 | 1.55<br>1.89<br>1.46<br>442.3<br>0.911 |
| 140 | 0.83<br>3.52<br>0.23<br>2.6<br>0.798 | 0.89<br>3.18<br>0.29<br>3.9<br>0.804 | 0.96<br>2.92<br>0.35<br>5.9<br>0.813 | 1.05<br>2.67<br>0.46<br>10.3<br>0.833 | 1.12<br>2.52<br>0.56<br>15.8<br>0.852 | 1.20<br>2.42<br>0.68<br>24.6<br>0.869 | 1.30<br>2.32<br>0.84<br>45.9<br>0.895 | 1.37<br>2.27<br>0.96<br>75.9<br>0.911 | 1.45<br>2.24<br>1.11<br>124.5<br>0.930 | 1.50<br>2.21<br>1.23<br>270.7<br>0.944 | 1.54<br>2.20<br>1.30<br>502.6<br>0.952 |
| 160 | 0.84<br>3.85<br>0.22<br>2.7<br>0.835 | 0.90<br>3.50<br>0.28<br>4.0<br>0.842 | 0.97<br>3.24<br>0.34<br>6.1<br>0.852 | 1.06<br>2.97<br>0.44<br>10.7<br>0.873 | 1.13<br>2.83<br>0.53<br>16.5<br>0.890 | 1.23<br>2.73<br>0.67<br>24.4<br>0.916 | 1.29<br>2.63<br>0.77<br>50.1<br>0.950 | 1.38<br>2.58<br>0.89<br>81.5<br>0.951 | 1.43<br>2.55<br>0.99<br>141.6<br>0.965 | 1.49<br>2.52<br>1.09<br>308.1<br>0.978 | 1.48<br>2.51<br>1.12<br>602.5<br>1.011 |
| 180 | 0.85<br>4.18<br>0.21<br>2.8<br>0.869 | 0.91<br>3.82<br>0.26<br>4.2<br>0.877 | 0.97<br>3.55<br>0.33<br>6.3<br>0.889 | 1.07<br>3.28<br>0.42<br>11.1<br>0.909 | 1.15<br>3.14<br>0.51<br>17.1<br>0.928 | 1.23<br>3.03<br>0.61<br>26.6<br>0.949 | 1.31<br>2.93<br>0.74<br>51.8<br>0.972 | 1.40<br>2.89<br>0.86<br>83.4<br>0.991 | 1.44<br>2.86<br>0.92<br>151.0<br>1.002 | 1.48<br>2.83<br>1.00<br>339.4<br>1.012 | 1.50<br>2.82<br>1.03<br>644.6<br>1.017 |
| 200 | 0.85<br>4.50<br>0.21<br>2.9<br>0.901 | 0.91<br>4.14<br>0.26<br>4.3<br>0.909 | 0.98<br>3.86<br>0.31<br>6.5<br>0.923 | 1.07<br>3.59<br>0.40<br>11.5<br>0.942 | 1.16<br>3.44<br>0.50<br>17.3<br>0.966 | 1.22<br>3.33<br>0.57<br>28.9<br>0.980 | 1.35<br>3.24<br>0.73<br>51.0<br>1.011 | 1.38<br>3.19<br>0.78<br>93.6<br>1.020 | 1.42<br>3.17<br>0.84<br>167.8<br>1.030 | 1.49<br>3.15<br>0.94<br>354.3<br>1.047 | 1.44<br>3.14<br>0.90<br>774.8<br>1.065 |



+

TABLE 19

SAND SIZE 5.00 MILLIMETRES

| SEDIMENT<br>CONCENTRATION<br>(PPM) | DISCHARGE (CUMECs) |       |       |       |       |       |       |       |       |       |        |
|------------------------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
|                                    | 0.5                | 1.0   | 2.0   | 5.0   | 10.0  | 20.0  | 50.0  | 100.0 | 200.0 | 500.0 | 1000.0 |
| 10                                 | 0.79               | 0.84  | 0.89  | 0.96  | 1.01  | 1.07  | 1.16  | 1.23  | 1.30  | 1.40  | 1.50   |
|                                    | 1.28               | 1.01  | 0.81  | 0.61  | 0.51  | 0.43  | 0.35  | 0.30  | 0.27  | 0.23  | 0.21   |
|                                    | 0.38               | 0.50  | 0.65  | 0.91  | 1.17  | 1.49  | 2.06  | 2.60  | 3.28  | 4.43  | 5.47   |
|                                    | 1.7                | 2.4   | 3.5   | 5.7   | 8.4   | 12.5  | 20.9  | 31.2  | 46.8  | 80.6  | 122.2  |
| 20                                 | 0.437              | 0.417 | 0.402 | 0.390 | 0.385 | 0.384 | 0.384 | 0.391 | 0.401 | 0.422 | 0.430  |
|                                    | 0.81               | 0.86  | 0.91  | 0.99  | 1.05  | 1.12  | 1.21  | 1.28  | 1.38  | 1.48  | 1.58   |
|                                    | 1.57               | 1.27  | 1.05  | 0.83  | 0.71  | 0.62  | 0.53  | 0.48  | 0.44  | 0.40  | 0.38   |
|                                    | 0.35               | 0.45  | 0.58  | 0.81  | 1.03  | 1.31  | 1.77  | 2.21  | 2.82  | 3.64  | 4.44   |
| 30                                 | 1.8                | 2.6   | 3.8   | 6.2   | 9.2   | 13.7  | 23.3  | 35.3  | 51.4  | 92.5  | 142.8  |
|                                    | 0.493              | 0.478 | 0.468 | 0.456 | 0.457 | 0.463 | 0.474 | 0.491 | 0.503 | 0.523 | 0.542  |
|                                    | 0.82               | 0.87  | 0.93  | 1.00  | 1.08  | 1.14  | 1.25  | 1.32  | 1.41  | 1.53  | 1.62   |
|                                    | 1.81               | 1.50  | 1.26  | 1.03  | 0.90  | 0.80  | 0.70  | 0.64  | 0.60  | 0.56  | 0.54   |
| 40                                 | 0.32               | 0.42  | 0.54  | 0.75  | 0.95  | 1.19  | 1.59  | 1.97  | 2.43  | 3.14  | 3.75   |
|                                    | 1.9                | 2.7   | 4.0   | 6.7   | 9.8   | 14.8  | 25.2  | 38.3  | 58.6  | 104.6 | 165.0  |
|                                    | 0.530              | 0.518 | 0.512 | 0.517 | 0.517 | 0.530 | 0.539 | 0.554 | 0.572 | 0.597 | 0.617  |
|                                    | 0.83               | 0.88  | 0.94  | 1.03  | 1.09  | 1.16  | 1.27  | 1.34  | 1.44  | 1.56  | 1.65   |
| 50                                 | 2.04               | 1.71  | 1.46  | 1.21  | 1.08  | 0.97  | 0.86  | 0.81  | 0.76  | 0.72  | 0.69   |
|                                    | 0.31               | 0.40  | 0.51  | 0.72  | 0.88  | 1.11  | 1.46  | 1.78  | 2.20  | 2.80  | 3.31   |
|                                    | 2.0                | 2.8   | 4.2   | 6.8   | 10.4  | 15.6  | 27.0  | 41.9  | 63.2  | 114.7 | 183.3  |
|                                    | 0.568              | 0.559 | 0.555 | 0.561 | 0.571 | 0.586 | 0.593 | 0.609 | 0.631 | 0.657 | 0.675  |
| 60                                 | 0.84               | 0.89  | 0.95  | 1.04  | 1.11  | 1.19  | 1.29  | 1.37  | 1.45  | 1.58  | 1.66   |
|                                    | 2.25               | 1.91  | 1.65  | 1.39  | 1.25  | 1.14  | 1.03  | 0.97  | 0.92  | 0.88  | 0.85   |
|                                    | 0.30               | 0.38  | 0.49  | 0.67  | 0.84  | 1.05  | 1.37  | 1.66  | 1.99  | 2.54  | 2.96   |
|                                    | 2.0                | 2.9   | 4.3   | 7.2   | 10.8  | 15.9  | 28.3  | 43.9  | 69.1  | 124.9 | 203.0  |
| 70                                 | 0.602              | 0.595 | 0.593 | 0.603 | 0.616 | 0.622 | 0.640 | 0.659 | 0.678 | 0.705 | 0.725  |
|                                    | 0.84               | 0.90  | 0.96  | 1.04  | 1.12  | 1.20  | 1.31  | 1.38  | 1.48  | 1.59  | 1.72   |
|                                    | 2.46               | 2.11  | 1.84  | 1.57  | 1.42  | 1.30  | 1.19  | 1.13  | 1.08  | 1.04  | 1.02   |
|                                    | 0.29               | 0.37  | 0.47  | 0.63  | 0.79  | 0.98  | 1.28  | 1.55  | 1.86  | 2.29  | 2.86   |
| 80                                 | 2.1                | 3.0   | 4.5   | 7.6   | 11.4  | 17.1  | 29.9  | 46.6  | 72.7  | 137.7 | 202.7  |
|                                    | 0.634              | 0.627 | 0.634 | 0.642 | 0.650 | 0.658 | 0.682 | 0.707 | 0.722 | 0.745 | 0.777  |
|                                    | 0.85               | 0.91  | 0.97  | 1.07  | 1.14  | 1.20  | 1.33  | 1.42  | 1.50  | 1.60  | 1.68   |
|                                    | 2.85               | 2.48  | 2.20  | 1.91  | 1.75  | 1.63  | 1.51  | 1.45  | 1.40  | 1.35  | 1.33   |
| 90                                 | 0.27               | 0.34  | 0.43  | 0.58  | 0.72  | 0.87  | 1.15  | 1.40  | 1.64  | 1.97  | 2.24   |
|                                    | 2.2                | 3.2   | 4.8   | 8.1   | 12.2  | 19.0  | 32.7  | 50.3  | 81.3  | 158.3 | 265.7  |
|                                    | 0.688              | 0.692 | 0.695 | 0.696 | 0.718 | 0.744 | 0.753 | 0.776 | 0.793 | 0.817 | 0.834  |
|                                    | 0.86               | 0.92  | 0.99  | 1.08  | 1.18  | 1.24  | 1.35  | 1.43  | 1.49  | 1.63  | 1.68   |
| 100                                | 3.23               | 2.84  | 2.54  | 2.25  | 2.08  | 1.95  | 1.83  | 1.76  | 1.72  | 1.68  | 1.66   |
|                                    | 0.26               | 0.33  | 0.41  | 0.54  | 0.70  | 0.82  | 1.06  | 1.25  | 1.43  | 1.76  | 1.93   |
|                                    | 2.3                | 3.3   | 5.0   | 8.5   | 12.1  | 19.6  | 34.9  | 55.9  | 93.3  | 175.2 | 308.1  |
|                                    | 0.745              | 0.742 | 0.737 | 0.751 | 0.774 | 0.786 | 0.814 | 0.831 | 0.866 | 0.877 | 0.891  |
| 120                                | 0.87               | 0.93  | 1.00  | 1.10  | 1.18  | 1.25  | 1.36  | 1.45  | 1.53  | 1.62  | 1.68   |
|                                    | 3.60               | 3.20  | 2.88  | 2.58  | 2.41  | 2.27  | 2.15  | 2.08  | 2.04  | 2.00  | 1.98   |
|                                    | 0.24               | 0.31  | 0.38  | 0.51  | 0.64  | 0.76  | 0.97  | 1.16  | 1.32  | 1.54  | 1.67   |
|                                    | 2.4                | 3.5   | 5.2   | 8.9   | 13.2  | 20.9  | 37.8  | 59.5  | 99.1  | 201.0 | 356.6  |
| 140                                | 0.788              | 0.777 | 0.783 | 0.801 | 0.820 | 0.837 | 0.862 | 0.885 | 0.904 | 0.924 | 0.929  |
|                                    | 0.88               | 0.94  | 1.01  | 1.11  | 1.20  | 1.28  | 1.38  | 1.45  | 1.55  | 1.62  | 1.66   |
|                                    | 3.96               | 3.54  | 3.22  | 2.90  | 2.73  | 2.59  | 2.47  | 2.40  | 2.36  | 2.32  | 2.30   |
|                                    | 0.23               | 0.30  | 0.37  | 0.48  | 0.62  | 0.74  | 0.91  | 1.05  | 1.23  | 1.39  | 1.49   |
| 160                                | 2.4                | 3.6   | 5.4   | 9.3   | 13.5  | 21.1  | 39.9  | 65.3  | 105.1 | 222.1 | 403.2  |
|                                    | 0.817              | 0.819 | 0.826 | 0.845 | 0.869 | 0.889 | 0.910 | 0.930 | 0.950 | 0.969 | 0.979  |
|                                    | 0.89               | 0.95  | 1.02  | 1.12  | 1.19  | 1.30  | 1.38  | 1.46  | 1.53  | 1.64  | 1.67   |
|                                    | 4.31               | 3.89  | 3.55  | 3.23  | 3.05  | 2.91  | 2.78  | 2.72  | 2.68  | 2.64  | 2.63   |
| 180                                | 0.23               | 0.28  | 0.35  | 0.46  | 0.56  | 0.71  | 0.84  | 0.98  | 1.11  | 1.30  | 1.37   |
|                                    | 2.5                | 3.7   | 5.6   | 9.7   | 14.9  | 21.7  | 42.9  | 69.4  | 118.1 | 233.9 | 436.0  |
|                                    | 0.854              | 0.858 | 0.867 | 0.886 | 0.905 | 0.931 | 0.951 | 0.972 | 0.988 | 1.012 | 1.020  |
|                                    | 0.89               | 0.96  | 1.03  | 1.13  | 1.20  | 1.29  | 1.37  | 1.46  | 1.54  | 1.60  | 1.63   |
| 200                                | 4.66               | 4.22  | 3.88  | 3.55  | 3.37  | 3.23  | 3.11  | 3.04  | 3.00  | 2.96  | 2.95   |
|                                    | 0.22               | 0.27  | 0.34  | 0.44  | 0.54  | 0.64  | 0.78  | 0.91  | 1.04  | 1.14  | 1.20   |
|                                    | 2.6                | 3.8   | 5.7   | 10.0  | 15.5  | 24.2  | 47.1  | 75.1  | 125.4 | 273.0 | 508.4  |
|                                    | 0.888              | 0.893 | 0.904 | 0.923 | 0.943 | 0.961 | 1.003 | 1.015 | 1.027 | 1.041 | 1.049  |
| 220                                | 0.90               | 0.96  | 1.03  | 1.13  | 1.21  | 1.30  | 1.40  | 1.48  | 1.53  | 1.61  | 1.63   |
|                                    | 5.00               | 4.56  | 4.21  | 3.87  | 3.69  | 3.55  | 3.42  | 3.36  | 3.32  | 3.29  | 3.28   |
|                                    | 0.21               | 0.27  | 0.33  | 0.43  | 0.51  | 0.62  | 0.76  | 0.87  | 0.95  | 1.08  | 1.12   |
|                                    | 2.6                | 3.9   | 5.9   | 10.4  | 16.1  | 25.1  | 46.6  | 78.3  | 137.8 | 288.5 | 548.6  |
| 240                                | 0.921              | 0.927 | 0.939 | 0.960 | 0.974 | 0.998 | 1.028 | 1.044 | 1.058 | 1.078 | 1.084  |

+

TABLE 19

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10



TABLE 20

SAND SIZE 6.00 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

TABLE 20

|     | 0.5                                  | 1.0                                  | 2.0                                  | 5.0                                  | 10.0                                  | 20.0                                  | 50.0                                  | 100.0                                 | 200.0                                  | 500.0                                  | 1000.0                                 |
|-----|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| 10  | 0.83<br>1.52<br>0.37<br>1.6<br>0.456 | 0.88<br>1.19<br>0.50<br>2.3<br>0.432 | 0.94<br>0.94<br>0.65<br>3.3<br>0.414 | 1.01<br>0.71<br>0.91<br>5.4<br>0.399 | 1.07<br>0.58<br>1.17<br>8.0<br>0.392  | 1.13<br>0.48<br>1.49<br>11.8<br>0.389 | 1.22<br>0.39<br>2.07<br>19.9<br>0.391 | 1.30<br>0.33<br>2.62<br>29.4<br>0.391 | 1.37<br>0.29<br>3.31<br>44.1<br>0.400  | 1.48<br>0.25<br>4.47<br>75.4<br>0.416  | 1.56<br>0.23<br>5.59<br>114.5<br>0.435 |
| 20  | 0.85<br>1.82<br>0.34<br>1.7<br>0.512 | 0.90<br>1.47<br>0.45<br>2.4<br>0.492 | 0.96<br>1.20<br>0.58<br>3.6<br>0.479 | 1.04<br>0.94<br>0.82<br>5.9<br>0.469 | 1.11<br>0.80<br>1.04<br>8.7<br>0.461  | 1.17<br>0.69<br>1.31<br>13.1<br>0.469 | 1.27<br>0.58<br>1.79<br>21.9<br>0.474 | 1.35<br>0.52<br>2.25<br>32.9<br>0.486 | 1.46<br>0.47<br>2.97<br>46.3<br>0.515  | 1.56<br>0.42<br>3.74<br>85.8<br>0.521  | 1.66<br>0.40<br>4.58<br>131.8<br>0.540 |
| 30  | 0.86<br>2.09<br>0.33<br>1.8<br>0.556 | 0.91<br>1.71<br>0.43<br>2.6<br>0.539 | 0.98<br>1.43<br>0.54<br>3.8<br>0.521 | 1.07<br>1.15<br>0.79<br>5.9<br>0.531 | 1.13<br>0.99<br>0.95<br>9.3<br>0.519  | 1.20<br>0.87<br>1.20<br>13.8<br>0.526 | 1.30<br>0.76<br>1.61<br>24.0<br>0.543 | 1.38<br>0.69<br>2.04<br>35.6<br>0.566 | 1.48<br>0.64<br>2.50<br>54.0<br>0.571  | 1.60<br>0.59<br>3.26<br>95.7<br>0.597  | 1.70<br>0.56<br>3.93<br>150.0<br>0.617 |
| 40  | 0.87<br>2.33<br>0.31<br>1.9<br>0.593 | 0.93<br>1.94<br>0.40<br>2.7<br>0.570 | 0.99<br>1.64<br>0.51<br>3.9<br>0.564 | 1.08<br>1.35<br>0.71<br>6.6<br>0.563 | 1.15<br>1.18<br>0.91<br>9.6<br>0.570  | 1.22<br>1.06<br>1.14<br>14.4<br>0.586 | 1.33<br>0.93<br>1.50<br>25.0<br>0.593 | 1.41<br>0.86<br>1.84<br>38.5<br>0.609 | 1.51<br>0.81<br>2.28<br>58.2<br>0.630  | 1.64<br>0.75<br>2.94<br>104.0<br>0.658 | 1.73<br>0.73<br>3.50<br>164.8<br>0.679 |
| 50  | 0.88<br>2.56<br>0.30<br>1.9<br>0.618 | 0.94<br>2.15<br>0.39<br>2.8<br>0.606 | 1.00<br>1.84<br>0.49<br>4.1<br>0.601 | 1.09<br>1.54<br>0.67<br>6.8<br>0.603 | 1.16<br>1.36<br>0.85<br>10.2<br>0.618 | 1.23<br>1.23<br>0.85<br>15.3<br>0.629 | 1.35<br>1.10<br>1.40<br>26.4<br>0.640 | 1.44<br>1.03<br>1.72<br>40.4<br>0.659 | 1.53<br>0.97<br>2.08<br>63.0<br>0.679  | 1.66<br>0.92<br>2.68<br>112.6<br>0.709 | 1.76<br>0.89<br>3.16<br>180.3<br>0.728 |
| 60  | 0.88<br>2.78<br>0.29<br>2.0<br>0.648 | 0.95<br>2.36<br>0.37<br>2.8<br>0.638 | 1.01<br>2.04<br>0.47<br>4.2<br>0.635 | 1.10<br>1.72<br>0.64<br>7.1<br>0.640 | 1.17<br>1.54<br>0.82<br>10.3<br>0.660 | 1.26<br>1.40<br>1.01<br>15.8<br>0.660 | 1.37<br>1.27<br>1.33<br>27.3<br>0.684 | 1.47<br>1.19<br>1.65<br>41.3<br>0.705 | 1.55<br>1.13<br>1.95<br>66.1<br>0.724  | 1.67<br>1.08<br>2.44<br>122.9<br>0.749 | 1.81<br>1.06<br>3.05<br>181.2<br>0.781 |
| 80  | 0.89<br>3.20<br>0.27<br>2.1<br>0.703 | 0.96<br>2.76<br>0.35<br>3.0<br>0.694 | 1.02<br>2.42<br>0.44<br>4.4<br>0.695 | 1.11<br>2.08<br>0.60<br>7.5<br>0.711 | 1.20<br>1.89<br>0.76<br>11.0<br>0.725 | 1.28<br>1.74<br>0.91<br>17.1<br>0.729 | 1.39<br>1.60<br>1.20<br>30.0<br>0.755 | 1.49<br>1.52<br>1.47<br>45.5<br>0.779 | 1.58<br>1.46<br>1.74<br>73.1<br>0.799  | 1.69<br>1.41<br>2.11<br>139.9<br>0.823 | 1.78<br>1.38<br>2.44<br>229.8<br>0.844 |
| 100 | 0.90<br>3.60<br>0.26<br>2.1<br>0.751 | 0.96<br>3.14<br>0.33<br>3.1<br>0.755 | 1.03<br>2.78<br>0.49<br>4.7<br>0.756 | 1.13<br>2.43<br>0.56<br>7.9<br>0.756 | 1.21<br>2.23<br>0.69<br>12.0<br>0.770 | 1.31<br>2.08<br>0.87<br>17.6<br>0.793 | 1.42<br>1.93<br>1.12<br>31.5<br>0.818 | 1.50<br>1.85<br>1.32<br>50.5<br>0.838 | 1.61<br>1.79<br>1.61<br>76.5<br>0.864  | 1.72<br>1.74<br>1.90<br>153.2<br>0.887 | 1.79<br>1.71<br>2.12<br>263.9<br>0.902 |
| 120 | 0.91<br>3.99<br>0.25<br>2.2<br>0.795 | 0.97<br>3.51<br>0.32<br>3.3<br>0.800 | 1.05<br>3.14<br>0.39<br>4.8<br>0.791 | 1.15<br>2.77<br>0.53<br>8.3<br>0.806 | 1.23<br>2.57<br>0.65<br>12.5<br>0.822 | 1.32<br>2.41<br>0.81<br>18.6<br>0.845 | 1.43<br>2.26<br>1.02<br>34.3<br>0.870 | 1.53<br>2.18<br>1.23<br>53.1<br>0.892 | 1.61<br>2.12<br>1.42<br>87.7<br>0.911  | 1.71<br>2.07<br>1.69<br>172.9<br>0.935 | 1.81<br>2.05<br>1.95<br>283.1<br>0.959 |
| 140 | 0.91<br>4.37<br>0.24<br>2.3<br>0.844 | 0.98<br>3.87<br>0.30<br>3.4<br>0.848 | 1.06<br>3.49<br>0.38<br>5.0<br>0.833 | 1.16<br>3.11<br>0.50<br>8.6<br>0.851 | 1.24<br>2.90<br>0.62<br>13.1<br>0.868 | 1.34<br>2.74<br>0.78<br>19.2<br>0.895 | 1.45<br>2.59<br>0.97<br>35.5<br>0.918 | 1.53<br>2.50<br>1.13<br>58.1<br>0.937 | 1.63<br>2.45<br>1.33<br>92.0<br>0.962  | 1.72<br>2.40<br>1.53<br>189.7<br>0.982 | 1.77<br>2.38<br>1.67<br>337.4<br>0.995 |
| 160 | 0.92<br>4.74<br>0.23<br>2.4<br>0.881 | 0.99<br>4.23<br>0.29<br>3.5<br>0.868 | 1.06<br>3.84<br>0.36<br>5.2<br>0.876 | 1.17<br>3.45<br>0.48<br>8.9<br>0.892 | 1.25<br>3.23<br>0.59<br>13.6<br>0.911 | 1.33<br>3.07<br>0.71<br>21.1<br>0.932 | 1.45<br>2.91<br>0.90<br>38.3<br>0.959 | 1.54<br>2.83<br>1.06<br>61.2<br>0.982 | 1.62<br>2.78<br>1.20<br>102.8<br>1.001 | 1.74<br>2.73<br>1.44<br>200.2<br>1.028 | 1.78<br>2.71<br>1.54<br>366.2<br>1.037 |
| 180 | 0.93<br>5.10<br>0.22<br>2.4<br>0.903 | 1.00<br>4.58<br>0.28<br>3.6<br>0.905 | 1.07<br>4.18<br>0.35<br>5.3<br>0.913 | 1.18<br>3.78<br>0.46<br>9.2<br>0.930 | 1.26<br>3.56<br>0.56<br>14.2<br>0.950 | 1.34<br>3.40<br>0.68<br>22.1<br>0.971 | 1.48<br>3.24<br>0.88<br>38.2<br>1.005 | 1.54<br>3.16<br>0.98<br>65.8<br>1.020 | 1.63<br>3.11<br>1.13<br>108.3<br>1.040 | 1.70<br>3.06<br>1.28<br>229.9<br>1.059 | 1.75<br>3.04<br>1.37<br>418.8<br>1.070 |
| 200 | 0.94<br>5.46<br>0.22<br>2.5<br>0.936 | 1.00<br>4.93<br>0.27<br>3.6<br>0.939 | 1.08<br>4.52<br>0.34<br>5.5<br>0.948 | 1.18<br>4.12<br>0.44<br>9.5<br>0.968 | 1.27<br>3.89<br>0.54<br>14.7<br>0.986 | 1.36<br>3.72<br>0.65<br>22.5<br>1.008 | 1.47<br>3.57<br>0.81<br>42.0<br>1.036 | 1.56<br>3.49<br>0.94<br>68.0<br>1.059 | 1.62<br>3.44<br>1.04<br>118.0<br>1.067 | 1.71<br>3.39<br>1.20<br>243.7<br>1.095 | 1.74<br>3.38<br>1.26<br>453.9<br>1.103 |



TABLE 21

SAND SIZE 8.00 MILLIMETRES

| SEDIMENT<br>CONCENTRATION<br>(PPM) | DISCHARGE (CUMECs) |      |      |      |      |      |      |       |       |       | VELOCITY (METRES/SEC) |                                                                        |
|------------------------------------|--------------------|------|------|------|------|------|------|-------|-------|-------|-----------------------|------------------------------------------------------------------------|
|                                    | 0.5                | 1.0  | 2.0  | 5.0  | 10.0 | 20.0 | 50.0 | 100.0 | 200.0 | 500.0 | 1000.0                | SLOPE *1000<br>DEPTH (METRES)<br>WIDTH (METRES)<br>FRICTION FACTOR *10 |
| 10                                 | 0.90               | 0.96 | 1.02 | 1.10 | 1.16 | 1.23 | 1.33 | 1.40  | 1.48  | 1.61  | 1.70                  |                                                                        |
|                                    | 1.99               | 1.54 | 1.21 | 0.89 | 0.72 | 0.59 | 0.47 | 0.40  | 0.34  | 0.29  | 0.26                  |                                                                        |
|                                    | 0.37               | 0.49 | 0.64 | 0.90 | 1.16 | 1.49 | 2.05 | 2.64  | 3.34  | 4.52  | 5.67                  |                                                                        |
| 20                                 | 0.92               | 0.98 | 1.04 | 1.12 | 1.19 | 1.27 | 1.38 | 1.46  | 1.55  | 1.68  | 1.78                  |                                                                        |
|                                    | 2.33               | 1.86 | 1.50 | 1.15 | 0.96 | 0.82 | 0.67 | 0.59  | 0.53  | 0.47  | 0.44                  |                                                                        |
|                                    | 0.34               | 0.45 | 0.58 | 0.82 | 1.05 | 1.33 | 1.82 | 2.30  | 2.87  | 3.88  | 4.82                  |                                                                        |
| 30                                 | 0.93               | 0.99 | 1.05 | 1.14 | 1.22 | 1.30 | 1.41 | 1.50  | 1.59  | 1.73  | 1.84                  |                                                                        |
|                                    | 2.63               | 2.13 | 1.75 | 1.38 | 1.18 | 1.02 | 0.86 | 0.78  | 0.71  | 0.64  | 0.61                  |                                                                        |
|                                    | 0.32               | 0.43 | 0.55 | 0.76 | 0.98 | 1.24 | 1.66 | 2.09  | 2.61  | 3.43  | 4.19                  |                                                                        |
| 40                                 | 0.93               | 1.00 | 1.06 | 1.16 | 1.24 | 1.32 | 1.43 | 1.52  | 1.63  | 1.77  | 1.87                  |                                                                        |
|                                    | 2.90               | 2.38 | 1.98 | 1.60 | 1.38 | 1.21 | 1.05 | 0.96  | 0.88  | 0.82  | 0.78                  |                                                                        |
|                                    | 0.31               | 0.41 | 0.52 | 0.72 | 0.96 | 1.15 | 1.55 | 1.93  | 2.39  | 3.13  | 3.78                  |                                                                        |
| 50                                 | 0.94               | 1.00 | 1.07 | 1.17 | 1.25 | 1.34 | 1.45 | 1.54  | 1.65  | 1.79  | 1.90                  |                                                                        |
|                                    | 3.15               | 2.61 | 2.20 | 1.80 | 1.58 | 1.40 | 1.23 | 1.13  | 1.06  | 0.99  | 0.95                  |                                                                        |
|                                    | 0.30               | 0.39 | 0.50 | 0.69 | 0.87 | 1.11 | 1.48 | 1.84  | 2.22  | 2.88  | 3.46                  |                                                                        |
| 60                                 | 0.95               | 1.01 | 1.09 | 1.19 | 1.26 | 1.35 | 1.46 | 1.57  | 1.67  | 1.81  | 1.96                  |                                                                        |
|                                    | 3.39               | 2.84 | 2.42 | 2.00 | 1.77 | 1.58 | 1.41 | 1.31  | 1.23  | 1.16  | 1.12                  |                                                                        |
|                                    | 0.29               | 0.38 | 0.48 | 0.66 | 0.83 | 1.04 | 1.39 | 1.71  | 2.09  | 2.66  | 3.27                  |                                                                        |
| 80                                 | 0.96               | 1.03 | 1.10 | 1.20 | 1.28 | 1.33 | 1.50 | 1.62  | 1.70  | 1.84  | 1.94                  |                                                                        |
|                                    | 3.85               | 3.27 | 2.83 | 2.38 | 2.14 | 1.95 | 1.75 | 1.65  | 1.57  | 1.50  | 1.46                  |                                                                        |
|                                    | 0.28               | 0.36 | 0.45 | 0.61 | 0.77 | 0.89 | 1.27 | 1.60  | 1.88  | 2.36  | 2.76                  |                                                                        |
| 100                                | 0.97               | 1.04 | 1.11 | 1.21 | 1.30 | 1.40 | 1.52 | 1.62  | 1.72  | 1.87  | 1.96                  |                                                                        |
|                                    | 4.29               | 3.69 | 3.22 | 2.76 | 2.50 | 2.30 | 2.10 | 1.99  | 1.91  | 1.84  | 1.80                  |                                                                        |
|                                    | 0.26               | 0.34 | 0.43 | 0.58 | 0.73 | 0.92 | 1.17 | 1.43  | 1.71  | 2.14  | 2.45                  |                                                                        |
| 120                                | 0.98               | 1.05 | 1.12 | 1.22 | 1.32 | 1.41 | 1.54 | 1.62  | 1.74  | 1.87  | 1.98                  |                                                                        |
|                                    | 4.71               | 4.09 | 3.60 | 3.12 | 2.85 | 2.64 | 2.44 | 2.33  | 2.25  | 2.17  | 2.14                  |                                                                        |
|                                    | 0.25               | 0.32 | 0.41 | 0.55 | 0.68 | 0.85 | 1.11 | 1.32  | 1.58  | 1.92  | 2.25                  |                                                                        |
| 140                                | 0.98               | 1.05 | 1.13 | 1.24 | 1.33 | 1.42 | 1.55 | 1.65  | 1.77  | 1.88  | 1.96                  |                                                                        |
|                                    | 5.12               | 4.48 | 3.98 | 3.48 | 3.20 | 2.99 | 2.78 | 2.67  | 2.59  | 2.52  | 2.48                  |                                                                        |
|                                    | 0.25               | 0.31 | 0.39 | 0.53 | 0.65 | 0.80 | 1.04 | 1.24  | 1.50  | 1.77  | 1.97                  |                                                                        |
| 160                                | 0.99               | 1.06 | 1.13 | 1.25 | 1.34 | 1.43 | 1.56 | 1.68  | 1.76  | 1.90  | 1.96                  |                                                                        |
|                                    | 5.52               | 4.86 | 4.35 | 3.84 | 3.55 | 3.33 | 3.12 | 3.01  | 2.93  | 2.86  | 2.83                  |                                                                        |
|                                    | 0.24               | 0.30 | 0.38 | 0.51 | 0.62 | 0.76 | 0.98 | 1.19  | 1.36  | 1.67  | 1.82                  |                                                                        |
| 180                                | 0.99               | 1.06 | 1.14 | 1.26 | 1.35 | 1.44 | 1.60 | 1.67  | 1.78  | 1.88  | 1.94                  |                                                                        |
|                                    | 5.91               | 5.24 | 4.71 | 4.19 | 3.90 | 3.67 | 3.46 | 3.35  | 3.27  | 3.20  | 3.17                  |                                                                        |
|                                    | 0.23               | 0.29 | 0.37 | 0.49 | 0.60 | 0.73 | 0.97 | 1.10  | 1.30  | 1.50  | 1.65                  |                                                                        |
| 200                                | 0.99               | 1.07 | 1.15 | 1.27 | 1.36 | 1.45 | 1.58 | 1.70  | 1.77  | 1.88  | 1.94                  |                                                                        |
|                                    | 6.30               | 5.61 | 5.07 | 4.54 | 4.24 | 4.01 | 3.80 | 3.69  | 3.61  | 3.54  | 3.51                  |                                                                        |
|                                    | 0.23               | 0.29 | 0.36 | 0.47 | 0.58 | 0.70 | 0.89 | 1.08  | 1.20  | 1.41  | 1.53                  |                                                                        |

TABLE 21



SAND SIZE 10.00 MILLIMETRES

| SLOPE *1000                  |       |       |       |       |       |       |       |       |       |       |        |
|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| DEPTH (METRES)               |       |       |       |       |       |       |       |       |       |       |        |
| WIDTH (METRES)               |       |       |       |       |       |       |       |       |       |       |        |
| FRICTION FACTOR *10          |       |       |       |       |       |       |       |       |       |       |        |
| VELOCITY (METRES/SEC)        |       |       |       |       |       |       |       |       |       |       |        |
| DISCHARGE (CUMEC/S)          |       |       |       |       |       |       |       |       |       |       |        |
| SEDIMENT CONCENTRATION (PPM) | 0.5   | 1.0   | 2.0   | 5.0   | 10.0  | 20.0  | 50.0  | 100.0 | 200.0 | 500.0 | 1000.0 |
| 10                           | 0.96  | 1.02  | 1.09  | 1.17  | 1.24  | 1.32  | 1.41  | 1.50  | 1.58  | 1.71  | 1.81   |
|                              | 2.46  | 1.90  | 1.48  | 1.08  | 0.86  | 0.70  | 0.54  | 0.46  | 0.39  | 0.32  | 0.29   |
|                              | 0.36  | 0.48  | 0.63  | 0.89  | 1.15  | 1.51  | 2.05  | 2.63  | 3.35  | 4.57  | 5.75   |
|                              | 1.4   | 2.0   | 2.9   | 4.8   | 7.0   | 10.0  | 17.2  | 25.4  | 37.7  | 64.1  | 96.2   |
| 20                           | 0.523 | 0.486 | 0.457 | 0.429 | 0.413 | 0.407 | 0.398 | 0.398 | 0.402 | 0.412 | 0.423  |
|                              | 0.97  | 1.04  | 1.10  | 1.20  | 1.28  | 1.35  | 1.46  | 1.55  | 1.65  | 1.79  | 1.90   |
|                              | 2.84  | 2.24  | 1.79  | 1.36  | 1.12  | 0.94  | 0.76  | 0.66  | 0.59  | 0.51  | 0.47   |
|                              | 0.34  | 0.45  | 0.58  | 0.82  | 1.07  | 1.35  | 1.86  | 2.34  | 2.92  | 3.96  | 4.93   |
| 30                           | 1.5   | 2.1   | 3.1   | 5.1   | 7.3   | 11.0  | 18.4  | 27.7  | 41.4  | 70.6  | 106.5  |
|                              | 0.574 | 0.541 | 0.515 | 0.494 | 0.486 | 0.480 | 0.483 | 0.487 | 0.490 | 0.509 | 0.527  |
|                              | 0.98  | 1.05  | 1.12  | 1.21  | 1.29  | 1.37  | 1.50  | 1.61  | 1.69  | 1.83  | 1.95   |
|                              | 3.16  | 2.53  | 2.06  | 1.60  | 1.35  | 1.16  | 0.96  | 0.86  | 0.77  | 0.69  | 0.65   |
| 40                           | 0.32  | 0.43  | 0.55  | 0.77  | 0.98  | 1.25  | 1.69  | 2.19  | 2.67  | 3.56  | 4.36   |
|                              | 1.6   | 2.2   | 3.2   | 5.4   | 7.9   | 11.7  | 19.7  | 28.3  | 44.2  | 76.8  | 117.5  |
|                              | 0.615 | 0.585 | 0.562 | 0.545 | 0.539 | 0.539 | 0.537 | 0.552 | 0.561 | 0.591 | 0.601  |
|                              | 0.99  | 1.06  | 1.13  | 1.23  | 1.31  | 1.40  | 1.52  | 1.62  | 1.72  | 1.88  | 1.99   |
| 50                           | 3.45  | 2.80  | 2.31  | 1.83  | 1.57  | 1.36  | 1.16  | 1.04  | 0.96  | 0.87  | 0.82   |
|                              | 0.31  | 0.41  | 0.53  | 0.73  | 0.93  | 1.21  | 1.59  | 1.99  | 2.44  | 3.27  | 3.99   |
|                              | 1.6   | 2.3   | 3.4   | 5.6   | 8.2   | 11.8  | 20.6  | 31.1  | 47.7  | 81.6  | 125.7  |
|                              | 0.651 | 0.622 | 0.602 | 0.588 | 0.585 | 0.592 | 0.590 | 0.603 | 0.618 | 0.644 | 0.666  |
| 60                           | 1.00  | 1.07  | 1.14  | 1.24  | 1.33  | 1.42  | 1.55  | 1.64  | 1.74  | 1.89  | 2.02   |
|                              | 3.72  | 3.06  | 2.55  | 2.05  | 1.77  | 1.56  | 1.35  | 1.23  | 1.13  | 1.05  | 1.00   |
|                              | 0.30  | 0.40  | 0.51  | 0.70  | 0.88  | 1.13  | 1.54  | 1.87  | 2.32  | 2.97  | 3.67   |
|                              | 1.6   | 2.4   | 3.5   | 5.8   | 8.5   | 12.4  | 20.9  | 32.5  | 49.5  | 89.2  | 134.6  |
| 80                           | 0.683 | 0.656 | 0.638 | 0.627 | 0.617 | 0.624 | 0.640 | 0.651 | 0.677 | 0.692 | 0.719  |
|                              | 1.00  | 1.07  | 1.15  | 1.26  | 1.34  | 1.42  | 1.56  | 1.66  | 1.76  | 1.92  | 2.03   |
|                              | 3.98  | 3.30  | 2.77  | 2.26  | 1.97  | 1.75  | 1.53  | 1.41  | 1.31  | 1.22  | 1.17   |
|                              | 0.30  | 0.38  | 0.49  | 0.67  | 0.85  | 1.07  | 1.44  | 1.79  | 2.17  | 2.82  | 3.35   |
| 100                          | 1.7   | 2.4   | 3.6   | 5.9   | 8.8   | 13.1  | 22.3  | 33.7  | 52.3  | 92.3  | 147.1  |
|                              | 0.713 | 0.687 | 0.670 | 0.652 | 0.654 | 0.667 | 0.678 | 0.703 | 0.716 | 0.741 | 0.762  |
|                              | 1.01  | 1.08  | 1.17  | 1.27  | 1.36  | 1.47  | 1.59  | 1.69  | 1.81  | 1.97  | 2.07   |
|                              | 4.48  | 3.76  | 3.21  | 2.67  | 2.36  | 2.13  | 1.89  | 1.76  | 1.66  | 1.56  | 1.51   |
| 120                          | 0.28  | 0.36  | 0.46  | 0.63  | 0.79  | 1.05  | 1.35  | 1.62  | 2.00  | 2.56  | 3.00   |
|                              | 1.7   | 2.5   | 3.7   | 6.2   | 9.3   | 13.0  | 23.2  | 36.4  | 55.2  | 99.1  | 160.6  |
|                              | 0.765 | 0.742 | 0.718 | 0.714 | 0.719 | 0.748 | 0.762 | 0.766 | 0.790 | 0.822 | 0.844  |
|                              | 1.02  | 1.10  | 1.18  | 1.29  | 1.38  | 1.46  | 1.61  | 1.72  | 1.83  | 1.99  | 2.09   |
| 140                          | 4.95  | 4.20  | 3.63  | 3.06  | 2.74  | 2.49  | 2.25  | 2.11  | 2.01  | 1.91  | 1.86   |
|                              | 0.27  | 0.35  | 0.44  | 0.59  | 0.75  | 0.93  | 1.24  | 1.52  | 1.82  | 2.32  | 2.69   |
|                              | 1.8   | 2.6   | 3.9   | 6.5   | 9.7   | 14.6  | 25.1  | 38.2  | 60.2  | 108.4 | 177.5  |
|                              | 0.812 | 0.780 | 0.770 | 0.768 | 0.776 | 0.797 | 0.809 | 0.832 | 0.853 | 0.888 | 0.907  |
| 160                          | 1.04  | 1.11  | 1.19  | 1.30  | 1.38  | 1.48  | 1.65  | 1.74  | 1.85  | 2.00  | 2.12   |
|                              | 5.40  | 4.62  | 4.03  | 3.44  | 3.11  | 2.85  | 2.60  | 2.46  | 2.35  | 2.26  | 2.21   |
|                              | 0.26  | 0.33  | 0.42  | 0.57  | 0.71  | 0.88  | 1.21  | 1.40  | 1.70  | 2.10  | 2.49   |
|                              | 1.8   | 2.7   | 4.0   | 6.8   | 10.2  | 15.3  | 25.0  | 41.0  | 63.5  | 118.9 | 188.9  |
| 180                          | 0.842 | 0.824 | 0.816 | 0.817 | 0.836 | 0.855 | 0.872 | 0.886 | 0.912 | 0.940 | 0.968  |
|                              | 1.04  | 1.11  | 1.20  | 1.31  | 1.40  | 1.50  | 1.66  | 1.76  | 1.89  | 2.01  | 2.11   |
|                              | 5.83  | 5.04  | 4.42  | 3.81  | 3.47  | 3.21  | 2.95  | 2.81  | 2.70  | 2.60  | 2.56   |
|                              | 0.25  | 0.32  | 0.40  | 0.55  | 0.68  | 0.84  | 1.13  | 1.33  | 1.63  | 1.95  | 2.22   |
| 200                          | 1.9   | 2.8   | 4.1   | 7.0   | 10.5  | 15.9  | 26.6  | 42.7  | 65.0  | 127.4 | 214.0  |
|                              | 0.880 | 0.865 | 0.859 | 0.862 | 0.883 | 0.886 | 0.920 | 0.938 | 0.968 | 0.992 | 1.013  |
|                              | 1.04  | 1.12  | 1.20  | 1.31  | 1.42  | 1.52  | 1.65  | 1.80  | 1.88  | 1.96  | 2.11   |
|                              | 6.25  | 5.44  | 4.81  | 4.18  | 3.83  | 3.56  | 3.30  | 3.16  | 3.05  | 2.96  | 2.91   |
| 220                          | 0.24  | 0.31  | 0.39  | 0.53  | 0.65  | 0.80  | 1.05  | 1.31  | 1.49  | 1.72  | 2.06   |
|                              | 2.0   | 2.9   | 4.3   | 7.2   | 10.9  | 16.5  | 28.7  | 42.6  | 71.7  | 148.2 | 230.0  |
|                              | 0.917 | 0.903 | 0.898 | 0.912 | 0.912 | 0.930 | 0.970 | 0.991 | 1.005 | 1.046 | 1.059  |
|                              | 1.05  | 1.13  | 1.21  | 1.32  | 1.43  | 1.53  | 1.67  | 1.79  | 1.90  | 2.02  | 2.08   |
| 240                          | 6.67  | 5.84  | 5.19  | 4.55  | 4.19  | 3.91  | 3.64  | 3.50  | 3.39  | 3.30  | 3.26   |
|                              | 0.24  | 0.30  | 0.38  | 0.51  | 0.63  | 0.77  | 1.00  | 1.21  | 1.43  | 1.68  | 1.86   |
|                              | 2.0   | 2.9   | 4.4   | 7.5   | 11.2  | 17.1  | 30.1  | 46.3  | 73.8  | 147.3 | 259.0  |
|                              | 0.952 | 0.939 | 0.936 | 0.954 | 0.952 | 0.971 | 1.001 | 1.029 | 1.051 | 1.077 | 1.112  |
| 260                          | 1.05  | 1.13  | 1.21  | 1.34  | 1.43  | 1.53  | 1.68  | 1.79  | 1.89  | 2.02  | 2.10   |
|                              | 7.07  | 6.23  | 5.57  | 4.91  | 4.54  | 4.26  | 3.99  | 3.84  | 3.74  | 3.65  | 3.61   |
|                              | 0.23  | 0.29  | 0.37  | 0.49  | 0.60  | 0.74  | 0.97  | 1.15  | 1.33  | 1.59  | 1.76   |
|                              | 2.1   | 3.0   | 4.5   | 7.6   | 11.5  | 17.6  | 30.7  | 48.6  | 79.8  | 155.1 | 271.1  |
| 280                          | 0.985 | 0.972 | 0.982 | 0.976 | 0.988 | 1.009 | 1.043 | 1.075 | 1.086 | 1.117 | 1.133  |

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10



TABLE 23

SAND SIZE 20.00 MILLIMETRES

| SEDIMENT<br>CONCENTRATION<br>(PPM) | DISCHARGE (CUMECs) |       |       |       |       |       |       |       |       |       |        |
|------------------------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
|                                    | 0.5                | 1.0   | 2.0   | 5.0   | 10.0  | 20.0  | 50.0  | 100.0 | 200.0 | 500.0 | 1000.0 |
| 10                                 | 1.16               | 1.24  | 1.32  | 1.43  | 1.52  | 1.61  | 1.74  | 1.84  | 1.94  | 2.09  | 2.21   |
|                                    | 4.88               | 3.71  | 2.83  | 2.00  | 1.56  | 1.22  | 0.91  | 0.73  | 0.60  | 0.48  | 0.41   |
|                                    | 0.34               | 0.46  | 0.61  | 0.86  | 1.11  | 1.44  | 2.00  | 2.57  | 3.28  | 4.52  | 5.73   |
|                                    | 1.3                | 1.7   | 2.5   | 4.1   | 5.9   | 8.6   | 14.4  | 21.2  | 31.3  | 52.8  | 78.8   |
|                                    | 0.662              | 0.600 | 0.548 | 0.496 | 0.465 | 0.442 | 0.420 | 0.410 | 0.405 | 0.404 | 0.408  |
| 20                                 | 1.17               | 1.25  | 1.33  | 1.45  | 1.54  | 1.64  | 1.78  | 1.88  | 2.00  | 2.16  | 2.30   |
|                                    | 5.37               | 4.15  | 3.23  | 2.36  | 1.88  | 1.52  | 1.18  | 0.98  | 0.84  | 0.69  | 0.61   |
|                                    | 0.33               | 0.44  | 0.57  | 0.81  | 1.04  | 1.34  | 1.86  | 2.36  | 3.01  | 4.09  | 5.18   |
|                                    | 1.3                | 1.8   | 2.6   | 4.3   | 6.2   | 9.1   | 15.2  | 22.5  | 33.3  | 56.5  | 84.1   |
|                                    | 0.708              | 0.647 | 0.598 | 0.551 | 0.525 | 0.507 | 0.492 | 0.487 | 0.488 | 0.495 | 0.506  |
| 30                                 | 1.17               | 1.26  | 1.35  | 1.47  | 1.56  | 1.66  | 1.81  | 1.92  | 2.04  | 2.21  | 2.35   |
|                                    | 5.79               | 4.52  | 3.57  | 2.66  | 2.17  | 1.79  | 1.42  | 1.21  | 1.05  | 0.90  | 0.81   |
|                                    | 0.32               | 0.42  | 0.55  | 0.77  | 0.99  | 1.27  | 1.75  | 2.22  | 2.80  | 3.82  | 4.77   |
|                                    | 1.3                | 1.9   | 2.7   | 4.4   | 6.5   | 9.5   | 15.8  | 23.4  | 35.1  | 59.3  | 89.2   |
|                                    | 0.746              | 0.685 | 0.640 | 0.596 | 0.572 | 0.558 | 0.545 | 0.547 | 0.551 | 0.565 | 0.579  |
| 40                                 | 1.18               | 1.26  | 1.35  | 1.48  | 1.58  | 1.68  | 1.83  | 1.92  | 2.07  | 2.25  | 2.41   |
|                                    | 6.16               | 4.86  | 3.89  | 2.94  | 2.43  | 2.03  | 1.64  | 1.43  | 1.25  | 1.09  | 1.00   |
|                                    | 0.31               | 0.41  | 0.53  | 0.74  | 0.95  | 1.21  | 1.67  | 2.11  | 2.66  | 3.59  | 4.45   |
|                                    | 1.4                | 1.9   | 2.8   | 4.6   | 6.7   | 9.8   | 16.3  | 24.7  | 36.3  | 61.9  | 93.3   |
|                                    | 0.778              | 0.719 | 0.675 | 0.634 | 0.613 | 0.601 | 0.596 | 0.610 | 0.606 | 0.623 | 0.630  |
| 50                                 | 1.18               | 1.27  | 1.36  | 1.49  | 1.59  | 1.69  | 1.85  | 1.97  | 2.10  | 2.29  | 2.44   |
|                                    | 6.51               | 5.18  | 4.18  | 3.21  | 2.67  | 2.26  | 1.85  | 1.63  | 1.45  | 1.28  | 1.18   |
|                                    | 0.30               | 0.40  | 0.52  | 0.72  | 0.92  | 1.17  | 1.60  | 2.02  | 2.54  | 3.37  | 4.20   |
|                                    | 1.4                | 2.0   | 2.9   | 4.7   | 6.9   | 10.1  | 16.9  | 25.1  | 37.6  | 64.7  | 99.5   |
|                                    | 0.806              | 0.750 | 0.707 | 0.669 | 0.650 | 0.640 | 0.636 | 0.643 | 0.653 | 0.662 | 0.682  |
| 60                                 | 1.19               | 1.28  | 1.37  | 1.50  | 1.60  | 1.71  | 1.86  | 1.99  | 2.13  | 2.32  | 2.46   |
|                                    | 6.83               | 5.48  | 4.46  | 3.46  | 2.91  | 2.48  | 2.06  | 1.83  | 1.65  | 1.46  | 1.37   |
|                                    | 0.30               | 0.39  | 0.50  | 0.70  | 0.89  | 1.13  | 1.54  | 1.96  | 2.46  | 3.24  | 3.96   |
|                                    | 1.4                | 2.0   | 2.9   | 4.8   | 7.0   | 10.4  | 17.4  | 25.6  | 38.3  | 66.7  | 102.5  |
|                                    | 0.833              | 0.777 | 0.737 | 0.700 | 0.683 | 0.675 | 0.675 | 0.685 | 0.697 | 0.707 | 0.727  |
| 80                                 | 1.20               | 1.29  | 1.38  | 1.51  | 1.62  | 1.73  | 1.89  | 2.02  | 2.17  | 2.36  | 2.53   |
|                                    | 7.45               | 6.05  | 4.98  | 3.94  | 3.36  | 2.91  | 2.47  | 2.22  | 2.02  | 1.83  | 1.73   |
|                                    | 0.29               | 0.37  | 0.48  | 0.66  | 0.84  | 1.07  | 1.45  | 1.82  | 2.26  | 2.99  | 3.76   |
|                                    | 1.5                | 2.1   | 3.0   | 5.0   | 7.3   | 10.8  | 18.3  | 27.2  | 40.9  | 70.9  | 104.9  |
|                                    | 0.881              | 0.828 | 0.790 | 0.757 | 0.743 | 0.738 | 0.743 | 0.754 | 0.758 | 0.785 | 0.824  |
| 100                                | 1.20               | 1.29  | 1.39  | 1.52  | 1.63  | 1.75  | 1.91  | 2.07  | 2.21  | 2.41  | 2.55   |
|                                    | 8.02               | 6.58  | 5.48  | 4.40  | 3.79  | 3.32  | 2.86  | 2.60  | 2.40  | 2.20  | 2.09   |
|                                    | 0.28               | 0.36  | 0.46  | 0.64  | 0.81  | 1.02  | 1.38  | 1.78  | 2.15  | 2.86  | 3.58   |
|                                    | 1.5                | 2.1   | 3.1   | 5.2   | 7.6   | 11.2  | 19.0  | 27.1  | 42.1  | 72.7  | 116.1  |
|                                    | 0.925              | 0.873 | 0.837 | 0.807 | 0.795 | 0.794 | 0.807 | 0.824 | 0.825 | 0.867 | 0.872  |
| 120                                | 1.21               | 1.30  | 1.40  | 1.53  | 1.65  | 1.76  | 1.94  | 2.09  | 2.22  | 2.42  | 2.52   |
|                                    | 8.57               | 7.09  | 5.96  | 4.84  | 4.21  | 3.73  | 3.24  | 2.97  | 2.76  | 2.56  | 2.46   |
|                                    | 0.27               | 0.35  | 0.45  | 0.61  | 0.77  | 0.97  | 1.31  | 1.66  | 2.00  | 2.60  | 3.08   |
|                                    | 1.5                | 2.2   | 3.2   | 5.3   | 7.8   | 11.6  | 19.7  | 28.9  | 45.0  | 79.3  | 128.6  |
|                                    | 0.965              | 0.915 | 0.880 | 0.853 | 0.843 | 0.844 | 0.843 | 0.862 | 0.878 | 0.905 | 0.952  |
| 140                                | 1.21               | 1.31  | 1.41  | 1.54  | 1.65  | 1.79  | 1.96  | 2.11  | 2.24  | 2.45  | 2.59   |
|                                    | 9.10               | 7.58  | 6.42  | 5.27  | 4.62  | 4.12  | 3.62  | 3.34  | 3.13  | 2.92  | 2.81   |
|                                    | 0.26               | 0.34  | 0.44  | 0.59  | 0.75  | 0.94  | 1.25  | 1.59  | 1.94  | 2.49  | 2.95   |
|                                    | 1.6                | 2.2   | 3.3   | 5.5   | 8.1   | 12.0  | 20.5  | 29.7  | 46.0  | 81.8  | 130.7  |
|                                    | 1.002              | 0.953 | 0.920 | 0.895 | 0.895 | 0.877 | 0.890 | 0.913 | 0.943 | 0.960 | 0.984  |
| 160                                | 1.22               | 1.31  | 1.41  | 1.55  | 1.67  | 1.80  | 1.97  | 2.11  | 2.25  | 2.46  | 2.62   |
|                                    | 9.61               | 8.06  | 6.87  | 5.69  | 5.02  | 4.51  | 4.00  | 3.71  | 3.49  | 3.28  | 3.17   |
|                                    | 0.26               | 0.33  | 0.42  | 0.58  | 0.72  | 0.90  | 1.21  | 1.49  | 1.83  | 2.33  | 2.79   |
|                                    | 1.6                | 2.3   | 3.3   | 5.6   | 8.3   | 12.3  | 21.1  | 31.9  | 48.7  | 87.4  | 136.8  |
|                                    | 1.037              | 0.989 | 0.957 | 0.935 | 0.930 | 0.919 | 0.935 | 0.954 | 0.987 | 1.005 | 1.033  |
| 180                                | 1.22               | 1.32  | 1.42  | 1.56  | 1.69  | 1.81  | 1.98  | 2.11  | 2.26  | 2.47  | 2.57   |
|                                    | 10.10              | 8.52  | 7.31  | 6.10  | 5.42  | 4.89  | 4.37  | 4.07  | 3.85  | 3.64  | 3.53   |
|                                    | 0.25               | 0.32  | 0.41  | 0.56  | 0.70  | 0.87  | 1.16  | 1.43  | 1.75  | 2.23  | 2.57   |
|                                    | 1.6                | 2.3   | 3.4   | 5.7   | 8.4   | 12.6  | 21.7  | 33.0  | 50.6  | 90.7  | 151.2  |
|                                    | 1.070              | 1.023 | 0.992 | 0.972 | 0.954 | 0.958 | 0.977 | 1.007 | 1.028 | 1.050 | 1.096  |
| 200                                | 1.23               | 1.32  | 1.43  | 1.58  | 1.70  | 1.82  | 1.99  | 2.12  | 2.31  | 2.42  | 2.63   |
|                                    | 10.59              | 8.98  | 7.74  | 6.51  | 5.81  | 5.27  | 4.74  | 4.44  | 4.21  | 4.01  | 3.89   |
|                                    | 0.25               | 0.32  | 0.40  | 0.54  | 0.68  | 0.85  | 1.13  | 1.38  | 1.73  | 2.05  | 2.49   |
|                                    | 1.6                | 2.4   | 3.5   | 5.8   | 8.6   | 12.9  | 22.3  | 34.1  | 50.1  | 100.3 | 153.0  |
|                                    | 1.102              | 1.056 | 1.026 | 0.992 | 0.991 | 0.995 | 1.016 | 1.047 | 1.063 | 1.107 | 1.116  |

TABLE 23

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10



TABLE 24

SAND SIZE 40.00 MILLIMETRES

| SEDIMENT<br>CONCENTRATION<br>(PPM) |       | DISCHARGE (CUMECs) |       |       |       |       |       |       |       |       |       | VELOCITY (METRES/SEC)<br>SLOPE *1000<br>DEPTH (METRES)<br>WIDTH (METRES)<br>FRICTION FACTOR *10 |  |  |  |
|------------------------------------|-------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------------------------------------------------------------------------------------------|--|--|--|
|                                    |       | 0.5                | 1.0   | 2.0   | 5.0   | 10.0  | 20.0  | 50.0  | 100.0 | 200.0 | 500.0 | 1000.0                                                                                          |  |  |  |
| 10                                 | 1.36  | 1.47               | 1.58  | 1.73  | 1.84  | 1.96  | 2.13  | 2.26  | 2.39  | 2.58  | 2.72  |                                                                                                 |  |  |  |
|                                    | 9.90  | 7.46               | 5.62  | 3.90  | 2.97  | 2.28  | 1.63  | 1.28  | 1.02  | 0.77  | 0.63  |                                                                                                 |  |  |  |
| 20                                 | 0.33  | 0.44               | 0.57  | 0.81  | 1.06  | 1.36  | 1.90  | 2.46  | 3.13  | 4.33  | 5.49  |                                                                                                 |  |  |  |
|                                    | 1.1   | 1.5                | 2.2   | 3.6   | 5.1   | 7.5   | 12.3  | 18.0  | 26.8  | 44.8  | 67.0  |                                                                                                 |  |  |  |
| 30                                 | 0.902 | 0.791              | 0.702 | 0.610 | 0.557 | 0.515 | 0.472 | 0.447 | 0.430 | 0.416 | 0.408 |                                                                                                 |  |  |  |
|                                    | 1.37  | 1.48               | 1.59  | 1.74  | 1.86  | 1.99  | 2.16  | 2.30  | 2.44  | 2.64  | 2.80  |                                                                                                 |  |  |  |
| 40                                 | 10.53 | 8.02               | 6.14  | 4.35  | 3.38  | 2.66  | 1.97  | 1.59  | 1.30  | 1.02  | 0.87  |                                                                                                 |  |  |  |
|                                    | 0.32  | 0.43               | 0.55  | 0.78  | 1.01  | 1.30  | 1.81  | 2.32  | 2.96  | 4.06  | 5.14  |                                                                                                 |  |  |  |
| 50                                 | 1.2   | 1.6                | 2.3   | 3.7   | 5.3   | 7.7   | 12.8  | 18.8  | 27.7  | 46.7  | 69.5  |                                                                                                 |  |  |  |
|                                    | 0.943 | 0.833              | 0.746 | 0.659 | 0.609 | 0.570 | 0.532 | 0.512 | 0.500 | 0.490 | 0.490 |                                                                                                 |  |  |  |
| 60                                 | 1.37  | 1.48               | 1.60  | 1.76  | 1.88  | 2.01  | 2.20  | 2.33  | 2.47  | 2.68  | 2.85  |                                                                                                 |  |  |  |
|                                    | 11.06 | 8.50               | 6.58  | 4.74  | 3.74  | 2.98  | 2.26  | 1.86  | 1.55  | 1.25  | 1.09  |                                                                                                 |  |  |  |
| 70                                 | 0.31  | 0.41               | 0.54  | 0.76  | 0.97  | 1.25  | 1.78  | 2.22  | 2.83  | 3.85  | 4.89  |                                                                                                 |  |  |  |
|                                    | 1.2   | 1.6                | 2.3   | 3.7   | 5.3   | 7.7   | 12.8  | 19.4  | 28.6  | 48.4  | 71.7  |                                                                                                 |  |  |  |
| 80                                 | 0.977 | 0.868              | 0.784 | 0.698 | 0.650 | 0.614 | 0.584 | 0.563 | 0.553 | 0.550 | 0.554 |                                                                                                 |  |  |  |
|                                    | 1.37  | 1.49               | 1.61  | 1.77  | 1.89  | 2.02  | 2.20  | 2.35  | 2.50  | 2.72  | 2.91  |                                                                                                 |  |  |  |
| 90                                 | 11.54 | 8.94               | 6.98  | 5.09  | 4.06  | 3.28  | 2.52  | 2.11  | 1.78  | 1.47  | 1.30  |                                                                                                 |  |  |  |
|                                    | 0.30  | 0.40               | 0.53  | 0.73  | 0.95  | 1.21  | 1.68  | 2.14  | 2.68  | 3.71  | 4.74  |                                                                                                 |  |  |  |
| 100                                | 1.2   | 1.7                | 2.4   | 3.9   | 5.6   | 8.1   | 13.5  | 19.9  | 29.8  | 49.6  | 72.9  |                                                                                                 |  |  |  |
|                                    | 1.007 | 0.899              | 0.815 | 0.728 | 0.686 | 0.649 | 0.620 | 0.606 | 0.595 | 0.601 | 0.612 |                                                                                                 |  |  |  |
| 110                                | 1.38  | 1.49               | 1.61  | 1.78  | 1.90  | 2.04  | 2.22  | 2.37  | 2.53  | 2.75  | 2.93  |                                                                                                 |  |  |  |
|                                    | 11.98 | 9.34               | 7.34  | 5.41  | 4.36  | 3.56  | 2.78  | 2.34  | 2.01  | 1.68  | 1.49  |                                                                                                 |  |  |  |
| 120                                | 0.30  | 0.40               | 0.51  | 0.72  | 0.92  | 1.18  | 1.63  | 2.08  | 2.64  | 3.58  | 4.49  |                                                                                                 |  |  |  |
|                                    | 1.2   | 1.7                | 2.4   | 3.9   | 5.6   | 8.1   | 13.5  | 20.3  | 30.0  | 50.8  | 76.1  |                                                                                                 |  |  |  |
| 130                                | 1.033 | 0.926              | 0.844 | 0.756 | 0.716 | 0.683 | 0.656 | 0.645 | 0.642 | 0.646 | 0.655 |                                                                                                 |  |  |  |
|                                    | 1.38  | 1.50               | 1.62  | 1.79  | 1.91  | 2.05  | 2.24  | 2.39  | 2.52  | 2.78  | 2.96  |                                                                                                 |  |  |  |
| 140                                | 12.40 | 9.71               | 7.69  | 5.73  | 4.64  | 3.82  | 3.02  | 2.59  | 2.23  | 1.88  | 1.69  |                                                                                                 |  |  |  |
|                                    | 0.29  | 0.39               | 0.50  | 0.72  | 0.90  | 1.15  | 1.59  | 2.02  | 2.58  | 3.49  | 4.34  |                                                                                                 |  |  |  |
| 150                                | 1.2   | 1.7                | 2.4   | 3.9   | 5.6   | 8.1   | 14.1  | 20.8  | 30.7  | 51.4  | 77.9  |                                                                                                 |  |  |  |
|                                    | 1.056 | 0.950              | 0.869 | 0.792 | 0.746 | 0.714 | 0.690 | 0.681 | 0.699 | 0.689 | 0.698 |                                                                                                 |  |  |  |
| 160                                | 1.39  | 1.51               | 1.63  | 1.80  | 1.93  | 2.07  | 2.26  | 2.42  | 2.58  | 2.82  | 3.01  |                                                                                                 |  |  |  |
|                                    | 13.17 | 10.42              | 8.33  | 6.30  | 5.18  | 4.32  | 3.48  | 3.01  | 2.64  | 2.28  | 2.08  |                                                                                                 |  |  |  |
| 170                                | 0.29  | 0.38               | 0.49  | 0.68  | 0.87  | 1.11  | 1.52  | 1.92  | 2.42  | 3.27  | 4.09  |                                                                                                 |  |  |  |
|                                    | 1.3   | 1.8                | 2.5   | 4.1   | 6.0   | 8.8   | 14.6  | 21.6  | 32.0  | 54.3  | 81.2  |                                                                                                 |  |  |  |
| 180                                | 1.101 | 0.996              | 0.917 | 0.840 | 0.799 | 0.771 | 0.750 | 0.744 | 0.745 | 0.758 | 0.773 |                                                                                                 |  |  |  |
|                                    | 1.39  | 1.51               | 1.64  | 1.80  | 1.94  | 2.08  | 2.28  | 2.44  | 2.61  | 2.87  | 3.05  |                                                                                                 |  |  |  |
| 190                                | 13.88 | 11.08              | 8.94  | 6.85  | 5.69  | 4.80  | 3.92  | 3.43  | 3.05  | 2.67  | 2.45  |                                                                                                 |  |  |  |
|                                    | 0.28  | 0.37               | 0.47  | 0.65  | 0.84  | 1.07  | 1.46  | 1.84  | 2.31  | 3.15  | 3.86  |                                                                                                 |  |  |  |
| 200                                | 1.3   | 1.8                | 2.6   | 4.3   | 6.1   | 9.0   | 15.0  | 22.3  | 33.1  | 55.4  | 85.1  |                                                                                                 |  |  |  |
|                                    | 1.142 | 1.038              | 0.960 | 0.880 | 0.847 | 0.821 | 0.803 | 0.800 | 0.804 | 0.823 | 0.837 |                                                                                                 |  |  |  |
| 210                                | 1.40  | 1.52               | 1.64  | 1.82  | 1.95  | 2.10  | 2.30  | 2.46  | 2.63  | 2.88  | 3.10  |                                                                                                 |  |  |  |
|                                    | 14.56 | 11.70              | 9.51  | 7.37  | 6.18  | 5.26  | 4.35  | 3.84  | 3.44  | 3.05  | 2.83  |                                                                                                 |  |  |  |
| 220                                | 0.27  | 0.36               | 0.46  | 0.64  | 0.81  | 1.03  | 1.41  | 1.77  | 2.22  | 2.97  | 3.66  |                                                                                                 |  |  |  |
|                                    | 1.3   | 1.8                | 2.6   | 4.3   | 6.3   | 9.2   | 15.4  | 22.9  | 34.2  | 58.4  | 88.0  |                                                                                                 |  |  |  |
| 230                                | 1.180 | 1.077              | 0.999 | 0.928 | 0.890 | 0.866 | 0.851 | 0.850 | 0.857 | 0.875 | 0.881 |                                                                                                 |  |  |  |
|                                    | 1.40  | 1.52               | 1.65  | 1.82  | 1.96  | 2.11  | 2.31  | 2.48  | 2.66  | 2.92  | 3.14  |                                                                                                 |  |  |  |
| 240                                | 15.20 | 12.29              | 10.06 | 7.87  | 6.65  | 5.70  | 4.77  | 4.24  | 3.83  | 3.43  | 3.20  |                                                                                                 |  |  |  |
|                                    | 0.27  | 0.35               | 0.45  | 0.63  | 0.79  | 1.00  | 1.37  | 1.71  | 2.14  | 2.89  | 3.53  |                                                                                                 |  |  |  |
| 250                                | 1.3   | 1.9                | 2.7   | 4.4   | 6.4   | 9.5   | 15.8  | 23.5  | 35.2  | 59.2  | 90.1  |                                                                                                 |  |  |  |
|                                    | 1.215 | 1.113              | 1.036 | 0.966 | 0.930 | 0.908 | 0.895 | 0.897 | 0.905 | 0.929 | 0.935 |                                                                                                 |  |  |  |
| 260                                | 1.41  | 1.53               | 1.66  | 1.83  | 1.97  | 2.12  | 2.33  | 2.50  | 2.67  | 2.88  | 3.15  |                                                                                                 |  |  |  |
|                                    | 15.83 | 12.87              | 10.60 | 8.36  | 7.11  | 6.14  | 5.18  | 4.64  | 4.21  | 3.81  | 3.57  |                                                                                                 |  |  |  |
| 270                                | 0.27  | 0.35               | 0.44  | 0.61  | 0.77  | 0.98  | 1.33  | 1.66  | 2.07  | 2.68  | 3.35  |                                                                                                 |  |  |  |
|                                    | 1.3   | 1.9                | 2.7   | 4.5   | 6.6   | 9.6   | 16.2  | 24.1  | 36.1  | 64.8  | 94.7  |                                                                                                 |  |  |  |
| 280                                | 1.249 | 1.147              | 1.071 | 1.002 | 0.968 | 0.948 | 0.936 | 0.939 | 0.950 | 0.978 | 0.980 |                                                                                                 |  |  |  |
|                                    | 1.41  | 1.53               | 1.66  | 1.84  | 1.98  | 2.13  | 2.34  | 2.51  | 2.69  | 3.00  | 3.17  |                                                                                                 |  |  |  |
| 290                                | 16.43 | 13.43              | 11.11 | 8.84  | 7.56  | 6.57  | 5.58  | 5.03  | 4.60  | 4.17  | 3.94  |                                                                                                 |  |  |  |
|                                    | 0.26  | 0.34               | 0.43  | 0.60  | 0.76  | 0.96  | 1.29  | 1.61  | 2.01  | 2.71  | 3.23  |                                                                                                 |  |  |  |
| 300                                | 1.4   | 1.9                | 2.8   | 4.5   | 6.7   | 9.8   | 16.5  | 24.7  | 37.0  | 61.6  | 97.6  |                                                                                                 |  |  |  |
|                                    | 1.281 | 1.179              | 1.104 | 1.037 | 1.004 | 0.985 | 0.975 | 0.980 | 0.991 | 1.007 | 1.025 |                                                                                                 |  |  |  |
| 310                                | 1.41  | 1.54               | 1.67  | 1.84  | 1.99  | 2.14  | 2.35  | 2.52  | 2.71  | 3.03  | 3.21  |                                                                                                 |  |  |  |
|                                    | 17.02 | 13.97              | 11.62 | 9.30  | 8.00  | 6.99  | 5.98  | 5.41  | 4.97  | 4.55  | 4.30  |                                                                                                 |  |  |  |
| 320                                | 0.26  | 0.33               | 0.43  | 0.59  | 0.74  | 0.93  | 1.26  | 1.57  | 1.95  | 2.71  | 3.16  |                                                                                                 |  |  |  |
|                                    | 1.4   | 1.9                | 2.8   | 4.6   | 6.8   | 10.0  | 16.9  | 25.2  | 37.9  | 61.0  | 98.9  |                                                                                                 |  |  |  |
| 330                                | 1.311 | 1.210              | 1.136 | 1.069 | 1.037 | 1.020 | 1.011 | 1.018 | 1.030 | 1.078 | 1.069 |                                                                                                 |  |  |  |
|                                    |       |                    |       |       |       |       |       |       |       |       |       |                                                                                                 |  |  |  |



TABLE 25

SAND SIZE 60.00 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

|     | 0.5                                   | 1.0                                   | 2.0                                   | 5.0                                   | 10.0                                  | 20.0                                 | 50.0                                  | 100.0                                 | 200.0                                 | 500.0                                 | 1000.0                                |
|-----|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| 10  | 1.47<br>15.07<br>0.32<br>1.1<br>1.122 | 1.60<br>11.31<br>0.43<br>1.5<br>0.963 | 1.74<br>8.51<br>0.56<br>2.1<br>0.839  | 1.91<br>5.85<br>0.79<br>3.3<br>0.713  | 2.05<br>4.43<br>1.02<br>4.8<br>0.639  | 2.19<br>3.37<br>1.32<br>6.9<br>0.580 | 2.38<br>2.37<br>1.84<br>11.4<br>0.520 | 2.53<br>1.83<br>2.35<br>16.8<br>0.485 | 2.70<br>1.43<br>3.02<br>24.6<br>0.458 | 2.90<br>1.05<br>4.14<br>41.6<br>0.432 | 3.07<br>0.85<br>5.27<br>61.8<br>0.419 |
| 20  | 1.48<br>15.79<br>0.31<br>1.1<br>1.161 | 1.61<br>11.97<br>0.42<br>1.5<br>1.004 | 1.75<br>9.10<br>0.54<br>2.1<br>0.881  | 1.93<br>6.37<br>0.75<br>3.4<br>0.752  | 2.07<br>4.90<br>0.98<br>4.9<br>0.686  | 2.21<br>3.80<br>1.27<br>7.1<br>0.630 | 2.41<br>2.75<br>1.77<br>11.7<br>0.575 | 2.57<br>2.18<br>2.26<br>17.2<br>0.544 | 2.73<br>1.75<br>2.88<br>25.4<br>0.521 | 2.96<br>1.34<br>3.96<br>42.6<br>0.501 | 3.14<br>1.11<br>5.04<br>63.2<br>0.494 |
| 30  | 1.48<br>16.41<br>0.31<br>1.1<br>1.194 | 1.62<br>12.52<br>0.41<br>1.5<br>1.037 | 1.75<br>9.60<br>0.53<br>2.2<br>0.915  | 1.94<br>6.82<br>0.74<br>3.5<br>0.794  | 2.08<br>5.31<br>0.96<br>5.0<br>0.725  | 2.23<br>4.17<br>1.23<br>7.3<br>0.671 | 2.44<br>3.09<br>1.72<br>11.9<br>0.619 | 2.60<br>2.48<br>2.19<br>17.6<br>0.590 | 2.77<br>2.03<br>2.79<br>25.9<br>0.571 | 3.00<br>1.59<br>3.83<br>43.4<br>0.556 | 3.21<br>1.35<br>4.91<br>63.4<br>0.556 |
| 40  | 1.49<br>16.96<br>0.30<br>1.1<br>1.223 | 1.62<br>13.02<br>0.40<br>1.5<br>1.067 | 1.76<br>10.06<br>0.52<br>2.2<br>0.946 | 1.95<br>7.22<br>0.73<br>3.5<br>0.826  | 2.10<br>5.68<br>0.95<br>5.0<br>0.759  | 2.24<br>4.50<br>1.20<br>7.4<br>0.706 | 2.45<br>3.38<br>1.66<br>12.3<br>0.655 | 2.62<br>2.76<br>2.12<br>18.0<br>0.630 | 2.79<br>2.29<br>2.70<br>26.5<br>0.614 | 3.04<br>1.83<br>3.70<br>44.4<br>0.600 | 3.23<br>1.57<br>4.68<br>66.0<br>0.600 |
| 50  | 1.49<br>17.47<br>0.30<br>1.1<br>1.250 | 1.63<br>13.49<br>0.39<br>1.6<br>1.093 | 1.76<br>10.48<br>0.51<br>2.2<br>0.973 | 1.95<br>7.59<br>0.71<br>3.6<br>0.855  | 2.11<br>6.01<br>0.92<br>5.2<br>0.784  | 2.26<br>4.82<br>1.18<br>7.5<br>0.737 | 2.47<br>3.66<br>1.63<br>12.5<br>0.689 | 2.64<br>3.02<br>2.07<br>18.3<br>0.666 | 2.81<br>2.53<br>2.63<br>27.0<br>0.652 | 3.07<br>2.05<br>3.61<br>45.1<br>0.643 | 3.27<br>1.79<br>4.55<br>67.3<br>0.644 |
| 60  | 1.49<br>17.95<br>0.30<br>1.1<br>1.274 | 1.63<br>13.92<br>0.39<br>1.6<br>1.118 | 1.77<br>10.87<br>0.50<br>2.3<br>0.998 | 1.96<br>7.94<br>0.70<br>3.6<br>0.881  | 2.11<br>6.34<br>0.90<br>5.2<br>0.814  | 2.27<br>5.11<br>1.15<br>7.7<br>0.766 | 2.48<br>3.93<br>1.59<br>12.7<br>0.720 | 2.65<br>3.27<br>2.07<br>18.6<br>0.699 | 2.84<br>2.77<br>2.57<br>27.4<br>0.685 | 3.11<br>2.27<br>3.55<br>45.4<br>0.683 | 3.30<br>1.99<br>4.43<br>68.3<br>0.684 |
| 80  | 1.50<br>18.84<br>0.29<br>1.1<br>1.320 | 1.64<br>14.73<br>0.38<br>1.6<br>1.163 | 1.78<br>11.61<br>0.49<br>2.3<br>1.044 | 1.97<br>8.60<br>0.68<br>3.7<br>0.929  | 2.13<br>6.94<br>0.88<br>5.4<br>0.866  | 2.28<br>5.67<br>1.11<br>7.9<br>0.818 | 2.51<br>4.44<br>1.53<br>13.0<br>0.774 | 2.68<br>3.75<br>1.95<br>19.1<br>0.756 | 2.87<br>3.22<br>2.47<br>28.3<br>0.747 | 3.13<br>2.69<br>3.32<br>48.1<br>0.741 | 3.35<br>2.40<br>4.21<br>71.1<br>0.753 |
| 100 | 1.50<br>19.64<br>0.28<br>1.2<br>1.358 | 1.64<br>15.47<br>0.37<br>1.6<br>1.203 | 1.78<br>12.29<br>0.48<br>2.4<br>1.086 | 1.98<br>9.21<br>0.66<br>3.8<br>0.972  | 2.14<br>7.51<br>0.84<br>5.6<br>0.906  | 2.30<br>6.20<br>1.08<br>8.1<br>0.863 | 2.53<br>4.92<br>1.48<br>13.3<br>0.823 | 2.71<br>4.20<br>1.88<br>19.7<br>0.808 | 2.90<br>3.65<br>2.38<br>29.1<br>0.801 | 3.17<br>3.10<br>3.20<br>49.3<br>0.801 | 3.39<br>2.79<br>4.05<br>72.8<br>0.816 |
| 120 | 1.52<br>20.48<br>0.29<br>1.1<br>1.398 | 1.65<br>16.18<br>0.36<br>1.7<br>1.239 | 1.79<br>12.94<br>0.47<br>2.4<br>1.122 | 1.99<br>9.80<br>0.65<br>3.9<br>1.010  | 2.15<br>8.05<br>0.82<br>5.7<br>0.943  | 2.31<br>6.70<br>1.05<br>8.2<br>0.906 | 2.54<br>5.38<br>1.44<br>13.6<br>0.868 | 2.73<br>4.64<br>1.82<br>20.1<br>0.855 | 2.92<br>4.07<br>2.30<br>29.8<br>0.851 | 3.20<br>3.50<br>3.10<br>50.5<br>0.857 | 3.42<br>3.18<br>3.86<br>75.6<br>0.867 |
| 140 | 1.52<br>21.17<br>0.28<br>1.2<br>1.430 | 1.65<br>16.85<br>0.36<br>1.7<br>1.274 | 1.80<br>13.56<br>0.46<br>2.4<br>1.157 | 2.00<br>10.35<br>0.63<br>3.9<br>1.047 | 2.16<br>8.57<br>0.81<br>5.7<br>0.989  | 2.32<br>7.19<br>1.03<br>8.4<br>0.946 | 2.56<br>5.83<br>1.40<br>13.9<br>0.912 | 2.74<br>5.07<br>1.77<br>20.6<br>0.899 | 2.94<br>4.48<br>2.23<br>30.5<br>0.897 | 3.22<br>3.89<br>3.00<br>51.8<br>0.905 | 3.45<br>3.56<br>3.74<br>77.4<br>0.920 |
| 160 | 1.51<br>21.85<br>0.27<br>1.2<br>1.461 | 1.66<br>17.50<br>0.35<br>1.7<br>1.307 | 1.80<br>14.16<br>0.45<br>2.5<br>1.191 | 2.00<br>10.89<br>0.62<br>4.0<br>1.081 | 2.17<br>9.07<br>0.80<br>5.8<br>1.025  | 2.33<br>7.66<br>1.00<br>8.5<br>0.983 | 2.57<br>6.27<br>1.37<br>14.2<br>0.951 | 2.76<br>5.49<br>1.73<br>21.0<br>0.940 | 2.96<br>4.88<br>2.17<br>31.2<br>0.939 | 3.24<br>4.28<br>2.90<br>53.1<br>0.950 | 3.50<br>3.94<br>3.67<br>77.7<br>0.971 |
| 180 | 1.52<br>22.56<br>0.26<br>1.3<br>1.492 | 1.66<br>18.12<br>0.35<br>1.7<br>1.339 | 1.81<br>14.74<br>0.44<br>2.5<br>1.223 | 2.01<br>11.42<br>0.61<br>4.1<br>1.114 | 2.18<br>9.56<br>0.78<br>5.9<br>1.058  | 2.34<br>8.13<br>0.98<br>8.7<br>1.018 | 2.58<br>6.71<br>1.34<br>14.5<br>0.988 | 2.77<br>5.90<br>1.69<br>21.4<br>0.978 | 2.98<br>5.28<br>2.11<br>31.8<br>0.979 | 3.26<br>4.66<br>2.82<br>54.3<br>0.991 | 3.51<br>4.32<br>3.51<br>81.2<br>1.010 |
| 200 | 1.52<br>23.21<br>0.26<br>1.3<br>1.522 | 1.66<br>18.73<br>0.34<br>1.8<br>1.369 | 1.81<br>15.30<br>0.44<br>2.5<br>1.253 | 2.02<br>11.93<br>0.60<br>4.1<br>1.146 | 2.18<br>10.04<br>0.77<br>6.0<br>1.090 | 2.35<br>8.58<br>0.97<br>8.8<br>1.052 | 2.59<br>7.13<br>1.31<br>14.7<br>1.023 | 2.79<br>6.31<br>1.65<br>21.7<br>1.014 | 2.99<br>5.67<br>2.06<br>32.4<br>1.016 | 3.28<br>5.04<br>2.75<br>55.4<br>1.031 | 3.56<br>4.69<br>3.48<br>80.8<br>1.056 |





TABLE 26

SAND SIZE 80.00 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

TABLE 26

|     | 0.5                          | 1.0                          | 2.0                          | 5.0                          | 10.0                         | 20.0                         | 50.0                         | 100.0                        | 200.0                        | 500.0                        | 1000.0                       |
|-----|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| 10  | 1.55<br>20.28<br>0.31<br>1.0 | 1.70<br>15.22<br>0.42<br>1.4 | 1.85<br>11.43<br>0.54<br>2.0 | 2.05<br>7.84<br>0.77<br>3.2  | 2.20<br>5.91<br>0.99<br>4.6  | 2.36<br>4.47<br>1.28<br>6.6  | 2.58<br>3.12<br>1.78<br>10.9 | 2.75<br>2.40<br>2.29<br>15.9 | 2.92<br>1.85<br>2.92<br>23.5 | 3.16<br>1.34<br>4.01<br>39.5 | 3.34<br>1.06<br>5.09<br>58.8 |
|     | 1.327                        | 1.128                        | 0.968                        | 0.808                        | 0.716                        | 0.642                        | 0.566                        | 0.522                        | 0.487                        | 0.451                        | 0.433                        |
| 20  | 1.55<br>21.09<br>0.31<br>1.1 | 1.70<br>15.96<br>0.41<br>1.4 | 1.85<br>12.09<br>0.53<br>2.0 | 2.06<br>8.42<br>0.75<br>3.2  | 2.22<br>6.45<br>0.97<br>4.7  | 2.38<br>4.95<br>1.24<br>6.8  | 2.61<br>3.54<br>1.73<br>11.1 | 2.78<br>2.78<br>2.21<br>16.3 | 2.96<br>2.20<br>2.82<br>23.9 | 3.22<br>1.65<br>3.87<br>40.2 | 3.42<br>1.35<br>4.94<br>59.3 |
|     | 1.374                        | 1.168                        | 1.009                        | 0.851                        | 0.761                        | 0.689                        | 0.617                        | 0.576                        | 0.545                        | 0.513                        | 0.503                        |
| 30  | 1.56<br>21.77<br>0.30<br>1.1 | 1.71<br>16.61<br>0.41<br>1.4 | 1.86<br>12.65<br>0.52<br>2.1 | 2.07<br>8.91<br>0.73<br>3.3  | 2.23<br>6.89<br>0.94<br>4.7  | 2.40<br>5.36<br>1.21<br>6.9  | 2.63<br>3.90<br>1.68<br>11.3 | 2.81<br>3.11<br>2.15<br>16.6 | 2.99<br>2.50<br>2.74<br>24.4 | 3.25<br>1.92<br>3.76<br>40.9 | 3.46<br>1.60<br>4.78<br>60.5 |
|     | 1.406                        | 1.202                        | 1.037                        | 0.886                        | 0.797                        | 0.727                        | 0.658                        | 0.620                        | 0.591                        | 0.564                        | 0.556                        |
| 40  | 1.56<br>22.41<br>0.30<br>1.1 | 1.72<br>17.13<br>0.39<br>1.5 | 1.87<br>13.17<br>0.52<br>2.1 | 2.08<br>9.36<br>0.72<br>3.4  | 2.24<br>7.29<br>0.93<br>4.8  | 2.41<br>5.73<br>1.19<br>7.0  | 2.64<br>4.23<br>1.65<br>11.5 | 2.83<br>3.41<br>2.10<br>16.9 | 3.02<br>2.79<br>2.67<br>24.8 | 3.29<br>2.18<br>3.70<br>41.0 | 3.50<br>1.84<br>4.66<br>61.4 |
|     | 1.436                        | 1.224                        | 1.073                        | 0.916                        | 0.829                        | 0.760                        | 0.694                        | 0.657                        | 0.632                        | 0.613                        | 0.603                        |
| 50  | 1.56<br>22.96<br>0.29<br>1.1 | 1.71<br>17.68<br>0.39<br>1.5 | 1.87<br>13.63<br>0.51<br>2.1 | 2.08<br>9.77<br>0.71<br>3.4  | 2.25<br>7.66<br>0.91<br>4.9  | 2.42<br>6.07<br>1.17<br>7.1  | 2.66<br>4.53<br>1.61<br>11.7 | 2.84<br>3.69<br>2.06<br>17.1 | 3.04<br>3.05<br>2.62<br>25.2 | 3.32<br>2.42<br>3.58<br>42.1 | 3.55<br>2.07<br>4.58<br>61.6 |
|     | 1.462                        | 1.274                        | 1.099                        | 0.944                        | 0.857                        | 0.790                        | 0.726                        | 0.691                        | 0.667                        | 0.646                        | 0.647                        |
| 60  | 1.57<br>23.48<br>0.29<br>1.1 | 1.72<br>18.12<br>0.38<br>1.5 | 1.88<br>14.07<br>0.50<br>2.1 | 2.09<br>10.15<br>0.69<br>3.5 | 2.26<br>8.02<br>0.89<br>5.0  | 2.43<br>6.39<br>1.15<br>7.2  | 2.67<br>4.82<br>1.58<br>11.8 | 2.86<br>3.96<br>2.02<br>17.3 | 3.06<br>3.30<br>2.56<br>25.5 | 3.33<br>2.65<br>3.51<br>42.8 | 3.56<br>2.29<br>4.43<br>63.3 |
|     | 1.486                        | 1.274                        | 1.124                        | 0.963                        | 0.884                        | 0.818                        | 0.755                        | 0.721                        | 0.700                        | 0.684                        | 0.680                        |
| 80  | 1.57<br>24.45<br>0.28<br>1.1 | 1.72<br>19.00<br>0.38<br>1.5 | 1.88<br>14.88<br>0.49<br>2.2 | 2.10<br>10.89<br>0.68<br>3.5 | 2.27<br>8.67<br>0.87<br>5.1  | 2.45<br>7.00<br>1.12<br>7.3  | 2.69<br>5.37<br>1.54<br>12.1 | 2.89<br>4.47<br>1.95<br>17.8 | 3.09<br>3.78<br>2.47<br>26.2 | 3.38<br>3.09<br>3.37<br>43.9 | 3.61<br>2.71<br>4.22<br>65.6 |
|     | 1.531                        | 1.325                        | 1.169                        | 1.017                        | 0.932                        | 0.868                        | 0.808                        | 0.777                        | 0.758                        | 0.746                        | 0.740                        |
| 100 | 1.57<br>25.34<br>0.28<br>1.1 | 1.73<br>19.83<br>0.37<br>1.6 | 1.89<br>15.63<br>0.48<br>2.2 | 2.11<br>11.55<br>0.67<br>3.6 | 2.28<br>9.29<br>0.85<br>5.2  | 2.46<br>7.57<br>1.09<br>7.4  | 2.71<br>5.89<br>1.49<br>12.4 | 2.91<br>4.95<br>1.89<br>18.2 | 3.12<br>4.23<br>2.40<br>26.8 | 3.41<br>3.52<br>3.26<br>45.0 | 3.65<br>3.12<br>4.11<br>66.6 |
|     | 1.571                        | 1.365                        | 1.210                        | 1.059                        | 0.975                        | 0.913                        | 0.855                        | 0.827                        | 0.809                        | 0.801                        | 0.806                        |
| 120 | 1.58<br>26.19<br>0.28<br>1.1 | 1.73<br>20.60<br>0.36<br>1.6 | 1.90<br>16.34<br>0.47<br>2.2 | 2.12<br>12.19<br>0.65<br>3.6 | 2.29<br>9.88<br>0.83<br>5.3  | 2.48<br>8.12<br>1.07<br>7.6  | 2.72<br>6.38<br>1.46<br>12.6 | 2.93<br>5.42<br>1.84<br>18.5 | 3.14<br>4.67<br>2.33<br>27.3 | 3.44<br>3.93<br>3.16<br>46.0 | 3.70<br>3.52<br>3.96<br>68.3 |
|     | 1.609                        | 1.402                        | 1.247                        | 1.097                        | 1.014                        | 0.955                        | 0.899                        | 0.870                        | 0.856                        | 0.852                        | 0.853                        |
| 140 | 1.58<br>26.99<br>0.27<br>1.2 | 1.74<br>21.34<br>0.36<br>1.6 | 1.90<br>17.02<br>0.46<br>2.3 | 2.12<br>12.79<br>0.64<br>3.7 | 2.30<br>10.44<br>0.81<br>5.3 | 2.49<br>8.64<br>1.05<br>7.7  | 2.74<br>6.86<br>1.42<br>12.8 | 2.95<br>5.87<br>1.80<br>18.9 | 3.16<br>5.10<br>2.27<br>27.9 | 3.46<br>4.34<br>3.07<br>47.1 | 3.69<br>3.91<br>3.85<br>70.4 |
|     | 1.644                        | 1.438                        | 1.283                        | 1.133                        | 1.051                        | 0.993                        | 0.937                        | 0.911                        | 0.900                        | 0.898                        | 0.918                        |
| 160 | 1.58<br>27.76<br>0.27<br>1.2 | 1.74<br>22.05<br>0.36<br>1.6 | 1.91<br>17.67<br>0.46<br>2.3 | 2.13<br>13.38<br>0.63<br>3.7 | 2.31<br>10.98<br>0.80<br>5.4 | 2.50<br>9.15<br>1.03<br>7.8  | 2.75<br>7.33<br>1.39<br>13.1 | 2.96<br>6.31<br>1.76<br>19.2 | 3.18<br>5.52<br>2.21<br>28.4 | 3.49<br>4.74<br>2.99<br>48.0 | 3.74<br>4.30<br>3.73<br>71.8 |
|     | 1.677                        | 1.471                        | 1.316                        | 1.167                        | 1.086                        | 1.027                        | 0.975                        | 0.950                        | 0.941                        | 0.941                        | 0.950                        |
| 180 | 1.59<br>28.50<br>0.27<br>1.2 | 1.75<br>22.72<br>0.35<br>1.6 | 1.91<br>18.30<br>0.45<br>2.3 | 2.14<br>13.94<br>0.62<br>3.8 | 2.32<br>11.51<br>0.79<br>5.5 | 2.51<br>9.64<br>1.01<br>7.9  | 2.76<br>7.79<br>1.37<br>13.3 | 2.98<br>6.75<br>1.72<br>19.5 | 3.19<br>5.94<br>2.17<br>28.9 | 3.51<br>5.13<br>2.91<br>48.9 | 3.76<br>4.68<br>3.63<br>73.3 |
|     | 1.709                        | 1.496                        | 1.348                        | 1.200                        | 1.117                        | 1.061                        | 1.010                        | 0.987                        | 0.979                        | 0.981                        | 0.992                        |
| 200 | 1.59<br>29.22<br>0.26<br>1.2 | 1.75<br>23.38<br>0.35<br>1.7 | 1.92<br>18.91<br>0.45<br>2.3 | 2.14<br>14.50<br>0.61<br>3.8 | 2.32<br>12.02<br>0.77<br>5.6 | 2.51<br>10.12<br>0.96<br>8.3 | 2.77<br>8.23<br>1.34<br>13.4 | 2.98<br>7.17<br>1.69<br>19.8 | 3.21<br>6.35<br>2.12<br>29.4 | 3.52<br>5.53<br>2.85<br>49.8 | 3.78<br>5.06<br>3.54<br>74.8 |
|     | 1.736                        | 1.529                        | 1.376                        | 1.228                        | 1.148                        | 1.083                        | 1.044                        | 1.024                        | 1.015                        | 1.019                        | 1.031                        |







TABLE 27

SAND SIZE 100.00 MILLIMETRES

SEDIMENT  
CONCENTRATION  
(PPM)

DISCHARGE (CUMECs)

VELOCITY (METRES/SEC)  
SLOPE \*1000  
DEPTH (METRES)  
WIDTH (METRES)  
FRICTION FACTOR \*10

TABLE 27

|     | 0.5                                   | 1.0                                   | 2.0                                   | 5.0                                   | 10.0                                  | 20.0                                  | 50.0                                  | 100.0                                 | 200.0                                 | 500.0                                 | 1000.0                                |
|-----|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| 10  | 1.60<br>25.54<br>0.31<br>1.0<br>1.547 | 1.76<br>19.18<br>0.41<br>1.4<br>1.289 | 1.93<br>14.41<br>0.54<br>1.9<br>1.094 | 2.15<br>9.87<br>0.76<br>3.1<br>0.900  | 2.32<br>7.42<br>0.97<br>4.4<br>0.788  | 2.50<br>5.60<br>1.26<br>6.4<br>0.700  | 2.74<br>3.88<br>1.75<br>10.5<br>0.609 | 2.92<br>2.96<br>2.23<br>15.3<br>0.556 | 3.11<br>2.28<br>2.85<br>22.6<br>0.514 | 3.38<br>1.63<br>3.93<br>37.7<br>0.473 | 3.57<br>1.28<br>4.95<br>56.5<br>0.447 |
| 20  | 1.60<br>26.41<br>0.30<br>1.0<br>1.586 | 1.77<br>19.97<br>0.40<br>1.4<br>1.329 | 1.94<br>15.12<br>0.53<br>2.0<br>1.133 | 2.16<br>10.49<br>0.74<br>3.1<br>0.941 | 2.34<br>7.99<br>0.95<br>4.5<br>0.831  | 2.53<br>6.11<br>1.23<br>6.4<br>0.741  | 2.76<br>4.34<br>1.70<br>10.7<br>0.658 | 2.95<br>3.37<br>2.12<br>15.6<br>0.608 | 3.15<br>2.65<br>2.77<br>22.9<br>0.569 | 3.42<br>1.96<br>3.80<br>38.5<br>0.532 | 3.63<br>1.59<br>4.82<br>57.1<br>0.512 |
| 30  | 1.61<br>27.14<br>0.30<br>1.0<br>1.619 | 1.78<br>20.64<br>0.40<br>1.4<br>1.358 | 1.94<br>15.72<br>0.52<br>2.0<br>1.166 | 2.17<br>11.02<br>0.72<br>3.2<br>0.975 | 2.35<br>8.47<br>0.93<br>4.6<br>0.866  | 2.52<br>6.56<br>1.22<br>6.5<br>0.795  | 2.78<br>4.72<br>1.66<br>10.8<br>0.697 | 2.98<br>3.73<br>2.12<br>15.8<br>0.650 | 3.18<br>2.98<br>2.70<br>23.3<br>0.613 | 3.46<br>2.25<br>3.71<br>39.0<br>0.580 | 3.69<br>1.86<br>4.72<br>57.5<br>0.565 |
| 40  | 1.61<br>27.86<br>0.30<br>1.0<br>1.650 | 1.78<br>21.24<br>0.39<br>1.4<br>1.390 | 1.95<br>16.27<br>0.51<br>2.0<br>1.195 | 2.18<br>11.50<br>0.71<br>3.2<br>1.004 | 2.37<br>8.92<br>0.92<br>4.6<br>0.898  | 2.54<br>6.95<br>1.17<br>6.7<br>0.814  | 2.81<br>5.07<br>1.63<br>11.0<br>0.731 | 3.01<br>4.05<br>2.08<br>16.1<br>0.686 | 3.22<br>3.28<br>2.64<br>23.6<br>0.652 | 3.51<br>2.52<br>3.63<br>39.5<br>0.622 | 3.74<br>2.10<br>4.60<br>58.4<br>0.609 |
| 50  | 1.61<br>28.44<br>0.29<br>1.1<br>1.676 | 1.78<br>21.79<br>0.39<br>1.4<br>1.417 | 1.95<br>16.77<br>0.50<br>2.0<br>1.222 | 2.18<br>11.94<br>0.90<br>3.3<br>1.031 | 2.37<br>9.32<br>0.90<br>4.7<br>0.926  | 2.55<br>7.32<br>1.16<br>6.8<br>0.843  | 2.81<br>5.40<br>1.60<br>11.1<br>0.762 | 3.01<br>4.35<br>2.04<br>16.3<br>0.717 | 3.22<br>3.56<br>2.59<br>23.9<br>0.686 | 3.51<br>2.78<br>3.56<br>40.0<br>0.659 | 3.74<br>2.34<br>4.72<br>59.8<br>0.643 |
| 60  | 1.62<br>29.00<br>0.29<br>1.1<br>1.700 | 1.78<br>22.31<br>0.39<br>1.5<br>1.441 | 1.96<br>17.24<br>0.47<br>2.1<br>1.246 | 2.19<br>12.36<br>0.69<br>3.3<br>1.056 | 2.37<br>9.70<br>0.89<br>4.7<br>0.951  | 2.56<br>7.66<br>1.14<br>6.9<br>0.869  | 2.82<br>5.71<br>1.57<br>11.3<br>0.790 | 3.03<br>4.64<br>2.00<br>16.5<br>0.746 | 3.24<br>3.82<br>2.55<br>24.2<br>0.717 | 3.54<br>3.02<br>3.49<br>40.5<br>0.692 | 3.78<br>2.57<br>4.42<br>59.9<br>0.684 |
| 80  | 1.62<br>30.04<br>0.28<br>1.1<br>1.744 | 1.79<br>23.27<br>0.37<br>1.5<br>1.478 | 1.96<br>18.11<br>0.49<br>2.1<br>1.291 | 2.20<br>13.13<br>0.68<br>3.4<br>1.102 | 2.39<br>10.40<br>0.87<br>4.8<br>0.998 | 2.58<br>8.31<br>1.11<br>7.0<br>0.917  | 2.84<br>6.30<br>1.53<br>11.5<br>0.841 | 3.05<br>5.18<br>1.95<br>16.8<br>0.799 | 3.27<br>4.32<br>2.47<br>24.7<br>0.773 | 3.57<br>3.48<br>3.38<br>41.4<br>0.752 | 3.85<br>3.02<br>4.34<br>59.8<br>0.753 |
| 100 | 1.62<br>31.00<br>0.28<br>1.1<br>1.785 | 1.80<br>24.15<br>0.37<br>1.5<br>1.518 | 1.97<br>18.92<br>0.48<br>2.1<br>1.331 | 2.21<br>13.85<br>0.66<br>3.4<br>1.143 | 2.40<br>11.06<br>0.85<br>4.9<br>1.040 | 2.59<br>8.92<br>1.08<br>7.1<br>0.961  | 2.86<br>6.84<br>1.49<br>11.7<br>0.887 | 3.07<br>5.69<br>1.90<br>17.2<br>0.849 | 3.29<br>4.80<br>2.40<br>25.3<br>0.823 | 3.61<br>3.93<br>3.28<br>42.3<br>0.806 | 3.89<br>3.44<br>4.19<br>61.3<br>0.805 |
| 120 | 1.63<br>31.91<br>0.28<br>1.1<br>1.823 | 1.80<br>24.99<br>0.37<br>1.5<br>1.564 | 1.97<br>19.68<br>0.47<br>2.2<br>1.368 | 2.21<br>14.53<br>0.65<br>3.5<br>1.181 | 2.40<br>11.68<br>0.83<br>5.0<br>1.079 | 2.60<br>9.50<br>1.06<br>7.2<br>1.001  | 2.87<br>7.37<br>1.46<br>11.9<br>0.929 | 3.09<br>6.18<br>1.85<br>17.5<br>0.893 | 3.32<br>5.26<br>2.34<br>25.7<br>0.869 | 3.64<br>4.36<br>3.19<br>43.1<br>0.853 | 3.90<br>3.85<br>4.00<br>64.1<br>0.852 |
| 140 | 1.63<br>32.77<br>0.27<br>1.1<br>1.859 | 1.80<br>25.78<br>0.36<br>1.5<br>1.599 | 1.98<br>20.40<br>0.46<br>2.2<br>1.403 | 2.22<br>15.17<br>0.64<br>3.5<br>1.216 | 2.41<br>12.28<br>0.82<br>5.1<br>1.115 | 2.61<br>10.05<br>1.04<br>7.4<br>1.038 | 2.88<br>7.87<br>1.43<br>12.1<br>0.968 | 3.10<br>6.65<br>1.81<br>17.8<br>0.933 | 3.34<br>5.71<br>2.29<br>26.2<br>0.909 | 3.66<br>4.78<br>3.11<br>43.9<br>0.898 | 3.93<br>4.25<br>3.90<br>65.4<br>0.899 |
| 160 | 1.63<br>33.60<br>0.27<br>1.1<br>1.893 | 1.80<br>26.54<br>0.35<br>1.6<br>1.632 | 1.98<br>21.10<br>0.46<br>2.2<br>1.437 | 2.23<br>15.80<br>0.63<br>3.6<br>1.250 | 2.42<br>12.86<br>0.81<br>5.1<br>1.149 | 2.62<br>10.58<br>1.02<br>7.5<br>1.073 | 2.90<br>8.36<br>1.40<br>12.3<br>1.005 | 3.12<br>7.11<br>1.78<br>18.0<br>0.971 | 3.36<br>6.15<br>2.24<br>26.6<br>0.948 | 3.69<br>5.19<br>3.03<br>44.7<br>0.939 | 3.95<br>4.65<br>3.80<br>66.6<br>0.942 |
| 180 | 1.63<br>34.39<br>0.27<br>1.1<br>1.926 | 1.81<br>27.26<br>0.35<br>1.6<br>1.663 | 1.99<br>21.77<br>0.45<br>2.2<br>1.468 | 2.23<br>16.40<br>0.62<br>3.6<br>1.282 | 2.43<br>13.41<br>0.79<br>5.2<br>1.181 | 2.63<br>11.10<br>1.01<br>7.6<br>1.106 | 2.91<br>8.84<br>1.38<br>12.5<br>1.039 | 3.13<br>7.56<br>1.74<br>18.3<br>1.005 | 3.37<br>6.57<br>2.20<br>27.0<br>0.986 | 3.70<br>5.59<br>2.97<br>45.5<br>0.979 | 3.97<br>5.04<br>3.71<br>67.8<br>0.983 |
| 200 | 1.64<br>35.16<br>0.26<br>1.2<br>1.957 | 1.81<br>27.97<br>0.35<br>1.6<br>1.694 | 1.99<br>22.43<br>0.45<br>2.2<br>1.499 | 2.24<br>16.99<br>0.61<br>3.6<br>1.312 | 2.43<br>13.96<br>0.78<br>5.3<br>1.212 | 2.63<br>11.61<br>0.99<br>7.6<br>1.138 | 2.92<br>9.31<br>1.36<br>12.6<br>1.070 | 3.15<br>8.01<br>1.71<br>18.6<br>1.039 | 3.39<br>7.00<br>2.16<br>27.4<br>1.021 | 3.72<br>6.00<br>2.91<br>46.2<br>1.016 | 4.00<br>5.43<br>3.63<br>69.0<br>1.021 |

