

SCHEDULE B-1 Pipeline **(Rising/Gravity Main Pipeline for Hamlet/ Faliya Connectivity)**

Item No 1-A:

Providing and supplying in standard length ISI mark rigid unplasticised PVC pipes suitable for potable water with ring fit joint including cost of rings, as per IS specification no. 4985/1988 including all local and central taxes, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to the departmental stores and including cost of jointing material etc. complete. 1. One coupler / ring shall be provided with each full length pipe cost of which is included in rates below. 2. 3% (Three) Discounted rate to be consider for Coupler jointed pipe 3. Rate for PVC Resin as Rs. 91739/MT (price without GST).

For Indian manufacturers a valid license issued by the Bureau of Indian Standards for marking the PVC pipes with ISI mark is a mandatory requirement both for PVC pipes & rings

Standards

- The UPVC Pipes to be manufactured, supplied and delivered under the scope of this contract shall be manufactured in accordance and confirming to IS:4985-2000 or its latest revision or amendments or other authoritative standard that ensure at least a substantially equal quality to the IS:4985-2000 or its latest revision or amendments
- Elastometric sealing ring shall be as per specification of IS – 5382-1985, and ISO: 4633-1996 or it shall be EPDM rubber ring.
- The dimensions, material compositions, tests etc. shall be as per IS:4985-2000 or with its latest revision or amendments.
- The minimum wall thickness weight shall be as per Appendix I of the tender.
- The colour of pipes shall be as per IS 4985-2000
- Bureau of Indian Specifications (BIS) / Indian Standard (IS) shall mean the Latest version issued by BIS. The material from which the pipes are made shall consist substantially of unplasticised polyvinyl chloride conforming to IS: 10151, to which may be added only those additives that are absolutely needed to facilitate the manufacture of the polymer, and the production of sound, durable pipes of good surface, finish, mechanical strength and opacity.

The bulk density of the UPVC compound shall be 0.50 to 0.53 and the density of UPVC pipe shall be 1.40 to 1.46 g / cm³.

The additional of the manufactures own rework material shall comply to clause 4.2 of IS: 4985.

PVC resin of suspension grade K-66/K-67 shall be used for extrusion of UPVC pipe.

- In line with BIS 4985-2000 the tolerance on outside diameter of the pipe shall be as under:

Nominal outside Diameter	Mean outside diameter in mm		Outside diameter at any point in mm	
	Minimum	Maximum	Minimum	Maximum
63	63	63.3	62.2	63.8
75	75	75.3	74.1	75.9
90	90	90.3	88.9	91.1
110	110	110.4	108.6	111.4
125	125	125.4	123.5	126.5

140	140	140.5	138.3	141.7
160	160	160.5	158.0	162.0
180	180	180.6	177.8	182.2
200	200	200.6	197.6	202.4
225	225	225.7	222.3	227.7
250	250	250.8	247.0	253.0
280	280	280.9	276.6	283.4
315	315	316.0	311.2	318.8

- The pipes shall be transported to the store by flat floored trucks in pre packed wooden crate. The height of crate should not be exceeding more than 2 meters. The both ends of packaging unit (crate) shall be covered with plastic sheet to ensure adequate protection during transport. At the time of packing and stacking of pipes, the sockets shall be alternated within the pipe of pipes and shall project sufficiently for the pipes to be correctly supported along their whole length. The pipes shall rest uniformly on the vehicle bed over their whole length during transport to avoid sagging or deformation.

The packing material like wooden crate, plastic sheet etc. shall be the properly of tenderer and he is permitted to reuse the packing material for transporting next batch of pipes”.

The pressure rating of pipes shall be in accordance with IS 4985 with a maximum continuous working pressure at 270 C. of 6 & 10 kg/cm². This working pressure shall be down graded for ambient underground soil temperature of 450 C. as per the figure given in IS 4985 for design purposes.

The pipes when subjected to internal hydrostatic pressure in accordance with IS: 12235-1986 (part – 8) shall not burst during the prescribed test duration. The temperature, duration and test and induced internal stress shall conform to the parameters given below

Sr. No.	Test	Temp. (0C)	Min.duration (h)	Induced Stress (Mpa)	Requirements
1	Type test	60	1000	10	No failure
2	Acceptance Test	27	1	36	No failure

- The integral socket of the pipe shall be tested for internal hydrostatic pressure in accordance with ISO: 3603 and ISO 1167.
- The UPVC pipe shall not contain vinyl chloride monomer (VCM) exceeding 1 ppm when determined by means of gas phase chromatography using the “headspace” method according to IS: 10151.
- The wall of the socket and the wall of the plain pipe shall not transmit more than 0.2% of visible light falling on them when tested in accordance with IS:12235 (part -3).

The pipes shall be supplied in straight length of 6 mtrs with tolerance of +20mm and -0mm. The effective length of socket pipe shall be considered as shown in figure 2 of IS 4985.

All plastic and non plastic material for components of the UPVC piping system e.g. Elastomeric sealing ring, lubricants, when in permanent or in temporary contact with water which is intended for human consumption, shall not adversely affect the quality of the drinking water.

Concentrations of chemicals, biological agents or other substance leached from pipe materials in contact with drinking water and the values of the relevant physical parameters, shall not exceed the maximum values recommended by IS: 10500.

- The pipe material shall be in accordance with IS 4985, clause 6.3.
- The quality control system and sampling model shall be as under:

Temperature Variations

All the pipes to be manufactured, supplied and delivered shall be subjected to weather conditions like sun, dust, rain, wind as available in State of Gujarat. They shall be also subjected to carry and convey drinking water under variable temperature conditions ranging from 4 C0 to 45 C0.

Marking

The methods of marking all the pipes to be delivered under scope of contract shall ensure that all the information will remain legible even after transportation, storage in open space etc. In general the legible and indelible marking upon the goods shall indicate the followings;

- i) Certification mark on each pipe.
- ii) Manufacturers brand name and/or trademark.
- iii) Purchasers mark as "GWSSB" be inscribed.
- iv) The outside diameter and pressure rating.
- v) Batch Number Or Lot Number.
- vi) Inspector's Mark On Each Pipe

Elastomeric Sealing Ring

These sealing ring shall be Saturnine Butadin in red color as specified in IS. The lubricant applied for jointing of elastomeric rubber ring shall be of good quality and comply the following specifications: Must have paste like consistency and be ready for use, preferably Soap Jelly. Has To Adhere Wet And Dry Surfaces Of Upvc Pipes And Rubber Ring. Must Be Non-Toxic. Must Be Water-Soluble.

Must non-affecting physio-chemical and organoleptic properties of drinking water carried on the pipe.

Must not have an objectionable odour.

Must not harmful to the skin. Elastomeric sealing ring shall be in accordance with one of the types (Type - 1 to Type – 6) as per ISS 5382. These sealing rings shall be EPDM rubber ring. The sealing ring shall be with ISI mark.

In case of imported EPDM Ring, such rings shall conform to relevant International Standards or the Standards of country of origin, which are equivalent or higher than the Bureau of Indian Standard Specifications. In case of manufacturers who have applied for getting a BIS certification mark, it would be mandatory for such bidders to produce the BIS certification license on or before the date of opening of the price bids. An undertaking in this regard shall have to be provided along with the technical bid.

The rubber sealing rings shall be vulcanized from Ethylene Propylene (EPDM) with strengths as per table 2 of IS 5382-1985.

Type Test

- a) Type test capacity, test for effect on water, test for resistance to Sulphuric Acid, internal Hydrostatic pressure test for 1000 Hrs. shall be carried out at least once at any time during the contract. Or shall be taken at least once during every six months irrespective of the ordered quantity.
- b) The said type test shall be taken by the GWSSB's representative or third party inspection agency at the in-house laboratory of the manufacturer

Colour Of Pipes

- The colour of the pipes shall be as per IS 4985-2000.
- The pipes shall bear ISI mark confirming to IS:4985-2000 or its latest amendment/revision if any.

Test For PVC Resin & Pipe

Test For PVC Resin

It shall be sufficient to show the certificate of chemical test (in accordance with IS 4669) to the inspecting authority to confirm the 'K' value to be 64 to 67 as per clause No. 6.1.2. of IS 4985-2000

Specific Gravity And Ash Content Tests:

A) Density

These tests shall be carried out by the inspection agency as per the IS:4985-2000 OR its latest revision OR amendments. The value shall be between 1.40 and 1.46 as per the ISS clause No. 10.6

B) Sulphate Ash Content

When tested as per Annex B, of IS 4985-2000, the sulphated ash content in the pipe shall not exceed 11 percent.

C) Other test shall be carried out as per ISS 4985-2000 or its latest revision or amendment

Tolerance In Weight Of Pipes

(-) 1% tolerance in actual weight of pipes shall be allowed but in overall weight there should not be any minus tolerance i.e. minus tolerance may be compensated in overall weight. If the tolerance is in minus, the consignment shall be outright rejected. The weight of pipes as given in Appendix-I shall be considered. If required the consignee can weight the whole lot of supply for verification.

Quality Assurance

The manufacturer shall have a laid down Quality Assurance Plan for the manufacture of the products offered which shall be submitted along with the tenders.

Unit weight and minimum wall thickness of un plasticizes ring fit type PVC pipes are as per IS 4985-2000.

Inspection:

Inspection of pipe will be carried out at factory site by inspecting agency to be fixed and authorised by GWSSB. The inspecting agency will inspect the material as per the specification and on satisfying itself will mark the inspecting mark on all pipe and issued inspection note to the supplier and concerned consignee.

The bidder shall have to arrange for random testing of pipes brought on site, in CIPET/GIRDA in the presence of GWSSB's representative and on satisfactorily report from the CIPET/GIRDA the payment of pipes will be made. Testing charges shall be borne by Agency.

Pipes supplied must be purchased from the latest vendors approved by GWSSB at the time of purchase of pipes.

Mode Of Measurement And Payments

Payments will be made as per percentage shown in payment schedule. The measurement shall be recorded in running meter of pipe length supplied and Payment shall be made as per Running meter.

Item No 2:

Providing and supplying at site or store P.V.C.specials including all taxes etc. Complete. PVC Specials.

The PVC specials shall be of the same material used for PVC pipes and should be best quality approved by Engineer-in-charge.

It shall be of best quality as per requirement and rate shall be including loading, unloading, carting, insurance and labour charge for fixing etc. complete.

The payment shall be made on No. basis.

Item No 3:

Excavation for pipe line trenches for water supply, sewerage line, manhole etc. all with shoring and strutting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified.

GENERAL

- 1.1 The excavation for trenches will generally, refer to open excavation for trenches in wet / dry conditions for pipe laying work.

CLEARING OF SITES:

The site on which the pipelines are to be laid and shown on plan and the area required for setting out and other operations shall be cleared and all obstruction loose stones and materials, rubbish of all kinds, stumps, brushwood as trees shall be removed as directed the roots shall be entirely grubbed up.

- 2.2 The products of the clearing to restocked in such a place and in such a manner, as directed by the engineer in charge.

- 2.3 In jungle clearings, all trees not specially marked for preservation, bamboo's jungle wood and brushwood shall be cut down their roots grubbed up. All wood and materials from the clearing shall be the property of the Board shall be arranged as directed by the Board Engineer or his authorized agent, the material pronounced as useful by the Engineer will be conveyed and properly stacked as directed within the specified limit. Unless materials will be burnt or otherwise disposed off as directed.

- 2.4 All holes or hollows whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well earth, well rammed leveled off, as may be directed.

3.0 SETTING OUT:

The center lines of all pipe trenches etc. shall be given by the Engineer-in-charge and it will be the responsibility of the contractor to install substantial reference marks, bench marks, etc. and maintain them as long as required true to line, level curve and slopes. The contractor shall assure full responsibility for alignment, and dimension of trench.

The labor materials etc. required for setting out and establishing benchmarks and other reference marks shall be arranged by the contractor at his own cost.

4 EXCAVATION

- 4.1 The excavation incl. Bailing out of water for the pipe trenches shall also incl. Removal of all materials of whatever nature and whether wet or dry condition necessary for laying of pipelines exactly in accordance with alignment, levels grades and curves shown on the plans or as directed by the Engineer-in-charge. Trenches shall be excavated to the exact width and depth according to the size of pipe and the sides shall be left vertical as far as possible or according to the angle of repose of various soils. Unless there is a specific extra provision in the contract for shoring and strutting or for cutting side slopes the contractor shall at his own cost do the necessary shoring and strutting or cutting of slopes to a safe of repose or both approved by the Engineer-in-charge. As per Site condition if Extra width or depth require then prior permission of concern chief engineer is require. The contractor shall notify the Engineer before starting excavation to enable him to take cross sectional levels for purpose of measurements before the ground is disturbed. The bottom of the trenches shall be leveled both longitudinally and transversely or slopped as directed by the Engineer. The contractor shall at his own cost to remove such portions of boulders or rocks, as are rectified to make the bottom of the trench level. No filling shall be allowed to bring the trench to level. If by contractor's mistake excavation is made deeper than shown on the plans and if ordered by the Engineer the extra depth shall have to be made with selected excavated stuff only with watering, remedying etc. as directed, by the Engineer and at the cost of the contractor. Other hard excavation shall be cleared of all sorts and loose materials and cut to firm surface, either level, stepped as directed by the Engineer. The Engineer may order such charges in the dimensions and alignment of pipe trench as may be deemed necessary to secure satisfactory cover over pipeline. The contractor shall, at his own expense, make provision for bailing out of draining water and the trenches shall be kept free of water, during laying work.

After each excavation is completed, the contractor shall notify the Engineer to that effect and no laying of pipeline will be allowed to laid until Engineer has approved the depth and dimensions of trenches level and measurements.

The minimum width of trench should be 25 CM on each side of the pipe the rate includes cost of dewatering, blasting if required and as per detailed specification etc complete.

5.0 SHORING AND STRUTTING:

Shoring & strutting and dewatering if required shall have to be carried out by the contractor, for which any extra charge will not be paid During excavation if water connections, sewage connections, telephone lines khalkuva (soak pits) etc. are damaged by the contractor, the same shall have to be restored by the contractor without any extra payment.

PROTECTION

The trenches shall be strongly fenced and red light signal shall be kept at night and arrangement of watchman to prevent accidents should be done, sufficient care protective measure shall be taken to see that the excavation shall not affect or damage the adjoining structure. The contractor shall be entirely responsible for any injury to life and damage to the properties etc. Necessary protection work such as guide ropes, crossing places, barricades, caution boards etc. shall be provided by the contractor.

- 7.0 The excavation in all sorts of soil, hard murram, soft rock or hard rock or any type of soil shall have to be carried out up to the required depth by the agency, no extra payment shall be given for soft/ hard rock.

8 DISPOSAL OF EXCAVATED STUFF

No excavated stuff from trench are to be placed even temporarily nearer than 1.5 meter or greater distance up to 90 meter or as prescribed by the Engineer from the outer edge of trench. All excavated material will be the property of the board. The rate of excavated includes sorting out of useful materials and stacking then separately as directed within specified lead. The excavated stuff suitable and useful for refilling or for other use shall be stacked at convenient places. The materials not useful in any wet shall be disposal off as directed by the Engineer from the outer edge of trench.

8.2 The site should be cleared off on completion of work.

9.0 ADDITIONAL REQUIREMENTS

At the joints of pipes, the trench shall be excavated to an additional depth of 15 cm. and width of 30 cm. And length of 15 cm. beyond the edge of collar on both the sides or as directed. The rate include for such extra excavation made at the joints. The trenches shall be excavated perfectly in straight line. The bottom of the trench shall be kept as per invert level or as directed. To maintain the proper slop the usual method of site rails and boning rods shall be adopted. The contractor shall have to provide and fix and maintain sight rails and boning rod without any extra cost.

If the contractor fails or makes delay to give hydraulic test of the pipe line laid in any of the section, without any genuine reason, he shall be responsible to get any part of the length trenches refill in such case i.e. before tasting for safety of pedestrian and/or vehicular traffic as found necessary by the engineer-in-charge without any extra cost. If found necessary any directed by the Engineer-in-charge. The contractor shall have to excavate the refilled trenches, during hydraulic test without any extra cost.

At all road crossings, trenches shall be excavated only for half width of the road and pipe shall be laid. The other half shall be excavated only after back filling over the laid pipeline is done so as to make it suitable for the traffic. The contractor shall provide direction when the pipeline is to be laid along the road as required and shall maintain the diversion or any part of it, without any extra cost. At all road crossings, the pipe shall be laid below the crest of read.

9.2 The contractor shall break the road surface by excavation chiseling to the exact width and length as shown on the drawing or as directed by the Engineer-in-charge.

The excavated stuff shall be deposited in uniform layers to avoid mixing with other kind of materials at non-objectionable place or as directed by the Engineer-in-charge.

MEASURMENT AND PAYMENT

As per per cum mentioned in Price bid or Payment Schedule.

This item of excavation shall include unless and otherwise mentioned.

- (a) Clearing of site
- (b) Setting out work including all materials and labour.
- (c) Providing and subsequently removing, shoring and strutting outing slopes etc.
- (d) Excavation and removal and staking of all excavated stuff as directed.
- (e) Necessary protection including labour materials equipment etc. to ensure safety and protection against risk or accident.
- (f) Providing facilities for inspection and damage to property if caused during progress of work.
- (g) Compensation for injury to life and damage to property if caused during progress of work.
- (h) Restoring of water supply connections, sewer connections, telephone

lines, khalkuva soapiest etc. if damaged by contractor without extra payment.

- (i) Dewatering of excavated pit trench during the progress of work.
- (j) Clearing the site on completion of works directed by the Engineer.

Item No 4

Lowering, laying, fixing and jointing PVC/uPVC/cPVC pipes and specials of following class and diameter including cost of conveyance from stores to site of works including cost of labour, material, cement solvent, giving satisfactory hydraulic testing as per ISI code.

a) PVC Pipes

- 1) The excavation for trenches shall be done before laying of the pipes as per required depth and width so that adequate space can be made available for joint.
- 2) The pipes & joints shall be procured, supplied by the Contractor at work site at his own cost. Every care shall be taken in carting them to site. During transportation any damage shall be occurring to pipes for fittings the replacement of pipes given by the contractor at his own cost.
- 3) Before laying the pipes it shall be brushed throughout length so that the dust and soil can be removed.
- 4) Reducer bends tees, and adopter etc. to be supplied by the contractor as per requirement.
- 5) All the specials such as bends, tees, reducer, etc. shall be fixed as per instruction of engineer-in-charge in the pipeline.
- 6) The pipe shall be hydraulically tested during the testing no leakage shall be observed. If, leakage observed, it shall be set rightly by the contractor at his own cost as per the instruction of engineer-in-charge. The payment shall be as per payment schedule.

TESTING OF WATER PIPES:

After each section of the pipeline has been completed it shall be tested for water tightness before being covered. The contractor shall at his own cost fill up water in pipe line and given necessary hydraulic test section by section and the pipe line shall stand the pressure which shall stand the pressure which shall exceed the working pressure by (a) 50% of the highest pressure in the section.

The Scope For The Item Cover

Cost of additional excavation required for jointing clearing the site of all scrubs, bushes, and trees and dewatering where necessary.

Labour for laying pipes in trenches to correct alignment at required depth with tools, including cutting of pipes and specials if required for laying of pipes including connecting pipes to specials and appurtenances. Cost of the scaffolding, tools and plants, ropes etc.

Protection of existing works from damage and cost of repair to the damages carried out to the existing structure, sewer line telephone/electricity cables, electric cables, electric lines, gas pipe line, irrigation pipe line etc

The pipe laying across the state highways, national highways etc. will have to be done either through open cut method or through push through method depending upon the requirement to be prescribed by the sanctioning authority. However, mostly it would be push through method.

GWSSB will not be able to provide water for testing of the pipelines & water containers of the project. This shall have to be managed by the contractor at his cost and risk.

Labour for making joints including jointing material for joints, tools as well as tests. Testing of pipes for leakage under water pressure and flushing the pipes after testing and construction work shall have to be arranged by the contractor at his own cost.

Testing of the Existing pipeline laid earlier shall be done by the agency including necessary job connection to be made and starting water supply to all faliya as instructed by Engineer In Charge (EIC).

Method Of Measurement Of Pipes:

Payment shall be made on per Rmt.

Item No 5:

Refilling the pipeline trenches incl. ramming, watering, consolidating desposal of surplus stuff as directed within a radius of 3 km.

REFILLING OF TRENCHES:

On completion of the pipe laying operations in any section, for a length of about 100m and while further work is still in progress, refilling of trenches shall be started by the Contractor with a view of restricting the length of open trenches. Pipe laying shall closely follow the progress of Trench Excavation and the Contractor shall not permit unreasonably excessive lengths of trench excavation to remain open while awaiting testing of the pipeline. If the Engineer considers that the Contractor is not complying with any of the foregoing requirements, he may prohibit further trench excavation until he is satisfied with the progress of laying and testing of pipes and refilling of trenches. The excavated material nearest to the trench shall be used filling. Care shall be taken during backfilling, not to injure or disturb the pipes, joints or coating. Filling shall be carried out simultaneously on both sides of the pipes so that unequal pressure does not occur. Walking or working on the completed pipeline unless the trench has been filled to height of at least 30cm over the top of the pipe except as may be necessary for tamping etc., during backfilling work. The remaining portion of the trench may be filled in with a mixture of hard and soft material free from boulders and clods of earth larger than 150mm in size if sufficient quantity of good earth and murrum are not available. The trench shall be refilled so as to build up to the original ground level, keeping due allowance for subsequent settlement likely to take place. The top 300mm layer or fertile agricultural soil shall be kept aside during excavation and shall be laid in layers near ground level during refilling.

To prevent buckling of pipe shell of diameters 1200mm and above, pipes shall be strutted from inside while the work of refilling is in progress, for which no separate payment shall be made.

Strutting shall be done by means of strong spiders having at least 6 arms which shall be sufficiently stiff to resist all deformation. Spiders shall be provided at a maximum interval of 2m & shall be welded in such a way that internal coating does not get burnt.

The Engineer shall, at all times, have powers to decide which portion of the excavated materials shall be for filling and in which portion of the site and in what manner it shall be so used.

If any material remains as surplus it shall be disposed of as directed by the Engineer, which includes loading, unloading, transporting and spreading as directed within all lead. If the Contractor fails to remove the earth from site within 7 days after the period specified in a written notice, the Engineer may arrange to carry out such work at the Contractor's risk and cost or may impose such fine for such omission as he may deem fit. Particular care shall be taken to keep the trench dry during the entire refilling operation.

If suitable material for refilling is not available for excavation the Contractor shall bring earth, murrum of approved quality as directed by the Engineer.

No mechanical plant other than approved compacting equipment shall run over or operate within the trench until backfilling has reached its final level or the approval of the Engineer has been obtained.

Subsidence in filling in : Should any subsidence take place either in the filling of the trenches or near about it during the maintenance period of 24 months from the completion of the Contract Works, the Contractor shall make good the same at his own cost or the Engineer may without notice to the Contractor, make good the same in any way and with any material that he may think proper, at the expense of the Contractor. The Engineer may also, if he anticipates occurrence of any subsidence, employ persons to give him timely notice of the necessity of making good the same, and the expenses on this account shall be charged to the Contractor.

Mode of measurement and payment :

The rate shall be paid per cum. of refilled volume to original ground level. The measurement shall be worked out on the basis of quantity of excavation as per item no. 2 of this tender less the volume of pipeline. The rates includes the loading, carting, unloading, breaking clods, ramming, watering, consolidating, bringing selected materials brought from outside if required. Payment of refilling shall be made on cum. basis after satisfactory testing of pipeline is given by contractor.

Item No 6:

Demolition including Stacking of serviceable Materials and Disposal of unserviceable Materials with all lead and Lift (RCC Work)

1. Scope of Work

The work shall consist of demolishing existing **Reinforced Cement Concrete (RCC)** structures such as slabs, beams, columns, lintels, chajjas, foundations, walls, staircases, pavements, retaining walls, and other RCC members, including reinforcement wherever required. The work includes:

- Careful dismantling/demolition of RCC structures.
- Cutting and removing reinforcement steel.
- Segregation of serviceable and unserviceable materials.
- Stacking of reusable/serviceable materials at designated locations.
- Loading, transporting, and disposing of debris and unserviceable materials.
- Removal of all rubbish from the site.
- Making the area clean and safe after completion.
- Providing all labour, tools, plants, machinery, fuel, scaffolding, safety equipment, and incidentals required for execution.

2. Materials

No specific materials are required except temporary supports, safety barricades, scaffolding, and protective arrangements necessary for safe demolition.

3. Method of Demolition

3.1 Preliminary Works

- Obtain necessary permissions and approvals from concerned authorities.
- Disconnect all utility services such as water supply, electricity, gas lines, communication cables, etc.
- Erect warning signs, barricades, and safety fencing around the demolition area.
- Provide temporary supports/shoring wherever required to prevent accidental collapse.

3.2 Demolition Procedure

- Demolition shall be carried out manually, mechanically, or by controlled methods as approved by the Engineer-in-Charge.
- Demolition shall proceed in a systematic manner from top to bottom.
- Structural stability of adjoining structures shall be maintained throughout the operation.
- Vibrations and damage to nearby structures shall be minimized.
- Reinforcement bars shall be cut using approved equipment and removed carefully.
- Water sprinkling shall be carried out to control dust generation.

3.3 Handling of Materials

- Serviceable materials such as steel reinforcement, reusable concrete blocks, stone, bricks, fittings, etc., shall be carefully removed without damage.
- Such materials shall be cleaned and stacked neatly at locations directed by the Engineer-in-Charge.
- Unserviceable materials and debris shall be collected separately for disposal.

4. *Stacking of Serviceable Materials*

- Serviceable materials shall be transported to designated storage areas within the site premises.
- Materials shall be stacked category-wise.
- Reinforcement steel shall be straightened, cleaned of loose concrete, and stacked properly.
- The contractor shall be responsible for safe custody until materials are handed over.

5. *Disposal of Unserviceable Materials*

- Debris, broken concrete, and other waste materials shall be loaded and transported to approved dumping grounds.
- Disposal shall be carried out as per local municipal and environmental regulations.
- The contractor shall arrange all transportation, labour, loading, unloading, and tipping charges.
- The rate shall include disposal for all loads and lifts specified in the contract.

6. *Safety Requirements*

- All demolition activities shall comply with applicable safety regulations.
- Workers shall use PPE including helmets, safety shoes, gloves, goggles, reflective jackets, and safety harnesses where required.
- Adequate precautions shall be taken against falling debris.
- No unauthorized persons shall be allowed within the demolition zone.
- Fire-fighting equipment and first-aid facilities shall be available at site.

7. *Environmental Protection*

- Dust suppression measures such as water spraying shall be adopted.
- Noise levels shall be controlled by proper selection of equipment.
- Debris shall not be dumped indiscriminately.
- Environmental regulations and waste-management rules shall be strictly followed.

8. *Measurement*

- Measurement shall be taken in **cubic metres (m³)** of RCC work actually demolished.
- The dimensions shall be measured before demolition.
- No deduction shall generally be made for embedded reinforcement.
- Measurement shall be as per applicable Standard Specifications, Schedule of Rates (SOR), or contract provisions.

9. Rate Includes

The rate shall include:

- Labour, supervision, and technical staff.
- Tools, plants, machinery, breakers, compressors, cutters, etc.
- Scaffolding, staging, shoring, and temporary supports.
- Cutting and removal of reinforcement.
- Dust suppression and safety measures.
- Segregation and stacking of serviceable materials.
- Loading, unloading, transportation, and disposal of unserviceable materials.
- All leads, lifts, royalties, taxes, duties, and incidental charges.
- Cleaning and dressing of the site after demolition.

10. Mode of Payment

Payment shall be made based on the measured quantity of RCC work demolished, stacked, and debris disposed of, at the contract unit rate per cubic metre, which shall constitute full compensation for all operations described in this specification

Item No 7

Providing C.C.M.:100 for encasing pipes using trap metal size 12 mm to 50 mm incl. form work curing consolidation etc. complete for various location on pipe line using trap metal 20 mm nominal size

1.0 Materials

- 1.1 Water shall conform to M-1 sand shall conform to M-6 cement shall conform to M-3 stone aggregate 20 mm nominal size shall conform to M-12.

2.0 Workmanship

2.1 General

Before starting concrete the bed of foundation trenches shall be cleared of all loose materials, levelled, watered and rammed as directed.

2.2 Proportion of Mix :

- 2.2.1 The proportion of cement, sand and coarse aggregate shall be one part of cement, 3 parts of sand and 6 parts of stone aggregates and shall be measured by volume.

2.3 Mixing:

- 2.3.1 The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed of smaller quantity of work if approved by the Engineer in charge. When hand mixing is permitted by the Engineer in charge in case of breakdown of machineries and in the interest of the work. It shall be carried out on a water tight platform and care shall be taken to ensure the mixing is continued, until the mass is uniform in colour and consistency. However in such cases 10% more cement than otherwise required shall have to be used, without any extra cost. The mixing in mechanical mixer shall be done for a period 1 ½ to 2 minutes. The quantity of water shall be just sufficient to produce a dense concrete or required workability for the purpose.

2.4 Transporting & placing the concrete

- 2.4.1 The concrete shall be banded from the place of mixing to the final position in not more than 15 minutes by the method of as directed and shall be placed in to its final position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences the concrete shall be laid in layers of 15 cm. to 20 cm.

2.5 Compacting:

- 2.5.1 The concrete shall be rammed with heavy iron rammers or vibrator and rapidly to get required compaction and to allow all the interstices to be filled with mortar.

2.6 Curing :

- 2.6.1 After the final set, the concrete shall be kept continuously wet, if required for a period of not less than 7 days from the date of placement.

2.7 Mode of measurements & Payments :

- 2.7.1 The concrete shall be measured for its and depth. limiting dimensions to those specified on plan or as directed.

The rate shall be for a unit of one cubic meter.

Item No 8:

Excavation in Bituminous road as per required gradient and line including safety provisions using site rails and stacking excavated stuff including upto all required lead clearing the siteetc. Complete for all lift as specified.

1. Scope of Work

This item covers the complete excavation of an existing bituminous (asphalt/tar) road to the required formation levels, gradients, and alignment, including all associated safety measures, material handling, and site clearance — for all depths of lift as specified in the drawings or as directed by the Engineer-in-Charge.

2. Applicability

Applicable to:

- Road widening or realignment projects
- Utility trenching through bituminous carriageways
- Reconstruction of failed road sections
- Subgrade improvement requiring removal of existing pavement layers

3. Sequence of Operations

3.1 Pre-Excavation Activities

- Site survey and marking of excavation limits with paint/chalk lines conforming to the approved plan, gradient, and cross-section.
- Identification of utilities (water mains, cables, drains) through as-built drawings and trial pits; marking on ground.

- Obtaining necessary traffic diversion permits and approvals from local/road authorities.
- Arrangement of dewatering equipment if groundwater is anticipated.
- Setting up of site rails (profile rails/boning rods) to control excavation grade and alignment.

3.2 Cutting of Bituminous Surface

- The existing bituminous surface shall be saw-cut or jack-hammer cut along marked lines to produce clean, vertical edges, preventing uncontrolled cracking beyond the excavation zone.
- Saw-cutting depth shall extend through all bituminous layers (wearing course, binder course, base course) to the underlying granular base.
- No cutting beyond the specified limits without written approval.

3.3 Excavation

- Excavation shall be carried out layer by layer (lift by lift) as specified, using appropriate machinery (hydraulic excavators, backhoes) or manual labour depending on site constraints.
- The excavation shall strictly follow:
 - Required gradient (longitudinal slope as per design)
 - Required cross-fall/camber (transverse slope)
 - Alignment as set out by site rails
- Bottom of excavation shall be trimmed, levelled, and compacted to achieve a firm, unyielding surface.
- Any over-excavation shall be made good with approved material at the contractor's expense.
- Soft spots encountered at formation level shall be reported to the Engineer; treatment (e.g., removal and replacement with granular fill) to be as directed.

4. Gradient and Alignment Control (Site Rails)

- Site rails (profile boards/boning rods) shall be erected at regular intervals — typically 5 m to 10 m centres longitudinally, at every change of grade, and at both edges of excavation transversely.
- Rails shall be set by a qualified surveyor using levels and theodolite/total station referenced to established benchmarks.
- The contractor shall maintain and protect site rails throughout excavation; disturbed rails must be re-established before work proceeds.
- A traveller (boning rod) of fixed height shall be used by operatives to visually check formation level continuity between profile boards.
- Excavation depth shall be verified by the Engineer or his representative at regular intervals and recorded.

5. Safety Provisions

5.1 Traffic Management

- Traffic cones, barricades, and reflective delineators to be placed as per approved traffic management plan.
- Warning signs (Road Work Ahead, Speed Limit, Lane Closed, etc.) to be installed at adequate advance notice distances.
- Flagmen/traffic marshals to be deployed during working hours.
- Excavation in live carriageways to be carried out in half-width sections wherever possible.
- Temporary road surface (steel plates or cold-mix patches) to be provided over excavated sections left overnight.

5.2 Shoring and Trench Safety

- Excavations exceeding 1.5 m depth shall be provided with timbering, shoring, or sheet piling as required by site conditions and applicable safety codes (IS 3764, local regulations).
- Battering/stepping of trench sides as an alternative to shoring where space permits.
- Ladders to be provided for access/egress at maximum 15 m intervals in trenches.
- No person shall work below unsupported excavation walls.

5.3 General Site Safety

- Excavated area to be barricaded with rigid fencing/crash barriers; no open excavation to be left unfenced.
- Red warning lights/flashing beacons to be provided at night.
- Safety helmets, high-visibility vests, safety boots mandatory for all personnel.
- Watchman to be posted during non-working hours.
- Adequate drainage to prevent flooding of excavation.

6. Stacking of Excavated Material

- All excavated material (bituminous pavement, base course, subgrade soil) shall be segregated by type and stacked separately:
 - Bituminous material (milled/broken asphalt)
 - Granular base/sub-base material
 - Earthen material (subgrade soil)
- Stacking shall be done at designated stacking areas approved by the Engineer, clear of the traffic lanes, drainage paths, and structural elements.
- Lead distance (stacking/disposal distance) shall be as specified in the BOQ/contract; stacking within the specified lead is deemed included in the rate.
- Stacked material shall not obstruct pedestrian movement, adjacent property access, or natural drainage.
- Reusable material (granular base) to be stacked for re-use; unsuitable material to be disposed of at approved dumping sites.
- Bituminous material, if to be recycled, shall be stored separately and protected from contamination.

7. Disposal and Site Clearance

- On completion of excavation, the site (work zone) shall be cleared of all debris, spoil, and temporary arrangements.
- Excess excavated material beyond what is to be re-used shall be transported and disposed of at approved tips/landfills within the lead specified.
- The carriageway and footpaths adjacent to the work zone shall be swept clean and made safe for traffic.
- All site rails, formwork, and temporary supports shall be removed after their purpose is served.

8. Measurements

Parameter	Basis
Unit of measurement	Cubic metres (m ³)
Length	Centre-line length of excavation
Width	Average width at specified cross-section
Depth	Difference between existing surface level and formation level
Lift	As specified (typically in stages of 1.5 m or as directed)

- Measurement is taken for the authorised excavation only; no payment for over-excavation.
- Deductions are made for embedded structures, pipes, etc., already in place.

9. Rate Includes

The quoted/contract rate for this item shall be deemed to include:

- Saw-cutting of bituminous surface
- Excavation by machine or hand for all lifts
- Setting out and maintaining site rails throughout
- All safety provisions (barricading, signs, flagmen, shoring)
- Stacking of excavated material within specified lead
- Disposal of surplus/rejected material within specified lead
- Trimming and dressing of formation to required gradient and section

- Clearance and cleaning of site on completion
- All tools, plant, equipment, labour, and incidentals

10. Relevant Standards and References

- IRC: SP 20 — Rural Roads Manual
- IRC: 58 — Guidelines for design of rigid pavements
- IS 3764 — Safety code for excavation work
- MOSRT&H Specifications for Road and Bridge Works (latest edition)
- Local municipal/PWD schedule of rates and specifications

ITEM NO.9

Labour charges for repairing of leakage in PVC pipeline of Following diameter at different places including necessary excavation manually or by mechanized excavation removing of mud, cleaning of pipe and leakage portion cutting the the pipeline & removing piece of pipe from trench with inclusive of mechanical deviced JCB, Hydra/crain if necessary & labours required with providing material such Coupler, Solution etc.comp.(incl. all material but Exclu.cost of pipe)

1. Excavation and Site Preparation

- **Manual Excavation:**
 - Excavation depth and width depend on the diameter of the pipeline and the location of the leak.
 - Labor costs for manually excavating the trench around the pipeline to expose the leakage.
 - Material Removal: Includes removal of mud, soil, debris, and any other obstructions.
- **Mechanized Excavation (Using JCB or Hydra/Crane):**
 - Mobilization of machinery (JCB, Hydra/Crane) if required for larger areas or deeper trenches.
 - Costs associated with operating the machinery (typically hourly rates for JCB and Hydra/Crane).
 - Trench preparation and site access setup.
 - Labor for Setting up Equipment: Labor required for preparing and assisting the machinery to ensure proper trench excavation.

2. Cutting and Removing the Damaged Pipe

- **Cutting the Damaged Section:**
 - Labor to cut the leaking portion of the PVC pipe using appropriate cutting tools (hacksaws, pipe cutters, etc.).
 - If required, mechanized tools can also be used for quicker results.
- **Removal of the Damaged Pipe:**
 - Removal of the cut-out section of the damaged pipe from the trench.
 - Transportation or disposal of the old, damaged pipe to the appropriate disposal area.

3. Repair and Reconnection

- **Cleaning the Pipe and Trench:**

- Cleaning the pipeline ends and the trench area of dirt, debris, or foreign material to ensure a tight seal and smooth pipe fitting.
 - Providing and Installing Couplers:
 - Provision of necessary couplers or connectors (specification of size and type depending on pipeline diameter).
 - Labor to install the coupler and ensure the proper fitting of the new section of pipe.
 - Providing and Applying Solvent/Cement Solution:
 - Provision of solvent or adhesive solution for proper sealing between the new pipe section and existing pipeline. This will include the cost of the cement or solution.
 - Labor for applying the cement solution to the pipe and coupler ends.
 - Installing Replacement Pipe Section:
 - Labor for placing and joining the new section of the PVC pipe (cost of pipe excluded as per your requirement).
 - Ensuring the pipe is aligned, connected securely, and properly fitted.
-

4. Backfilling and Site Restoration

- Backfilling the Trench:
 - Labor for backfilling the trench after completing the pipe repair work. This includes filling the trench with clean soil and compacting it.
 - If required: Additional labor for compacting the backfill to prevent future settling.
 - Restoration of Surface:
 - Restoration of any disturbed surfaces, including leveling of soil, pavement, or any landscape areas that were affected during the excavation process.
-

5. Safety and Miscellaneous

- Safety Measures:
 - Ensuring all necessary safety measures are in place, including trench shoring, protective equipment for workers, and compliance with local regulations.
 - Other Materials and Miscellaneous Items:
 - Any other small materials required for the job, such as pipe straps, gaskets, gloves, or temporary supports.
-

Labor Cost Estimation:

- Hourly or Daily Labor Charges:
 - Skilled labor (welders, pipe fitters, etc.) and unskilled labor for trenching, cleaning, and general assistance.
 - Hourly or daily rates depending on local labor rates, number of workers required, and project complexity.

Total Cost Breakdown (Excluding Pipe Cost):

1. Manual Excavation Costs:
 - Based on trench size and depth.
 - Labor rate per hour/day for excavation.
2. Mechanized Excavation Costs (JCB/Hydra):
 - Hourly charges for operating machinery.
 - Mobilization charges (if applicable).
3. Labor for Cutting, Removing, and Installing Pipe:
 - Labor cost for cutting and removing damaged pipe sections.
 - Cost of couplers, cement, and other installation materials.
4. Backfilling and Site Restoration:
 - Labor cost for backfilling and compacting the trench.
 - Surface restoration labor.

Notes:

- Pipeline Diameter: Costs can vary significantly with the diameter of the PVC pipe. Larger diameter pipes may require more labor or specialized tools and materials.
- Location: Rates may vary by region, availability of machinery, and the accessibility of the site.
- Duration: The overall labor cost will depend on how long the repair work takes, including excavation, cutting, installation, and backfilling.

If you have more specific dimensions (pipe diameter, trench size, etc.) or location details, I can refine this estimate for you further.

ITEM NO.10

Manufacture, Supply and Delivery of Cast iron Detachable joints (Short&Long) complete with joint flanges duly drilled, synthetic rubber sealing rings manufactured from styren butadine rubber (SBR) and other required accessories such as nut, bolt etc. conforming to IS specification 8794-1988 or its latest revision if any suitable for use with AC pressure pipes. Delivery of joints including its accessories including loading, unloading, carting, stacking, insurance, all taxes, octroi etc. complete.

1

Material and Standards

Ensure cast iron detachable joints conform to IS 8794-1988 or its latest revision.

- Cast iron grade suitable for pressure applications
- Synthetic rubber sealing rings made from **Styrene Butadiene Rubber (SBR)**
- Flanges drilled as per IS standard dimensions

2

Joint Types

Provide both short and long detachable joints with proper flanges.

- Short detachable joints for compact installations
- Long detachable joints for extended coupling requirements
- All joints must be pressure-tight and corrosion-resistant

3

Accessories Supply

Deliver complete set of accessories with each joint.

- Nut and bolt sets of appropriate grade
- Synthetic rubber sealing rings (SBR)
- Washers and protective coatings if required

4

Manufacturing Requirements

Follow strict quality control during manufacturing.

- Precision machining of flanges and drilling
- Uniform thickness and smooth finish
- Rubber rings tested for elasticity and sealing capacity

5

Delivery and Logistics

Include all handling and statutory requirements in delivery.

- Loading, unloading, carting, stacking at site
- Insurance coverage during transit
- Inclusive of all taxes, duties, and octroi

6

Suitability for AC Pressure Pipes

Ensure compatibility with asbestos cement pressure pipes.

- Joints must withstand operating pressure
- Rubber rings must provide leak-proof sealing
- Flanges aligned for easy installation