

General

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General

101. INTRODUCTION

These Specifications shall apply to all such road and bridge works as are required to be executed under the Contract or otherwise directed by the Engineer-in-Charge (hereinafter referred to as the Engineer). In every case, the work shall be carried out to the satisfaction of the Engineer and conform to the location, lines, dimensions, grades and cross-sections shown on the drawings or as indicated by the Engineer. The quality of materials, processing of materials as may be needed at the site, salient features of the construction work and quality of finished work shall comply with the requirements set forth in succeeding sections. Where the drawings and Specifications describe a portion of the work in only general terms, and not in complete detail, it shall be understood that only the best general practice is to prevail, materials and workmanship of the best quality are to be employed and instructions of the Engineer are to be fully complied with.

A list of Indian Roads Congress Specifications and Recommended Codes of Practice which have been made use of in the preparation of these Specifications is given at *Appendix-1*. The latest edition of all Specifications/Standards till 30 (thirty) days before the final date of submission of the tender, shall be adopted.

102. DEFINITIONS

The words like Contract, Contractor, Engineer (synonymous with Engineer-in-charge), Drawings, Employer, Government, Works and Work Site used in these Specifications shall be considered to have the meaning as understood from the definitions of these terms given in the General Conditions of Contract.

The following abbreviations shall have the meaning as set forth below:

AASHTO	:	American Association of State Highway and Transportation Officials
ASTM	:	American Society for Testing and Materials
BS	:	British Standard published by the British Standards Institution
CBR	:	California Bearing Ratio
IRC	:	Indian Roads Congress
IS	:	Indian Standard published by the Bureau of Indian Standards

The various elements in the cross-section of a road referred to in these Specifications are shown in the cross-sections in Figs. 100-1 and 100-2.

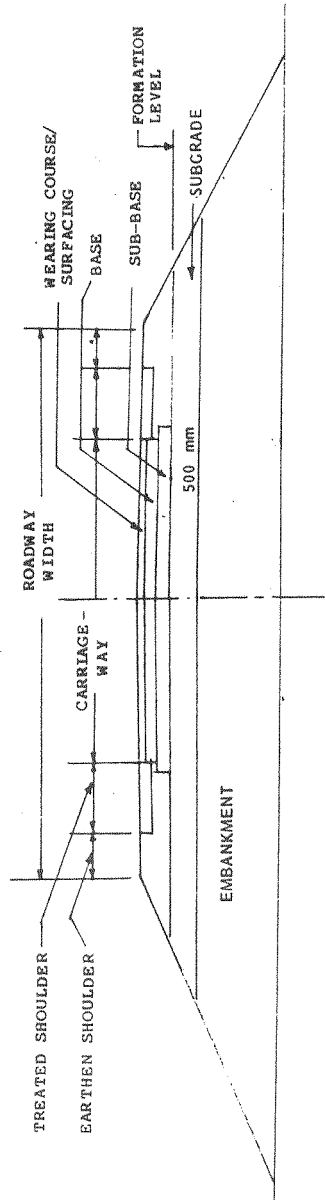


Fig. 100.1 : Terms used in the specifications to describe road cross-section elements with a flexible pavement

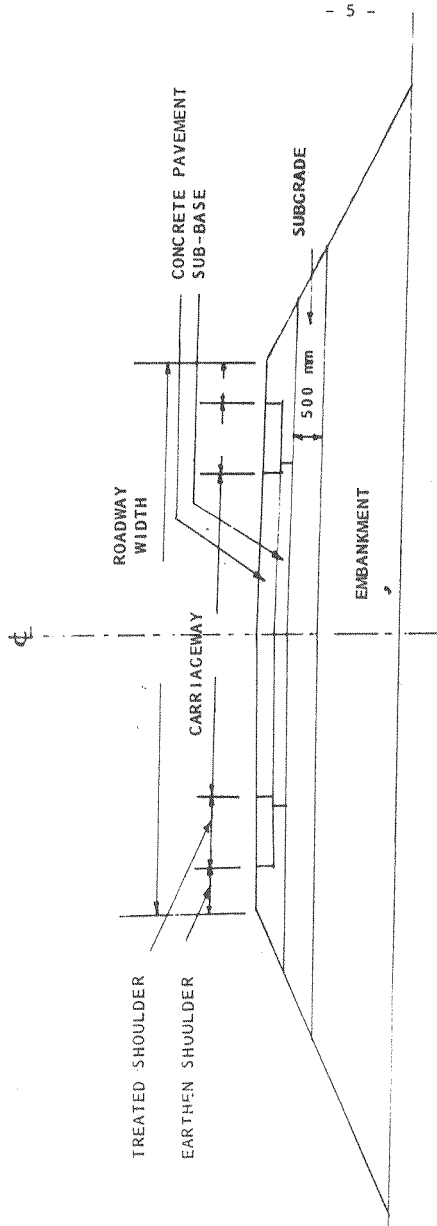


Fig. 100.2 : Terms used in the specifications to describe road cross-section elements with a concrete pavement

Treated shoulders shown in the cross-section shall be of two types:-

- (i) "Hard" shoulders which have select gravel/moorum, any other compacted granular layer or bricks.
- (ii) "Paved" shoulders which have a bituminous surfacing over granular layers.

103. MATERIALS AND TEST STANDARDS

The relevant standards for materials, as well as the testing procedures, have been indicated at appropriate places in the Specifications. A list of these standards with their full title and the year of publication applicable is included at *Appendix-2*.

104. SIEVE DESIGNATIONS

The sieve designations referred to in the Specifications correspond to those specified by Bureau of Indian Standards in IS: 460. Table 100-1 gives the list of the commonly used IS sieves.

TABLE 100-1. DESIGNATION OF TEST SIEVES

IS Designation conforming to IS: 460

(in mm)	(in micron)
* 125	850
106	* 710
* 90	600
75	* 500
* 63	425
53	355
	300
* 45	* 250
37.5	212
* 31.5	* 180
26.5	150
* 22.4	* 125
19.0	106
* 16.0	* 90
13.2	75
* 11.2	* 63
9.50	53
* 8.00	* 45
6.70	

- * 5.60
4.75
- * 4.00
3.35
- * 2.80
2.36
- * 2.00
1.70
- * 1.40
1.18
- * 1.00

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- Notes :
1. '*' are the principal sizes stated in ISO-565 and are preferred.
 2. Sieve sizes given in BS:410 & ASTM -E 11 are same as in IS:460
 3. Only sieves with square openings shall be used.

105. SCOPE OF WORK

105.1. The work to be carried out under the Contract shall consist of the various items as generally described in the Tender Documents as well as in the Bill of Quantities furnished in the Tender Documents.

105.2. The works to be performed shall also include all general works preparatory to the construction of roads, bridges, canal crossings, drainage and all other related works. The works shall include work of any kind necessary for the due and satisfactory construction, completion and maintenance of the works to the intent and meaning of the drawings and these Specifications and further drawings and orders that may be issued by the Engineer from time to time. The scope of work shall include compliance by the Contractor with all General Conditions of Contract, whether specifically mentioned or not in the various clauses of these Specifications, all materials, apparatus, plant, equipment, tools, fuel, water, strutting, timbering, transport, offices, stores, workshop, staff, labour and the provision of proper and sufficient protective works, diversions, temporary fencing and lighting. It shall also include: safety of workers, first-aid equipment, suitable accommodation for the staff and workmen with adequate sanitary arrangements, the effecting and maintenance of all insurances, the payment of all wages, salaries, fees, royalties, duties or other charges arising out of the erection of works and the regular clearance of rubbish, reinstatement and clearing-up of the site as may be required on completion of works, safety of the public and protection of the works and adjoining land.

105.3. The Contractor shall ensure that all actions are taken to build in quality assurance in the planning and execution of works. The quality assurance shall cover all stages of work such as setting out, selection of materials, selection of construction methods, selection of equipment and plant, deployment of personnel and supervisory staff, quality control testing, etc. The work of building in quality assurance shall be deemed to be covered in the scope of the work.

105.4. The Contractor shall furnish, at least 15 days in advance, his programme of commencement of item of work, the method of working he intends to adopt for various items of work such as site clearance, construction for embankment, sub-base, base, surfacing, culverts, bridges, retaining walls, well-sinking, cast-in-situ piling, construction of cast-in-situ prestressed concrete simply supported girders, cantilever construction of prestressed concrete superstructure, and such other items for which the Engineer demands the submission of the method of working. He shall provide information regarding the details of the method of working and equipment he proposes to employ and satisfy the Engineer about the adequacy and safety of the same. The sole responsibility for the safety and adequacy of the methods adopted by the Contractor will, however, rest on the Contractor, irrespective of any approval given by the Engineer.

106. CONSTRUCTION EQUIPMENT

In addition to the general conditions indicated in the Contract Documents, the following conditions regarding use of equipment in works shall be satisfied:

- (a) The Contractor shall be required to give a trial run of the equipment for establishing their capability to achieve the laid down Specifications and tolerances to the satisfaction of the Engineer before commencement of the work;
- (b) All equipment provided shall be of proven efficiency and shall be operated and maintained at all times in a manner acceptable to the Engineer;
- (c) All the plant/equipment to be deployed on the works shall be got approved from the Engineer for ensuring their fitness and efficiency before commencement of work;
- (d) Any material or equipment not meeting the approval of the Engineer shall be removed from the site forthwith;
- (e) No equipment will be removed from site without permission of the Engineer; and
- (f) The Contractor shall also make available the equipment for site quality control work as directed by the Engineer.

107. CONTRACT DRAWINGS

107.1. The Contract Drawings provided for tendering purposes shall be as contained in the Tender Documents and shall be used as a reference only. The Contractor should visualise the nature and type of work contemplated and to ensure that the rates and prices quoted by him in the Bill of Quantities have due consideration of the qualitative and quantitative variations, as may be found at the site and complexities of work involved during actual execution/construction.

107.2. The tendered rates/prices for the work shall be deemed to include the cost of preparation, supply and delivery of all necessary drawings, prints, tracings and negatives which the Contractor is required to provide in accordance with the Contract.

107.3. Two copies of drawings, on the basis of which actual execution of the work is to proceed, shall be furnished free of cost to the Contractor by the Engineer progressively according to the work programme submitted by the Contractor and accepted by the Engineer. Drawings for any particular activity shall be issued to the Contractor at least 30 days in advance of the scheduled date of the start of the activity.

107.4. Examination and /or approval by the Engineer of any drawings or other documents submitted by the Contractor shall not relieve the Contractor of his responsibilities or liabilities under the Contract.

108. SITE INFORMATION

108.1. The information about the site of work and site conditions in the Tender Documents is given in good faith for guidance only but the Contractor shall satisfy himself regarding all aspects of site conditions.

108.2. The location of the works and the general site particulars are as generally shown on the Site plan/Index plan enclosed with the Tender Documents.

108.3. Whereas the right-of-way to the bridge sites/road works shall be provided to the Contractor by the Engineer, the Contractor shall have to make his own arrangement for the land required by him for site offices, labour camps, stores, etc.

108.4. The quarry charts enclosed with the Tender Documents indicate the location of quarries and other sources from which naturally occurring materials are available, for guidance of the Contractor. The leads indicated in the said charts are only approximate. It is assumed

that the Contractor has inspected the quarries, borrow areas etc., before quoting his rates for the work to assess the availability of construction materials in required quantity and quality.

109. SETTING OUT

109.1. The Contractor shall establish working Bench Marks tied with the Reference Bench Mark in the area soon after taking possession of the site. The Reference Bench Mark for the area shall be as indicated in the Contract Documents and the values of the same shall be obtained by the Contractor from the Engineer. The working Bench Marks shall be at the rate of four per km and also at or near all drainage structures, over-bridges and underpasses. The working Bench Marks/levels should be got approved from the Engineer. Checks must be made on these Bench Marks once every month and adjustments, if any, got agreed with the Engineer and recorded. An up-to-date record of all Bench Marks including approved adjustments, if any, shall be maintained by the Contractor and also a copy supplied to the Engineer for his record.

109.2. The lines and levels of formation, side slopes, drainage works, carriageways and shoulders shall be carefully set out and frequently checked, care being taken to ensure that correct gradients and cross-sections are obtained everywhere.

109.3. In order to facilitate the setting out of the works, the centre line of the carriageway or highway must be accurately established by the Contractor and approved by the Engineer. It must then be accurately referenced in a manner satisfactory to the Engineer, every 50 m intervals in plain and rolling terrains and 20 m intervals in hilly terrain and in all curve points as directed by the Engineer, with marker pegs and chainage boards set in or near the fence line, and a schedule of reference dimensions shall be prepared and supplied by the Contractor to the Engineer. These markers shall be maintained until the works reach finished formation level and are accepted by the Engineer.

109.4. On construction reaching the formation level stage, the centre line shall again be set out by the Contractor and when approved by the Engineer, shall be accurately referenced in a manner satisfactory to the Engineer by marker pegs set at the outer limits of the formation.

109.5. No reference peg or marker shall be moved or withdrawn without the approval of the Engineer and no earthwork or structural work shall be commenced until the centre line has been referenced.

109.6. The Contractor will be the sole responsible party for safe-

guarding all survey monuments, bench marks, beacons, etc. The Engineer will provide the Contractor with the data necessary for setting out of the centre line. All dimensions and levels shown on the drawings or mentioned in documents forming part of or issued under the Contract shall be verified by the Contractor on the site and he shall immediately inform the Engineer of any apparent errors or discrepancies in such dimensions or levels. The Contractor shall, in connection with the staking out of the centre line, survey the terrain along the road and shall submit to the Engineer for his approval, a profile along the road centre line and cross-sections at intervals as required by the Engineer.

109.7. After obtaining approval of the Engineer, work on earthwork can commence and the profile and cross-sections shall form the basis for measurements and payment. The Contractor shall be responsible for ensuring that all the basic traverse points are in place at the commencement of the contract and if any are missing, or appear to have been disturbed, the Contractor shall make arrangements to re-establish these points. A "Survey File" containing the necessary data will be made available for this purpose. If in the opinion of the Engineer, design modifications of the centre line or grade are advisable, the Engineer will issue detailed instructions to the Contractor and the Contractor shall perform the modifications in the field, as required, and modify the ground levels on the cross-sections accordingly as many times as required. There will be no separate payment for any survey work performed by the Contractor. The cost of these services shall be considered as being included in the cost of the items of work in the Bill of Quantities.

109.8. The work of setting out shall be deemed to be a part of general works preparatory to the execution of work and no separate payment shall be made for the same.

109.9. Precision automatic levels, having a standard deviation of ± 2 mm per km, and fitted with micrometer attachment shall be used for all double run levelling work. Setting out of the road alignment and measurement of angles shall be done by using theodolite with traversing target, having an accuracy of one second. Measurement of distances shall be done preferably using precision instruments like Distomat.

110. PUBLIC UTILITIES

110.1. Drawings scheduling the affected services like water pipes, sewers, oil pipelines, cables, gas ducts etc. owned by various authorities including Public Undertakings and Local Authorities included in the

Contract Documents shall be verified by the Contractor for the accuracy of the information prior to the commencement of any work.

110.2. Notwithstanding the fact that the information on affected services may not be exhaustive, the final position of these services within the works shall be supposed to have been indicated based on the information furnished by different bodies and to the extent the bodies are familiar with the final proposals. The intermediate stages of the works are, however, unknown at the design stage, these being dictated by the Contractor's methods of working. Accordingly, the Contractor's programme must take into account the period of notice and duration of diversionary works of each body as given on the Drawings and the Contractor must also allow for any effect of these services and alterations upon the Works and for arranging regular meetings with the various bodies at the commencement of the Contract and throughout the period of the Works in order to maintain the required co-ordination. During the period of the Works, the Contractor shall have no objection if the public utility bodies vary their decisions in the execution of their proposals in terms of programme and construction, provided that, in the opinion of the Engineer, the Contractor has received reasonable notice thereof before the relevant alterations are put in hand.

110.3. No clearance or alterations to the utility shall be carried out unless specially ordered by the Engineer.

110.4. Any services affected by the Works must be temporarily supported by the Contractor who must also take all measures reasonably required by the various bodies to protect their services and property during the progress of the Works.

110.5. The Contractor may be required to carry out certain works for and on behalf of the various bodies and he shall also provide, with the prior approval of the Engineer, such assistance to the various bodies as may be authorised by the Engineer.

110.6. The work of temporarily supporting and protecting the public utility services during execution of the Works shall be deemed to be part of the Contract and no extra payment shall be made for the same.

110.7. The Contractor may be required to carry out the removal or shifting of certain services/utilities on specific orders from the Engineer for which payment shall be made to him. Such works shall be taken up by the Contractor only after obtaining clearance from the Engineer and ensuring adequate safety measures.

111. PRECAUTIONS FOR SAFEGUARDING THE ENVIRONMENT

111.1. General

The Contractor shall take all precautions for safeguarding the environment during the course of the construction of the works. He shall abide by all laws, rules and regulations in force governing pollution and environmental protection that are applicable in the area where the works are situated.

111.2. Borrowpits for Embankment Construction

Borrowpits shall not be dug in the right-of-way of the road. The stipulations in Clause 305.2.2. shall govern.

111.3. Quarry Operations

The Contractor shall obtain materials from quarries only after the consent of the Forest Department or other concerned authorities is obtained. The quarry operations shall be undertaken within the purview of the rules and regulations in force.

111.4. Control of Soil Erosion, Sedimentation and Water Pollution

The Contractor shall carry out the works in such a manner that soil erosion is fully controlled, and sedimentation and pollution of natural water courses, ponds, tanks and reservoirs is avoided. The stipulations in Clause 306 shall govern.

111.5. Pollution from Hot-Mix Plants and Batching Plants

Bituminous hot-mix plants and concrete batching plants shall be located sufficiently away from habitation, agricultural operations or industrial establishments. The Contractor shall take every precaution to reduce the levels of noise, vibration, dust and emissions from his plant and shall be fully responsible for any claims for damages caused to the owners of property, fields and residences in the vicinity.

111.6. Substances Hazardous to Health

The Contractor shall not use or generate any materials in the works which are hazardous to the health of persons, animals or vegetation. Where it is necessary to use some substances which can cause injury to the health of workers, the Contractor shall provide protective clothing or appliances to his workers.

111.7. Use of Nuclear Gauges

Nuclear gauges shall be used only where permitted by the Engineer.

The Contractor shall provide the Engineer with a copy of the regulations governing the safe use of nuclear gauges he intends to employ and shall abide by such regulations.

111.8. The Contractor must take all reasonable steps to minimise dust nuisance during the construction of the works.

111.9. All existing highways and roads used by vehicle of the Contractor or any of his sub-contractors or suppliers of materials or plant, and similarly any new roads which are part of the works and which are being used by traffic, shall be kept clean and clear of all dust/mud or other extraneous materials dropped by the said vehicles or their tyres. Similarly, all dust/mud or other extraneous materials from the works spreading on these highways shall be immediately cleared by the Contractor.

111.10. Clearance shall be effected immediately by manual sweeping and removal of debris, or, if so directed by the Engineer, by mechanical sweeping and clearing equipment, and all dust, mud and other debris shall be removed entirely from the road surface. Additionally, if so directed by the Engineer, the road surface shall be hosed or watered using suitable equipment.

111.11. Any structural damage caused to the existing roads by the Contractor's construction equipment shall be made good without any extra cost.

111.12. Compliance with the foregoing will not relieve the Contractor of any responsibility for complying with the requirements of any Highway Authority in respect of the roads used by him.

112. ARRANGEMENT FOR TRAFFIC DURING CONSTRUCTION

112.1. General

The Contractor shall at all times carry out work on the highway in a manner creating least interference to the flow of traffic while consistent with the satisfactory execution of the same. For all works involving improvements to the existing highway, the Contractor shall, in accordance with the directives of the Engineer, provide and maintain, during execution of the work, a passage for traffic either along a part of the existing carriageway under improvement, or along a temporary diversion constructed close to the highway. The Contractor shall take prior approval of the Engineer regarding traffic arrangements during construction.

112.2. Passage of Traffic along a part of the Existing Carriageway under Improvement

For widening/strengthening existing carriageway where part width of the existing carriageway is proposed to be used for passage of traffic, treated shoulders shall be provided on the side on which work is not in progress. The treatment to the shoulder shall consist of providing atleast 150 mm thick granular base course covered with bituminous surface dressing in a width of atleast 1.5 m and the surface shall be maintained throughout the period during which traffic uses the same to the satisfaction of the Engineer. The continuous length in which such work shall be carried out, would be limited normally to 500 m at a place. However, where work is allowed by the Engineer in longer stretches passing places atleast 20 m long with additional paved width of 2.5 m shall be provided at every 0.5 km interval.

In case of widening existing two-lane to four-lane, the additional two lanes would be constructed first and the traffic diverted to it and only thereafter the required treatment to the existing carriageway would be carried out. However, in case where on the request of the Contractor, work on existing two-lane carriageway is allowed by the Engineer with traffic using part of the existing carriageway, stipulations as in para above shall apply.

After obtaining permission of the Engineer, the treated shoulder shall be dismantled, the debris disposed of and the area cleared as per the direction of the Engineer.

112.3. Passage of Traffic along a Temporary Diversion

In stretches where it is not possible to pass the traffic on part width of the carriageway, a temporary diversion shall be constructed with 7 m carriageway and 2.5 m earthen shoulders on each side (total width of roadway 12 m) with the following provision for road crust in the 7 m width:

- (i) 200 mm (compacted) granular subbase;
- (ii) 225 mm (compacted) granular base course; and
- (iii) Premix carpet with Seal Coat/Mix Seal Surfacing.

The alignment and longitudinal section of diversion including junctions and temporary cross drainage provision shall be as approved by the Engineer.

112.4. Traffic Safety and Control

The Contractor shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as may be required by the Engineer for the information and protection of traffic approaching or passing through the section of the highway under improvement. Before taking up any construction, an agreed phased programme for the diversion of traffic on the highway shall be drawn up in consultation with the Engineer.

The barricades erected on either side of the carriageway/portion of the carriageway closed to traffic, shall be of strong design to resist violation, and painted with alternate black and white stripes. Red lanterns or warning lights of similar type shall be mounted on the barricades at night and kept lit throughout from sunset to sunrise.

At the points where traffic is to deviate from its normal path (whether on temporary diversion or part width of the carriageway) the channel for traffic shall be clearly marked with the aid of pavement markings, painted drums or a similar device to the directions of the Engineer. At night, the passage shall be delineated with lanterns or other suitable light source.

One-way traffic operation shall be established whenever the traffic is to be passed over part of the carriageway inadequate for two-lane traffic. This shall be done with the help of temporary traffic signals or flagmen kept positioned on opposite sides during all hours. For regulation of traffic, the flagmen shall be equipped with red and green flags and lanterns/lights.

On both sides, suitable regulatory/warning signs as approved by the Engineer shall be installed for the guidance of road users. On each approach, at least two signs shall be put up, one close to the point where transition of carriageway begins and the other 120 m away. The signs shall be of approved design and of reflectory type, if so directed by the Engineer.

112.5. Maintenance of Diversions and Traffic Control Devices

Signs, lights, barriers and other traffic control devices, as well as the riding surface of diversions shall be maintained in a satisfactory condition till such time they are required as directed by the Engineer. The temporary travelled way shall be kept free of dust by frequent applications of water, if necessary.

112.6. Measurements for Payment and Rate

All arrangements for traffic during construction including provision of temporary cross drainage structures, if required, and treated shoulder as described in Clause 112.2 including their maintenance, dismantling and clearing debris, where necessary, shall be considered as incidental to the works and shall be the Contractor's responsibility.

The construction of temporary diversion including temporary cross drainage structures as described in Clause 112.3, shall be measured in linear metre and the unit contract rate shall be inclusive of full compensation for construction (including supply of material, labour, tools etc.), maintenance, final dismantling, and disposal.

113. GENERAL RULES FOR THE MEASUREMENT OF WORKS FOR PAYMENT

113.1. General

All measurements shall be made in the metric system. Different items of work shall be measured in accordance with the procedures set forth in the relevant sections read in conjunction with the General Conditions of Contract. The same shall not, however, apply in the case of lumpsum contracts.

All measurements and computations, unless otherwise indicated, shall be carried nearest to the following limits:

(i) length and breadth	10 mm
(ii) height, depth or thickness of earthwork, subgrade, sub-bases, bases, surfacing and structural members	5 mm
(iii) areas	0.01 sq. m.
(iv) cubic contents	0.01 cu. m.

In recording dimensions of work, the sequence of length, width and height or depth or thickness shall be followed.

113.2. Measurement of Lead for Materials

Where lead is specified in the Contract for construction materials, the same shall be measured as described hereunder:

Lead shall be measured over the shortest practicable route and not the one actually taken and the decision of the Engineer in this regard shall be taken as final. Distances upto and including 100 m shall be measured in units of 50 m, exceeding 100 m but not exceeding 1 km in units of 100 m and exceeding 1 km in units of 500 m, the half

and greater than half of the unit shall be reckoned as one and less than half of the unit ignored. In this regard, the source of the material shall be divided into suitable blocks and for each block, the distance from the centre of the block to the centre of placing pertaining to that block shall be taken as the lead distance.

113.3. Measurement of Pavement Thickness for Payment on Volume Basis

The finished thickness of sub-base, base and bituminous courses to be paid on volume basis shall be computed in the following manner:

Levels shall be taken before and after construction, at grid of points 10 m centre to centre longitudinally in straight reaches but 5 m at curves. Normally, on two-lane roads, the levels shall be taken at four positions transversely, at 0.75 and 2.75 m from either edge of the carriageway; and on single lane roads, these shall be taken at two positions transversely, being at 1.25 m from either edge of the carriageway. For multi-lane roads, levels shall be taken at two positions transversely for each lane at locations specified by the Engineer.

Suitable references for the transverse grid lines should be left in the form of embedded bricks on either ends or by other means so that it is possible to locate the grid points for level measurements after each successive course is laid.

For pavement courses laid only over widening portions, atleast one line of levels shall be taken on each strip of widening, or more depending on the width of widening as decided by the Engineer.

Notwithstanding the above, the measurements may be taken at closer intervals also, if so desired by the Engineer, the need for which may arise particularly in the case of estimation of the volume of the material for profile corrective course (levelling course). The average thickness of the pavement course in any area shall be the arithmetic mean of the difference of levels before and after construction at all the grid points falling in that area, provided that the thickness of finished work shall be limited to those shown on the drawings or approved by the Engineer in writing.

As supplement to level measurements, the Engineer shall have the option to take cores/make holes to check the depth of construction. The holes made and the portions cut for taking cores shall be made good by the Contractor by laying fresh mix/material including compacting as required at no extra cost immediately after the measurements are recorded.

113.4. Checking of Pavement Thickness for Payment on Area Basis

Where payment for any bituminous course in Section 500 is allowed to be made on area basis, the Engineer may have its thickness checked with the help of a suitable penetration gauge at regular intervals or other means as he may decide.

113.5. Measurement of Bituminous Courses for Payment on Weight Basis

Plant-mixed bituminous materials for pavement courses where designated to be paid on weight basis shall be weighed on accurate scales approved by the Engineer. Approved scales shall mean scales that are of size, capacity, kind and type suitable for the weighing to be done, and these shall be properly and adequately installed and maintained. Prior to the use of the scales and as frequently thereafter as the Engineer may deem necessary to ensure accuracy, the scales shall be checked and approved by the Engineer, or the Engineer may direct the Contractor to have the scales checked by other competent agency at the cost of the Contractor.

Location of the scales shall be as designated by the Engineer. Trucks used for hauling the material to be weighed shall be weighed empty daily at such times as the Engineer directs, and each truck shall bear a plainly legible identification mark.

For materials specified to be measured by weight, the Engineer will have the option to make measurements of the finished work by volume in accordance with Clause 113.3 and such volumes shall be converted into weight for payment purposes. The factor for conversion from volume measurement to weight measurement shall be computed from the representative density of the compacted material at site determined at locations approved by the Engineer.

114. SCOPE OF RATES FOR DIFFERENT ITEMS OF WORK

114.1. For item rate contracts, the contract unit rates for different items of work shall be payment in full for completing the work to the requirements of the Specifications including full compensation for all the operations detailed in the relevant sections of these Specifications under "Rates". In the absence of any directions to the contrary, the rates are to be considered as the full inclusive rate for finished work covering all labour, materials, wastage, temporary work, plant, equipment, over-

head charges and profit as well as the general liabilities, obligations, insurance and risks arising out of General Conditions of Contract.

114.2. The item rates quoted by the Contractor shall, unless otherwise specified, also include compliance with/supply of the following :

- (i) General works such as setting out, clearance of site before setting out and clearance of works after completion;
- (ii) A detailed programme for the construction and completion of the work (using CPM/PERT techniques) giving, in addition to construction activities, detailed network activities for the submission and approval of materials, procurement of critical materials and equipment, fabrication of special products/equipment and their installation and testing, and for all activities of the Employer that are likely to affect the progress of work, etc., including updating of all such activities on the basis of the decisions taken at the periodic site review meetings or as directed by the Engineer;
- (iii) Samples of various materials proposed to be used on the Work for conducting tests thereon as required as per the provisions of the Contract;
- (iv) Design of mixes as per the relevant Clauses of the Specifications giving proportions of ingredients, sources of aggregates and binder along with accompanying trial mixes as per the relevant Clauses of these Specifications to be submitted to the Engineer for his approval before use on the Works;
- (v) Detailed design calculations and drawings for all Temporary Works (such as formwork, staging, centering; specialised constructional handling and launching equipment and the like);
- (vi) Detailed drawings for templates, support and end anchorage, details for prestressing cable profiles, bar bending and cutting schedules for reinforcement, material lists for fabrication of structural steel, etc;
- (vii) Mill test reports for all mild and high tensile steel and cast steel as per the relevant provisions of the Specifications;
- (viii) Testing of various finished items and materials including bitumen, cement, concrete, bearings as required under these Specifications and furnishing test reports/certificates;
- (ix) Inspection Reports in respect of formwork, staging, reinforcement and other items of work as per the relevant Specifications;
- (x) Any other data which may be required as per these Specifications or the Conditions of Contract or any other annexures/schedules forming part of the Contract;
- (xi) Any other item of work which is not specifically provided in the Bill of Quantities but which is necessary for complying with the provisions of the Contract;
- (xii) All temporary works, formwork and false work;
- (xiii) Establishing and running a laboratory with facilities for testing for various items of works as specified in Section 900 and other relevant Clauses, where there is no separate item in the Bill of Quantities for establishing and running a laboratory;

- (xiv) Cost of in-built provisions for Quality Assurance;
- (xv) Cost of safeguarding the environment; and
- (xvi) Cost of providing "as-built drawings" in original and two sets of prints.

114.3. Portions of road works beyond the limits and/or any other work may be got constructed by the Employer directly through other agencies. Accordingly, other agencies employed by the Employer may be working in the vicinity of the Works being executed by the Contractor. The Contractor shall liaise with such agencies and adjust his construction programme for the completion of work accordingly and no claim or compensation due to any reason whatsoever will be entertained on this account. The Employer will be indemnified by the Contractor for any claims from other agencies on this account.

115. METHODOLOGY AND SEQUENCE OF WORK

Prior to start of the construction activities at site, the Contractor shall, within 30 days after the date of the Letter of Acceptance, submit to the Engineer for approval, the detailed construction methodology including mechanical equipment proposed to be used, sequence of various activities and schedule from start to end of the project. Programme relating to pavement and shoulder construction shall be an integrated activity to be done simultaneously in a coordinated manner. The methodology and the sequence shall be so planned as to provide proper safety, drainage and free flow of traffic.

116. CRUSHED STONE AGGREGATES

Where the terms crushed gravel/shingle, crushed stone, broken stone or stone aggregate appear in any part of the Tender Documents or Drawings issued for work, they refer to crushed gravel/crushed shingle/crushed stone aggregate obtained from integrated crushing plant having appropriate primary crusher, secondary crusher and vibratory screen.

117. APPROVAL OF MATERIALS

Approval of all sources of material for work shall be obtained in writing from the Engineer before their use on the project.

118. SUPPLY OF QUARRY SAMPLES

Raw and processed samples of the mineral aggregates from the approved quarry shall be submitted by the Contractor at no extra cost.

119. USE OF SURFACES BY CONSTRUCTION TRAFFIC

119.1. Ordinarily, no construction traffic shall be allowed on pavement under construction unless authorised by the Engineer. Even in that case the load and intensity of construction traffic should be so regulated that no damage is caused to the subgrade or pavement layers already constructed. Where necessary, service roads shall be constructed for this purpose and the same shall be considered as incidental to the work.

119.2. The wheels or tracks of plant moving over the various pavement courses shall be kept free of deleterious materials.

119.3. Bituminous base course shall be kept clean and uncontaminated as long as the same remains uncovered by a wearing course or surface treatment. The only traffic permitted access to the base course shall be that engaged in laying and compacting the wearing course or that engaged on such surface treatment where the base-course is to be blinded and /or surface dressed. Should the base course or tack coat on the base course become contaminated, the Contractor shall make good by clearing it to the satisfaction of the Engineer, and if this is impracticable, by removing the layer and replacing it to Specification without any extra cost.

120. SITE OFFICE FOR ENGINEER AND OTHER SUPERVISORY STAFF

120.1. Scope

The work covers the construction and provision of furnished site office accommodation for the supervisory staff of Engineer and maintaining the same.

120.2. Description

The Contractor shall arrange to provide fully furnished office accommodation constructed as shown in drawings. Work includes providing electric supply, all electrical items like lights, fans and complete wiring, providing water supply including all pipes, fittings, tanks, tube well, pumps, valves etc. complete, septic tank, sewer lines, drains, fencing, internal surfaced roads etc. complete as shown on the drawings. The Contractor shall provide the office accommodation within 4 months from the date of the commencement of work or 3 months from the date of providing the land and the working drawings for the construction of office accommodation, whichever is later. List of furniture to be

provided and maintained for Engineer's site office shall be as in Table 100-2.

Table 100-2. LIST OF FURNITURE TO BE PROVIDED AND MAINTAINED FOR ENGINEER'S SITE OFFICE

S.No.	Item	Specifications	Nos. Req'd.*
01	Executive table (for the Engineer)	Make - Godrej Model No. T-108 or equivalent	
02.	Executive chair (for the Engineer)	Make-Godrej Model No. PCH-701 or equivalent	
03.	Table (for Site Engineer, Accountant and Head Clerk)	Make-Godrej Model No. T-104 or equivalent.	
04.	Ordinary chair Type I(For the Engineer, Accountant, Head Clerk and visitors)	Make-Godrej Model No. CHR-6 or equivalent.	
05.	Table (for all other staff)	Make-Godrej Model No T-101 or equivalent	
06.	Ordinary chair-Type II (for all other staff and visitors)	Make-Godrej Model No. CHR-6 or equivalent	
07.	Stool	Make-Godrej Model No. ST-2 or equivalent.	
08.	Steel Almirah 1980mm x 915mm x 485mm	Make-Godrej Model No.1 Storewel plain or equivalent	
09.	Steel Almirah 1270mm x 765 mm x 440 mm	Make-Godrej Model Minor plain or equivalent	
10.	Racks - 5 Tier 1800 mm x 900 mm x 375 mm	Made of slotted angles and M.S. Sheets of Godrej make	
11.	Typewriter	Electronic-Bilingual (English & Hindi) Network make or equivalent.	

S.No.	Item	Specifications	Nos. Req.*
12.	Steel Cash Chest of size 1.5' x 1.5' (450 mm x 450 mm) (approx.)	Make-Godrej Storewel or equivalent	
13.	Air Coolers	The coolers shall have 24" (60cm) size fan with suitable pump and shall be of either GEC, Khaitan or Cool Home make or equivalent	
14.	Room Heaters	The heaters shall be of 2000 W capacity - Bajaj make or equivalent	
15.	Ceiling Fans 1400 mm size	Ceiling fans shall be of approved make and colour	
16.	Computer with printer	PC 486 with hard disc capacity 230 MB, Maths coprocessor, Two disc drives of 5.25" (132 mm) and 3.5" (88 mm), 14" (350 mm) size colour VGA monitor letter- quality dotmatrix printer of 132 columns and 101 Key board	
17.	Photocopier	Make RICOH Model FT 4065 or equivalent	

* Numbers to be decided by the Engineer as per requirements of the Project.

120.3. Ownership

The site office with all services, furniture and fittings shall be the property of the Employer. The land for the site office shall be provided by the Engineer and the location shall be as indicated in the Drawings.

120.4. Maintenance

The Contractor shall arrange to maintain the site office until the issue of Taking over Certificate for the complete work. Maintenance includes the day to day upkeep of the building and the surroundings, attending to repairs to various parts of the building, furniture, fittings, office equipment and the connected services as and when necessary, including the periodic white/colour washing of building and painting of wood work, steel work, replacing the broken window/door/ventilator

glasses, furniture and other hardware and maintaining necessary watch and ward during day and night.

The Contractor shall arrange to provide uninterrupted supply of electricity and water for the office building. In case of failure of main power/water supply, alternate source shall be available for providing uninterrupted supply. All sources, tappings and connected equipment and fittings, piping, tanks, wiring and all accessories of the main alternate power/water supply, for the site office accommodation shall be the property of the Employer.

120.5. Measurements for Payment

The measurement for construction and provision of site office shall be in square metres of the plinth area of the office accommodation and the payment shall be made after the completion and handing over of the buildings with connected services fully furnished including office equipment for occupation.

If the Contractor fails to hand over the furnished office accommodation within the period stipulated under Clause 120.2, an amount of Rs. 15,000 per month or part thereof shall be debited to the Contractor's account for the period of delay.

The measurement for maintenance of Engineer's site office accommodation shall be on maintenance months and shall be made on completion of satisfactory maintenance every month.

If at any stage, the Contractor fails to carry out the required maintenance satisfactorily, an amount of Rs. 5000 per month or part thereof shall be debited to the Contractor's account. In addition, the month/months during which the Contractor fails to carry out the required maintenance satisfactorily shall not be measured for payment.

If the Contract works are not completed within the stipulated period or within the granted extended time of completion, maintenance of site office accommodation in accordance with Clause 120.4 shall be carried out by the Contractor at his own cost and as such no payment shall be made for the same. In case of any failure by the Contractor to do so, an amount of Rs. 15,000 per month or part thereof shall be debited to the Contractor's account.

120.6. Rate

The Contract unit rate for constructing and providing the site office accommodation shall include the expenses of all the operations involved

in construction of the building including all services, fittings, fixtures, furniture, fencing, internal surfaced roads, as mentioned under Clause 120.2.

The Contract unit rate for maintenance shall include expenses towards all items of works detailed in Clause 120.4 including power and water charges for supply from the mains and for providing uninterrupted supply of power and water from alternate sources in case of failure of main supply.

121. FIELD LABORATORY

121.1. Scope

The work covers the provision and maintenance of an adequately equipped field laboratory as required for site control on the quality of materials and the works.

121.2. Description

The Contractor shall arrange to provide fully furnished and adequately equipped field laboratory constructed as shown in drawings. The field laboratory shall preferably be located adjacent to the site office of the Engineer and provided with amenities like water supply, electric supply etc. as for the site office of the Engineer in Clause 120.2.

The floor space requirement for the field laboratory shall be as indicated in the drawing. It shall include office space for the Materials Engineers, one from the Contractor's side and another from the Engineer's side and a store for the storage of samples. The remaining space shall be provided for the installation of equipment, laboratory tables and cupboards, working space for carrying out various laboratory tests, besides a wash basin, toilet facility and a curing tank for the curing of samples, around 4m x 2m x 1m in size and a fume chamber. The furnishing in each of two offices of the Materials Engineers shall be as provided for the Site Engineer in Table 100-2. Wooden/concrete working table with a working platform area of about 1m x 10m shall be provided against the walls, also providing wooden cupboards above and below the working tables to store accessories such as sample moulds etc. At least 4 racks of slotted angles and M.S. sheets as at Sl.No. 10 of Table 100-2 and atleast 6 stools for laboratory test operators as at Sl.No 7 of Table 100-2 shall also be provided.

121.3. Laboratory Equipment

The following items of laboratory equipment shall be provided in the field laboratory.

121.3.1. General

- | | | |
|--------|---|---|
| (i) | Oven - Electrically operated, thermostatically controlled, range upto 200°C sensitivity 1°C | 1 No. |
| (ii) | Platform balance 300 kg capacity | 1 No. |
| (iii) | Balance 20 kg capacity-self indicating type | 1 No. |
| (iv) | Electronic Balance 5 kg capacity accuracy 0.5 gm | 2 Nos. |
| (v) | Water bath-electrically operated and thermostatically controlled with adjustable shelves, sensitivity 1°C | 1 No. |
| (vi) | Thermometers:
Mercury-in-glass thermometer range 0° to 250°C
Mercury-in-steel thermometer with 30 cm stem, range upto 300°C | 4 Nos. |
| (vii) | Kerosene or gas stove or electric hot plate | 1 No. |
| (viii) | Glasswares, spatulas, wire gauzes, steel scales, measuring tape, casseroles, karahis, enamelled trays of assorted sizes, pestle-mortar, porcelain dishes, gunny bags, plastic bags, chemicals, digging tools like pickaxes, shovels etc. | As required |
| (ix) | Set of IS sieves with lid and pan:
450 mm diameter:
63 mm, 53 mm, 37.5 mm, 26.5 mm, 13.2 mm, 9.5 mm, 6.7 mm and 4.75 mm size
200 mm diameter:
2.36 mm, 2.0 mm, 1.18 mm, 600 micron, 425 micron, 300 micron, 150 micron, and 75 micron | 1 set

2 sets |
| (x) | Water testing kit | 1 set |
| (xi) | First aid box | 1 set |

121.3.2. For soils and aggregates

- | | | |
|------|--|-------|
| (i) | Riffle Box | 1 No. |
| (ii) | Atterberg Limits (liquid and plastic limits) determination apparatus | 1 set |

(iii)	Compaction Test Equipment both 2.5 kg and 4.5 kg rammers (Light and Heavy compactive efforts)	1 set
(iv)	Dry Bulk Density Test apparatus (sand pouring cylinder, tray, can etc.) complete	1 set
(v)	Speedy Moisture Meter complete with chemicals	1 set
(vi)	Post-hole Auger with extensions	1 set
(vii)	Core cutter apparatus 10 cm dia, 10/15 cm height, complete with dolly, rammer etc.	1 set
(viii)	Aggregate Impact Value Test apparatus/Los Angeles Abrasion Test apparatus	1 set
(ix)	Flakiness and Elongation Test Gauges	1 set
(x)	Standard measures of 30, 15 and 3 litres capacity alongwith standard tamping rod	1 set
(xi)	California Bearing Ratio test apparatus	1 set
(xii)	Unconfined compression test apparatus	1 set
121.3.3. For bitumen and bituminous mixes		
(i)	Penetrometer with standard needles	1 set
(ii)	Riffle box—small size	1 No.
(iii)	Centrifuge type bitumen extractor, hand operated, complete with petrol/commercial benzene	1 set
(iv)	Marshall stability test apparatus, complete with all accessories	1 set
(v)	Field density bottle alongwith cutting tray, chisel, hammer and standard sand	2 Nos.
(vi)	3 m straight edge	1 No.
(vii)	Camber board	1 No.
(viii)	Core cutting machine with 10 cm dia diamond cutting edge	1 set
(ix)	Vacuum pump and 3 specific gravity bottles	1 set

121.3.4. For cement and cement concrete-

(i)	Vicat apparatus for testing setting times	1 set
(ii)	Slump testing apparatus	4 sets
(iii)	Compression and Flexural strength testing machine of 200 tonne capacity with additional dial for flexural testing	1 No.
(iv)	Needle Vibrator	2 Nos.
(v)	Air Meter	1 No.
(vi)	Vibrating hammer for vibrating dry mix as for Dry Lean Cement concrete sub-base	1 No.

Note : The items and their numbers listed above in this Clause shall be decided by the Engineer as per requirements of the Project and modified accordingly.

121.4. Ownership

If provided as a separate payable item in the Bill of Quantities, the field laboratory building and equipment shall be the property of the Employers and the land for laboratory will be provided by the Employer.

121.5. Maintenance

If provided for as a separate payable item in the Bill of Quantities, the Contractor shall arrange to maintain the field laboratory in a satisfactory manner until the issue of Taking Over Certificate for the complete work. Maintenance includes all activities described in Clause 120.4.

121.6. Measurements for Payment

If provided as a separate payable item in the Bill of Quantities, the measurement for payment for the construction of the field laboratory shall be on square metres of plinth area.

The supply of testing equipment, the erection, maintenance and running the same shall be on a lump sum basis.

121.7. Rate

If provided in the Bill of Quantities as a separate payable item, the contract unit rate for constructing and providing the field laboratory shall include expenses of all operations involved in construction of the building including all services, fittings, fixtures, furniture and fencing as mentioned in Clause 121.2.

The Contract unit rate for maintenance shall include expenses towards all items of works and equipment in Clauses 121.2 and 121.3 including power and water charges for supply from the mains and for providing uninterrupted supply of power and water from alternate sources in case of failure of main supply.

The Contract lumpsum rate for the supply, erection, maintenance and running of testing equipment shall include cost of supply, installation and running including all consumables like chemicals and reagents.

122. SITE RESIDENTIAL ACCOMMODATION FOR ENGINEER AND OTHER SUPERVISORY STAFF

122.1. Scope

The work covers the provision and maintenance of unfurnished site residential accommodation for the Engineer and other supervisory staff.

The Contractor shall arrange to provide residential accommodation constructed as shown in the drawings.

Work includes providing electric supply, all electrical items like wiring, switches, all fittings, lights, fans, etc. complete; providing water supply and sanitation including all pipes, fittings, tanks, tube well, pumps, valves etc. complete; septic tank, sewer lines, drains, fencing, internal roads etc., complete as shown in the drawings.

122.2. Ownership

The site residential accommodation with all services and fittings etc., shall be the property of the Employer. The land for the residential accommodation shall be provided by the Engineer and the location shall be as indicated by the Engineer. The Contractor shall provide the residential accommodation within 4 months from the date of commencement of the work or 3 months from the date of providing land and the working drawings for the construction of residential accommodation, whichever is later.

122.3. Maintenance

The Contractor shall arrange to maintain the supervisory staff residential accommodation until the issue of Taking Over Certificate for the complete work.

Maintenance includes attending to repairs to various parts of the building, fittings etc. and the connected services as and when necessary, including the annual white/colour washing of the building and periodic painting of wood and steel work; replacing the broken window/door, ventilator glasses and other hardware; and maintenance of internal roads.

The Contractor shall arrange to provide uninterrupted supply of electricity and water for the buildings. In case of failure of main water or power supply, suitable alternate arrangement shall be made for

providing uninterrupted supply. All sources/tappings and connected equipment and fittings, piping, tanks, wiring and all other accessories of the main and alternate power/water supply for the residential accommodation shall be the property of the Employer.

122.4. Measurement for Payment

The measurement for construction of the residential accommodation shall be on square metres of plinth area of the accommodation. The payment shall be made after the residential accommodation, complete with all services, fencing etc., is constructed and handed over for occupation. If the Contractor fails to complete and hand over the complete residential accommodation within the period stipulated under Clause 122.2, an amount of Rs. 50,000 per month or part thereof shall be debited to the Contractor's account for the period of delay.

The measurement for maintenance of supervisory staff residential accommodation shall be in maintenance months and shall be made on completion of satisfactory maintenance every month. If at any stage the Contractor fails to carry out the required maintenance satisfactorily, an amount of Rs. 25,000 per month or part thereof shall be debited to the Contractor's account. In addition, the month/months during which the Contractor fails to carry out the required maintenance satisfactorily shall not be measured for payment.

If the Contract works are not completed within the stipulated period or within the granted extended time of completion, maintenance of residential accommodation in accordance with Clause 122.3 shall be carried out by the Contractor at his own cost and as such no payment shall be made for the same. In case of any failure by the Contractor to do so, an amount of Rs. 60,000 per month or part thereof shall be debited to the Contractor's account.

122.5. Rate

The Contract unit rate for constructing and providing residential accommodation for the Engineer and other supervisory staff shall include cost of all the operations involved in construction of buildings and connected services and fittings, fencing etc. complete.

The Contract unit rate for maintenance shall include the expenses for all items of work detailed in Clause 122.3 including provision of uninterrupted supply of power and water.

123. PROVIDING AND MAINTAINING WIRELESS COMMUNICATION SYSTEM

123.1. Scope

The work covers the provision and maintenance of wireless communication systems with necessary mobile/base trans-receivers and other accessories.

123.2. Supply

The Contractor shall arrange to supply, install and commission the complete wireless system of approved quality suitable for a range of upto 65 km. The system shall consist of the following:

- (a) Mobile Trans-receiver suitable for mounting on 4 wheelers with Microphone assembly, Mobile Antenna with Cable and External Speaker assembly (3 W audio output) with all necessary fittings and accessories - 10 sets.
- (b) Base Trans-receivers with Microphone assembly, suitable Antenna, external speaker unit (3 W audio output) with all necessary fittings and accessories - 3 sets.
- (c) Hand held radio sets - 10 Nos.

The Contractor shall provide the complete wireless system within 12 months from the date of commencement of work or 8 months from the date on which frequency is allotted to him by the Govt. Department, whichever is later. He shall submit a guarantee for replacement of any defective trans-receiver/trans-receivers during the currency of the contract.

123.3. Approval

The Contractor shall arrange to obtain all necessary statutory approvals from various Government bodies for operating the system. He shall also fulfil the requirements laid down by various Government Departments and obtain the frequency to operate the wireless system.

123.4. Maintenance

The Contractor shall arrange to maintain the entire wireless system including the mobile and base trans-receivers and all accessories until the issue of the Taking Over Certificate for the complete work. He shall replace any Trans-receiver or accessory which goes out of order, at his own cost and provide all necessary spares and attend to all repairs necessary for keeping the complete system in satisfactory working condition. On issue of the Taking Over Certificate after obtaining clearance from the Engineer, the Contractor shall dismantle the complete wireless system and hand over to the Engineer.

123.5. Measurements for Payment

The measurement for supply and installation of wireless system shall be on lumpsum basis for the complete system as described in the preceding paras.

If the Contractor fails to commission and hand over the complete wireless system in the stipulated time, an amount of Rs. 10,000 per month or part thereof shall be debited to the Contractor's account.

The measurement for maintenance of the wireless system shall be on maintenance months and shall be made on completion of satisfactory maintenance every month. If the Contractor fails to carry out the required maintenance as directed by the Engineer at any stage of work, an amount of Rs. 5000 per month or part thereof shall be debited to the Contractor. In addition, the month/months during which the Contractor fails to carry out the required maintenance shall not be measured for payment. If the Contract Works are not completed within the stipulated period or within granted extended time of completion, the maintenance of wireless system in accordance with Clause 123.4 shall be carried out by the Contractor at his own cost and as such, no payment shall be made for the same. In case of any failure by the Contractor to do so, an amount of Rs. 8000 per month or part thereof shall be debited to the Contractor's account.

123.6. Rates

The Contract unit rate for the supply and installation of wireless system shall cover all the expenses towards the supply of all necessary items and expenses towards obtaining statutory approvals and operating frequency, erection, commissioning and handing over, guarantee for replacement of the trans-receiver/trans-receivers (which are found defective) during the currency of the Contract and all other incidentals.

The Contract unit rate for the maintenance of wireless system shall be payment in full for carrying out periodic servicing and checking of the system, replacement of components, attending to all necessary repair, payment of taxes, if any, and other incidentals to keep the complete system in satisfactory working condition.

124. PROVIDING AND MAINTAINING VEHICLES FOR THE ENGINEER

124.1. Scope

The work covers providing and maintaining of hard top passenger

cars and /or hard top jeeps for use by the Engineer as described under the Bill of Quantities.

124.2. Description

The passenger cars shall be petrol or diesel driven and may be Ambassador or equivalent having cylinder capacity of minimum 1400 cc. The hard top jeeps shall be 4 W Drive either petrol or diesel driven and may be Maruti Gypsy Model MG - 410, Mahindra & Mahindra Jeep Model MM-540/MM-440 or equivalent. The number of vehicles to be provided by the Contractor shall be decided by the Engineer at various times, out of the total provision in the Bill of Quantities and indicated in writing.

The Contractor shall provide within one month from the date of order by the Engineer, vehicles as indicated above. The vehicles shall be provided and maintained until issue of the Taking Over Certificate for the complete Work. Initially, new vehicles shall be provided. In case of vehicles of Indian make, a vehicle shall be replaced with a new vehicle after a maximum run of 75,000 km or two years whichever is earlier. In case of vehicles of foreign make approved by the Engineer, the vehicle shall be replaced with a new vehicle after a maximum run of 1,00,000 km or three years whichever is earlier. All necessary taxes for operating the vehicles shall be fully paid and all necessary papers shall be provided as required by prevailing Motor Vehicles Act with comprehensive insurance cover for the vehicles. The vehicles shall be provided day and night as required by the Engineer. The Contractor shall also make available drivers having valid licence at such times and for such duration as instructed by the Engineer.

124.3. Maintenance

The vehicles shall be maintained in a smooth running condition. All expenses required for keeping the vehicles in smooth running condition such as fuel, lubrication oil and other consumables, necessary service and maintenance, drivers, repairs and replacement etc. are to be met by the Contractor. In the event of any vehicle being off the road for maintenance or on account of breakdown, the Contractor shall provide substitute vehicle(s) immediately. If the Contractor at any time fails to provide vehicle(s) or substitute vehicle(s) as specified above, an amount of Rs. 500 per day or part thereof for each vehicle (that the Contractor failed to provide) shall be debited to the Contractor's account. Also the number of days for which the vehicle(s) were not provided shall not be included for payment.

If the Contract Works are not completed within the stipulated period or within the granted extended time of completion, provision and maintenance of vehicles in accordance with Clause 124.1 through 124.4 shall be carried out by the Contractor at his own cost and no payment shall be made for the same. In case of any failure by the Contractor to do so, an amount of Rs. 700 per day or part thereof per vehicle shall be debited to the Contractor's account.

124.4. Withdrawal of Vehicles

The Contractor shall withdraw particular vehicle/vehicles for the non-use by the Engineer if so directed by the Engineer. In such cases the instructions for non-use of vehicle shall be given in writing 15 days in advance and the withdrawal of vehicles shall not be for a period of less than 15 days continuously at a time.

124.5. Measurements for Payment

The payment for providing and maintaining vehicles shall be on vehicle day basis for actual number of days the vehicles were provided in satisfactory working order. No payment shall be made for the period of withdrawal as per Clause 124.4 irrespective of the fact whether vehicle was available or not.

124.6. Rates

The Contract unit rate for providing and maintaining vehicles for Engineer shall include all expenses towards providing and keeping the vehicles in smooth running condition including taxes etc., mentioned in the preceding paras.

125. SUPPLY OF COLOUR RECORD PHOTOGRAPHS AND ALBUMS

125.1. Scope

The work covers the supply of photographs, negatives and albums to serve as a permanent record of various stages/facets of the work needed for an authentic documentation as approved by the Engineer.

125.2. Description

The Contractor shall arrange to take colour photographs at various stages/facets of the work including interesting and novel features of the work as desired by the Engineer. The photographs shall be of acceptable quality and they shall be taken by a professionally competent photographer with camera having the facility to record the date of

photographs taken in the prints and negative. The Contractor shall supply two colour prints of each of the photographs taken to the standard postcard size mounted in albums of acceptable quality. Also the negative in 35 mm size shall be supplied for each photograph. Each photograph in the album shall be suitably captioned.

125.3. Measurements for Payment

Supply of two copies of colour record photographs mounted in the albums and the negative thereof shall be measured in number of record photographs supplied.

Supply of additional prints of colour record photographs shall be measured in number of additional prints supplied.

125.4. Rate

The rate for the supply of record photographs shall include the cost of taking the photographs, developing and obtaining colour prints, cost of album, mounting of photographs and captioning the same etc.

The rate for additional colour prints shall similarly include all costs incurred.

The photographs and materials including negatives shall form a part of the records of the Department and the prints of the same cannot be supplied to anybody else or published without the written permission of the Department.

126. SUPPLY OF VIDEO CASSETTES

126.1. Description

The work consists of taking video films of important activities of the work as directed by the Engineer during the currency of the project and editing them to a video film of playing time not less than 60 minutes and upto 180 minutes as directed by the Engineer. It shall contain narration of the activities in English by a competent narrator. The edition of the video film and the script for narration shall be as approved by the Engineer. The video cassettes shall be of acceptable quality and the film shall be capable of producing colour pictures.

126.2. Measurements for Payment

The measurement shall be by number of sets of edited master cassettes each with four copies thereof.

126.3. Rates

The contract unit rate shall include all expenses for making video films with the help of a professionally competent photographer, editing, narration and supplying the final edited master cassette alongwith four copies thereof.

