



Jadual Fee Ukur Kejuruteraan 2001

(Pindaan Kepada Jadual Fee Ukur Kejuruteraan 1980)

SCALE OF FEES FOR ENGINEERING SURVEY 2001

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**JADUAL KADAR BAYARAN PERKHIDMATAN UKUR TANAH
BAGI TUJUAN KEJURUTERAAN**

Berikut ialah jadual bayaran perkhidmatan yang di jalankan oleh Jurukur Tanah Berlesen yang berdaftar di bawah Akta Jurukur Tanah Berlesen 1958 (Akta 458) (Pindaan 1991). Jadual bayaran ini berdasarkan kepada kos sehari bagi satu pasukan ukur seperti berikut:-

Semenanjung Malaysia	:	RM743.00
Sabah, Sarawak dan Wilayah Persekutuan Labuan	:	RM966.00 (Kadar Semenanjung Malaysia + 30%)

PART I

GENERAL ENGINEERING SURVEY

1. GENERAL ITEMS

Para 1.1 to 1.14 prescribe work items and work rates applicable in all types of survey. They are to be included as and when necessary as part and parcel of the relevant work items for any particular survey.

1.1 Classification of Terrain and Ground Condition

The following classification of terrain and ground condition is to be adopted in determining the general ground condition of the project site.

Classification of Terrain and Ground Condition	Description
Flat and undulating area	up to 10 degrees slope or differences in heights of not more than 20 metres
Hilly area	exceeding 10 degrees slope or differences in heights of more than 20 metres
Swampy area	generally wetted at the time of survey whether temporary or permanent in nature
Built up area	area with man made structure such as building, road, fence, drain, hedge, cutting, embankment and etc.

1.2 Preparatory Work

Work rate for preparatory work is 1 party-day.

1.3 Mobilization and Demobilization

Work rates for mobilization and demobilization per party are as follow:

Distance between Worksite and Headquarters	Mobilization and Demobilization Cost
50 kilometres or less	Nil
More than 50 kilometres but not exceeding 150 kilometres	1 party-days
More than 150 kilometres but not exceeding 300 kilometres	2 party-days
Exceeding 300 kilometres	3 party-days

1.3.1 Mobilization of the survey party by the following modes of transportation where necessary shall be reimbursable at cost.

1.3.1.1 Hire of helicopter or aircraft and crew

1.3.1.2 Hire of boat and crew

1.3.1.3 Hire of additional motor vehicles and drivers under exceptional circumstances.

1.3.1.4 Air fares

1.4 *Point Positioning by Satellite*

This item provides the fee for Point Positioning with the use of Satellite.

The survey rates chargeable under this item for each job shall consist of the following charges:-

1.4.1 Charge for mobilization and demobilization of 3 Field parties shall be as follows:

Distance to Worksite From Headquarters	Charge for 3 Field Parties
More than 50 kilometres but not exceeding 150 kilometres	RM 2,700
More than 150 kilometres but not exceeding 300 kilometres	RM 5,400
Exceeding 300 kilometres	RM8,100

1.4.2 Basic charge – RM 4,660.00

1.4.3 Charge for positioning of each point is RM1,970.00

1.4.4 Charge for the construction of a monument similar to type 'C' Mark of Survey Department is RM 300.00

1.4.5 Charge for site clearance for observation shall be on reimbursible basis.

1.4.6 Charge for Survey in Security Areas shall be as per item 1.8.

1.5 *Planimetric Control and Connection*

The accuracy for planimetric control and connection shall not be less than 1 in 4000.

The planimetric control and connection includes:

- i) Connection to Survey Department datum, and
- ii) Along the proposed or existing routes or alignment

1.5.1 Rates for planimetric control and connection are as follows:

Classification of Terrain and Ground Condition	Peninsular	Sabah/Sarawak
Flat and undulating area	\$2.00 / metre	\$2.60/ metre
Hilly area	\$2.50 / metre	\$3.25 / metre
Swampy area	\$2.50 / metre	\$3.25 / metre
Built up area	\$2.50 / metre	\$3.25 / metre

1.6 Height Control and Connection

The height control and connection includes:

- i) Connection to Bench Marks, and
- ii) Along the proposed or existing routes or alignments

1.6.1 Height control shall be established on the following conditions:

1.6.1.4 The datum for height control shall be established by at least two existing Bench Marks.

1.6.1.5 The surveyor shall take the shortest practical route.

1.6.2 Work rates are as follow:

		Work rate in kilometre per party-day	
<u>Class for Heighting</u>	<u>Accuracy (in metres)</u>	<u>Flat and Undulating</u>	<u>Hilly & Swampy & Built up area</u>
a. Ordinary	$+ 0.02 \sqrt{k}$	1.6 km/party-day	1.0 km/party-day
b. Precise	$+ 0.003 \sqrt{k}$	0.5 km/party-day	0.3 km/party-day
	Where k is the distance in kilometre		

The surveyor may use any methods that he considers most suitable for the job to meet the accuracy required.

1.7 Monumenting

(Construction of Intersection Points, Temporary Bench Marks and Reference Marks)

These rates are applicable if work item monumenting is done together with items 1.5 and 1.6.

1.7.1 Monumenting

The work rates for monumenting are as follows:-

Monument Type	Marks Per Party-days	
	Accessible	Inaccessible
a. With concreting	4	2
b. Without concreting	5	3

1.7.2 Specification for Standard Monument

The temporary bench marks (TBM) standard monument shall be constructed out of a 1 metre length of 40 mm diameter galvanised iron pipe set in concrete of dimension 30cm x 30cm x 30cm. The TBM standard monument number and the value of the TBM must be written on the concrete.

1.7.3 Specification for Standard Monument without Concreting

The temporary bench mark (TBM) standard monument shall be constructed out of a 1 metre length of 40 mm diameter galvanized iron pipe to be firmly embedded.

1.7.4 Non Standard Monument

In the event where the Surveyor is required to construct monuments according to non-standard specifications the charge shall be at actual cost.

1.8 Survey in Security Areas

1.8.1 Where security pass or permit has to be obtained from the authority, an additional charge of 25% of the total fees is applicable; or

1.8.2 Where armed escort is required and working hours are dictated by relevant authority, and additional fee of 50% of the total fees is applicable; and

1.8.3 When there is a waiting time after mobilization an additional charge at RM900.00 per party-day shall be applicable.

Where required, the provision of armed escort shall be at no cost to the Licensed Land Surveyors.

1.9 Survey in Inaccessible Areas

Where the survey worksite is away from motorable road, the following charges are applicable:

Distance to Worksite from Motorable Road	Additional Charges
a. 0 kilometre to 2 kilometres	No additional charge
b. More than 2 kilometres	20% of the total fees

1.10 Reimbursable

1.10.1 Reimbursements for out of pocket expenditure incurred are as follows:

1.10.1.1 Actual expenses incurred in purchase of relevant documents, plans, maps, record and etc.

1.10.1.2 Actual expenses incurred for telegrams, fax, telex, telephone calls and etc.

1.10.1.3 Hiring charge of special equipments and software packages as agreed with the client.

1.10.1.4 Expenses incurred in travelling, accommodation and subsistence allowance shall be as follows: -

i) Travelling	
Air Fare	Actual
Mileage	50 cents per km
ii) Hotel	Maximum RM 180.00 ++ per day
iii) Subsistence Allowance	RM85.00 per day

1.10.1.5 Expenses incurred in the use of special transportation e.g. helicopter, boat etc as agreed with the client.

1.11 Preparation of Land Acquisition Plans

1.11.1 Preparatory work as per item 1.2.

1.11.2 All certified plans and cadastral sheets purchased for the compilation/preparation of the land acquisition plans shall be charged as per item 1.10.3.1

1.11.3 The time involved for search at the Land Office and other Government Department will be charged at RM10.00 per hour plus traveling expenses chargeable as per item 1.10.3.4

1.11.4 Charge for computation and plan drawing shall be RM20.00 per lot subject to a minimum charge of RM400.00 per A1 size sheet.

Conditions:

Land acquisition plans shall be compiled from the Survey Department cadastral sheet, and on the same scale. This drawing shall show:

- (i) lot boundaries with bearings and distances within the surveyed corridor
- (ii) lot numbers
- (iii) lot areas
- (iv) any other information normally shown on Survey Department cadastral survey sheets.

1.12 Processing, Conversion and Translation of Digital Data together with Quality Assurance

Where the survey result is required to be submitted in a designated format, a charge of 20% of the total survey fees is applicable.

1.13 Transformation of Co-ordinates

The charge shall be RM20.00 per point subject to a minimum charge of RM400.00 per job.

1.14 Supply of Plans and Documents

1.14.1 Plans and documents to be supplied to the client without charge shall be as follows:-

- 1.14.1.1 One (1) set of plan on tracing paper of weight 105/110 gms/sq m
- 1.14.1.2 Two (2) sets of paper prints
- 1.14.1.3 Digital data in DWG format
- 1.14.1.4 All relevant data, field book, drawing, calculation sheet, etc prepared in the execution of the contract.

Condition:

Except 1.14.1.1 all other documents shall bear the signature of the Licensed Land Surveyor.

1.14.2 The cost of replotting any drawing on a different scale on A1 size is RM280 per sheet.

1.14.3 Additional sets of transparencies or paper prints shall be supplied at the following cost:

Type of Size of Plan	Charge per copy
Film transparency of A1 size	RM50.00
Tracing paper transparency of A1 size	RM30.00
Tracing paper transparency of A2 size or smaller	RM25.00
Paper print of A1 size or smaller	RM10.00

2. SITE SURVEY

2.1 Classification of Sites

Survey sites may include:-

- 2.1.1 Building sites
- 2.1.2 Dam sites
- 2.1.3 Sites for traffic interchanges and road junctions
- 2.1.4 Any site for development and construction.

Fees for Sites Survey are as follows:-

2.2 Preparatory Work

Work rate for preparatory work is 1 party-day.

2.3 Mobilization and Demobilization

Rates for mobilization and demobilization shall be as per item 1.3

2.4 *Demarcation of Boundaries, Planimetric Control and Connection*

Rates for demarcation of boundaries, planimetric control and connection shall be as per item 1.5

2.5 *Height Control and Connection*

Work rates for height control and connection shall be as per item 1.6

2.6 *Monumenting*

Work rates for monumenting shall be as per item 1.7. These rates are applicable if work item monumenting is done together with item 2.2, 2.3, 2.4 and 2.5.

2.7 *Survey in Security Areas*

Work rates for survey in security areas shall be as per item 1.8.

2.8 *Survey in Inaccessible Areas*

Work rates for survey in inaccessible areas shall be as per item 1.9.

2.9 *Reimbursable*

The charge for reimbursable shall be as per item 1.10.

2.10 *Topographical Survey*

These rates are applicable if work item topographical survey is done together with items 2.2, 2.3, 2.4, 2.5 and 2.6.

2.10.1 Contour and Detail

Work rates per party-days in hectare are as follows:-

Classification of Terrain And Ground Condition	Contour Intervals		
	1 metre	2 metres	3 metres
Flat and Undulating area	1.25	1.50	1.75
Hilly area	-	0.75	1.00
Swampy area	1.00	1.25	1.50
Built up area	1.00	1.25	1.50

2.10.2 Grid Heighting

Work rates per kilometer in party-days are as follows:-

Classification of Terrain And Ground Condition	Grid Interval (With detail)		Grid Interval (Without detail)	
	10 m	20 m	10 m	20 m
Developed area	5.00	2.50	2.50	1.25
Built up area	6.00	3.00	3.00	1.50
Undeveloped area	4.00	2.00	2.00	1.00
Swampy area	5.50	2.75	2.75	1.40

2.11 *Minimum Fee*

The minimum fee shall be 2 party-days which is inclusive of 1 party-day for preparatory works.

2.12 *Preparation of Land Acquisition Plans*

The charge for preparation of land acquisition plans shall be as per item 1.11.

2.13 *Processing, Conversion and Translation of Digital Data together with Quality Assurance*

Where the survey result is required to be submitted in a designated format the charge shall be as per item 1.12

2.14 *Transformation of Co-ordinates*

The charge for conversion and transformation of coordinates shall be as per item 1.13.

2.15 *Supply of Plans and Documents*

The charge for supply of plans and documents shall be as per item 1.14.

3. *CROSS-SECTIONING WITH SOUNDING FOR BRIDGE SITES*

Fees for Cross-Sectioning with sounding for bridge sites survey are as follows:-

3.1 *Preparatory Work*

Work rate for preparatory work is 1 party-day.

3.2 *Mobilization and Demobilization*

Work rates for Mobilization and Demobilization shall be as per item 1.3

3.3 *Planimetric Control and Connection*

Rates for planimetric control and connection shall be as per item 1.5

3.4 *Height Control and Connection*

Work rates for height control and connection shall be as per item 1.6

3.5 *Monumenting*

Work rates for monumenting shall be as per item 1.7. These rates are applicable if work item monumenting is done together with items 3.1, 3.2, 3.3 and 3.4.

3.6 *Survey in Security Areas*

Work rates for survey in security areas shall be as per item 1.8

3.7 *Survey in Inaccessible Area*

Work rates for survey in inaccessible areas shall be as per item 1.9

3.8 *Reimbursable*

The charge for reimbursable shall be as per item 1.10.

3.9 *Survey of Bridge Sites*

The work rates for the survey of bridge site shall be 5.50 party-day/per hectare, excluding the generally wetted area. These rates are applicable if work item survey of bridge sites is done together with items 3.1, 3.2, 3.3, 3.4 and 3.5.

3.10 *Cross-Sectioning with Sounding*

These rates are applicable if work item cross sectioning with sounding is done together with items 3.1, 3.2, 3.3, 3.4 and 3.5.

3.10.1 Depth of water less than 1 metre

Where the depth of water is less than 1 metre, the work rate shall be 8 party days per kilometer of cross-sectioning with spot level taken at 10 metres intervals. If the interval is less than 10 metres the fees shall be increased proportionately.

3.10.2 Depth of Water greater than 1 metre

Where the depth of water is greater than 1 metre, the charges are as follows:

3.10.2.1 Mobilization and demobilization of boat is RM600.00 per boat

3.10.2.2 Boat rental RM300.00 per boat per day.

3.10.2.3 Work rate for cross-sectioning shall be 8 party-day per kilometer of cross-sectioning with spot level taken at 10 metres intervals. If the interval is less than 10 metres the fees shall be increased proportionately.

3.11 *Preparation of Land Acquisition Plans*

The charges for preparation of land acquisition plans shall be as per item 1.11. These rates are applicable of work item preparation of land acquisition plans is done together with item 3.1.

3.12 *Processing, Conversion and Translation of Digital Data together with Quality Assurance*

Where the survey result is required to be submitted in a designated format the charge shall be as per item 1.12

3.13 *Transformation of Co-ordinates*

The charge for conversion and transformation of coordinates shall be as per item 1.13.

3.14 *Supply of Plans and Documents*

The charge for supply of plans and documents shall be as per item 1.14.

4. ROAD AND RAILWAY SURVEY

Fees for Road and Railway Survey are as follows:-

4.1 *Preparatory Work*

Work rate for preparatory work is 1 party-day.

4.2 *Mobilization and Demobilization*

Work rates for Mobilization and Demobilization shall be as per item 1.3

4.3 *Planimetric Control and Connection*

Rates for planimetric control and connections shall be as per item 1.5

4.4 *Height Control and Connection*

Work rates for height control and connection shall be as per item 1.6

4.5 *Monumenting*

Work rates for monumenting shall be as per item 1.7. These rates are applicable if work item monumenting is done together with items 4.1, 4.2, 4.3 and 4.4.

4.6 *Survey in Security Areas*

Work rates for survey in security areas shall be as per item 1.8

4.7 *Survey in Inaccessible Areas*

Work rates for survey in inaccessible areas shall be as per item 1.9

4.8 *Reimbursable*

The charge for reimbursable shall be as per item 1.10.

4.9 *Survey of Strip with Spot Level and Detail*

These rates are applicable if work item survey of strip with spot level at 20 metres interval is done together with items 4.1, 4.2, 4.3, 4.4, 4.5 and 4.11. The work rates per party-day in hectares are as follows:

Classification of Terrain And Ground Condition	Rate
Developed area/flat & undulating area	2.0 ha / party-day
Built up area	1.5 ha / party-day
Undeveloped area / hilly area	1.5 ha / party-day
Swampy area	1.0 ha / party-day

4.10 *Setting Out of Centre Line of Road and Railway*

These rates are applicable if work item setting out of center line of road and railway is done together with items 4.1, 4.2 and 4.3.

- 4.10.1 Setting out of center line of road and railway from IP to IP with chainage pegs at 20 metres intervals.

The work rates in party-days per kilometer are as follows:

Classification of Terrain And Ground Condition	Rate
Flat & Undulating area	2.75 party-days / km
Hilly area	4.25 party-days / km
Swampy area	4.25 party-days / km
Built up area	4.25 party-days / km

- 4.10.2 Setting out of center line of road and railway from IP to IP with 20 metres intervals chainage pegs and curve setting

Work rates in party-days per kilometer are as follows:-

Classification of Terrain And Ground Condition	Rate
Flat & Undulating area	3.75 party-days / km
Hilly area	5.50 party-days / km
Swampy area	5.50 party-days / km
Built up area	5.50 party-days / km

Condition

Where the chainage interval is less than 20 metres then the fees shall be increased proportionately.

4.11 Connection to Reference Markers

These rates are applicable if work item connection to reference markers is done together with items 4.1, 4.2, 4.3 and 4.4.

Rates for connection to reference markers shall be as follow:

- 4.11.1 Planimetric Connection
Rates for planimetric connection shall be as per item 1.5
- 4.11.2 Height Connection
Work rates for height connection shall be as per item 1.6

4.12 Longitudinal Profiling Along Established Chainage Pegs

Longitudinal Profiling is the determination of levels at the pegs established and is done together with item 4.10. The work rate in party-days per kilometer are as follows:-

Classification of Terrain And Ground Condition	Rate
Flat & Undulating area	1.75 party-days / km
Hilly area	3.00 party-days / km
Swampy area	3.00 party-days / km
Built up area	3.00 party-days / km

Condition

- (i) Levels to be taken at every 20 metres interval and at any points to indicate significant change in slope.
- (ii) Where the chainage interval is less than 20 metres then the fees shall be increased proportionately.

4.13 Cross-sectioning

Cross-sectioning shall be carried out at the chainage pegs established and is done together with item 4.10 and 4.12.

The work rates in sections per party-days are as follows:

Classification of Terrain And Ground Condition	Rate
Flat & Undulating area	7 sections / party-day
Hilly area	4 sections / party-day
Swampy area	4 sections / party-day
Built up area	4 sections / party-day

Condition

- (i) Where the total width is more than 70 metres then the fees shall be increased proportionately.

4.14 Setting Out of Reserve Boundaries

These rates are applicable if work item setting out of reserve boundaries is done together with items 4.10.

The work rates in party-days per kilometer are as follows:-

Classification of Terrain And Ground Condition	Rate
Flat & Undulating area	2.5 party-days / km
Hilly area	3.0 party-days / km
Swampy area	3.0 party-days / km
Built up area	3.0 party-days / km

Conditions

- (i) The above rates are only applicable when the setting out of the reserve boundary is carried out together with the setting out of the center line. Otherwise the normal rates for planimetric control and connection as per item 1.5 shall apply.
- (ii) Hard wood pegs to be planted at turning points and jungle roller pegs at intermediate points on the reserve at about 100 metres 7 intervals.
- (iii) For reserve width of 60 metres or less, fees shall be charged according to the distance measured along the center-line of the reserve.
- (iv) For reserve width of more than 60 metres, or where the setting out has to be carried out along both sides of the reserve, fees shall be charged according to planimetric control and connection rates as per item 1.5 measured along both sides of the reserve.

4.15 Preparation of Land Acquisition Plans

The charges for preparation of Land Acquisition Plans shall be as per item 1.11. These rates are applicable if work item preparation of land acquisition plans is done together with item 4.1.

4.16 Processing, Conversion and Translation of Digital Data together with Quality Assurance

Where the survey result is required to be submitted in designated format, the charge shall be as per item 1.12

4.17 Transformation of Co-ordinates

The charges for conversion and transformation of co-ordinates shall be as per item 1.13.

4.18 Supply of Plans and Documents

The charges for supply of plans and documents shall be as per item 1.14

4.18.1 Types of Plans to be Supplied

The types of plans to be supplied to the client's department are as follows:-

- 4.18.1.1 Location plan of the survey area at a suitable scale such that the area under study can be shown in a single standard size sheet. The chainages of the alignment shall be indicated for ease of cross referencing with the detail plans.
- 4.18.1.2 Longitudinal profile and plan shall show details of ground levels, chainages and all features as required, the survey stations along the center-line of the road, IPs, locations of the cross-sections taken, reference points and bench marks. All items shall be clearly indicated and referenced. The longitudinal profile shall be at a scale of:

1	:	1000 (horizontal)
1	:	100 (vertical)

The drawing on plan view shall be to scale of 1 : 1000

- 4.18.1.3 Drawing of all the cross-sections taken along the centre line of the proposed road, plotted in consecutive order, to a scale of 1 : 100 both horizontal and vertical. The drawings shall show details of ground levels and distances from the centre line of pavement, shoulders, etc
- 4.18.1.4 All formats of plans submitted shall conform to accepted practice. All drawings shall be on A1 size unless otherwise agreed.

5. PIPELINE SURVEY

Fees for Pipeline Survey are as follows:-

5.1 *Preparatory Work*

Work rate for preparatory work is 1 party-day.

5.2 *Mobilization and Demobilization*

Work rates for mobilization and demobilization shall be as per item 1.3

5.3 *Planimetric Control and Connection*

Rates for planimetric control and connection shall be as per item 1.5

5.4 *Height Control and Connection*

Work rates for height control and connection shall be as per item 1.6

5.5 *Monumenting*

Work rates for monumenting shall be as per item 1.7. These rates are applicable if work item monumenting is done together with items 5.1, 5.2, 5.3 and 5.4.

5.6 *Survey in Security Areas*

Work rates for survey in security areas shall be as per item 1.8

5.7 *Survey in Inaccessible Areas*

Work rates for survey in inaccessible area shall be as per item 1.9

5.8 *Reimbursable*

The charge for reimbursable shall be as per item 1.10.

5.9 *Setting Out of Pipeline*

Setting out of Pipeline from IP to IP with chainage pegs at 20 metres intervals. These rate are applicable if work item setting out of pipeline is done together with items 5.1, 5.2, 5.3, 5.4 and 5.5.

The work rates in party-days per kilometer are as follows:

Classification of Terrain And Ground Condition	Along Existing Road	Other areas
Flat & Undulating area	3.00 party-days / km	3.75 party-days / km
Hilly area	3.75 party-days / km	5.00 party-days / km
Swampy area	3.75 party-days / km	5.00 party-days / km
Built up area	3.75 party-days / km	5.00 party-days / km

5.10 Longitudinal Profiling

Longitudinal Profiling is the determination of levels at the pegs established and is done together with 5.9. The work rates in party-days per kilometer are as follows:-

Classification of Terrain And Ground Condition	Along Existing Road	Other areas
Flat & Undulating area	1.25 party-days / km	1.5 party-days / km
Hilly area	2.00 party-days / km	2.5 party-days/ km
Swampy area	2.00 party-days/ km	2.5 party-days/ km
Built up area	2.00 party-days/ km	2.5 party-days/ km

Conditions

- (i) Levels along center-line of the pipeline route to be taken at 20 metre intervals and at points necessary to show any significant changes in slope.
- (ii) Longitudinal sections along the pipeline route shall be drawn to a scale of:
 - 1 in 100 (vertical)
 - 1 in 1000 (horizontal)
- (iii) At all streams, bridge and culvert crossings the following information shall be obtained:
 - (a) Section of streams along the pipeline center-line giving levels at intervals sufficiently close to show the bed levels.
 - (b) The soffit level of the longitudinal beam of the bridges, together with their spans and the locations of the columns.
 - (c) The invert levels and the crown levels of all culverts.

5.11 Survey of Site with 0.5 metre Contour and Detail

These rates are applicable if work item survey of site with spot level at 20m interval and detail is done together with items 5.1, 5.2, 5.3, 5.4 and 5.5.

5.11.1 0.5 metre contour and detail survey 0.75 ha/ party-days

5.11.2 The charge for minimum fees shall be as per item 2.11.

5.12 Cross-Sectioning

The charges for cross-sectioning shall be as per item 4.13.

5.13 Survey of Strip with Spot Level and Detail

The charges for survey of strip with 2 metre contour interval and detail shall be as per item 4.9.

5.14 Setting out of Reserve Boundaries

The fees for setting out of reserve boundaries shall be as per item 4.14.

5.15 *Preparation of Land Acquisition Plans*

The charges for preparation of land acquisition plans shall be as per item 1.11. These rates are applicable if work item preparation of land acquisition plans is done together with items 5.1.

5.16 *Processing, Conversion and Translation of Digital Data together with Quality Assurance*

Where the survey result is required to be submitted in a designated format, the charge shall be as per item 1.12.

5.17 *Transformation of Co-ordinates*

The charges for conversion and transformation of co-ordinates shall be as per item 1.13.

5.18 *Supply of Plans and Documents*

The charge for supply of plans and documents shall be as per item 1.14.

PART II

ENGINEERING SURVEY FOR DRAINAGE AND IRRIGATION

6. *CLASSIFICATION OF TERRAIN AND GROUND CONDITION*

The following classification of terrain shall be applied:

6.1 *Developed area refers to an area currently planted with padi.*

6.2 *Built-up area refers to an area with man-made structures such as building, road, fence, drain, hedge, cutting, embankment etc.*

6.3 *Undeveloped area refers to any area other than that referred to in 6.1 and 6.2 above.*

6.4 *Swampy area refers to generally wetted area at the time of survey whether temporary or permanent in nature.*

6.5 *Tidal area refers to an area subjected to inundation by tides.*

7. *SITE SURVEY*

Fees for Site Survey are as follow:-

7.1 *Preparatory work for Site Survey.*

Work rate for preparatory work is 1 party-day.

7.2 *Mobilization and Demobilization*

Work rates for mobilization and demobilization shall be as per item 1.3.

7.3 *Planimetric Control and Connection*

Rates for planimetric control and connection shall be as per item 1.5.

7.4 *Height Control and Connection*

Work rates for height control and connection shall be as per item 1.6.

7.5 *Monumenting*

Work rates for monumenting shall be as per item 1.7. These rates are applicable if work item monumenting is done together with items 7.1, 7.2, 7.3 and 7.4.

7.6 *Survey in Security Areas*

Work rates for survey in Security areas shall be as per item 1.8.

7.7 *Survey in Inaccessible Areas*

Work rates for survey in inaccessible areas shall be as per item 1.9.

7.8 *Reimbursable*

The charge for reimbursable shall be as per item 1.10.

7.9 *Topographical Survey*

These rates are applicable if work item topographical survey is done together with items 7.2, 7.3, 7.4, 7.5 and 7.6

7.9.1 *Contour and Detail*

Work rates per party-days in hectares are as follows:

Classification of Terrain and Ground Condition	Contour Interval		
	1 metre	2 metres	3 metres
Flat and Undulating area / develop	1.25	1.50	1.75
Hilly area / undeveloped	-	0.75	1.00
Swampy area	1.00	1.25	1.50
Built up area	1.00	1.25	1.50

7.9.2 *Grid Survey*

Cost in party-day per kilometre

Classification of Terrain and Ground Condition	Base Line and Height Control	Grid line with Spot Levels at intervals of		
		25 metres	50 metres	100 metres and above
Developed area	2.50	2.00	1.75	1.50
Built up area	3.00	3.00	2.75	2.50
Undeveloped area	3.25	2.50	2.25	2.00
Swampy area	4.00	3.50	3.25	3.00
Tidal area	4.50	4.00	3.75	3.50

7.10 Minimum Fee for Site Survey

The minimum fees shall be 2 party-days which is inclusive of 1 party-day for preparatory work. The method of survey shall be left to the professional discretion of the Licensed Land Surveyor.

7.11 Preparation of Land Acquisition Plans

The charge for preparation of land acquisition plans shall be as per item 1.11 .

7.12 Processing, Conversion, and Translation of Digital Data together with Quality Assurance

Where the survey result is required to be submitted in designated format, the charge shall be as per item 1.12.

7.13 Transformation of Co-ordinates

The charges for conversion and transformation of co-ordinates shall be as per item 1.13

7.14 Supply of Plans and Documents

The charge for supply of plans and documents shall be as per item 1.14.

8. WATERWAYS SURVEY

Fees for Survey Waterways (inclusive of Lakes, Ponds and Reservoir) are as follows: -

8.1 Preparatory work

Work rate for preparatory work is 1 party-day.

8.2 Mobilization and Demobilization

Work rates for mobilization and demobilization shall be as per item 1.3 .

8.3 Planimetric Control and Connection

Rates for planimetric control and connection of the site shall be as per item 1.5.

8.4 Height Control and Connection

Work rates for height control and connection shall be as per item 1.6 .

8.5 Monumenting

Rates for monumenting shall be as per item 1.7 . These rates are applicable if work item monumenting is done together with items 8.1, 8.2, 8.3 and 8.4.

8.6 Survey in Security Areas

Work rates for survey in security areas shall be as per item 1.8 .

8.7 Survey in Inaccessible Areas

Work rates for survey in inaccessible areas shall be as per item 1.9.

8.8 Reimbursable

The charge for reimbursable shall be as per item 1.10.

8.9 Survey of Strip with Detail

These rates are applicable if work item survey of strip with detail is done together with items 8.1, 8.2, 8.3, 8.4 and 8.5. Work rates per party-days in hectare are as follows:

Classification of Terrain and Ground Condition	Rate
Developed area / flat & undulating area	2.00 ha / party-days
Built up area	1.50 ha / party-days
Undeveloped area / hilly area	1.50 ha / party-days
Swampy area	1.00 ha / party-days
Tidal area	0.75 ha / party-days

8.10 Setting Out of Centre Line of Proposed Route, Waterways, Canals and Drains

These rates are applicable if work item setting out of centre line, longitudinal sectioning and cross sectioning for the proposed route, waterways, canals and drains is done together with items 8.1, 8.2, 8.3, 8.4, 8.5 and 8.9.

Cost in party-day per kilometer

Classification of Terrain and Ground Condition	Setting Out	Longitudinal Section with Spot Levels at interval of		Cross section at 50m intervals for surveyed width of		
		50 m	100 m	50m	75 m	100 m
Developed area	2.75	1.25	1.00	1.75	2.00	2.25
Undeveloped area	4.25	1.75	1.00	2.00	2.50	3.00
Built up	4.25	2.00	1.75	2.00	2.50	3.00
Swampy area	4.25	2.25	2.00	2.75	3.25	3.75
Tidal area	4.75	2.50	2.25	3.00	3.50	4.00

8.11 Survey of Existing Route, Waterways, Canals and Drains

These rates are applicable if work item setting out of centre line, longitudinal sectioning and cross sectioning of the existing route, waterways, canals and drains is done together with items 8.1, 8.2, 8.3, 8.4, 8.5 and 8.9.

Classification of Terrain and Ground Condition	Alignment Survey	Longitudinal Section with Spot Levels at interval of		Cross section at 50 m intervals for surveyed width of		
		50 m	100 m	50m	75 m	100 m
Developed area	3.00	1.75	1.50	2.25	2.50	2.75
Undeveloped area	3.50	2.25	2.00	2.50	3.00	3.50
Built up	3.50	2.50	2.25	2.50	3.00	3.50
Swampy area	3.50	2.75	2.50	3.25	3.75	4.25
Tidal area	4.25	3.00	2.75	3.50	4.00	4.50

Specifications:

- (i) Setting out of center line from IP to IP of proposed or existing where applicable of route, waterways, canals and drains shall be carried out at 50 metres interval.
- (ii) Where the interval of setting out is less or more than 50 metres then the fees shall be increased or decreased proportionately.
- (iii) Only x and y coordinates of the setting out markers are to be supplied.
- (iv) Longitudinal section survey of existing route, waterways, canals and drains include taking of levels of the right and left banks.
- (v) Levels shall be taken along alignment at every 50 metres interval and at points necessary to show significant change in slope.
- (vi) Cross section survey shall be carried out at intervals of 50 metres and across corridor width of 50 metre.
- (vii) Where the width of corridor and intervals is more or less than 50 metres then the fees shall be increased or decreased proportionately.
- (viii) If the depth of the route, waterways, drains and canals at the time of survey is more than 1 metre the charge shall be as per item 3.10.2 of Part 1.

8.12 Site Survey

Cost in party-day per site

Classification of Terrain and Ground Condition	Rate for Site of 150m x 150m
Developed area	2.5 party-day / site
Undeveloped area	3.5 party-day / site
Built up area	3.5 party-day / site
Swampy area	3.5 party-day / site
Tidal area	3.5 party-day / site

Conditions:

- (i) Cross-section survey shall be carried out at intervals of 50 metre and across corridor width of 50 metre.
- (ii) Where the width of corridor and intervals is more than 50 metres then the fees shall be increased proportionately.
- (iii) If the depth of the waterways at the time of survey is more than 1 metre the charge shall be as per item 3.10.2 .

8.13 Setting-out of Waterways Reserve

These rates are applicable if work item setting out of waterways reserve is done together with items 8.1, 8.2, 8.3 and 8.10.

Work rates in party-days per kilometer are as follows:

Classification of Terrain and Ground Condition	Rate
Developed area	2.5 party-days / km
Built up area	3.0 party-days / km
Undeveloped area	3.0 party-days / km
Swampy area	3.0 party-days / km
Tidal area	3.5 party-days / km

Conditions:

- (i) The above rates are only applicable when the setting out of the reserve boundary is carried out together with the setting out of the centre line. Otherwise the normal rates for planimetric control and connection as per item 1.5 shall apply.
- (ii) Hard wood pegs to be planted at turning points and jungle roller pegs at intermediate points on the reserve at about 100 metre intervals and where the intervals is less than 100 metres the fees shall be increased proportionately.
- (iii) For reserve width of 60 metres or less, fees shall be charged according to the distance measured along the centre-line of the reserve.
- (iv) For reserve width of more than 60 metres, or where the setting out has to be carried out along both sides of the reserve, fees shall be charged according to planimetric control and connection rates as per item 1.5 measured along both sides of the reserve.

8.14 Preparation of Land Acquisition Plans

The charge for preparation of land acquisition plans shall be as per item 1.11 .

8.15 Processing, Conversion and Translation of Digital Data together with Quality Assurance

Where the survey result is required to be submitted in designated format, the charge shall be as per item 1.12.

8.16 Transformation of Co-ordinates

The charges for conversion and transformation of co-ordinates shall be as per item 1.13

8.17 Supply of Plans and Documents

The charge for supply of plans and documents shall be as per item 1.14 .

PART III

ENGINEERING SURVEY FOR TRANSMISSION LINE

9. CLASSIFICATION OF TERRAIN AND GROUND CONDITION

The following classification of terrain shall be applied:

- 9.1 *Flat and undulating area refers to an area with terrain of up to 10 slope.*
- 9.2 *Hilly area refers to an area with terrain exceeding 10 slope.*
- 9.3 *Swampy area refers to generally wetted area at the time of survey whether temporary or permanent in nature.*
- 9.4 *Built-up area refers to an area with man-made structures such as buildings, road, fence, drain, hedge, cutting, embankment etc.*

10. TRANSMISSION LINE SURVEY

Fees for Transmission Line Survey are as follow:

10.1 Preparatory work

Work rate for preparatory work is 1 party-day per job.

10.2 Mobilization and Demobilization

Work rates for mobilization and demobilization shall be as per item 1.5.

10.3 Planimetric Control and Connection

Rates for planimetric control and connection shall be as per item 1.5 .

10.4 Height Control and Connection

Work rates and condition for height control and connection shall be as per item 1.6 .

10.5 Monumenting

Work rates for monumenting shall be as per item 1.7 . These rates are applicable if work item monumenting is done together with items 10.1, 10.2, 10.3 and 10.4.

10.6 Survey in Security Areas

Work rates for survey in security areas shall be as per item 1.8.

10.7 Survey in Inaccessible Areas

Work rates for survey in inaccessible areas shall be as per item 1.9 .

10.8 Survey of Strip with Spot Level and Detail

These rates are applicable if work item survey of strip with spot level at 20m interval is done together with items 10.1, 10.2, 10.3, 10.4 and 10.5.

The work rates per party-days in hectare are as follows :

Classification of Terrain And Ground Condition	Rate
Flat & undulating area	2.0 ha / party-day
Hilly area	1.5 ha / party-day
Swampy area	1.0 ha / party-day
Built up area	1.5 ha / party-day

10.9 Setting-out of Centre Line of Transmission Line

These rates are applicable if work item setting-out of centre line of transmission line is done together with item 10.8.

Work rates in party-days per kilometer are as follows:

Classification of Terrain And Ground Condition	Rate
Flat & undulating area	2.75 party-days / km
Hilly area	4.25 party-days / km
Swampy area	4.25 party-days / km
Built up area	4.25 party-days / km

Conditions:

- (i) The setting-out of centre line of transmission line shall be carried out at 200 metres intervals.
- (ii) Angle positions shall be indicated by emplacement of galvanized iron pipes 1 metre in length and 40 mm in diameter. The pipe shall be buried in the ground to a depth of 0.75 metre and the remaining exposed portion to be painted red.
- (iii) Where the interval is less than 200 metres then the fees shall be increased proportionately.

10.10 Longitudinal Profiling

These rates are applicable if work item longitudinal profiling is done together with item 10.9.

Work rates in party-day per kilometre are as follow: -

Classification of Terrain And Ground Condition	Rate
Flat & undulating area	1.50 party-days / km
Hilly area	2.75 party-days / km
Swampy area	2.75 party-days / km
Built up area	2.75 party-days / km

Conditions:

- (i) Levels shall be taken at every 50 metres intervals and at points necessary to indicate significant changes in slope.
- (ii) Where the interval is less than 50 metres then the fees shall be increased proportionately.

10.11 Cross-Sectioning

These rates are applicable if work item cross sectioning is done together with item 10.8 and 10.10.

Work rates in party-day per section are as follows: -

Classification of Terrain And Ground Condition	Rate
Flat & undulating area	14 sections / party-day
Hilly area	10 sections / party-day
Swampy area	10 sections / party-day
Built up area	10 sections / party-day

Condition

- (i) The total width of each section shall be 10 metres.
- (i) Where the width is more than 10 metres then the fees shall be increased proportionately.

10.12 Setting Out of Tower/Pylon Positions

These rates are applicable if work item setting out of tower/pylon positions is done together with items 10.1, 10.2 and 10.3.

The work rates in tower/pylon per party-day are as follows: -

Classification of Terrain And Ground Condition	Rate
Flat & Undulating area	3 towers/ pylon per party-day
Hilly area	2 towers/pylon per party-day
Swampy area	2 towers/pylon per party-day

10.13 Site Survey for Tower/Pylon Positions

These rates are applicable if work item site survey for survey for tower/pylon positions is done together with items 10.1, 10.2, 10.3, 10.4 and 10.5.

Work rates in sites per party-day are as follows: -

Classification of Terrain And Ground Condition	Rate
Flat & Undulating area	3 sites / party-day
Hilly area	2 sites / party-day
Swampy area	2 sites / party-day

Condition

- (i) The maximum area per site shall be 100 square metres.
- (ii) Spot levels shall be taken at 2 metres intervals.
- (iii) Where the interval is less than 2 metres then the fees shall be increased proportionately.
- (iv) Where the area is more than 100 square metres the fees shall be increased proportionately.

10.14 *Setting Out Reserve Boundaries*

These rates are applicable if work item setting out reserve boundaries is done together with item 10.9.

Work rates in party-days per kilometre are as follows: -

Classification of Terrain and Ground Condition	Contour Interval		
	60m	40m	20m
Flat and undulating area	2.5 party-day	2.25	2.0
Hilly area	3.0 party-day	2.75	2.5
Swampy area	3.0 party-day	2.75	2.5
Built up area	3.0 party-day	2.75	2.5

Condition

- (i) Setting-out shall be carried out by off-setting from the centre line 200 metres markers.

10.15 *Marking of Trees within the Reserve Boundaries*

These rates are applicable if work item marking of trees within the reserve boundaries is done together with item 10.14.

Work rates in party-days per kilometre are as follows: -

Classification of Terrain and Ground Condition	Reserve Width		
	20 metres	40 metres	60 metres
Flat and undulating area	0.50 party-day	0.75 party-day	1.00 party-day
Hilly area	0.75 party-day	1.00 party-day	1.25 party-day
Swampy area	0.75 party-day	1.00 party-day	1.25 party-day
Built up area	0.50 party-day	0.75 party-day	1.00 party-day

Conditions:

The trees to be marked shall be 30 centimetres or more in diameter measured at approximately 1 metre above ground level.

10.16 *Reimbursable*

The charge for reimbursable shall be as per item 1.10.

10.17 *Preparation of Land Acquisition Plans*

Rates and conditions for preparation of Land Acquisition Plans shall be as per item 1.11 of Part I. These rates are applicable if work item preparation of land acquisition plans is done together with items 10.1.

10.18 *Processing, Conversion and Translation of Digital Data together with Quality Assurance*

Where the survey results is required to be submitted in designated format, the charge shall be as per item 1.12.

10.19 *Transformation of Co-ordinates*

The charges for conversion and transformation of co-ordinates shall be as per item 1.13

10.20 *Supply of Plans and Documents*

Cost of plans and documents to be supplied shall be as per item 1.14 .

PART IV

ENGINEERING SURVEY FOR AERIAL MAPPING

11. *Aerial Mapping*

11.1 *Aerial Mapping Rate*

Compilation Scale	Ground Control Fee	Compilation Fee
Smaller than or equal to 1 : 10000	RM0.5[Cx(D+H)]	RM(24.00xA)x0.5
Larger than 1 : 10000 but smaller than or equal to 1: 4000	RM[Cx(D+H)]	RM(24.00xA)
Larger than 1 : 4000 but smaller than or equal to 1 : 1000	RM1.5[Cx(D+H)]	RM(24.00xA)x1.5
Larger than 1 : 1000	RM2.0[Cx(D+H)]	RM(24.00xA)x2.0

Where A is the area in hectare.

C is the distance in metre = $5A \times 10,000$

D is the rate for traversing as provided in terms 1.5 of Part I.

H is the rate for heighting as provided in para 1.6 of Part I.

11.2 *Deliverables*

- (i) The compiled hard copy plans.
- (ii) Digital data in DWG format.

Where the survey result is required to be submitted in a designated format an additional charge of 20% of the total survey fees is applicable.

12. *Aerial Photography*

Aerial photography will be charged on actual cost plus 25% management fee . Reimbursable items are:

- 12.1 Cost of chartering of aircraft .
- 12.2 Cost of rental of equipment such as camera and navigation equipment.
- 12.3 Cost of photographic material such as aerial film, paper, diapositive, chemical and processing.
- 12.4 Cost of security supervision.

13. *Reimbursable*

The charge for reimbursable shall be as per item 1.10.

PART V

HYDROGRAPHIC SURVEY FOR TERRITORIAL WATERS

14. *General*

The schedule of rates for Coastal Hydrographic Surveys in support of: -

- the management of coastal zones
- the hydrographic survey of deltaic regions and river mouths up to two kilometers upstream of the river mouth
- the development of coastal engineering, property, infrastructure projects and activities
- the management and development of jetties, ports, harbours and associated maritime facilities
- the management and development along inland waterways and inland water body

The General Items in Part I shall be applicable here. Fees for Coastal Hydrographic Survey are as follows:

14.1 *Mobilization and Demobilization*

Work rates for mobilization and demobilization shall be as per item 1.3 of Part I

14.2 *Planimetric Control and Connection*

Work rates for planimetric control and connection of the site shall be as per item 1.5 of Part I.

14.3 *Height Control and Connection*

Work rates for height control and connection shall be as per item 1.6 of Part I.

14.4 *Monumenting*

Work rate for monumenting shall be as per item 1.7 of Part I. These rates are applicable if work item monumenting is done together with items 14.1, 14.2 and 14.3

14.5 *Survey in Security Areas*

Work rates for survey in security areas shall be as per item 1.8 of Part I.

14.6 *Survey in Inaccessible Areas*

Work rates for survey in inaccessible areas shall be as per item 1.9 of Part I.

14.7 *Reimbursable*

The charge for reimbursable shall be as per item 1.10.

14.8 *Survey of Strip With Detail*

These rates are applicable if work item survey of strip with detail is done together with items 14.1, 14.2, 14.3 and 14.4.

Work rates per party days in hectare are as follows:

14.8.1. Developed area / flat and undulating	2.0 ha / party day
14.8.2. Built up area	1.5 ha / party days
14.8.3. Undeveloped area / hilly area	1.5 ha / party days
14.8.4. Swampy area	1.0 ha / party days
14.8.5. Tidal area	0.75 ha / party days

14.9 *Shoreline Profiling*

14.9.1 Topographical (Onshore) Profiling

These rates are applicable if work item of topographical (Onshore) profiling is done together with items 14.1, 14.2, 14.3, 14.4 and 14.8

Cost in party day per km

Specifications	Base Line and Height Control	Profiles at interval of		
		25 m	50 m	100 m and above
Developed area	2.50	2.00	1.75	1.50
Undeveloped area	3.00	2.50	2.25	2.00
Built up area	3.25	3.00	2.75	2.50
Swampy area	4.00	3.50	3.25	3.00
Tidal area	4.50	4.00	3.75	3.50

Specification :

Spot levels shall not be more than 10 metres apart along the profiling line and shall extend as far into the sea as is possible.

14.9.2 Bathymetric (Offshore) Profiling

These rates are applicable if work item of bathymetric profiling is done together with items 14.1, 14.2, 14.3, 14.4, 14.8 and 14.9.1

Cost in party day per km

Profiles at interval of (m)	Party Day/km
25	0.30
50	0.40
75	0.40
100 or more	0.50

Subject to a minimum of RM. 3,000.00 per job

Specification

- (i) The echo sounder shall be calibrated at the start and at the end of each day's sounding using the bar check method.
- (ii) Continuous echo sounding shall be carried out with the sounding recorded at not more than 10 metres interval along the profiling line.
- (iii) Sounding is to be extended as close as possible to the shoreline.
- (iv) Sounding must be reduced to the adopted height datum from observed tides.

14.10 Tidal Observation

These rates are applicable if work item of tidal observation is done together with items 14.1, 14.2, 14.3 and 14.4.

14.10.1 Automatic Water Level Recording

The lump sum cost per location per instrument.

Period	Installation	Measurement and Data Processing
14 days or less	RM 3,600	RM 5,000
30 days	RM 3,600	RM 12,200

Where the duration is less than 30 days but more than 14 days, the fees shall be computed proportionately. Where the duration is more than 30 days, then the fees shall be increased proportionately

Specification

- (i) Water level measurement with self-recording (automatic) water level recorder with the measurement recorded at not more than 15 minutes interval continuously for measurement period.
- (ii) The recorded data shall be down loaded at the end of the measurement period and process to produce tabulation of recorded water level in ASCII or MS EXCEL format.
- (iii) For the purposes of harmonic analysis of tidal data, a minimum of 30 days recorded data is recommended.

14.10.2 Direct Reading

The cost in party day and lump sum.

Installation of Tide Pole RM 900.00

Tidal Observation RM 20.00 / hour subject to a minimum of 1 party day per job

Specification

- (i) Water level measurement by method of direct observation of a tide pole establish in the vicinity of the survey area with the tidal observations carried out at no more than 15 minutes interval.
- (ii) The observed data should be processed to produce tabulation of observed tidal levels in ASCII or MS EXCEL format.

14.11 *Current Measurement*

These rates are applicable if work item current measurement is done together with items 14.1, 14.2, 14.3 and 14.4

14.11.1 Self Recording Current Measurement

The Cost in Lump Sum per location per instrument.

Period	Installation	Measurement and Data Processing
14 days or less	RM 7,000	RM 19,600
30 days	RM 7,000	RM 39,500

Where the duration is less than 30 days but more than 14 days, the fees shall be computed proportionately. Where the duration is more than 30 days, then the fees shall be increased proportionately

Specification

- (i) A self-recording current meter shall be deployed at a designated location with a suitable mooring and recovery system (e.g. U-shape mooring)
- (ii) Measurement of current speed and direction using the self recording current meter deployed at designated depth within the water column at the designated location, with the measurement of current speed and direction at not more than 30 minutes interval continuously for the measurement period.
- (iii) The self-recording current meter must not be subject to bifouling during the measurement period.
- (iv) The recorded data shall be down loaded at the end of the measurement period and process to produce tabulation of recorded current speed and direction in ASCII or MS EXCEL format.

14.11.2 Direct Reading

The cost per location.

Preparation and set up	RM 1,800
Direct observation of	RM 300/hour
Current Speed and Direction	subject to a minimum of RM 3,900 per job.

Specification

- (i) In-situ observation of the current speed and direction using a direct reading current meter at three depths within the water column (one meter below surface, mid depth, and one meter above the seabed) at one designated location. The current speed and direction will be observed at no more than 30 minutes interval.
- (ii) The measurement is normally carried out during spring and neap tidal condition and the measurement period shall not be less than 13 hours to sufficiently cover the basic tidal cycle.
- (iii) The observed data should be processed to produce tabulation of observed current speed and direction in ASCII or MSEXCEL format.

14.12 *Seawater Temperature and Salinity Measurement*

These rates are applicable if work item Seawater Temperature and Salinity Measurement is done together with items 14.1, 14.2, 14.3 and 14.4

The cost per location.

Installation	RM 1,800
In-situ (direct) observation of Seawater Temperature and Salinity	RM 300 / hour subject to a minimum of RM 3,900 per job.

Specification

- (i) In-situ observation of sea water temperature and salinity using direct reading temperature and salinity bridge at three depths within the water column (one metre below surface, mid depth, and one metre above the seabed.) at one designated location. The temperature and salinity will be observed at no more than 30 minutes interval.
- (ii) The measurement is normally carried out during spring and neap tidal condition and the measurement period shall not be less than 13 hours to sufficiently cover the basic tidal cycle.
- (iii) The observed data shall be processed to produce tabulation in ASCII or MS EXCEL format.

14.13 *Seabed (Grab) Soil Sampling*

These rate is applicable if work item grab sampling is done together with item 14.1, 14.2, 14.3 and 14.4

Cost in Lump Sum per sample

RM 250 per sample subject to a minimum charge of RM 1,250

Specification

- (i) Seabed (Grab) soil sampling shall be carried out at designated location using appropriate grab sampler e.g. Van Der Veen type
- (ii) The seabed soil samples shall be sent to approved laboratory for particle size distribution (sieve analysis)

14.14 Seawater Sampling

These rates is applicable if work item sea water sampling is done together with item 14.1, 14.2, 14.3 and 14.4

Cost in Lump Sum per sample

RM 250 per sample subject to a minimum charge of RM 1,250

Specification

- (i) Seawater sample shall be collected using an appropriate water sampler at different depths within the water location at each designated location.
- (ii) Water sample shall be sent to an approval laboratory for total suspended solids analysis.

14.15 Processing, Conversion and Transformation to Designated Format With Quality Assurance

As per item 1.12 of Part 1.

14.16 Preparation of Report and Submission

Cost in Percentage of Total Survey Fees chargeable.

5% of the total Survey Fees chargeable

A minimum fee is RM 2,500 per job.

14.16.1 Survey Report should include, as a minimum, the following

- (i) Scope of Work
- (ii) Personnel and Equipment
- (iii) Methodology
- (iv) Significant Events
- (v) Data Collected
- (vi) Results of laboratory analysis (if applicable)

14.16.2 Supply of Plans and Documents

Supply of Plans and Documents as per item 1.14 of Part I