

# SPECIFICATION FOR TOPOGRAPHIC AND HYDROGRAPHIC SURVEYS OF RECLAMATION AND DREDGING WORKS

## 1.0 EXTENT OF WORKS

The main survey works shall comprise of the following :

- a. Carry out topographic and hydrographic survey works at the work site &
- b. Submission of survey drawings and reports.

## 2.0 TOPOGRAPHIC AND HYDROGRAPHIC SURVEY WORKS

The survey scale and spacing shall be as specified by the Engineer.

For the area where localised protrusions are observed or expected, the spacing shall be closer in order to pick up all peculiar features in the area. The same shall be applied to pick up the toe line and the crest line of any sloping ground.

All survey levels are in Admiralty Chart Datum (ACD) for echo sounding survey and Land Survey Datum (LSD) based on relevant local survey grid system. The conversion between ACD and LSD shall be indicated in the survey drawing.

A minimum of five (5) control stations of a reasonably permanent nature should be left at site, and should be clearly shown in the survey drawings.

The echo sounding equipment shall be checked and calibrated at the beginning and end of each day's work. This shall be carried out within the area of the survey. The equipment shall be calibrated by approved method. Check soundings shall be made by lead line at reasonable spacing (30m) over the echo sounding survey emphasizing on coverage as directed by the Engineer.

A continuous record of tide levels during the period of sounding shall be submitted along with the echo sounding survey report.

The error in the survey shall not exceed the following :

<u>Echo Sounding</u>	<u>Topographic Survey</u>
In horizontal position = $\pm 3.0$ m	$\pm 0.2$ m
In vertical position = $\pm 0.2$ m	$\pm 0.01$ m

Metric units shall be used throughout the survey.

## 3.0 SUBMISSION OF SURVEY DRAWINGS, REPORTS AND DISKETTES

The following shall be surveyed and plotted on survey plan :-

- i) Lot boundaries
- ii) Vegetation edge

- iii) Existing structures
- iv) Drainage outlets with invert level
- v) Pipeline/cable crossing/other utilities or services under and on ground surface
- vi) Existing navigation marks
- vii) Existing shore-protection works
- viii) Sunken barges/vessels
- ix) Rocky outcrops
- x) Contours (to include also these contours : +2.1m ACD, +1.2m ACD)
- xi) Ground levels

The drawings to be submitted shall follow the format of the hydrographic survey drawings issued during tender.

All the above drawings are to be in AutoCAD Format in 3D mode. The Contractor is to supply 5 sets of CD-ROM containing the survey data.

The drawings shall be submitted as follows :-

- i) One (1) set of tracing.
- ii) Five (5) sets of prints.
- iii) Five (5) sets (A3) of all drawings mentioned above.
- iv) Five (5) sets of Report describing the survey details including description of all equipment used, tide observation, bench marks, positioning control, track plots, weather, personnel, photographs of all above-mentioned and all drain outlets, etc.
- v) Original set of all record, site notes, echo record, tide observation, daily site report, etc.

The surveyor is expected to be a licensed land and hydrographic surveyor (registered in Malaysia), who shall check and endorse all drawings and reports submitted. He is expected to carry out the works in his normal professional capacity, including allowance for liaison with relevant authorities, hire of boats, and the likes to enable survey to proceed as specified.

#### **4.0 HARBOUR REGULATIONS**

The Contractor shall be responsible for ensuring that his operations comply with the requirements of all regulations of the Marine Department and other relevant Authorities which may affect the works in any way. He shall be responsible for the payment of any dues or duties levied by the Marine Department and other relevant Authorities and for obtaining any permits, licences and approval required by Marine Department and other relevant authorities.

#### **5.0 OPERATIONS OF OTHERS**

The ordinary business of other users within the working area will be continued during the progress of the works. The Contractor's operations must be conducted in such a way as to avoid all interference by land and water with other users within the working area. Telecoms' approval may be required regarding frequency to be used in positioning system.

## **6.0 DAMAGE OF SERVICES**

The Contractor shall determine the precise location of any services in the survey area and shall take all necessary precautions to avoid damage to them. He shall at his own expense rectify any damage done and indemnify the Engineer from all claims in respect of any loss or injury arising from damage or interruptions of services.

The term "Services" shall include any pipe line, cable, mooring, buoy, navigation light or mark, jetty or landing stage or any other works.

## **7.0 CONDUCT OF THE WORKS**

The Contractor shall, during the execution of the works, keep all plant and materials and all things connected with the works in good order and tidy to the satisfaction of the Engineer and shall clear them away on completion.

## **8.0 SAFETY**

The Contractor shall provide and maintain upon all vessels and floating plant employed on the works sufficient, proper and efficient life-saving apparatus. This apparatus shall comply with the requirements of all relevant statutes and regulations.

## **9.0 SERVICES AND EQUIPMENT**

The Contractor shall provide all facilities and equipment without limitation necessary for the proper performance of the works, including all transport for the movement of his employees, equipment and materials to and from the site. This responsibility shall include clearance, off loading and handling of all equipment and materials.

## **10.0 PROVISION FOR INSPECTION**

The Contractor shall give every facility to the officials of the Engineer or their representatives to inspect the works and shall observe any instructions given by them regarding the use of plant, equipment and temporary works.

## **11.0 BUOYS, LIGHTS AND MARKERS**

The Contractor shall provide all buoys and other markers for the indication of all submerged work and mooring together with all navigation lights, warning lights and markers required on the vessels and floating plant all to the requirements of the competent authorities.

## **12.0 SUPERVISION**

The Contractor shall provide sufficient experienced supervisors for the works to ensure that the works are properly and expeditiously executed.

## **13.0 EXISTING CHANNEL AND WATERWAY**

Existing channel and waterway shall be kept clear and navigable at all times. The Contractor is to maintain such channel and waterway for the duration of the Contract. A hydrographic

survey shall be taken of the existing channel and waterway at the beginning of the Contract and also at four (4) monthly interval. Should there be a major difference in this survey as compared to the original survey due to siltation or any other reason, then the Contractor is to dredge the affected area to the satisfaction of the Engineer at no additional cost.

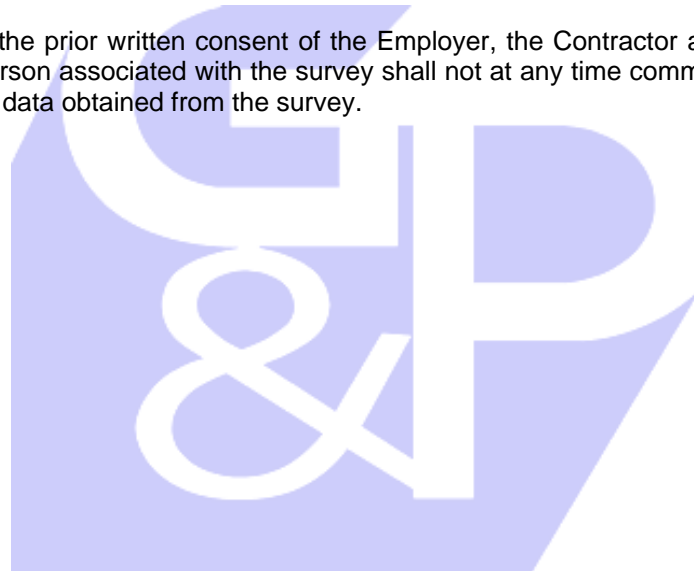
#### **14.0 PROGRESS OF THE WORKS**

During the course of the works, the Contractor shall keep full and detailed records of the progress of the works. These shall include weather, calibration test results and any other factors which may affect the accuracy of the survey. A copy of these records shall be delivered to the Engineer not later than noon on the day after which records were made together with a plan of the works marked up to show the extent of the area surveyed.

If the works or any part of them do not, in the opinion of the Engineer, comply with this Specification then the deficient parts of the works shall be repeated at the Contractor's own expense.

#### **15.0 CONFIDENTIALITY**

Except with the prior written consent of the Employer, the Contractor and the personnel and any other person associated with the survey shall not at any time communicate to any person or entity any data obtained from the survey.



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