

PART II
CANAL AND LAKES
(CHARACTERISTICS)

CHAPTER VI
CANAL AND LAKES CHARACTERISTICS

Art. 79- Canal and Approaches:

A- THE NAVIGABLE CHANNEL:

(1) North Approach Channel (Port Said) :

(1.1) East:

a) From outer pair of light buoys

(East Branch) at Hm. 215 to buoys at Hm. 94.90 where it joins the west approach channel.

b) From buoys at Hm 94.90 to buoys at Hm 0.00 E

C) The Light beacons at Hm 2.738 E

(1.2) West:

a) From buoys at Hm 94.90 to buoys at Hm 21.50.

b) Port Said Port from Hm 21.50 to Km 3.700.

c) Port Said Lighthouse at Hm 0.00

d) Distance from Fairway buoys to Port Said Lighthouse is 11.040 Km (Bearing 017 degree).

(2) Main Channel:

a) From buoys at Hm 0.00 E to Ismailia Station at Km 73.133.

b) From Ismailia Station at Km 76.133 to Port Tawfiq Station at Km 160.680.

c) From Port Tawfiq Station at Km 160.680 to Km 162.250(Hm 0.00).

(3) West Branches:

a) Port Said Branch from Km 3.700 to Km 17.000.

b) Ballah Branch from Km 51.477 to Km 60.333.

c) Timsah Branch from Km 76.950 to Km 81.000.

d) Deversior Branch from Km 95.000 to Km 101.050.

e) Kabret and Lakes Branch from Km 101.050 to Km 122.100.

(4) South Approach Channel:

a) From Port Tewfik Km. 162.250 (Hm.000) to the outer pairOf buoys Hm. 80.500.

b) Conry Rock-mark at Lat. 29 degree 48' .11 & Long 32 degree 34' .22 E.

C) New Port Rock (Zenobia) – framework at 29 degree 53'.11 N & Long 32 degree 33'.08 E.

d) Buoyage of Port of Suez:

Position of Green Island Light at 29 degree 54'.59 N & Long 32 degree 31'.80 E.

B- CHARACTERISTICS OF THE NAVIGABLE CHANNEL:

(1) North approaches:

a) Port Said East Approach Channel from Hm. 215 to Km. 0.00:

1- Depth of water 23.50 m.

2- Navigational Channel width measured at 23.50 m. depth :

| | |
|-------------|--------|
| Hm. 215.00 | 300 m. |
| Hm. 195.00 | 285 m. |
| Hm. 80.00 E | 205 m. |
| Hm. 0.000 E | 150 m. |
| Hm. 215 | 745 m. |

3- Distance between buoys at : Hm. 195 745 m.

Hm. 80 400 m.

4- Side Slopes:

Designed side slopes, ranging from 4/1 near shore to about 50/1 in the offshore part.

b) Port Said West Approach Channel from Hm. 95.00 to Port Said :

1-Depth of water..... 16.50 m.

2- Navigational Channel width measured at 16.50 m. depth :

| | |
|-----------|--------|
| Hm. 80.00 | 190 m. |
|-----------|--------|

Hm. 21.50

150 m.

3- Distance between buoys at :

Hm. 80.00

520 m.

Hm. 21.50

208 m.

(2) Canal Cross Sections:

a) The Canal cross sections are trapezoidal in shape, having side slopes of 4/1 in the northern part, up to Km. 61.00 and 3/1 in the southern part.

Toussoum Zone is the only place where the Western slopes are ranging from 2.5/1 to 3/1

b) Main dimensions of cross sections all through the Canal are mentioned in the following tables and drawings.

c) Both sides of the Canal are provided with mooring bollards, the distance between bollards, at east 125m and at west 75 m.

(3) South Approach from Hm. 0.00 (Km. 162.250) to Hm. 80.50 :

a) Depth of water 23.50 m.

b) Navigational Channel width measured at 23.50 depth is 265.00 m.

c) Distance between buoys at 11.00 m depth is 340.00 m.

d) Side slopes 3/1.

(4) Signal Stations :

| No. | Name of Station | Kilometric indication |
|-----|------------------------------------|------------------------|
| 1 | Port Fouad (Al Gona)- East | Km. 2.854 E |
| 2 | Al Raswa-West | Km. 3.757 |
| 3 | Ras Al Ish-West Ras Al Ish-East | Km. 14.304 12.800 E |
| 4 | El – Tina | Km. 24.775 |
| 5 | El – Cap | Km. 35.420 |
| 6 | Kantara | Km. 45.130 |
| 7 | Ballah – West & East | Km. 54.770 |
| 8 | Ferdan | Km. 64.894 |
| 9 | Ismailia | Km. 76.133 |
| 10 | Toussoum | Km. 86.787 |
| 11 | Deversoir – West & East | Km. 97.778 |
| 12 | Kabrit – West & East | Km. 120.827 |
| 13 | Gineifa | Km. 133.959 |
| 14 | Shallufa | Km. 146.133 |
| 15 | Port Taufiq | Km. 160.680 |

C - DEPTH AND WIDTH OF DIFFERENT PARTS OF THE CANAL:

1- Main Canal and Bitter Lake East Channel.

TABLE NO. 6 / 1

| Kilometric Position | Designation of Different parts of the Canal | Theoretical Depth | Width of Canal at 19 m. Depth | Remarks |
|----------------------------|--|--------------------------|--------------------------------------|-----------------------|
| From Km. To Km. | | Meters | Meters | |
| 0.000 E 2.800 E* | Junction | 22.50 | 170 - 135 East | Port Said Branch |
| 2.800 E 15.190 E | Straight line | 22.50 | 135 | East Port Said Branch |
| 15.190 E 15.540 E | Junction | 22.50 | Variable | East Port Said Branch |
| 15.540 E 18.980 | Southern entrance to Port Said by-Passes | 22.50 | Variable | |
| 18.980 30.430 | Straight line | 22.50 | 145 | |
| 30.430 32.350 | Northern approach to encoche (siding) | 22.50 | 145-222 | |
| 32.350 32.950 | East encoche of Km. 32(siding of Km32) | 22.50 | 222 | |
| 32.950 35.110 | Southern approach to encoche (siding) | 22.50 | 222 - 135 | |
| 35.110 49.512 | Straight line | 22.50 | 135 | |
| 49.512 51.449 E | Northern approach to Ballah Loop | 22.50 | Variable | |
| 51.449 E 51.785 E | Curve of Km. 51 East | 22.5 | 135 | |
| 51.785 E 59.895 E | Straight line | 22.50 | 135 | |

| | | | | | |
|----------|----------|-------------------------------|-------|---------------|-----------------------|
| 59.895 E | 61.321 | Curve of Km. 61 | 22.50 | Variable | |
| 61.321 | 63.419 | Curve of Km. 61 | 22.50 | Variable | |
| 63.419 | 64.514 | Approach to curve | 22.50 | 177.37 - 150 | |
| 64.514 | 71.164 | Straight line | 22.50 | 150 | |
| 71.164 | 71.964 | Approach to curve | 22.50 | 150 - 170 | |
| 71.964 | 75.311 | " S " Curves | 22.50 | 170 | |
| 75.311 | 76.033 | Straight line | 22.50 | 170 | |
| 76.033 | 76.578 | Approach to curve | 22.50 | Variable | East timsah By - Pass |
| 76.578 | 79.096 E | Curve of Timsah | 22.50 | 170 | East timsah By - Pass |
| 79.096 E | 80.919 | Siding of Km. 80 (East) | 22.50 | Variable | East timsah By - Pass |
| 80.919 | 82.576 | Curve of Timsah | 22.50 | 170 | East timsah By - Pass |
| 82.576 | 85.027 | Straight line | 22.50 | 170 | |
| 85.027 | 87.414 | Curve of Km. 85 | 22.50 | 170 | |
| 87.414 | 88.814 | Approach to Curve | 22.50 | 170 - 140 | |
| 88.814 | 92.950 | Straight line | 22.50 | 140 | |
| 92.950 | 93.050 | Junction to Syphons zone | 22.50 | 140 - 185 | |
| 93.050 | 93.446 | Syphons Zone | 22.50 | 185 | |
| 93.446 | 95.000 | Junction to Deversoir by-pass | 22.50 | Variable | |
| 95.000 | 95.250 | Junction to East Branch | 22.50 | 225.55-197.99 | Deversoir East branch |
| 95.250 | 96.000 | Junction to East Branch | 22.50 | 197.99-135 | Deversoir East branch |
| 96.000 | 99.000 | Straight line | 22.50 | 135 | Deversoir East branch |

| | | | | | |
|-----------------|----------------|---------------------------------------|--------------|---------------------|----------------------------------|
| 99.000 | 102.600 | Straight line | 22.00 | 135 | Deversoir East branch |
| 102.600 | 105.250 | Curve | 21.50 | variable | Bitter Lakes East Channel |
| 105.250 | 112.860 | Main Channel (straight line) | 21.50 | 346 | Bitter Lakes East Channel |
| 112.860 | 114.200 | Junction | 21.50 | variable | Bitter Lakes East Channel |
| 114.200 | 114.957 | Junction with Kabrit-Loop | 22.00 | Variable | Bitter Lakes East Channel |
| 114.957 | 115.320 | Junction | 22.00 | From Approx. | Kabrit Loop East Channel |
| 115.320 | 118.000 | Straight line | 22.50 | 140 | Kabrit Loop East Channel |
| 118.00 | 121.800 | Straight line | 22.50 | 140 | Kabrit Loop East Channel |
| 121.800E | 122.100 | Junction | 22.50 | 140 - 150 | Kabrit Loop East Channel |
| 122.100 | 122.500 | Approach to curve | 22.50 | Variable | |
| 122.500 | 125.507 | Curve of Km. 122 | 22.50 | Variable | |
| 125.507 | 128.899 | Straight Line | 22.50 | 155 | |
| 128.899 | 129.499 | Approach to curve | 22.50 | 155 - 165 | |
| 129.499 | 131.975 | Curve of Km. 130 | 22.50 | 165 | |
| 131.975 | 133.175 | Approach to curve | 22.50 | 165-135 | |
| 133.175 | 144.714 | Straight line | 22.50 | 135 | |
| 144.714 | 147.146 | siding of Km.146 | 22.50 | Variable | |
| 147.146 | 149.400 | Straight line | 22.50 | 135 | |
| 149.400 | 150.000 | Straight line | 25.00 | 145 | |
| 149.500 | 153.524 | Straight line | 25.00 | 145 | |
| 153.524 | 154.724 | Approach to curve | 25.00 | 145-175 | |

| | | | | |
|---------|---------|--------------------------------|-------|---------|
| 154.724 | 155.724 | Curve of Km. 154 | 25.00 | 175 |
| 155.724 | 156.274 | Straight line | 25.00 | 175 |
| 156.274 | 159.998 | Curve of Km. 157 | 25.00 | 175 |
| 159.998 | 161.050 | Straight line | 25.00 | 175 |
| 161.050 | 162.250 | Southern approach of the Canal | 25.00 | 175-336 |

2- Canal West Branches and Bitter Lake West Channel.

TABLE NO. 6 / 2

| Kilometric Position | | Designation of Different parts of the Canal | Theoretical Depth | Width of canal at 14 m. Depth | Remarks |
|---------------------|--------|---|-------------------|-------------------------------|-----------------------|
| From km. | To km | | Meters | Meters | |
| Hm 21.50 | 0.000 | Approach to Port | 15.50 | Variable | |
| 0.000 | 1.450 | Basin | 15.50 | port | |
| 1.450 | 3.650 | Basins For Coal & Fuel oil vessels | 15.50 | port | |
| 3.650 | 3.729 | Junction (0) | 15.50 | Variable | |
| 3.729 | 4.890 | Junction (1) | 15.50 | Variable | Port Said West Branch |
| 4.890 | 6.000 | Junction (2) | 15.50 | Variable | Port Said West Branch |
| 6.000 | 16.450 | Straight line | 15.50 | 201 | Port Said West Branch |

| | | | | | |
|--------|--------|---|---------------|---------------|-------------------------|
| 16.480 | 16.480 | Straight line Approach to Garage 15.50 - 23.00 | 201 | | Port Said West Branch |
| 16.480 | 17.000 | Garage Km. 17.000 | 23.00 | 201 | |
| 51.490 | 52.040 | Garage Km. 51.500 | 23.00 | 146 | |
| 52.040 | 52.054 | Straight line | 23.00 - 17.00 | 146 | West Branch Ballah Loop |
| 52.054 | 53.298 | Curve Km. 53 | 17.00 | Variable | West Branch Ballah Loop |
| 53.298 | 54.098 | Approach to curve | 17.00 | 160.64-146 | West Branch Ballah Loop |
| 54.098 | 56.398 | Straight line | 17.00 | 146 | West Branch Ballah Loop |
| 56.398 | 56.871 | Approach to curve Km. 57 | 17.00 | 146-157.82 | West Branch Ballah Loop |
| 56.871 | 58.797 | Curve of Km. 57 | 17.00 | Variable | West Branch Ballah Loop |
| 58.797 | 59.269 | Approach to curve | 17.00 | 157.82 – 146 | West Branch Ballah Loop |
| 59.269 | 59.900 | Straight line | 17.00 | 146 | West Branch Ballah Loop |
| 59.900 | 60.308 | Garage Km.60.000) | 21.00 | 146 | West Branch Ballah Loop |
| 76.033 | 77.371 | Curve (Centre on West Bank) | 15.50 | 129.60-172.65 | West Branch Timsah Lake |
| 77.371 | 77.672 | Junction | 15.50 | 172.65-226.22 | West Branch Timsah Lake |
| 77.672 | 77.912 | Junction | 15.50 | 226.22-291.64 | West Branch Timsah Lake |
| 77.912 | 79.776 | Curve of Like Timsah (centre on East Bank) | 15.50 | Variable | West Branch Timsah Lake |
| 79.766 | 79.950 | Straight line | 19.00 | 142 | West Branch Timsah Lake |
| 79.950 | 81.000 | Garage Km Km.80.00 | 19.00 | 142 | West Branch Timsah Lake |
| 95.000 | 95.500 | Garage Km Km.95.00 | 18.00 | 177 | Deversoir West Branch |

| | | | | | |
|----------------|----------------|----------------------|--------------|-----------------|---------------------------------|
| 95.500 | 100.262 | Straight line | 15.00 | 177 | Deversoir West Branch |
| 100.262 | 101.050 | Junction | 14.50 | 177-412 | Deversoir West Branch |
| 101.050 | 103.759 | Straight line | 14.50 | 412 | Bitter Lake West Channel |
| 103.759 | 104.291 | Junction | 14.50 | 412-232 | Bitter Lake West Channel |
| 104.291 | 114.200 | West Channel | 14.50 | 232 | Bitter Lake West Channel |
| 114.200 | 115.603 | Junction | 15.00 | Variable | Kabrit Loop West Branch |
| 115.603 | 122.100 | Straight line | 15.00 | 152 | Kabrit Loop West Branch |

D - Bends in the Canal :

The bends in the navigable channel have the following characteristics:

- (1) Minimum of Radius of navigation line at inner – 11.00m=4000 meters
at outer – 11.00m =5000 meters
- (2) At the ends of two bends, there is usually a funnel made to allow increasing the width of the channel from the width of the straight part to the width of the curves, (At 11.00 meters depth).
- (3) Location of beginning and end of each bend are included in the following table:

TABLE NO. 7

| Canal Bends | Kilometric indication of beginning point | Kilometric indication of end point | Width at - 11.00 m* |
|---------------|--|------------------------------------|---------------------|
| Km. 51 | Km. 49.778 | Km. 51.414 | 215-170 |
| | Km. 49.512 | Km. 51.785 E | 215 |
| Km. 53 | Km. 52.054 | Km. 53.512 | 170-201 |
| Km. 57 | Km. 56.871 | Km. 58.797 | 170-226 |
| Km. 61 | Km. 60.308 | Km. 63.314 | 170-239 |
| | Km. 61.321 E | Km. 63.419 | 215-237 |
| S' curves | Km. 71.964 | Km. 75.311 | 230 |
| Timsah curves | Km. 76.578 | Km. 81.692 E | 230 |
| Km. 85 | Km. 85.027 | Km. 87.414 | 230 |
| Km. 103 | Km. 102.6 | Km. 105.25 | 195-406 |
| Km. 122 | Km. 122.1 | Km. 125.507 | 210-215 |
| | Km. 122.449 | Km. 125.497 | 389-215 |
| Km. 130 | Km. 129.499 | Km. 131.975 | 225 |
| Km. 146 | Km. 145.313 | Km. 146.512 | 245-248 |
| Km. 154 | Km. 154.724 | Km. 155.724 | 235 |
| Km. 157 | Km. 156.274 | Km. 159.998 | 235 |

Note: At the approaches of the by-passes, bends are made with radius more than 5000 meters.

- - 11.00m is the Suez Canal reference level from chart datum.

E – BY-PASSES:

(1)Port Said By-Pass (See Drawing 1, 2, 3 and 4):

A by-pass is dredged East of Port Fouad starting at Km. 17.00 and extending straight to join the existing Port Said roadstead at Hm., 94.90 and continuing till Hm. 215 This channel (By-pass) is used for the exit of Northbound ships, the entry of VLCC's and ULCC's in ballast, 5th, 4th and 3rd generation containerhips, LASH over 35.000 SC.G.T.,L.P.G., L.N.G. Tankers and Vessels with draught over 42 feet coming from North.

Characteristics and Dimensions:

The kilometric marks are followed by letter "E" to distinguish them from those of the West branch .The part from Km. 2.800 E to Km. 15.190 E) width (at 21.00 meters depth) of 135 meters with side slopes 4/1. And design depth 22.50 meters . It is fitted with bollards on the Western side.

The transition zone from Km. 2.800E to Hm 0.000 E.

The seaward part (from Km. 0.000 E to Hm. 94.900 E) with width (at 23.20 meters depth) ranging from 150 meters at Km. 0.000 E to 205 meters at Hm. 80.00 E with natural side slopes ranges from (4/1-30/1).

Two revolving light beacons on each bank, to indicate the entrance of Canal from East Approach channel at Km. 2.738 E.

(2) Ballah Loop (See Drawing No. 8) :

Between Km. 51.449 E and 59.942 E the Canal is doubled. The zone comprising the 2 branches of the Canal limited by the North and South ends where the 2 branches meet, is called " Ballah Loop ".

Characteristics and Dimensions:

In the East Branch the kilometric marks are followed by letter "E". The length of the East Branch is 8.493 Km.

The width of straight part of the East Branch at 21.00 meters depth is 135 meters.

The width of straight part of the West Branch at 14.00 meters depth is 146 meters.

| | West Branch | East Branch |
|---------------------------------|----------------|----------------|
| Kilometric marking of North end | 51.477 | 51.449 E |
| Kilometric marking of South end | 60.333 | 59.942 E |

Slope of Bank 4/1.

In the West branch, 16 mooring berths are situated on the Eastern bank and numbered South to North.

(3)Timsah By-Pass (See Drawing No. 10)

Between Km. 76.578 and Km 81.692 E.

Characteristics and Dimensions:

The kilometric marks are followed by letter" E".

Length: 5.114 Km.

Main Width: 170 meters at a depth of 21 meters.

Slope: The side slope is 3/1.

The radius of its axis 4885 meters

The by-pass is used by North and Southbound vessels.

(4)Deversoir By-Pass (See Drawing No. 12)

The by-pass is the eastern channel of the doubled part at Deversoir zone.

This branch begins at Km. 95.000 and joins the main East channel in the G.B.L. at Km. 104.291. This branch is used by Northbound vessels.

Dimensions:

Length : 9.291Km.

Width : 135 meters at 21 meters depth. (straight line part)

Depths: 22.50 meters from Km. 95.000 to Km. 102.600.

22.00 meters from Km. 99.000 to Km. 102.600.

21.50 meters from Km. 102.600 to Km. 104.291.

Side Slope: 3/1.

(5)Kabrit By-Pass (See Drawing No. 14and No. 15)

The By-Pass is eastern channel of the doubled part at Kabret zone. it begins at Km. 114.957 and ends at Km. 122.100.

Dimensions:

Length : 7.143 Km.

Width : 140 meters at 21 m. depth. (straight line part)

Side Slope: 3/1.

Change of bearing at Km. 118.000.

The by-pass is separated from west branch by a submerged island at .

The width of the island approximately varies between 200 meters in the North and 66 meters in the South. Some mooring bollards have been installed on the submerged island to be used in case of emergency.

The two extremities of the submerged island are marked at Km.115.025 and 122.150 by a light buoy painted horizontally Black and Yellow and showing a flashing White light.

The by-pass (East channel) is used by Northbound vessels. Southbound vessels use the West channel.