

**SECTION - 5**  
**TECHNICAL SPECIFICATION**

## **GENERAL TECHNICAL SPECIFICATIONS**

### **GENERAL TERMINOLOGY:**

- 1) In the specification, "As Directed"/" Approved" shall be taken to mean, "As directed"/" Approved" by the Engineer-in-charge.
- 2) Wherever reference to any Indian Standards appears in the specifications, it shall be taken to mean as a reference to the latest edition of the same in force of the date of agreement.
- 3) In "Mode of Measurement" in the specification wherever a dispute arise in the absence of specific of a particular point to respects the provision on these particular points or aspects in the relevant Indian Standards shall be referred to.
- 4) All measurements and computations unless otherwise specified shall be carried out to the following limits.

i) Length, width and depth (height)	0.01 mt
ii) Areas	0.01 Sq.mt.
iii) Cubic contents.	0.01 Cu.mt.
- In recording dimension of work, the sequence of length width and height (depth) or thickness shall be followed.
- 5) The distance which constituted lead shall be determined along the shortest practical route and not necessarily the route actually taken. The decision of the Engineer-in-charge in this regard shall be taken as final.
- 6) Where no lead is specified, it shall mean "All leads"
- 7) Lift shall be measured from lowest ground level where no lift is specified it shall mean "All lift"
- 8) Approval to the samples of various materials given by the Engineer-in-charge shall not absolve contract or from the responsibility of replacing the defective material brought on site or materials used in the work found defective at a later date. The contractor shall have no claim to any payment or compensation whatsoever because of such materials being rejected by the Engineer-in-charge.
- 9) The contract rate of the item of work shall be for the work completed in all respect.
- 10) No collection of materials shall be made before it is got approved by the Engineer-in-charge.
- 11) Collection of the approved materials shall be done at site of work in a systematic manner. Materials shall be stored in such a manner as to prevent damage, deterioration or instruction of foreign matter and insure the reservation of their quality and fitness for the work.
- 12) Material if and when rejected by the Engineer-in-charge shall be immediately removed from the site of work.
- 13) No material shall be stored prior to, during and after execution of a work in such a way as to cause or lead to damage or overloading of the various components of the structure.
- 14) All work shall be carried out in a workman like manners per the best techniques for the particular item.
- 15) All tools, templates, machinery and equipment for correct execution of work as well as for checking lines, levels, alignment of the work during execution shall be kept in sufficient nos. and in good working condition on the site of work by the contractor.
- 16) The mode, procedure and manner of execution shall be such that it does not cause damage or overloading of the various components of the structure during execution or after completion of the structure.

- 17) Special modes of construction not adopted in general engineering practice, if proposed to be adopted by the contractor shall be considered only if the contractor provides satisfactory evidence that such special mode of construction is safe, sound and helps in speedy construction and completion of the work to be required strength and quality. Acceptance of the same by the Engineer-in-charge shall not however, absolve the contractor the responsibility of any adverse effects and consequences of adopting the same in the course of execution of completion of the work.
- 18) All necessary safety measures and precaution (including those laid down in various relevant Indian Standards) shall be taken to insure the safety of materials and machinery on the works as also of the work itself.
- 19) Approval to any or the executed items for the work done correct in any way earlier the contractor of his responsibility of its correctness, soundness and strength of the structure as per the drawing and specification.
- 20) The cement to be used for this work shall only be (Grey) Ordinary Portland cement.
- 21) All the material, labors required for the specimen of test and testing charges shall be borne by the contractor. Necessary arrangement for conveying the samples up to the laboratory shall be provided by the contractor.
- 22) Curing shall be carried out as mentioned in the detail specification. In case of further new work over the previously carried out cement work. The curing on the superficial work shall be continued, accordingly and sufficiently.
- 23) The earthen embankment work by suitable material and shall be collected by borrow area.
- 24) No machine or surface vibrator shall be given or arranged by the department.
- 25) The curing method shall be got approved from the Engineer-in-charge.
- 26) Necessary material and labors required from the control and checking of the geometrical parameters of the work shall be provided by the contractor.
- 27) In case of failure of providing satisfactory curing arrangement, the department will arrange for the same, after giving only one-hour notice only for once. On failure of not providing satisfactory arrangement the department provided the same and the charges will be deducted from the bills of the contractor.
- 28) The stacking of the material required for the work shall be done in such a way as not to obstruct the vehicular traffic of every kind.

The work in general shall be carried out in workmen like manner as well as to the correct section better and gradient as per drawing and to the entire specification and as directed by Engineer-in-charge in presence of his authorized representative. The site shall be cleared of all rubbish material and heaps etc. and shall be handed over in neat and good condition after completion of work. The work shall be carried out as per the specifications written specially for the item of the work and in case of conflict in the specification the work shall be carried out as per specification given in P.W.D. hand book Vol. I and II and or as per relevant latest ISI standards. The contractor or his authorized agent shall sign the working cross sections as well as field books etc. in token of acceptance prior to starting the work. No dispute in regard of acceptance levels shall be entertained at later stage. During course of execution of this work the contractor shall have to remove the sitting or accumulation of such materials that might have accumulated due to any reason. No extra payment shall be made to the contractor on his account.

- 29) The field testing of the material to be tested in the field laboratory / site laboratory established at the site of work.

### **30) Care and Diversion**

#### **1.0 CARE AND DIVERSION OF RIVER INCLUDING DEWATERING GENERAL:**

- 1.01 The area under all permanent work and the adjoining areas, if necessary shall be maintained free from water.
- 1.02 The contractor shall design, construct and maintain necessary diversion channel and other temporary diversions and protective works and make provisions for diversion of the river flows and furnish, maintain and operate all necessary pumping and draining plants, for dewatering the various part of the works, i.e. Weir etc. and maintaining the foundations, sump drainage and grouting system and other parts of the work as free from water as required for approved construction operations.
- 1.03 The area shall also be maintained free of water after any part of the work is completed for inspection safety and installation by Government or any other reasons determined as necessary by the Engineer-in-charge. The contractor shall pump all water from the site of the weir and appurtenant works and shall keep the foundations free of water while excavation, grouting and concreting on placing masonry or as otherwise required for completing the work and shall be entitled to no claims or damages on account of or by reasons of any amount of water leaking through under on around the coffer dam, diversion channel and other diversion etc. During the monsoon season, the work in the river portion shall be closed and the floods will be passed over to the partly constructed **Concrete** structure only and under no circumstances such flow will not flank the other part of the work.
- The gorge portion is to be sealed by the earthen dam and the decision regarding sealing of gorge portion shall be made as per the phases of the work in consultation with Engineer-in-charge. The contractor should plan the work accordingly in consultation with the department.
- 1.04 The care and diversion work shall have to be reckoned and provided for any eventualities like unseasonal floods etc.
- 1.05 Preliminary thought has been given to the diversion works and it is visualized that diversion channel together with an upstream and downstream coffer dam may be required to divert the post monsoon flow. The diversion is likely to be required for a period of two years of depending upon the progress of work achieved. The above scheme is purely for general guidance only and any inference and conclusion reached thereby the tendered are at his risk and responsibility.
- 1.06 The contractor will be free to suggest alternative arrangement which is considered suitable and safe and not likely to obstruct or delay the progress which may be approved at the description of the Engineer-in-charge. The contractor shall not be entitled to any extra claim on this account.
- 1.07 The contractor shall fully satisfy himself about the quantum of flow to be tackled and about the adequacy, efficiency, and safety of the care and diversion arrangement to be adopted by him.
- The Engineer shall however have the right to direct to enlarge or strength en the arrangements if he so consider in the interest of work. All such additions, modification etc. directed by the Engineer shall be promptly executed by the contractor and the same shall be deemed to be the part of the care and diversion arrangement and included in the agreed lump sum amount accepted for the item.
- 1.08 In case of the diversion arrangements getting washed out of largely damaged in pre-monsoon or post monsoon shown, the same shall be immediately repaired and redone by

the contractor to its original same condition at his own cost. Necessary pumping of water, removal of site etc. shall also be executed promptly so as to cause the least delay in the progress of work. No claim shall be entertained on this account.

- 1.09 The contractor shall construct the diversion arrangements in such a way that no damage would be caused to the permanent or temporary structure or other running works by dept or other agency.

If such damages are caused due to the flood water either during the monsoon or in the post monsoon period the same shall be made good at the contractor's cost.

- 1.10 Irrespective of whether contractor intends to follow the diversion arrangements proposed by the Department on his own alternative arrangement, he will submit within one months or notice to proceed with the work, his plan for diversion and care of the river with detailed drawing of his diversion channel coffer dam etc. for approval of the Engineer and once they are approved, he shall follow the same. In case of the need however, he shall be free to submit a revised plan of diversion and obtain fresh approval of the Engineer there to.

The data to be submitted by the tenderer shall include layout and dimensions of diversion channel, coffer dam, location of pumps and their capacity methods of dewatering etc.

- 1.11 Approval of the plans for the diversion works by the Engineer will not relieve the contractor from the responsibility for the adequacy there of and pumping plant or from furnishing all equipment, layout material necessary for dewatering the foundation and keep the work area free of water for all items necessary within the scope of this contract.

- 1.12 The contractor shall construct and maintain the diversion channel, furnish install and operate all necessary pumping and other requirement, required for the dewatering of the dam spillway and stilling basin foundation galleries, shafts and other parts of the work and keep them free from water as required.

The contractor shall provide and maintain temporary bulk heads to protect shaft conduit for direct channel and other openings in the structure from possible flooding from .any reason whatsoever, the cost of which shall be deemed to have been include under the item of care and diversion. The item and method of closure of the diversion channel and any other temporary openings shall be subject to the approval of the Engineer.

- 1.13 After having served their purpose the coffer dam, temporary bulk heads, etc. shall be removed or be burnt as directed by the Engineer from time to time. The removal of the temporary works, bulk heads, etc shall be so arranged as not to damage the permanent works and any damage resulting form these operations shall be made good by the contractor to the satisfaction of the Engineer. Any reasonable in flow of water from the works in other reaches shall be diverted by the contractor as part and partial of the item without any extra claim.

- 1.14 This item also include maintaining pumping out and keeping the galleries dry from all water from the gallery, sump accumulated due to seepage, drilling or grouting or any other cause during the construction period and till all the works are finally handed over to the Government.

**1.15 Use of Excavated Stuff :**

The material available from the excavation of diversion channel shall be disposed as under:

- 1.15.1 Rubble considered as useful by Engineer-in-charge for the work of masonry, or concrete of the weir and appurtant works shall be sorted out, carted and stacked at locations indicated by the Engineer and shall not be allowed to be used for coffer dam. The remaining materials of excavation excluding above can be used in the construction of coffer dam, free of charges, such of the material found in excess over the required in the construction of coffer dams, if

found suitable in the opinion of the Engineer -in-charge shall be transported and laid in the permanent structure of dam and appurtant works. Payment for depositing of suitable material stated for use in the permanent structures of dam and appurtant works shall be carried under suitable items of depositions. No separate payment shall however be made for excavation work covered in the items of care and diversion.

- 1.16 The materials obtained from the dismantling of coffer dam shall be suitable disposed off as under.

The materials found suitable to the Engineer-in-charge shall be carted and deposited in the structure of dam and appurtant works which shall be paid under relevant item of deposition of excavated material.

The material not found useful shall be disposed off in down stream reach of river or such location as approved and directed by the Engineer-in-charge under no circumstances such materials shall be allowed to be dumped across the river so as to obstruct the flow of the river or endanger any permanent structures or encroachment to the other works.

**DEWATERING AND DIVERSION AS AND WHERE NEEDED:**

The rates of the items in this tender also include arrangements for the diversion of water during construction in the fair weather as well as in the monsoon during the entire period of construction. No payment shall be made for any part of earth work, masonry work or any other work or materials washed away or damaged during the monsoon or other period and it will have to be made good by the contractor at his own expenses. It is the responsibility of the contractor to make good by the contractor at his own expenses. It is the responsibility of the contractor to make good or repair any Government property, material or work damaged during construction period. No extra payment shall be paid for dewatering in any item of work under this contract.

The rates are also inclusive of all labour, materials and plant necessary for the purpose of dewatering and diversion mentioned therein.

- 31.) Agency shall quote the rate considering situation of stagnation of water in the drain. Agency must visit the site before quoting the rates. The above work may be even done by agency in water flooding condition in drain if needed and as directed by Engineer In Charge.



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## **DETAIL TECHNICAL SPECIFICATION**

### **ITEMWISE SPECIFICATION**

#### **ITEM NO.1-a**

**Jungle clearance of specified category and bushes for canal/dam work as directed with depositing materials etc. complete (Excluding tree of girth above 0.5 Mt) (By Machinery**

**(a) For Light Dense**

#### **ITEM NO.1-c**

**Jungle clearance of specified category and bushes for canal/dam work as directed with depositing materials etc. complete (Excluding tree of girth above 0.5 Mt) (By Machinery**

**(c) For Heavy Dense**

### **1. Scope of Work**

The work comprises **jungle clearance works** in areas classified as **light dense and heavy dense vegetation**, using mechanical means, as directed by the Engineer-in-Charge.

### **2. Description of Work**

The contractor shall carry out:

- Clearing of **jungles, bushes, shrubs, undergrowth, grass, and small vegetation**
- Removal of **roots, stumps, and organic matter** as required
- Work shall be executed **by machinery** in specified areas

#### **Note:**

- Trees having girth **greater than 0.50 m shall NOT be included** in this item and will be measured and paid separately.

### **3. Classification of Area**

The work shall be executed under the following categories:

- **Light Dense Jungle:**  
Areas with sparse to moderately dense vegetation, bushes, and small shrubs.
- **Heavy Dense Jungle:**  
Areas with thick vegetation, closely spaced bushes, heavy undergrowth, and dense coverage requiring more effort and machinery.

Classification shall be **as decided by the Engineer-in-Charge** and shall be final.

### **4. Operations Included**

The item rate shall include:

- Cutting, uprooting, and clearing of vegetation
- Removal of bushes, shrubs, and small trees (within specified girth limit)
- **Grubbing of roots** to required depth
- **Stacking of useful materials** at designated locations
- **Disposal/depositing of unserviceable materials** as directed
- Loading, unloading, and transportation within site limits (lead as specified or within workable range)

## 5. Method of Execution

- Work shall be carried out **using suitable machinery** such as excavators, bulldozers, or other approved equipment.
- Manual assistance may be used where machinery access is limited.
- Cleared surfaces shall be made **reasonably even and free from obstructions**.

## 6. Safety and Environmental Considerations

- The contractor shall ensure:
  - Safety of nearby structures and utilities
  - Controlled clearing to avoid unnecessary environmental damage
  - Compliance with applicable environmental norms

## 7. Measurement

- Jungle clearance shall be measured in **hectares (ha)** as specified in BOQ.
- Measurement shall be taken based on **actual cleared area**, separately for:
  - Light dense jungle
  - Heavy dense jungle

## 8. Rate

The rate shall be **inclusive of all costs**, including:

- Labour, machinery, tools, and equipment
- Fuel and operational charges
- Cutting, uprooting, and grubbing
- Stacking and disposal of materials
- All incidental and ancillary works



## **ITEM NO.2**

**Clearing the silt from the drain bed by digging the same to the required bed level and gradient including depositing the excavated earth regularly in spoil bank for utilizing the same preparing the bank safter breaking clods as and where directed for lead upto 50 m. and all lifts. FOR MAIN,LATERAL& SUB-LATERAL DRAINS.(BYMACHINERY)( By Long Reach Hyd Excavator )**

### **1. Scope of Work**

This item covers clearing of silt from the bed of Main, Lateral and Sub-Lateral drains by mechanical means using a Long Reach Hydraulic Excavator, to the required bed level and gradient, including disposal and formation of spoil banks within specified lead and all lifts, complete as directed by the Engineer-in-Charge.

### **2. Description of Work**

The work shall include:

1. Removal of deposited silt, sludge, soft soil and other loose materials from drain bed.
2. Excavation of silt to the required bed level, width and longitudinal gradient as directed.
3. Operation of Long Reach Hydraulic Excavator suitable for working in deep and wide drains without disturbing side slopes.
4. Dressing and trimming of drain bed to required section and gradient.
5. Depositing the excavated material regularly in spoil banks along the drain embankment or at designated locations.
6. Preparing and shaping spoil banks for future utilization, including breaking of clods and rough leveling as directed.
7. Disposal of excavated material within a lead up to 50 metres.
8. All vertical lifts involved in excavation and deposition.
9. Ensuring that side slopes and existing structures are not damaged during excavation.
10. Removal of obstructions, vegetation and minor debris encountered during silt clearance.
11. All labour, machinery, fuel, operators, tools and plants required for completion of work.

### **3. Method of Execution**

- Silt removal shall be carried out systematically from upstream to downstream or as directed.
- Bed levels and gradients shall be checked frequently to ensure proper drainage flow.
- Excavated material shall not obstruct water flow or traffic and shall be neatly deposited in spoil banks.
- Spoil banks shall be dressed and compacted lightly after breaking clods.
- Care shall be taken to avoid damage to lining, pitching, side slopes, culverts, outlets or any existing structures.
- Work shall be executed preferably during dry conditions unless otherwise directed.

### **4. Lead and Lift**

- Lead for depositing excavated material shall be up to 50 metres.
- Rate shall include all lifts irrespective of depth of drain.

## 5. Measurement

- Measurement shall be in Cubic Metres (Cum).
- Quantity shall be measured based on actual volume of silt removed as per pre-work and post-work cross sections or as directed by the Engineer-in-Charge.
- No extra payment shall be made for double handling, working in wet conditions, or all lifts.

### 1. Rate

The rate shall be inclusive of:

- Excavation and clearance of silt
- Use of Long Reach Hydraulic Excavator
- Fuel, operators and maintenance
- Breaking clods and formation of spoil banks
- Lead up to 50 m
- All lifts
- Labour, tools, plants and incidental charges

Nothing extra shall be paid beyond the quoted rate.

**Unit:** Cubic Metre (Cum)\*\*

### **ITEM NO.3**

**Earth work in embankment from borrow pits in all sorts of soil and soft murrum or other suitable strata as directed including breaking the clods and dressing to the design sections including cutting the proud section with lead as under and all lift including site clearing etc. complete. For all canal capacity (c) 200 to 1000 Mt.**

## **1. Scope of Work**

The work shall consist of construction of canal embankment using approved earth obtained from designated borrow pits, in all types of soils including soft murrum or other suitable strata, complete as per drawings and directions of the Engineer-in-Charge.

This item is applicable for canals having discharge capacity.

## **2. Materials**

### **1. Soil:**

- Ordinary soil, soft murrum, or other approved strata.
- Material shall be free from organic matter, roots, rubbish, and deleterious substances.
- Black cotton soil or highly plastic soil shall not be used unless specifically permitted.

### **2. Borrow Area:**

- Borrow areas shall be cleared of vegetation and debris prior to excavation.

## **3. Execution of Work**

### **3.1 Site Clearance**

- Clearing and grubbing of site including removal of vegetation, shrubs, roots, and rubbish.
- Disposal of cleared material as directed.

### **3.2 Excavation from Borrow Pits**

- Excavation in all types of soil and soft murrum.
- Excavated material shall be transported to embankment site within specified lead.
- Borrow pits shall be properly dressed after completion.

### **3.4 Dressing and Finishing**

- Embankment shall be dressed to true lines, grades, slopes, and design sections.
- Proud sections shall be cut and removed.
- Side slopes shall be properly trimmed and finished smooth.

## **4. Lead and Lift**

- **Lead:** As specified in the schedule of quantities (distance between borrow pit and site).
- **Lift:** Includes all lifts required to place material at the required embankment height.

No extra payment shall be made for additional handling within specified lead and lift.

## 5. Measurement

- Measurement shall be taken in cubic meters (Cum).
- Quantity shall be calculated based on finished section dimensions.
- No allowance shall be made for shrinkage, wastage, or settlement.

## 6. Rate

The rate shall include:

- Site clearance
- Excavation from borrow pits
- Breaking of clods
- Loading, unloading, and transportation within specified lead
- All lifts
- Watering
- Dressing to design section
- Cutting proud sections
- Labour, tools, plant, machinery, royalties, taxes, and incidental charges
- Complete work as directed by Engineer-in-Charge

## 7. Mode of Payment

Payment shall be made at the accepted contract rate **per cubic meter** of completed embankment work, measured as specified above.

#### **ITEM NO.4**

**Excavation for C.O.T. work as per design in all sorts of soil & over burden including hard murrum incl. sorting, stacking and depositing materials with lead upto 1KM. and all lifts etc.comp.including dewatering**

##### **1. Scope of Work**

The work includes excavation for C.O.T. (Centre of Track / as per project definition) in all types of soil including overburden and hard murrum, complete in all respects.

##### **2. Description of Work**

The contractor shall carry out excavation work including:

- Excavation in **all kinds of strata** such as:
  - Ordinary soil
  - Hard soil
  - Murrum
  - Mixed soil and overburden
- Excavation shall be done **to required lines, levels, widths, and grades** as per directed by the Engineer-in-Charge.

##### **3. Operations Included**

The item rate shall include the following:

- **Site clearance** before excavation (if required)
- **Excavation** by manual / mechanical means
- **Sorting of excavated materials**
- **Stacking of useful materials** at designated locations
- **Disposal of surplus/unserviceable materials**
- **Loading, unloading, and transportation** of excavated material
  - Lead up to **1 km**
  - Including all lifts and depths

##### **4. Dewatering**

- The contractor shall carry out **dewatering operations**, if required, to keep the excavation area dry.
- This includes:
  - Pumping out water
  - Providing necessary equipment, drains, and arrangements
- No extra payment shall be made for dewatering; cost shall be deemed included in the item rate.

## 5. Lead and Lift

- The rate shall include:
  - **Lead up to 1 km**
  - **All lifts** (no restriction on depth unless specified otherwise)

## 6. Safety and Protection

- The contractor shall:
  - Ensure **proper shoring, strutting, or side protection** wherever required
  - Prevent collapse of excavation sides
  - Protect nearby structures, utilities, and workers

## 7. Measurement

- Excavation shall be measured in **cubic meters (m<sup>3</sup>)**.
- Measurement shall be based on **in-situ dimensions** as directed.

## 8. Rate

The quoted rate shall be **inclusive of all costs**, including:

- Labour, tools, and machinery
- Fuel and equipment charges
- Sorting and stacking
- Disposal within 1 km lead
- Dewatering
- All lifts
- Safety measures and incidental works

No extra payment shall be made for any item unless specifically mentioned.



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