TENDER S.U.R.E

SPECIFICATIONS for URBAN ROADS EXECUTION

VOLUME II

TYPICAL PROCUREMENT CONTRACT

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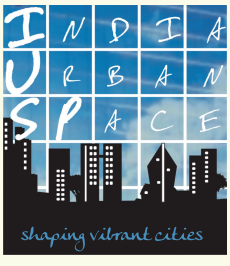

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TENDER SURE

TYPICAL PROCUREMENT CONTRACT

VOLUME 2

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FOREWORD

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The state of the roads in our cities is a blind spot for most people engaged in discussions on the myriad challenges of our cities – transport, infrastructure, governance, traffic, parking, garbage, etc. And yet, urban roads are the most significant local public good affecting us in each of these aspects as we step out of our homes and workplaces.

They are significant not just because they connect people to places, but also because they house the rest of the network services that bring power, water, internet, into our homes and take the sewage and the rainwater out of our homes.

The ripple effect of the poor state of our roads is felt daily, in the quality of life in our cities. Given that urban roads are allocated between 15-30% of total space in a city, they form a significant portion of public space.

Why is it that we don't have good roads in our cities? The explanation is straightforward: we don't focus on getting the planning, detailing, and contracting right.

This is what Tender S.U.R.E. addresses, in two Volumes:

Tender S.U.R.E. Volume I provides urban design guidelines for all roads -existing and new.

With a clearly defined hierarchy of roads, Tender S.U.R.E. provides design specifications for multiple road widths that considers consistent travel lanes, on-street parking, bus transport requirements, footpaths with pedestrian and cyclist movement, street hawkers, landscaping. Tender S.U.R.E. also introduces much needed safety and traffic calming measures at intersections.

Tender S.U.R.E. Volume I addresses the design specifications of two other commonly ignored aspects of the road – what's buried under the road, and what's on and above the road:

Under the road: Newly laid road are inevitably and frequently cut up to add a network line, or fix a water leak. Tender S.U.R.E. includes the design of an under-the-road utility corridor for the five utilities - drains, water & sewage lines, power, gas, and ICT lines. When implemented, road cuttings will become a lore of the past.

FOREWORD

Above the road: Footpaths are re-done frequently, but rarely allow any continuous comfort for pedestrians. This is because signage, lamp-posts, trees, RMUs, transformers, garbage bins, and even two wheelers parked on them, are randomly located in the space meant for pedestrians. Tender S.U.R.E. streamlines these elements of the street furniture to provide a smooth flow for pedestrians and cyclists, while enhancing the experience of the streets with landscaping, kerb drops, allocations for street vending, paving, etc.

But no amount of good design will help unless it is implemented correctly.

Tender S.U.R.E. Volume II provides the template for the procurement and contracting of urban road works.

This revised contract changes four key aspects from the current process of contracting: requires all details from government for improved road execution quality; reduces ambiguity for the contractor in design and technical specifications; increases transparency and the ability to monitor quality; and provides for on-going repair and maintenance post execution.

The downstream benefits that Tender S.U.R.E. design and procurement standards will provide are multi-fold. It will support city administration in delivering on a most basic urban infrastructure need – a good quality road network. It will similarly support all the utility agencies on provision and maintenance of their networks. Only when we build well designed and managed roads can we move meaningfully forward on the current conversations on transport systems, traffic solutions, parking, congestion policies, pedestrian and cyclist safety, hawker policies, saving trees, etc.

For the citizen, good roads provide a dramatic and visible benefit in the quality-of-life, promoting a far healthier trend of safe walking and cycling. Once the roads get better, it can catalyse efforts on sustainability and aesthetics: streets can be maintained by local residents, garbage collection points can be set up, landscaping can be planted, public advertisements can get more sensitive to context, etc.

Tender S.U.R.E. also makes economic sense, measured in terms of a twenty-year life-cycle of a road project, it will prove to be less than half the cost of the same road executed in the current manner.

Over time Tender S.U.R.E. roads will become a way of contracting and executing all urban roads - a public good that residents can demand and expect of their municipalities.

FOREWORD

How to use Tender S.U.R.E. Volume II

There are a total of 9 chapters in this document.

Chapter 1 to Chapter 6 provide comprehensive information about the tender: submission process, forms, qualifications, financial conditions, arbitration authorities and process, insurance, advances, penalties, etc.

Chapter 7 discusses the requirements on worker safety, site availability, general obligations of the contractor and employer. In addition, this chapter in a significant deviation from current practice on urban road contracting, provides detailed specifications for all the networked utilities that are housed beneath the right of ways – power, water, sewerage, OFC, telecom, gas, and storm water drainage.

Chapter 8 provides the list of design and detail drawings that need to be provided by the employer to the contractor: existing site conditions, new plans, dimensions, sections, construction details, street furniture and elements, landscaping, pedestrian safety measures, bicycle paths, bus bays and stops, etc.

Chapter 9 is the chapter on Bill of Quantities. This lists the 67 items involved in executing the works for the road, networked utilities, and all the accompanying features of the road that create the final finished work. It provides a clean, concise and transparent template for submitting financial bids.

If executed thus, the Tender SURE road will be a safe, vibrant, aesthetic public space, a source of pride and joy to the wide mix of people that use it.

| C O N T E N T S |

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LIST OF TABLES

LIST OF ABBREVIATIONS AND ACRONYMS

2D	Two Dimensional
3D	Three Dimensional
ACAD	Auto Computer Aided Drafting
AISI	American Iron and Steel Institute
App.	Approximate / Approximately
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials International
Avg.	Average
AWSS	American Welding Society
AWWA	American Water Works Association
BC	Bituminous Concrete
BE	Bachelor of Engineering
BIS	Bureau of Indian Standards
BM	Bituminous Macadam
BoQ	Bill of Quantities
BS EN	British Standard European Norm
C	Celsius
CA	Chartered Accountant
CAD	Computer Aided Drafting
C.C.	Cement Concrete
CD	Compact Disc / Cross-Drainage
CI	Cast Iron
CM	Cement Mortar
CoC	Conditions of Contract
CPWD	Central Public Works Department
CPM	Critical Path Method
CQC	Committee on Quality Control
Cum	Cubic metre
Cum / hr	Cubic metre per hour
Dia	Diameter
DLP	Defects Liability period
EMD	Earnest Money Deposit
ENEC	European Norms Electrical Certification
ERW	Electric Resistance Welded
FE	Field Engineers / Iron
FY(s)	Financial Year(s)
GIS	Geographic Information Survey
Gm	Gram
GR FG	Grey Glass Flat
GRP	Glass Reinforced Plastic
HDPE	High Density Polyethylene
HOM	History of operational machineries
Hz	Hertz
ICD	Intended Completion Date
IFT	Invitation for Tenders
IS	Indian Standard
ISI	Indian Standard Institute
ISO	Indian Standard Organisation
ISS	Instrument Specifications Sheet
ITT	Instructions to Tenderers
KBS	Karnataka Building Specifications
Kg(s).	Kilogram(s)
KRBS	Karnataka Road & Bridge Specifications
kV	Kilo volt
LED	Light Emitting Diode
LoA	Letter of Acceptance
LoC	Letter of Credit

Lt (s)	Litre(s)
Lt / Sqm	Litre per Square metre
IUSP	India Urban Space Foundation
IWTD	Inland Water & Transport Department
mA	Million Axles
mcd	Milli candela
MDPE	Medium-density polyethylene
MEP	Mechanical Electrical Plumbing
mm	Millimetre
MoRT&H	Ministry of Road Transport & Highways
MOST	Ministry of Shipping & Transport
Mpa	Mega Pascal
MS	Mild Steel
Mtr	Metre
N	Newton
NEFT	National Electronic Fund Transfer
NHAI	National Highways Authority of India
No(s).	Number / Numbers
OD	Outside Diameter
ODMDPE	Outside Diameter Medium Density Polyethylene
OFC	Optical Fibre cable
OFC-GAS	Optical Fibre Cable Gas
OMC	Optimum Moisture Content
OSH	Occupational Safety and Health
OTC	Over the Counter
PCC	Plain Cement Concrete
PDM	Precedence Diagramming Method
PE	Professional Engineer
pH	Potential of Hydrogen
PLR	Prime Lending Rate
PN	Nominal Pressure
PoA	Power of Attorney
PU	Polyurethane
PVC	Polyvinyl Chloride
PWD	Public Works Department
QP	Qualified Person
RCC	Reinforced Cement Concrete
Rmt	Running Meter
RPM(s)	Raised Pavement Marker(s)
Rs.	Rupees
SAW	Submerged Arc Welded
SELV	Safety Extra Low Voltage
SFRC	Steel Fibre Reinforced Concrete
SP	Special Publications
Sqm	Square metre
SO	Site Officer
SO_3	Sulfur Trioxide
SWD	Storm Water Drain(s)
T	Ton
T&P	Transportation & Packaging
Tph	Ton per hour
UGD	Underground Drainage
ULB	Urban Local Body
UPVC	Ultra Poly Vinyl Chloride
V	Volts
VAT	Value Added Tax
W	Watts

#1

TYPICAL TENDER NOTIFICATION

[Invitation for Tender (IFT)] and Cover Page for Tender submission

#1

1.1 TYPICAL TENDER NOTIFICATION [INVITATION FOR TENDER (IFT)] AND COVER PAGE FOR TENDER SUBMISSION

TENDER NOTIFICATION [INVITATION FOR TENDER (IFT)

Logo

&

Name of Competent Authority issuing notification

No.: (as applicable) [Name of Competent Authority]

[Address of Competent Authority]

[Date as applicable]

INVITATION FOR TENDER (IFT)

(Tender Notification)

[Note: (if applicable) (eg. ref. to e-Procurement portal)]

1. The [Name of Competent Authority] invites Tenders from eligible Contractors for construction of Works detailed in **Table 1.1** below. The Tenderers may submit Tenders for Works given in **Table 1.1** below at / through [Office address (as applicable or web address of e-Procurement portal (if applicable)]. Tenderers are advised to note the minimum qualification criteria specified in **sub-clause 2.1.3** of the **Instructions to Tenderers (ITT) [SECTION 2],** which specifies the qualifying criteria for award of Contract as per the **Standard Bidding Document**. The **Standard Bidding Document** is available with / at [Office address (as applicable) and / or web address of e-Procurement portal (if applicable)].

2. All Tender Documents may be obtained from [Office address (as applicable)] or downloaded from [Web address of the e-Procurement portal (if applicable)] of the Government of [Name of State / Union Territory / National Capital Territory (as applicable)] from [Date (as applicable)].

3. Tenders must be submitted along with the **Earnest Money Deposit (EMD)** as specified – in **Table 1.1** below – for the Works. The EMD will have to be in any one of the forms as specified in the Tender Document and shall have to be valid for days beyond the validity of the Tender.

4. Tenders must be submitted to [Name of Competent Authority] at [Office address (as applicable)] or [online (if applicable) with ref. to e-Procurement portal and web address (if applicable)] on or before [Time (as applicable)] on [Date (as applicable)]. The opening of Tenders will be as per the guidelines mentioned in / on [Ref. to applicable part of Tender Document with appropriate reference to it being available online (if applicable)].

5. Other details can be seen in the Tender Document.

Table 1.1: Details of Works

Sl. No.	Name of the Work(s)	App. amount put to Tender [` in lakh(s)]	EMD [` in lakh(s)]	Cost of Tender Document (Non-refundable) inclusive of Value Added Tax (VAT) and / or other applicable tax(es)	Period of Completion
1	Development / Redevelopment / Upgrading of [No. of road(s) (as applicable)] in [location(s) (as applicable)] in [Name of city / town (as applicable)] as per Tender S.U.R.E. standards. Name(s) of road(s): Road 1_____ Road 2. _____ Road 3. _____ Road N. _____	(as applicable)	(as applicable)	[Ref. to the part of the Tender Document with appropriate reference to it being available online (if applicable)]	(as applicable)

Note:

1. A Pre-Bid meeting will be held on [Date (as applicable)] at [Time (as applicable)] in the office of the **[Name of Competent Authority]** to clarify any issue(s) and to answer questions on any matter that may be raised at that stage as stated in **Sub-clause 2.2.2** of the **ITT [SECTION 2]**.

2. Technical Bids will be opened in the office of the **[Name of Competent Authority]** or online (if applicable) with a mention of the web address on [Date (as applicable)] at [Time (as applicable)].

3. Aspiring Bidders / Contractors who have not registered with [the e-Procurement portal (if applicable)] should register before participating through the [Website address (as applicable)].

4. Before submission of online Bids, the Bidders must ensure that scanned copies of all the necessary documents have been attached along with the Bid.

5. All the required information required for the Bids must be filled and submitted [to Office address (as applicable)] or online (if applicable) with a mention of the web address .

6. For details, registration and payment / e-payment (if applicable), contact [Office address (as applicable)] or ref. of the website (if applicable) with a mention of the web address.

7. This Tender notice can also be seen on _____the website (if applicable) of the **[Name of Municipal Corporation / Municipality / City Council / Notified Area (as applicable)].**

Copy submitted to:

Sd/-

1.

[Name of Competent Authority]

2.

3.

4. Notice Board.

1.2 COVER PAGE
FOR TENDER SUBMISSION

[Headline (as applicable)]

[TENDER TYPE(as applicable)]

INVITATION TO APPLY FOR TENDER FOR
[DEVELOPMENT / REDEVELOPMENT / UPGRADING]
OF EXISTING URBAN ROADS

Office of the [Name of Competent Authority]

Tender for the Work of

UPGRADATION OF [No. of roads (as applicable)]

ROADS IN [Place – city / town – (as applicable)]

AS PER

TENDER S.U.R.E. STANDARDS

TENDER REFERENCE: (as applicable)

DATED: (as applicable)

PERIOD OF SALE OF TENDER DOCUMENT: (as applicable-with ref. to e-Procurement portal-if applicable)

LAST DATE FOR SALE OF TENDER DOCUMENT: (as applicable-with ref. to e-Procurement portal-if applicable)

LAST DATE AND TIME FOR RECEIPT OF TENDERS: (as applicable-with ref. to e-Procurement portal-if applicable)

TIME AND DATE OF OPENING OF TENDERS: To be intimated only to Tenderers whose Tenders qualify.

PLACE OF OPENING OF TENDERS:
ADDRESS FOR COMMUNICATION: } (as applicable)

TENDER DOCUMENT ISSUED TO:

#2

Typical Instructions to Tenderers ITT]

#2

2.1 GENERAL

2.1.1 SCOPE OF TENDER

2.1.1.1 The [Name of Competent Authority], [Name of Municipal Corporation / Municipality / City Council / Notified Area (as applicable)], [Name of city / town (as applicable)] [referred to as "Employer" in this document] invites Tenders, from eligible Tenderers, for the construction of works (as defined in this document and referred to as "Works") detailed in the **Table 2.1** of the **IFT [SECTION 1]**. The Tenderers may submit Tenders for any or all of the Works detailed in **Table 2.1** of the **IFT [SECTION 1]** and would have to follow the "Two-Cover-Tender-Procedure".

2.1.2 ELIGIBLE TENDERERS

2.1.2.1 Tenderers shall **NOT** be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of [Name of State / Union Territory / National Capital Territory (as applicable)].

2.1.2.2 Tenderer could be any individual, firm or agency – registered with [Municipal Corporation / Municipality / City Council / Notified Area / (State / City) Development Authority (as applicable)], State Public Works Department (PWD), National Highways Authority of India (NHAI), Central Public Works Department (CPWD) or other State / Central agencies – with qualifications set forth in **Sub-clause 2.1.3** of this **ITT**.

2.1.2.3 Tenders from joint ventures [shall / shall NOT (as applicable)] be acceptable.

2.1.3 QUALIFICATION OF THE TENDERER

2.1.3.1 All Tenderers shall provide the requested information accurately and as required and set out in sufficient detail – in this document – **Qualification Information [SECTION 3].**

2.1.3.2 To qualify for being awarded this Contract, the Tenderer shall have to demonstrate that he has, during the last [__ (as applicable)] Financial Years [FY(s)]:

a) achieved – in [__ (as applicable)] FYs – a minimum financial turnover (in all classes of Civil Engineering Works only) of `_____ (as applicable) lakh(s);

b) satisfactorily completed – as the prime Contractor – at least [__[No(s).]__(as applicable)] similar Work(s) such as Road Works for National Highway / State Highway / Airports, valued at not less than ____% (as applicable) of the total cost of the Work or `_____ (as applicable) lakhs.

For electrical Works, the Tenderer shall have to possess a valid electrical license and must have executed similar electrical Works (for roads).

For water supply & sewerage Works, the Tenderer shall have executed similar Works; and

c) executed – in, at least, any [____ (as applicable)] year(s) – [one / some / all (as applicable)] the following minimum quantities of Work(s) such as:

i. Earth Work: - ___(as applicable) Cum;
ii. DBM & BC: - ___(as applicable) Cum;
iii. Minimum footpath Work of ___(as applicable) Sqm executed in the previous __ (as applicable) months that may include surfacing of tiles / cobble stones / cement concrete pavers;
iv. RCC NP3 Pipe Work - ___(as applicable) Rmt;
v. MS Water Pipe - ___(as applicable) Rmt; and

vi. NP_3 Sewer Pipe - ___(as applicable) Rmt

2.1.3.3 Each Tenderer shall have to further demonstrate:

a) availability of – by owning – at least ____% (as applicable) of the required / specified key and critical equipment for this Work and the remaining ____% (as applicable) can be deployed on lease / hire basis for all Works, provided the relevant documents (Commitments, Agreements etc. for availability of the equipment for this Work) are furnished {Ref.: **Table 3.5** in **Qualification Information [SECTION 3]**}; and

b) that the Tenderer has liquid assets and / or availability of credit facilities of not less than `_____ (as applicable) lakh(s) [Credit lines / Letter of Credit (LoC) / Certificates from banks] for meeting the fund requirement etc.

2.1.3.4 Each Tenderer shall:

a) be registered with [Municipal Corporation / Municipality / City Council / Notified Area / (State / City) Development Authority (as applicable)], State PWD, NHAI, CPWD or other State / Central agencies, as required by applicable law(s) to perform the Tenderer's obligations under this Contract;

b) conduct a reasonable background check of the personnel employed by him to execute the Works; and

c) ensure that the personnel employed by him for the Works have the requisite technical, financial and managerial qualifications as well as the necessary professional licenses.

2.1.3.5 To qualify for a package of Contracts made up of more than [__[No(s).]__ (as applicable)] item(s) of the Works - set out in the **Table 1.1** of the **IFT [SECTION 1]**, the Tenderer must also demonstrate that he has the experience and the resources to meet the aggregate of the qualifying criteria or have a Memorandum of Understanding (MoU) with the original manufacturers who have the requisite qualification with regard to the individual Contracts.

2.1.3.6 Experience and resources of the Sub-Contractors of the Tenderer shall **NOT** be taken into account in determining the Tenderer's compliance with the qualifying criteria - except for other allied technical Work such as electrical Works and plumbing Works. In all such cases, the Sub-contractors shall have to comply with **Sub-clauses 2.1.3.2 (b)** and **2.1.3.3** of this **ITT**.

Only those Tenderers, who meet the minimum qualifying criteria specified above, will qualify – if the available Tender capacity is more than the total Tender value. The available Tender capacity will be calculated as mentioned below:

Assessed available Tender capacity = (A * N * 1.5 - B)

Where,

A is the maximum value of Works executed in any [____(as applicable)] year(s) during the last [____ (as applicable)] year(s) taking into account the Works completed as well as those in progress {updated to FY [_____ (as applicable)]price level}.

N is the Number (No.) of years prescribed for completion of the Works for which Tenders are invited.

B is the Value - at FY [_____ (as applicable)] price level – of existing Commitment(s) and ongoing Works to be completed during the next [____(as applicable)] months (period of completion of the Works for which Tenders are invited - excluding the monsoon period).

Note: The statement(s) showing the value of existing Commitment(s) and ongoing Work(s) as well as the stipulated period of completion remaining for each of the Work(s) listed should be countersigned by the respective Employer-in-Charge – not below the rank of an Executive Engineer or its equivalent.

2.1.3.8 Tenderers shall be immediately disqualified if they are found to have any or all of the following:

a) made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements;

b) a record of poor performance such as, but not limited to, abandoning the Works, not properly completing the Contract, inordinate delays in completion;

c) litigation history;

d) financial failures; and

e) participated in the previous Tender for the same Work and had quoted unreasonably high Tender Prices – for which the Tenderer could not furnish rational justification.

2.1.4 [__No(s).___(as applicable)] TENDER PER TENDERER

2.1.4.1 Each Tenderer shall submit only [__No(s).___(as applicable)] Tender(s) for [__No(s).___(as applicable)] package(s). If a Tenderer submits or participates in more than [__No(s).___(as applicable)] Tender(s) (other than as a Sub-Contractor or in cases of alternatives that have been permitted by the Employer), it will cause disqualification of all such proposals submitted / participated in by that Tenderer.

2.1.5 COST OF TENDERING

2.1.5.1 A Tenderer shall bear all the costs associated with the preparation and submission of the Tender. The Employer will, in no case, and under no circumstance, be responsible and / or liable for the(se) cost(s).

2.1.6 SITE VISIT

2.1.6.1 The Tenderer or a representative of the Tenderer - at the expense; risk; and responsibility of the Tenderer - shall physically visit the site to examine the site of Works and its surroundings and obtain all necessary information for preparing the Tender and / or for entering into a Contract for construction of the Works.

2.2 TENDER DOCUMENT

2.2.1 CONTENTS OF TENDER DOCUMENT

2.2.1.1 The Tender Document shall have all the Sub-sub-sections mentioned under this Sub-section, of this document – i.e. 'Contents of Tender Document'.

2.2.2 CLARIFICATION OF TENDER DOCUMENT

2.2.2.1 A prospective Tenderer requiring any clarification with respect to the Tender Document may notify the Employer in writing or by cable (hereinafter "Cable" includes telex or facsimile) at the Employer's address / Cable no. indicated in this ITT. The Employer will respond to any request for clarification that he receives at least [____ (as applicable)] days prior to the

deadline for submission of Tenders. Copies of the Employer's response will be sent to all purchasers of the Tender Document and shall include a description of the enquiry without identifying its source.

2.2.3 PRE-TENDER MEETING

2.2.3.1 The Tenderer or his authorised representative is invited to attend a pre-Tender meeting that will take place at the office of the Employer at a date and time mentioned in [_____ (as applicable) including the web address (if applicable)].

2.2.3.2 The purpose of this meeting will be to clarify any issue(s) and / or to answer any question(s) on any matter that may be raised at that stage.

2.2.3.3 The Tenderer is requested to submit any question(s) in writing or by written electronic communication so as to reach the Employer at least [__ (as applicable)] day(s) / week(s) before the meeting.

2.2.3.4 Minutes of this meeting, including the text of the question(s) raised (without identifying the source of enquiry) and the response(s) given will be transmitted without delay to all purchasers of the Tender Document. Any modification to the Tender Document listed in **Sub-clause 2.2.1** of this **ITT**, which may become necessary as a result of the pre-Tender meeting shall be made by the Employer exclusively through the issue of an addendum pursuant to **Sub-clause 2.2.4** of this **ITT** and **NOT** through the minutes of the pre-Tender meeting.

2.2.3.5 Non-attendance at the pre-Tender meeting will **NOT** be a cause for disqualification of a Tenderer.

2.2.4 AMENDMENT OF TENDER DOCUMENT

2.2.4.1 Before the deadline for submission of Tenders, the Employer may modify the Tender Document by issuing addendum / addenda and then notifying the same to all purchasers of the Tender Document.

2.2.4.2 Any addendum, so issued, shall be part of the Tender Document and shall be posted [_____ (as applicable) including the web address (if applicable)] that Tenderer should obtain (/ download as applicable).

2.2.4.3 To give prospective Tenderers reasonable time in which to take an addendum into account in preparing their Tenders, the Employer shall extend – as necessary – the deadline for the submission of the Tenders in accordance with **Sub-clause 2.4.2** of this **ITT**.

2.3 PREPARATION OF TENDERS

2.3.1 DOCUMENTS COMPRISING TENDER

2.3.1.1 The Tender submitted by the Tenderer shall be in two covers / folders. It shall have to contain the following:

a) First Cover / Folder [Hand-delivered and / or submitted online (as applicable)]
i. EMD [Paid online as stipulated or by other permissible means (as applicable)];
ii. **Qualification Information [SECTION 3]** as per the formats specified;
iii. Tender transaction fee [Paid online as stipulated or by other permissible means (as applicable)];
iv. General eligibility criteria; and
v. Document(s) / evidence required from the Tenderer.

b) Second Cover / Folder: [Hand-delivered and / or submitted online (as applicable)]

i) The Tender [in the format indicated in [**SECTION 4**](I)}

ii) Priced Bill of Quantities (BoQ) {as per the format given in [**SECTION 9**]} [Hand-delivered and / or submitted online (as applicable)] ; and

iii) Any other material required to be submitted by the Tenderer in accordance with the instructions. The documents / formats listed under [**SECTIONS 3, 4(I), 6** and **9**] shall be filled in without exception.

2.3.1.2 Tenderers submitting Tenders together with other Contracts {as stated in the **IFT** [**SECTION 1**]} so as to form a package will indicate accordingly in the Tender and also state if any discounts have been offered in the case of being awarded more than one Contract.

2.3.2 TENDER PRICES

2.3.2.1 The Contract shall be for the whole Works as described in **Sub-clause 2.1.1** of this **ITT**, based on the priced BoQ submitted by the Tenderer.

2.3.2.2 The Tenderer shall fill in the rates and prices and the line item total (both in figures and words) for all the items of the Works described in the BoQ along with total Tender Price (both in figures and words). Items for which the rate and / or the price is not entered by the Tenderer will **NOT** be paid for by the Employer – when executed and shall be deemed covered by the other rates and prices in the BoQ. Corrections, if any, shall be made [____online (if applicable) or otherwise as stipulated_____] only before the submission of the Tender.

2.3.2.3 All duties, taxes, and other levies payable by the Contractor under the Contract or for any other cause shall be included in the rates, prices and total Tender Price submitted by the Tenderer.

2.3.2.4 The rates and prices quoted by the Tenderer shall be subject to adjustment during the performance of the Contract in accordance with the provisions of **Sub-clause 5.4.8** of the **Conditions of Contract (CoC)** [**SECTION 5**].

2.3.2.5 The price submitted by the Tenderer shall include the cost of maintenance of the road surface and all assets including the landscaping for a period of [__ (as applicable)] years.

2.3.3 TENDER VALIDITY

2.3.3.1 Tenders shall remain valid for a period not less than [__ (as applicable)] days after the deadline date for Tender submission specified in **Sub-clause 2.4.2** of this **ITT**. Any Tender valid for a shorter period shall be rejected by the Employer as non-responsive.

2.3.3.2 In exceptional circumstances, prior to the expiry of the original time limit, the Employer may request that the Tenderers may extend the period of validity for a specified additional period. The request and the Tenderer's response shall be in writing or by a written electronic communication. A Tenderer may refuse the request without forfeiting his EMD. A Tenderer agreeing to the request will **NOT** be required or permitted to modify his Tender, but will be required to extend the validity of his EMD for the period of the extension, and in compliance with **Sub-Clause 2.3.4.1** (in all respects) of this **ITT**.

2.3.4 TENDER TRANSACTION FEE AND EMD

2.3.4.1 EMD

a) The Tenderer shall furnish, as part of his Tender, EMD – for a particular Work – in the amount as mentioned in the IFT [SECTION 1]. Further, out of the total EMD amount, only `_____

(as applicable) lakh(s)[(Rupees _____ (as applicable) lakh(s) only) shall be paid [online as stipulated] using any of the following modes:

i. Credit Card;
ii. Direct Debit;
iii. National Electronic Fund Transfer (NEFT); or
iv. Over the Counter (OTC).
[or by other permissible means (as applicable)]

The remaining amount shall be in the form of a Bank Guarantee from a(ny) nationalised bank.

b) NEFT payment procedure

i. If a Tenderer chooses to make payment of EMD / Tender Processing Fee using Reserve Bank of India's NEFT system, the Tenderer will need to log into the e-Procurement System, access the Tender for which the Bid is being created and then select the NEFT option under the payment section and print the challan shown in that section. The printed challan will have the Unique Bid Reference Number, account details of Government of [Name of State / Union Territory / National Capital Territory (as applicable)] and the amount to be remitted.
ii. The Tenderer shall submit the printed challan to the bank's branch (NEFT-enabled) and request for an account–to–account transfer, wherein the money will get transferred from the Tenderer's bank account to the Government of [Name of State / Union Territory / National Capital Territory (as applicable)] bank account. The Tenderer shall ensure that the NEFT transfer instructions are executed and that the funds are wired to the Government of [Name of State / Union Territory / National Capital Territory (as applicable)] Principal Account before the last date for submission of the Tender and preferably [__ (as applicable)] hours before the last date for submission of the Bid.
iii. If the Tenderer's bank transfers / wires the money after the last date for submission of the Bid, the Tenderer's Bid will be liable for rejection. Upon executing the transfer, the Tenderer's bank will provide a reference number generated by the NEFT software as confirmation of the transfer, which has to be input by the Tenderer in the payment section of its Bid as payment confirmation before the Bid is submitted. This is a pre-requisite for submission of the Bid. The account number from which the funds were transferred shall also be input in the e-Procurement System as part of its Bid.

Note: If NEFT payment does not apply, then payment shall be made by other permissible means as applicable.

c) OTC payment procedure

i. If a Tenderer chooses to make payment of EMD / Tender Processing Fees OTC in any of the designated branches of [_____[Name of the bank (if & as applicable)] bank listed in the [_____website address if & as applicable_____], the Tenderer will need to log into e-Procurement System, access the Tender for which the Bid is being created and then select the OTC option under the payment section and print the challan shown in that section. The printed challan will have the Unique Bid Reference Number and the amount to be remitted along with the challan.
ii. The Tenderer can choose to make the payment either in the form of Cash or in the form of a Demand Draft. Cheque payments will NOT be accepted. The Tenderer is requested to specifically inform the bank's officer to input the Unique Bid Reference Number printed in the challan in the banking software.
iii. Upon successful receipt of the payment, the bank will provide a 16-digit reference number acknowledging the receipt of the payment. This 16-digit reference number has to be input by the Tenderer in the payment section of the Bid as payment confirmation before the Bid is submitted. This is a pre-requisite for submission of the Bid.

Note: If OTC payment does not apply, then payment shall be made by other permissible means as applicable.

2.3.4.2 EMD amount shall be submitted by the Tenderer taking into account of the following conditions:

a) An EMD of `_____ (as applicable) lakh(s)shall be accepted [only / optionally (if & as applicable)] in the form of Electronic Cash (and **NOT** through Demand Draft or Bank Guarantee) and will be maintained in the Government's central pooling account at _____(name of the bank specified)_____ (if & as applicable) until the Work is awarded and EMD for the balance amount shall be in the form of Bank Guarantee from any nationalised bank, valid for a period of not less than [__ (as applicable)] days after the last date for submission of the Tender specified in **Sub-clause 2.4.2** of this **ITT**.

b) Further, the original Bank Guarantee shall be submitted to the Office of the [_____Office address (as applicable)_____] by [__Date (as applicable)] by [__Time (as applicable)]; and

c) The Tenderer's Bid will be evaluated only on confirmation of receipt of the payment of EMD as indicated in **Sub-clauses 2.3.4.1** and **2.3.4.2** of this **ITT**.

2.3.4.3 A Tender not accompanied by the stipulated EMD and not secured as indicated in **Sub-clauses 2.3.4.1** and **2.3.4.2** of this **ITT** shall be rejected by the Employer as non-responsive.

2.3.4.4. EMD(s) of unsuccessful Tenderers will be returned within [____ (as applicable)] days of the end of the Tender validity period as specified in **Sub-clause 2.3.3.1**.

2.3.4.5 EMD of the successful Tenderer will be discharged only when the Tenderer has signed the Agreement and furnished the required performance security.

2.3.4.6 The EMD may be forfeited – if the Tenderer:

a) withdraws the Tender after opening of the Tender – during the period of its validity;

b) does not accept the correction of the Tender Price, pursuant to **Sub-Clause 2.5.6.1**; or

c) fails (in case of a successful Tender) within the specified time limit to:

i. sign the Agreement; or

ii. furnish the required performance security.

2.4 SUBMISSION OF TENDERS

2.4.1 SEALING AND MARKING OF TENDERS

2.4.1.1 The Tenderer shall submit the Tender Document [electronically (online) / by post on the website / at the office (if applicable) of _____] before the date and time for its submission – as published. The document for submission shall be [(as applicable) submitted / uploaded in PDF format (in case of electronic / online submission)] and submitted in the order mentioned below:

a) Content sheet with name of folder / file, no. of files / pages in each folder / file and size of the folder / file.

i. FIRST COVER / FOLDER (TECHNICAL PART)

- As per **Qualification Information** [**SECTION 3**]:
  - Qualification Information summary sheets;
  - An affidavit as per the format attached in Qualification Information [SECTION 3];
  - A brief description of Tenderer with the details of contact person for communication with Name of Municipal Corporation / Municipality / City Council / Notified Area (as applicable);
  - Attested copy of registration certificate of the Contractor;

- EMD as specified in the **Table 1.1** of **IFT** [**SECTION 1**] in this document;
- A Power of Attorney (PoA) for signing the Tender as per the format attached in the **Qualification Information** [**SECTION 3**];
- Work performed & quantity executed as per **Tables 3.1** and **3.2** of **Qualification Information** [**SECTION 3**] with supporting certificates from client for the claims mentioned in **Tables 3.1** and **3.2** of **Qualification Information** [**SECTION 3**];
- **Tables 3.1** and **3.2** of **Qualification Information** [**SECTION 3**] (duly filled) with supporting certificate from the client & calculation sheet regarding available Tender capacity;
- Availability of machinery as per Table 3.5 of Qualification Information **[SECTION 3]**;
- Experience & qualification of key persons as per **Table 3.5** of Qualification Information [**SECTION 3**];
- Financial statements for the past [__ (as applicable)] FYs, containing balance sheets, profit & loss statements on Cash-on-hand, liquid assets etc. duly endorsed by a Chartered Accountant (CA);
- Line of Credit and details of the Tenderer's bank with reference – as per the format attached in **Qualification Information** [**SECTION 3**];
- Experience of Sub-Contractors with supporting document from client as per **Table 3.7** of Qualification Information [**SECTION 3**];
- Litigation history as per **Table 3.8** of Qualification Information [**SECTION 3**];
- Method adopted for construction program, bar chart, quality assurance program as per **Sub-clause 3.15** of Qualification Information [**SECTION 3**]; and
- An undertaking that the Tender would be valid for [___ (as applicable)] days as per **Sub-clause 3.15** of **Qualification Information** [**SECTION 3**].

ii. SECOND COVER / FOLDER (FINANCIAL PART)

- Form of Tender as per [**SECTION 4**](I) of the Tender Document;
- Priced BoQ; and
- Any other material required to be completed and submitted by the Tenderers in accordance with this **ITT**.

2.4.2 DEADLINE FOR SUBMISSION OF TENDERS

2.4.2.1 Tenders must be submitted [Hand-delivered to and / or submitted online (if applicable) including the website address (if applicable)] to the Employer before the notified date and time.

2.4.2.2 The Employer may extend the deadline for submission of Tenders by issuing an amendment in accordance with **Sub-clause 2.2.4,** in which case all the rights and obligations of the Employer and the Tenderers previously subject to the original deadline will, then, be subject to the new deadline.

2.4.3 LATE TENDERS

2.4.3.1 Tenders shall NOT be accepted after the Tender submission date and time [(as applicable) either in the office of the Employer and / or online (- as the icon or the task in the e-procurement portal will NOT be available)].

2.4.4 MODIFICATION AND WITHDRAWAL OF TENDERS

2.4.4.1 The Tenderer can modify or correct [and (if applicable) upload] any relevant document on to the portal till the Tender submission date and time. (If applicable,) the Tenderer also has the option of withdrawing / cancelling the Tender [or through the e-procurement portal by digitally signing or through due communication (as stipulated)] before the Tender submission date and time.

2.5 TENDER OPENING AND EVALUATION

2.5.1 OPENING OF FIRST COVER / FOLDER (TECHNICAL PART) OF ALL TENDERS AND EVALUATION TO DETERMINE QUALIFIED TENDERERS

2.5.1.1 The Employer will open [online (if applicable) or otherwise as stipulated (and as applicable)] the first covers of all the Tenders [hand-delivered and / or received through the e-procurement portal (as applicable)], in the presence of the Tenderers or their authorised representatives, who choose to attend on the date and the place specified for the opening of the Tenders [(as applicable) on the e-procurement portal or in other official communication]. In the event of the specified date of Tender opening being declared a holiday for the Employer, the Tenders will be opened at the appointed time and location on the next working day.

2.5.1.2 The Tenderers' names, the presence or absence of EMD (amount, format and validity), the submission of qualification information and such other information as the Employer may consider appropriate will be announced by the Employer at the opening.

2.5.1.3 The Employer shall prepare minutes of the Tender opening meeting including the information disclosed to those present in accordance with **Sub-clause 2.5.1.2** of this **ITT**.

2.1.5.4 The Employer will evaluate and determine whether each Tender:

a) meets the eligibility criteria defined in **Sub-clause 2.1.2** of this **ITT**;

b) is accompanied by the required EMD as per stipulations in this **ITT**'s relevant **Sub-clauses**; and

c) meets the minimum qualification criteria stipulated in this **ITT**'s **Sub-clause 2.1.3**. The Employer will draw up a list of qualified Tenderers.

2.5.2 OPENING OF SECOND COVER / FOLDER (FINANCIAL PART) OF QUALIFIED TENDERERS AND EVALUATION

2.5.2.1 The Employer will inform all the qualified Tenderers the time, date and venue fixed for the opening of the second cover containing the priced Tenders. The Employer will [online (if applicable) or otherwise as stipulated (and as applicable)] the second covers of qualified Tenderers at the appointed time and date [(as mentioned on the e-procurement portal or in other official communication] in the presence of the Tenderers or their authorised representatives who choose to attend. In the event of the specified date of second cover opening being declared a holiday for the Employer, the second covers will be opened at the appointed time and location on the next working day.

2.5.2.2 The Employer shall prepare minutes of the second cover Tender opening.

2.5.3 PROCESS TO BE CONFIDENTIAL

Information relating to the examination, clarification, evaluation and comparison of Tenders and recommendations for the award of a Contract shall **NOT** be disclosed to the Tenderers or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced. Any effort by a Tenderer to influence the Employer's processing of Tenders or award decisions may – at the sole discretion of the Employer – result in the rejection of his Tender and / or the Employer may take such other actions as deemed fit and necessary by the Employer.

2.5.4 CLARIFICATION OF TENDERS

2.5.4.1 To assist in the examination, evaluation and comparison of Tenders, the Employer may – at his discretion – ask any Tenderer for clarification of his Tender, including breakdown of unit rates. The request for clarification and the response shall be in writing or by cable. However, no change in the price or substance of the Tender shall be sought, offered or permitted.

2.5.4.1 Subject to **Sub-clause 2.5.4.1,** no Tenderer shall contact the Employer on any matter relating to any Tender from the time of the Tender opening to the time the Contract is awarded. If the Tenderer wishes to bring additional information to the notice of the Employer, he should do so in writing through [the e-procurement portal (if applicable) or otherwise as stipulated (and as applicable)].

2.5.5 EXAMINATION OF TENDERS AND DETERMINATION OF RESPONSIVENESS

2.5.4.1 Prior to the detailed evaluation of the Tenders, the Employer will determine whether each Tender:

a) has been digitally signed; and

b) is substantially responsive to the requirements in the Tender Document.

2.5.5.2 A substantially responsive Tender is one that conforms to all the terms, conditions and Specifications of the Tender Document, without material deviation or reservation. A material deviation or reservation is one:

a) which affects in any substantial way the scope, quality or performance of the Works;

b) which limits in any substantial way – inconsistent with the Tender Document – the Employer's rights or the Tenderer's obligations under the Contract; or

c) whose rectification would affect – unfairly – the competitive position of other Tenderers presenting substantially responsive Tenders.

2.5.5.3 If a Tender is not substantially responsive, it will be rejected by the Employer and the reason(s) for such rejection will be duly recorded and filed to ensure that the rejection does not reflect any discretion or bias. This will be formally communicated to the Tenderer. The Tender can **NOT**, subsequently, be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

2.5.6 CORRECTION OF ERRORS

2.5.6.1 The Tenderer may modify the Tender only before the last date for submission of the Tender [– as indicated on the e-procurement portal (if & as applicable) and / or in other relevant official communications].

2.5.7 EVALUATION AND COMPARISON OF TENDERS

2.5.7.1 The Employer will evaluate and compare only those Tenders that are determined to be substantially responsive in accordance with **Sub-clause 2.5.5**.

2.5.7.2 The Employer reserves the right to accept or reject any variation, deviation or alternative offer. Variations, deviations, alternative offers and other factors which are in excess of the requirements of the Tender Document or result otherwise in unsolicited benefits for the Employer shall **NOT** be taken into account in Tender evaluation.

2.5.7.3 The estimated effect (during the implementation of the Contract) of the price adjustment conditions under **Sub-clause 5.4.8** of the CoC [SECTION 5] will **NOT** be taken into account in Tender evaluation.

2.5.7.4 If the Tender of the successful Tenderer is seriously unbalanced in relation to the Employer's estimate of the cost of the Work to be performed under the Contract, the Employer may require the Tenderer to produce detailed price analysis for any or all items of the BoQ to demonstrate the internal consistency of those prices with the construction methods and schedule proposed.

2.5.7.5 After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in **Sub-clause 2.9.1** of this **ITT** be increased at the expense of the successful Tenderer to a level sufficient to protect the Employer against any financial loss in the event of default of the successful Tenderer under the Contract and / or effect pro rata deductions in the running bills so as to cover such amount that would be required to have the remaining Work completed – should the Tenderer fail to complete the Work due to acceptance of an unbalanced Tender .

2.6 AWARD OF CONTRACT

2.6.1 AWARD CRITERIA

2.6.1.1 Subject to **Sub-clause 2.7.1** of this **ITT**, the Employer will award the Contract to the Tenderer whose Tender has been determined to be substantially responsive to the Tender Document and who has offered the lowest evaluated Tender Price, provided that such Tenderer has been determined to be:

a) eligible in accordance with the provisions of **Sub-clause 2.1.2** of this **ITT**; and

b) qualified in accordance with the provisions of **Sub-clause 2.1.3** of this **ITT**.

2.6.2 EMPLOYER'S RIGHT TO ACCEPT ANY TENDER AND TO REJECT ANY OR ALL TENDERS

2.6.2.1 Notwithstanding **Sub-clause 2.6.1** of this **ITT**, the Employer reserves the right to cancel the Tender process and to reject all Tenders, at any time prior to the award of the Contract, without, thereby, incurring any liability toward the affected Tenderer(s), but with an adequate explanation justifying such an action.

2.6.3 NOTIFICATION OF AWARD AND SIGNING OF AGREEMENT

2.6.3.1 The Tenderer whose Tender has been accepted will be notified of the award by the Employer prior to expiration of the Tender validity period by e-mail or facsimile [or e-procurement portal – (if & as applicable)] or through letter. This letter [hereinafter and in the **CoC [SECTION 5]** called the "Letter of Acceptance" (LoA)] will state the sum that the Employer will pay the Contractor in consideration of the execution, completion and maintenance of the Works by the Contractor as prescribed under the Contract (hereinafter and in the Contract called the "Contract Price").

2.6.3.2 The notification of the award will constitute the formation of the Contract, subject only to the furnishing of security deposit in accordance with the provisions of **Sub-clause 2.9.1** of this **ITT**.

2.6.3.3 The Agreement will incorporate all Agreements between the Employer and the successful Tenderer. It will be kept ready for signature of the successful Tenderer in the office of Employer within [__ (as applicable)] days following the notification of the award along with the Letter of Acceptance. Within [__ (as applicable)] days of receipt (of this notification), the successful Tenderer is required to sign the Agreement and deliver it to the Employer.

2.6.3.4 Upon the furnishing of the Security Deposit, by the successful Tenderer, the Employer will promptly notify the other Tenderers that their Tenders have been unsuccessful.

2.6.4 SECURITY DEPOSIT

2.6.4.1 Within [__ (as applicable)] days of receipt of the Letter of Acceptance, the successful Tenderer shall deliver to the Employer a security deposit in any of the forms given below for an amount equivalent to ____% (as applicable) of the Contract Price plus additional security for unbalanced Tenders in accordance with **Sub-clause 2.5.7.5** of this **ITT** and **Sub-clause 5.4.11** of the **CoC [SECTION 5]** for the Works:

a) Cash;

b) Banker's Cheque / Demand Draft / Pay Order in favour of [Name of the Authority concerned], [Name of Municipal Corporation / Municipality / City Council / Notified Area (as applicable)], [Place – city / town – (as applicable)] payable at [Place – city / town – (as applicable)];

c) Bank Guarantee in the form given in [**SECTION 10**]; or

d) Specified small savings instruments pledged to [(as applicable)].

2.6.4.2 If the security deposit is provided by the successful Tenderer in the form of a Bank Guarantee, it shall be issued by either a nationalised / scheduled bank.

2.6.4.3 The security deposit if furnished in Cash or through a Demand Draft can, if requested, be converted to interest bearing securities at the cost of the successful Tenderer ("Contractor").

2.6.4.4 Failure on part of the successful Tenderer to comply with the requirements of **Sub-clause 2.9.1** of this **ITT** shall constitute sufficient grounds for cancellation of the award and forfeiture of the EMD.

2.6.5 ADVANCE PAYMENT

2.6.5.1 The Employer will provide an advance payment on the Contract Price as stipulated in **Sub-clause 5.4.9** of the **CoC [SECTION 5]**, subject to a maximum amount – as stated in **Contract Data [SECTION 6].**

2.6.6 CORRUPT OR FRAUDULENT PRACTICES

2.6.6.1 The Government [Name of State / Union Territory / National Capital Territory (as applicable)] requires that the Tenderers / Suppliers / Contractors observe the highest standard of ethics during the procurement and execution of such Contracts. In pursuance of this policy, the Government of [Name of State / Union Territory / National Capital Territory (as applicable)]:

a) will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the Contract in question; and

b) will declare an(y) organisation as ineligible – either indefinitely or for a stated period of time – to be awarded a Government of [Name of State / Union Territory / National Capital Territory (as applicable)] Contract if it, at any time, determines that the organisation has engaged in corrupt or fraudulent practices in competing for, or in executing, a Government of [Name of State / Union Territory / National Capital Territory (as applicable)] Contract.

2.6.6.2 Furthermore, Tenderers shall be aware of the termination provision stated in **Sub-Clause 5.5.6** of the **CoC [SECTION 5]**.

#3

Typical Qualification Information

(SUMMARY SHEET)

3.1 The information to be filled in by the Tenderer hereunder will be used for purposes of computing Tender capacity as provided for in **Sub-clause 2.1.3** of the **ITT**. This information will not be incorporated in the Contract.

a. Constitution or legal status of Tenderer [copy attached (Yes/No)]

b. Place of Registration [copy attached (Yes/No)]

_____

c. Principal place of business:

_____

d. Brief description of the Company including details of its main line(s) of business with details of the individual(s) who will serve as the point of contact / communication for [Name of Municipal Corporation / Municipality / City Council / Notified Area (as applicable)]:

e. PoA for signing the Tender [copy attached (Yes/No)]

3.2 Total value of works executed and payments received in the last last [____ (as applicable)] years(starting with the earliest):

		in lakhs
FY 1	_____	_____
FY 2	_____	_____
FY 3	_____	_____
FY 4	_____	_____
FY 5	_____	_____

(Certified copy from CA is attached(Yes/No)

3.3 Work performed (in the same organization name) on works of similar nature over during the [____ (as applicable)] years specified in 1.2 above.
(Separate sheet should be added as per the table below with supporting experience certificate from the client) [Attached (Yes/No)]

Table 3.1: Brief description of the company

Project Name	Name of the Employer*	Description of work	Contract No.	Value of Contract (Rs crore)	Date of issue of work order	Stipulated period of completion	Actual date of completion*	Remarks explaining reasons for delay & work Completed

** Attach certificate(s) from the Engineer(s)-in-Charge*

_____

_____

_____

3.4 Quantities of work executed as prime Contractor (in the same organization name) during the last [____ (as applicable)] years specified in 1.2 above: (Separate sheet should be added as per the table below with supporting experience certificate from the client) (Attached (Yes/No)

Table 3.2: Brief description of the Works

Year	Name of Work	Name of Employer	Quantity of work performed (As per Clause 3.5 b) below					Remarks (Indicate contract reference)
FY 1								
FY 2								
FY 3								
FY 4								
FY 5								

3.5 Information on works for which Tenders have been submitted and works which are yet to be completed as on the date of this Tender.

a) **Existing commitments and on-going works**: (Separate sheet should be added as per the **table 3.3** with supporting certificate from the client) [(Attached (Yes/ No)]

Table 3.3: Existing Commitments and on-going Works

Description of works	Place & State	Contract No.	Name & Address of Employer	Value of Contract (in crores)	Stipulated period of completion	Value of works* remaining to be completed (in crores)	Anticipated date of completion
1							
2							
3							

**Attach certificate(s) from the Engineer(s)-in-Charge*

b) **Works for which tenders already submitted**: (Separate sheet should be added as per the **table 3.4** with supporting certificate if any) [(Attached (Yes/No)]

Table 3.4: Works for which Tenders have been submitted

Description of works	Place & State	Name & Address of Employer	Estimated value of works (in crores)	Stipulated period of completion	Date when decision is expected	Remarks, if any
1						
2						
3						

**Attach certificate(s) from the Engineer(s)-in-Charge*

3.6 The following items of equipment are considered essential for successfully carrying out the Works. The Tenderer should furnish all the information listed below (a separate sheet should be added as per the **Table 3.5** below). [(Attached (Yes/No)]

Table 3.5: Items of essential equipment

Item of Equipment	Requirement		Availability proposals			Remarks
	No.*	Capacity	Owned / Assured ownership	Nos /Capacity	Age/ Condition)	(from whom to be purchased)
Hydraulic Excavator	2	1 Cum				
Batch Mix plant	1	100-120TPH				
Front end loader	1	1 Cum				
Transit mixer	5	4.5 Cum/Hr				
Tippers	12	5 Cum				
Concrete Mixer	1	1 Cum				
Fixed/ slip form paver with electronic sensor	1	20 Cum/Hr				
Roller – Static & vibratory	1 each	8 -10 Tonnes				
Water tanker	2	6000 Lt				
Steel shuttering						
Pneumatic roller	1 each					

** No of equipments will be finalized once the drawings are frozen.*

3.7 Reports on the financial standing of the Tenderer, such as profit and loss statements and auditor's reports for the last [____ (as applicable)] years;
(Certified copy from CA is attached (Yes/No)

3.8 Qualification and experience of the key technical and management personnel in permanent employment with the Tenderer and those that are proposed to be deployed on this contract project, if awarded.
(Separate sheet should be added as per the **table 3.6** below) (Attached (Yes/No)

Table 3.6: Qualifications and experience of key technical and management personnel in permanent employment with the Tenderer

Position	Name	Qualification	Year of Experience (General)	Years of experience in the proposed position	Nos required
Project Manager		B.E (Civil)			
Site Engineer , Civil, MEP		B.E	(in respective branches)		
Planning Engineer		B.E (Civil)			
Plant Engineer		B.E (Mech) or Dip (Mech.)	_____ / _____ / _____ respectively		
Quality controlling Engr		B.E (Mech) or Dip (Mech.)	_____ / _____ / _____ respectively		
Quantity Surveyor		B.E (Mech) or Dip (Mech.)	_____ / _____ / _____ respectively		
				TOTAL	

3.9 Name, address, and telephone, telex, and fax numbers of the Tenderers' bankers who may provide references if contacted by the Employer.

3.10 Evidence of access to financial resources to meet the qualification requirements specified in **Sub-clause 2.1.3.3 b)** of the **ITT [SECTION 2]**: Cash-in-hand, LoC etc. List them below and attach the certificate from the banker in the suggested format in **Table 3.7** given below.

3.11 Proposals for Sub-Contracting components of Works amounting to more than [____ (as applicable)]% of the Contract Price (a separate sheet should be added as per **Table 3.7 below)**.
(Separate sheet should be added as per the table below) (Attached (Yes/No)

Table 3.7: Evidence of access to financial resources to meet qualification requirements

Item of works	Value of Sub-contract	Sub-contractor (Name & Address)	Experience in similar work *

**Attach certificate(s) from the respective employer*

3.12 Information on litigations in which the Tenderer is involved:
(Separate sheet should be added as per the table below) (Attached (Yes/No)

Table 3.8: Information on litigation involving the Tenderer

Other Party / Parties	Employer	Cause of Dispute	Amount involved	Remarks showing Present Status

3.13 The proposed methodology and program of construction, backed with equipment planning and deployment and duly supported with broad calculations and quality control procedures proposed to be adopted – while justifying their capability of execution and completion of the Work (as per technical Specifications) within the stipulated period of completion (as per milestones) (separate sheet(s) should be added – as applicable).

(Separate sheets should be added)
(Attached (Yes/No)

3.14 ADDITIONAL REQUIREMENTS

3.14.1 The Tenderer should provide any additional information required to fulfil the requirements of **Sub-clause 3.1** of the **ITT [SECTION 2]** – if applicable:

3.14.1.1 An Affidavit as per the format given in **Sub-clause 3.14.3** of this **Qualification Information.**

(Attached (Yes/No)

3.14.1.2 An Undertaking as per the format given in **Sub-clause 3.14.3** of this **Qualification Information.**

(Attached (Yes/No)

BANKER'S CERTIFICATE

(Refer Clause 1.10 of qualification Information)

This is to certify that M/s._____ is a reputed company with a good financial standing. If the contract for this work, namely _____ (Name of the work) _____Tender Reference No_____ is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of _____ to meet the working capital requirements for executing the above contract

Sd/-

Name of the Bank,

Senior Bank Manger

Address:_____
_____
_____

POWER OF ATTORNEY FOR SIGNING OF APPLICATION

(Refer Clause 3.1 e of qualification Information)

Know all men by these presents, We_____
(name of the firm and address of the registered office) do hereby irrevocably constitute, nominate, appoint and authorise Mr/ Ms (name),_____ son/daughter/wife of _____ and presently residing at _____, who is presently employed with us and holding the position of _____, as our true and lawful attorney (hereinafter referred to as the "Attorney") to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our application for Qualification and submission of our tender for the _____ Project proposed or being developed by the _____ (the "Authority") including but not limited to signing and submission of all applications, tenders and other documents and writings, participate in Pre-Applications and other conferences and providing information/ responses to the Authority, representing us in all matters before the Authority, signing and execution of all contracts including the Concession Agreement and undertakings consequent to acceptance of our tender, and generally dealing with the Authority in all matters in connection with or relating to or arising out of our tender for the said Project and/ or upon award thereof to us and/or till the entering into of the Concession Agreement with the Authority.

AND we hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

IN WITNESS WHEREOF WE,_____, THE ABOVE NAMED PRINCIPAL HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS DAY OF _____2___

FOR

_____

(Signature, name, designation and address)

Witnesses:
1.

(Notarised)
2.

Accepted
(Signature)

(Name, Title and Address of the Attorney)

Notes:

The mode of execution of the PoA should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.

Wherever required, the applicant should submit for verification the extract of the charter documents and documents such as a board or shareholders' resolution / PoA in favour of the person executing this PoA for the delegation of power hereunder on behalf of the applicant.

For a PoA executed and issued overseas, the document will also have to be legalised by the Indian embassy and notarised in the jurisdiction where the PoA is being issued. However, the PoA provided by applicants from countries that have signed the Hague Legislation Convention 1961 are not required to be legalised by the Indian embassy – if it carries a conforming Appostille certificate.

AFFIDAVIT

*(Refer **Sub-clause 3.14.1.1** of* **Qualification Information***)*

1 I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.

2 The undersigned also hereby certifies that neither our firm M/s _____ have abandoned any work on National Highways in India nor any contract awarded to us for such works have been rescinded, during last last [____ (as applicable)] years prior to the date of this tender

3 The undersigned hereby authorise (s) and request(s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding my (our) competence and general reputation.

4 The undersigned understand and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Department/ Project implementing agency.

(Signed by an Authorised Officer of the Firm)

Title of Officer

Name of Firm

DATE

UNDERTAKING

(Refer **Clause 3.14.1.2** *of* **Qualification Information***)*

I, the undersigned do hereby undertake that our firm M/s_____ _____ agree to abide by this tender for a period [____ (as applicable)] for the date fixed for receiving the same and it shall be binding on us and may be accepted at any time before the expiration of that period.

(Signed by an Authorized Officer of the Firm)

Title of Officer

Name of Firm

DATE

#4

Forms of Tender, Letter of Acceptance, Notice to Proceed with Work and Agreement Form

#4

FORMS OF TENDER, LETTER OF ACCEPTANCE, NOTICE TO PROCEED WITH THE WORK, AND AGREEMENT FORM

4.1 FORM OF TENDER

Description of the Works... (Name of the work, Tender Reference No.)

_____

Tender

_____

To : _____

Address :

Dear Madam/Sir(s),

We offer to execute the Works described above in accordance with the **CoC [SECTION 5]** accompanying this Tender for the Contract Price of _____(in figures)

_____(in words).

This Tender and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest of Tenders or any Tender you receive.

The advance payment required is Rs_____ Lakhs

We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely *"Prevention of Corruption Act 1988"*.

We hereby confirm that this Tender complies with the Tender validity and EMD required by the Tender documents.

We attach herewith our current income-tax clearance certificate.

Yours faithfully,

Authorized Signature:

Name & Title of Signatory: _____

Name of Tenderer : _____

Address: _____

_____

4.2 **LETTER OF ACCEPTANCE (LOA)**

(on the Employer's letterhead)

_____ Date

To

_____ (name and address of the Contractor)

_____

_____

Dear Madam/Sir(s),

This is to notify you that your Tender dated _____ for execution of the _____ for the Contract Price of Rupees (_____ _____) (amount in words and figures), as corrected and modified in accordance with the **ITT [SECTION 2]** is, hereby, accepted by our agency.

You are hereby requested to furnish security deposit plus additional security for unbalanced Tenders in terms of **Sub-clause 2.5.7.5** of the **ITT [SECTION 2]**, in the form detailed in **Sub-clause 2.6.4.1** of the **ITT [SECTION 2]** for an amount of _____ within [_____ (as applicable)] days of the receipt of this LoA, which shall be valid up to [_____ (as applicable)] days from the date of expiry of defects liability period i.e. up to [_____ (date as applicable)] and sign the Contract, failing which action as stated in **Sub-clause 2.6.4.4** of the **ITT [SECTION 2]** will be taken.

Yours faithfully,

Authorized Signature

Name and Title of Signatory

Name of Agency

4.3 ISSUE OF NOTICE TO PROCEED WITH THE WORK

(on the Employer's letterhead)

_____ Date

To

(name and address of the Contractor)

_____

_____

_____

Dear Madam / Sir,

Pursuant to your furnishing the requisite security deposit as stipulated in **Sub-clause 2.6.4.1** of the **ITT [SECTION 2]** and signing of the Contract Agreement for the construction of _____ for the Tender price of `. (_____), you are hereby instructed to proceed with the execution of the said Works in accordance with the Contract Documents.

Yours faithfully,

Authorized Signature

Name and Title of Signatory

Name of Agency

4.4 AGREEMENT FORM

Agreement

This agreement, made on the _____day of _____20_____, between _____ (hereinafter called "the Employer") of the one part and _____[name and address of Contractor (as applicable)] _____ _____ (hereinafter called "the Contractor") of the other part (together shall be referred to hereinafter as Parties).

Whereas the Employer is desirous that the Contractor execute _____ _____ (hereinafter called "the Works") and the Employer has accepted the Tender by the Contractor for the execution and completion of such Works and the remedying of any defects therein at a contract price of Rupees _____ _____

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the **CoC [SECTION 5]** hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.

2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity with all aspects of the **CoC [SECTION 5]**.

3. The Employer, hereby, covenants to pay the Contractor in consideration of the execution and completion of the Works and remedying the defects there in, the Contract Price or such other sum as may become payable under the provisions of the **CoC [SECTION 2]** at the times and in the manner prescribed in the Contract.

4. The following documents shall be deemed to form and be read and construed as part of this Agreement viz:

i. LoA;
ii. Notice to proceed with the Works;
iii. Contractor's Tender;
iv. **Contract Data [SECTION 6]**;
v. **CoC** (including **Special CoC**) **[SECTION 5]**;
vi. Specifications;
vii. Drawings;
viii. BoQ; and
ix. Any other document listed in the **Contract Data [SECTION 2]** as forming part of the Contract.

The common seal of _____was, hereunto, affixed in the presence of:

Signed, sealed and delivered by the said _____

_____

in the presence of:

Binding signature of Employer:

Binding signature of Contractor:

#5

Typical **Conditions of Contract** (CoC)

#5

5.1 **GENERAL**
5.1.1 Definitions
5.1.2 Interpretation
5.1.3 Law Governing Contract
5.1.4 Employer's Decisions
5.1.5 Delegation
5.1.6 Communications
5.1.7 Sub-Contracting
5.1.8 Other Contractors
5.1.9 Personnel
5.1.10 Employer's and Contractor's Risks
5.1.11 Employer's Risks
5.1.12 Contractor's Risks
5.1.13 Insurance
5.1.14 Site Investigation Reports
5.1.15 Queries about Contract Data
5.1.16 Contractor to Construct Works
5.1.17 Works to be Completed by Intended Completion Date
5.1.18 Approval by Employer
5.1.19 Safety
5.1.20 Discoveries
5.1.21 Possession of Site
5.1.22 Access to Site
5.1.23 Instructions
5.1.24 Arbitration

5.2 **TIME CONTROL**
5.2.1 Program
5.2.2 Extension of Intended Completion Date
5.2.3 Delays Ordered by Employer
5.2.4 Management Meetings

5.3 **QUALITY CONTROL**
5.3.1 Identifying Defects
5.3.2 Tests
5.3.3 Correction of Defects
5.3.4 Uncorrected Defects

5.1 GENERAL

5.1.1 DEFINITIONS

5.1.1.1 Terms which are defined in the **Contract Data [SECTION 6]** have not been defined in this CoC but keep their defined meanings. Bold letters have been used to identify defined terms.

- **Bill of Quantities (BoQ)**: The priced and completed BoQ forming part of the Tender.
- **Compensation Events:** Those events defined in **Sub-clause 5.4.6** of this **CoC**.
- **Completion Date:** The date of completion of the Works – as certified by the Employer in accordance with **Sub-clause 5.5.2.1** of this **CoC**.
- **Contract:** The Contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in **Sub-clause 5.1.2.2** of this **CoC**.
- **Contract Data**: It defines the documents and other information which comprise the Contract.
- **Contractor:** A person or corporate body whose Tender to carry out the Works has been accepted by the Employer.
- **Contractor's Tender:** The completed Tender Document submitted by the Contractor to the Employer.
- **Contract Price:** The price stated in the LoA and thereafter as adjusted in accordance with the provisions of the Contract.
- **Corrupt Practice:** Any offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in the Contract execution.
- **Days:** Calendar days [**Months**: Calendar months].
- **Defect:** Any part of the Works not completed in accordance with the Specifications of the Employer set out in the Contract or such Specifications communicated to the Contractor from time-to-time.
- **Defects Liability Period (DLP):** The period named in **Contract Data [SECTION 6]** and calculated from the completion date which is [_____ (as applicable)] months for this Tender.
- **Employer:** The party who will employ the Contractor to carry out the Works.
- **Engineer:** A qualified Civil Engineer appointed by the Employer for the purposes of the Contract and named in **Contract Data [SECTION 6]** or notified by the Employer from time-to-time.
- **Engineer-in-Charge:** The representative of the Employer (from the Department of Engineering) who is of an appropriate seniority and who will be responsible for supervising and administering the Contract.
- **Equipment:** The Contractor's machinery and vehicles brought temporarily to the site to construct the Works.
- **Fraudulent Practice:** A mis-representation of facts in order to influence a procurement process or the execution of a Contract to the unjust benefit or advantage of the Contractor, and

includes collusive practice among Tenderers (prior to and / or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Employer and the public of the benefits of free and open competition.

- **Initial Contract Price:** The Contract price listed in the Employer's LoA.

- **Intended Completion Date (ICD):** The date on which it is intended that the Contractor shall complete the Works. ICD is specified in the **Contract Data [SECTION 6]**. The ICD may be revised only by the Employer by issuing an extension of time.

- **Maintenance Period:** The period named in the **Contract Data [SECTION 6]**, during which the Contractor shall maintain the Works completed by him for a period of [_____ (as applicable)] months effective from last day of the DLP.

- **Materials:** All supplies, including consumables, used by the Contractor for incorporation in the Works.

- **Operations and Maintenance Manual(s):** Document(s) containing instructions for operation and maintenance of the Works.

- **Plant:** A place where construction material is stored.

- **Program of Construction:** A sequenced scheduling of the Works under the Contract

- **Site:** The area defined as such in the **Contract Data [SECTION 6]**.

- **Specification:** The Specification of the Works included in the Contract and any modification or addition made or approved by the Employer. The Specifications include supplemental Specifications, special provisions and all written or printed Agreements and instructions pertaining to the method and manner of performing the work or to the quantities and qualities of the materials to be furnished under the Contract.

- **Start Date:** A date given in the **Contract Data [SECTION 6]**. It is the date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the site possession dates, but shall be the same as or a date after the site possession date.

- **Sub-Contractor:** A person or corporate body who has a Contract with the Contractor to carry out a part of the Work in the Contract which includes Work on the site.

- **Temporary Works:** All temporary Works of every kind required in or about the execution, completion or maintenance of he Works and includes all temporary constructions such as scaffolding, ladders, timbering, site offices, cement and other platforms and bins for stacking building materials, gantries, temporary tracks and roads, temporary culverts and mixing platforms.

- **Variation:** An instruction given by the Employer which varies the Works.

- **Works:** Documents prepared by the Employer and are what the Contract requires the Contractor to construct, install and turn over to the Employer – as defined in the Contract Data. The Works shall contain name of the Work, brief summary, estimated cost, locality and precise extents of the site.

5.1.2 INTERPRETATION

5.1.2.1 In interpreting these **CoC**, singular also means plural, male also means female or neuter and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Employer will provide instructions clarifying queries about the Conditions of Contract.

5.1.2.2 The following documents forming the Contract shall be interpreted in toto:

a) Agreement;

b) LoA, Notice to proceed with the Works;

c) Contractor's Tender;

d) **Contract Data [SECTION 6]**;

e) (This) **Conditions of Contract**;

f) **Specifications** [including Annexure(s)] **[SECTION 6]**;

g) **Tender Drawings [SECTION 7]**;

h) **BoQ [SECTION 8]**; and

i) Any other document listed in the **Contract Data [SECTION 6]** as forming part of the Contract.

5.1.3 LAW GOVERNING CONTRACT

5.1.3.1 The law governing the Contract is / are the law(s) of India read along with the laws of the State of [Name of State / Union Territory / National Capital Territory (as applicable)].

5.1.4 EMPLOYER'S DECISIONS

5.1.4.1 Except where otherwise specifically stated, the Employer will decide contractual matters between the Employer and the Contractor after consulting with the Contractor.

5.1.5 DELEGATION

5.1.5.1 The Employer may delegate any of its duties and responsibilities to agencies to perform specific tasks with respect to the Works, after notifying the Contractor and may cancel any such delegation after notifying the Contractor.

5.1.6 COMMUNICATIONS

5.1.6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered.

5.1.7 SUBCONTRACTING

5.1.7.1 Sub-Contracting / partners may be considered for specialised Works related to water & sewer. Sub-Contractors / partners identified for these specialised Works must be a registered Contractor with the specific Government Utility Department or agency, and must have carried out Works of similar nature in the previous [_____ (as applicable)] months.

5.1.8 OTHER CONTRACTORS

5.1.8.1 The Contractor shall cooperate and share the site with other Contractors, Public Authorities, Utilities and the Employer.

5.1.9 PERSONNEL

5.1.9.1 The Contractor shall employ such technical personnel (of number and qualifications) as set out in the **Contract Data [SECTION 6]**, subject to conformity with the qualification requirements set out in **Sub-clause 2.1.3.3** of the **ITT [SECTION 2]**. The technical staff so employed shall be available at the site as may be stipulated by the Employer.

5.1.9.2 If the Employer asks the Contractor to remove a person who is a member of the Contractor's staff or his workforce stating the reasons, the Contractor shall ensure that the person leaves the site within [_____ (as applicable)] days and has no further connection with the Work.

5.1.10 EMPLOYER'S AND CONTRACTOR'S RISKS

5.1 The Employer carries the risks, which this Contract states are Employer's risks and the Contractor carries the risks, which this Contract states are Contractor's risks.

5.1.11 EMPLOYER'S RISKS

5.1.11.1 The Employer is responsible for the following risks:

a) Rebellion, riot, commotion or disorder unless solely restricted to employees of the Contractor or his Sub-Contractors arising from the conduct of the Works; or

b) A cause due solely to the design of the Works, other than the Contractor's design; or

c) Any operation of the forces of nature (in so far as it occurs on the site) which an experienced Contractor:

i. could not have reasonably foreseen; or

ii. could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures:

- prevent loss or damage to physical property from occurring by taking appropriate measures; or
- insure against such loss or damage.

5.1.12 CONTRACTOR'S RISKS

5.1.12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract, other than the excepted risks set forth above, are the responsibility of the Contractor.

5.1.13 INSURANCE

5.1.13.1 The Contractor shall, prior to commencing the Works, effect and thereafter maintain insurance(s), in the joint names of the Employer and the Contractor (cover from the first working day after the start date to the end of DLP) in the amounts stated in the **Contract Data [SECTION 6]:**

a) for loss of or damage to the Works, plants and materials and the Contractor's equipment;

b) for loss, damage, death and injury to third parties or their property arising out of the

the Contractor's performance of the Contract including the Contractor's liability for damage to the Employer's property other than the Works; and

c) For death and injury to the Contractor's personnel except to the extent that liability arises from the negligence of the Employer, any of the Employer's representative or its employees.

5.1.13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Employer for his approval before the start date. All such insurance shall provide for compensation to be payable to rectify the loss or damage incurred. All payments received from insurers relating to loss or damage shall be held jointly by the parties and used for the repair of the loss or damage or as compensation for loss or damage that is not to be repaired.

5.1.13.3 If the Contractor fails to effect or keep in force any of the insurances referred to in the previous sub-clauses or fails to provide satisfactory evidence, policies or receipts, the Employer may without prejudice to any other right or remedy, effect insurance relevant to such default and pay the premiums due and recover the same as a deduction from any other monies due to the Contractor. If no payment is due, the payment of the premiums shall be a debt due by the Contractor to the Employer.

5.1.13.4 Alterations to the terms of insurance shall not be made without the approval of the Employer.

5.1.13.5 Both parties shall comply with conditions of the insurance policies as per respective obligations specified in such policies and / or laws applicable thereto.

5.1.14 SITE INVESTIGATION REPORTS

5.1.14.1 The Employer shall make available to the Contractor the following documents as part of site investigation reports:

a) Location maps in Geographic Information Survey / Computer Aided Drafting format;

b) Detailed total station survey and Drawings of existing conditions;

c) Geo-technical investigation reports;

d) Preliminary assessment report;

e) Pre-feasibility report; and

f) Detailed project report.

5.1.14.2 The Contractor, in preparing the Tender, shall rely on any site investigation reports referred to in the **Contract Data [SECTION 6]**, supplemented by any information available to the Tenderer.

5.1.15 QUERIES ABOUT CONTRACT DATA

5.1.15.1 The Employer will clarify queries on the **Contract Data [SECTION 6]** within [_____ (as applicable)] days from receipt of such query.

5.1.16 CONTRACTOR TO CONSTRUCT WORKS

5.1.16.1 The Contractor shall construct the Works in accordance with the specification(s) and Drawings.

5.1.17 WORKS TO BE COMPLETED BY ICD

5.1.17.1 The Contractor will commence execution of the Works on the start date and shall carry out the Works in accordance with the program submitted by the Contractor – as updated with the approval of the Employer and complete them by the ICD.

5.1.18 APPROVAL BY EMPLOYER

5.1.18.1 The Contractor shall submit Specification and Drawings showing the proposed temporary Works to the Employer – who is to approve them if they comply with the specification(s) and Drawings.

5.1.18.2 The Contractor shall be responsible for the design of temporary Works.

5.1.18.3 The Employer's approval shall not alter the Contractor's responsibility for design of the temporary Works.

5.1.18.4 The Contractor shall obtain approval of third parties to the design of the temporary Works where required.

5.1.18.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works are subject to prior approval by the Employer before their use.

5.1.19 SAFETY

5.1.19.1 The Contractor shall be responsible for the safety of all activities on the site.

5.1.20 DISCOVERIES

5.1.20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the site is the property of the Employer. The Contractor is to notify the Employer of such discoveries and carry out the Employer's instructions for dealing with them.

5.1.21 POSSESSION OF SITE

5.1.21.1 The Employer shall give possession of all parts of the site to the Contractor. If possession of a part is not given by the date stated in the **Contract Data [SECTION 6],** the Employer is deemed to have delayed the start of the relevant activities and the same may be considered as a compensation event.

5.1.22 ACCESS TO SITE

5.1.22.1 The Contractor shall allow the Employer and any person authorised by the Employer access to the site, to any place where Work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the Works.

5.1.23 INSTRUCTIONS

5.1.23.1 The Contractor shall carry out all instructions of the Employer, which are in accordance with this Contract and which comply with the applicable laws.

5.1.24 ARBITRATION

5.1.24.1 As stated in clause **4 of Special Conditions.**

5.2 TIME CONTROL

5.2.1 PROGRAM

5.2.1.1 Within the time stated in the **Contract Data [SECTION 6]**, the Contractor shall submit to the Employer for approval a program showing the general methods, arrangements, order and timing for all the activities in the Works. The Contractor understands that time is the essence of this Contract and in the event the Contractor is unable to complete the Contract within the stipulated time, the Employer shall be entitled to terminate this Contract under **Sub-clause 5.5.6** of this **CoC**.

5.2.1.2 In the event of the Employer's disapproval of the program, the Contractor shall revise the program as per the requirements of the Employer and re-submit the same to the Employer for approval. In case there are any variations or compensation events, the Employer may require the Contractor to revise the program in order to reflect such variations or compensation events.

5.2.2 EXTENSION OF ICD

5.2.2.1 The Employer shall extend the ICD if a compensation event occurs or a variation is issued which makes it impossible for completion to be achieved by the original ICD.

5.2.2.2 The Employer shall determine the terms of revision of the program or the ICD, within [____(as applicable)] days of the Contractor asking the Employer for a decision upon the effect of a compensation event or variation and submitting complete supporting information thereto.

5.2.3 DELAYS ORDERED BY EMPLOYER

5.2.3.1 The Employer may instruct the Contractor to delay the start or progress of any activity within the Works.

5.2.4 MANAGEMENT MEETINGS

5.2.4.1 The Employer may require the Contractor to attend a management meeting. The business of a management meeting shall be to review the progress achieved and the plans for completion of the remaining Work.

5.2.4.2 The responsibility of the parties for actions to be taken is to be decided by the Employer either at the management meeting or after the management meeting and stated in writing to be distributed to all who attended the meeting.

5.3 QUALITY CONTROL

5.3.1 IDENTIFYING DEFECTS

5.3.1.1 The Employer shall, from time-to-time and upon completion of the Works, check the Contractor's Work and notify the Contractor of any defects that are found. The Employer may instruct the Contractor to search for a defect and to uncover and test any Work that the Employer considers may have a defect and instruct the Contractor to rectify such defect in terms hereof. Such tests and rectification shall not affect the Contractor's on-going responsibilities under this Contract and shall not be deemed to extend the ICD.

5.3.1.2 The Employer may appoint, mandate, outsource quality control to an independent agency or constitute a Committee of [____ (no. as applicable)] members on Quality Control (CQC). CQC shall perform its duties as stated by the Employer at the time of appointment / formation.

5.3.2 TESTS

5.3.2.1 If the Employer instructs the Contractor to carry out a test not specified in the Specifications, to check whether any work has a defect and in the event such test shows that there is a defect, the Contractor shall bear all costs with respect to such test. If there is no defect, the test shall be considered as a compensation event.

5.3.2.2 The tests stated in **Tender S.U.R.E.** may be used as per the project Work and type.

5.3.3 CORRECTION OF DEFECTS

5.3.3.1 The Employer shall give notice to the Contractor of any defects before the end of the DLP, which begins on the date of completion and is defined in the **Contract Data [SECTION 6]**. The DLP may be extended for a reasonable period of time beyond which the defect shall be deemed an uncorrected defect under **Sub-clause 5.3.4** of this **CoC**.

5.3.3.2 Every time the notice of a defect is given, the Contractor shall correct the notified defect within the length of time specified in such notice by the Employer.

5.3.4 UNCORRECTED DEFECTS

5.3.4.1 If the Contractor has not corrected a defect within the time specified in the Employer's notice, the Employer may assess the cost of having the defect corrected and require the Contractor to pay such amount, notwithstanding any other remedies that the Employer may seek against the Contractor for correction of such defect.

5.4 COST CONTROL

5.4.1 BOQ

5.4.1.1 The BOQ shall contain items for the construction, installation, testing and commissioning of the Works.

5.4.1.2 The BOQ is used to calculate the Contract Price. The Contractor is paid for the quantity of the Work done at the rate in the BOQ for each item

5.4.2 VARIATIONS

5.4.2.1 The Employer shall have power to order the Contractor to do any or all of the following as considered necessary or advisable during the progress of the Works:

a) Increase or decrease any item of Work included in the BOQ;

b) Omit any item of Work;

c) Change the character or quality or kind of any item of Work;

d) Change the levels, lines, positions and dimensions of any part of the Work;

e) Execute additional items of Work of any kind necessary for the completion of the Works; and

f) Change any specified sequence, methods or timing of construction of any part of the Work.

5.4.2.2 The Contractor shall be bound to carry out the Works in accordance with any instructions in this connection, which may be given to him in writing by the Employer and such alteration shall not

vitiate or invalidate the Contract.

5.4.2.3 Variations shall not be made by the Contractor without an order in writing by the Employer, provided that no order in writing shall be required for increase or decrease in the quantity of an item appearing in the BOQ so long as the Work executed conforms to the approved Drawings.

5.4.2.4 The Contractor shall promptly request in writing to the Employer to confirm verbal orders and the officer issuing oral instructions shall confirm it in writing within [____ (as applicable)] working days, failing which the Work shall be carried out as though there is no variation. In case the variation is approved, it shall be accompanied by BOQ failing which the Contractor shall be responsible for deviation – if any. Further, the Employer's approval must be obtained for any variation exceeding [____ (as applicable)]%.

5.4.3 PAYMENTS FOR VARIATIONS

5.4.3.1 Changes in material Specification may be made by the Employer at any time before the Contractor purchases the material under consideration for change or executes the Work as long as the new material Specification is equal to or less than the unit cost of the original Specification. Any difference in excess or reduction will be adjusted in dues to the Contractor in writing, approved and signed by the Employer. Payment for increase in the quantities of an item in the BOQ up to [____(as applicable)]% of that provided in the BoQ shall be made at the rates quoted by the Contractor.

5.4.3.2 For quantities in excess of [____(as applicable)]% of the Tendered quantity of an item as given in the BOQ, the Contractor shall be paid at the rate entered in or derived from the schedule of rates (applicable for the area of the Work and current at the time of award of the Contract) plus or minus the overall %age of the original Tendered rates over the current schedule of rates prevalent at the time of award of the Contract.

5.4.3.3 If there is no rate for the additional, substituted or altered item of the Work in the BOQ, efforts would be made to derive the rates from those given in the BOQ or the schedule of rates (applicable for the area of the Work and current at the time of award of the Contract) and if found feasible the payment would be made at the derived rate for the item plus or minus the overall %age of the original Tendered rates over the current schedule of rates prevalent at the time of award of the Contract.

5.4.3.4 If the rates for additional, substituted or altered item of Work cannot be determined either as at **Sub-clauses 5.4.3.1** or **5.4.3.2** or **5.4.3.3** above, the Contractor shall be requested to submit his quotation for the items supported by analysis of the rate or rates claimed within [____(as applicable)]] days.

5.4.3.5 If the contractor's quotation is determined unreasonable, the Employer may order the variation and make a change to the Contract Price, which shall be based on Employer's own forecast of the effects of the variation on the Contractor's costs.

5.4.3.6 If the Employer decides that the urgency of varying the Work would prevent a quotation being given and considered without delaying the Work, no quotation shall be given and the variation shall be treated as a compensation event.

5.4.3.7 Under no circumstances shall the Contractor suspend the Work on the plea of non-settlement of rates for items falling under this Sub-clause.

5.4.4 SUBMISSION OF BILLS FOR PAYMENT

5.4.4.1 The Contractor shall submit to the Employer bills of the value of the Work completed as per following stages less the cumulative amount paid previously:

a) Earthwork excavation and sub-grade preparation {or app. [____(as applicable)]% of total cost}.

b) Below-grade utility Works and BM / BC {or app. [____(as applicable)] % of total cost}.

c) Above-grade Works {or app. (as applicable)]% of total cost)}.

5.4.4.2 The Employer shall check the Contractor's bill and determine the value of the Work executed which shall comprise of the:

a) value of the quantities of the items in the BOQ completed; and

b) valuation of variations and compensation events.

5.4.4.3 The Employer may exclude any item paid in a previous bill or reduce the proportion of any item previously paid in the light of later date information.

5.4.5 PAYMENTS

5.4.5.1 Payments shall be adjusted for deductions of advance payments, other than recoveries in terms of the Contract and taxes at source, as applicable under the law. The Employer shall pay the Contractor within [____(as applicable)] working days of submission of bill. The Contractor(s) shall be liable to pay liquidated damages for shortfall in progress. For progress beyond the agreed program, payment is subject to availability of an incentive, at the discretion of the Employer as per the terms stipulated by the Employer.

5.4.5.2 If the Employer fails to pay the bills within [____(as applicable)] days of their submission, the Employer shall be liable to pay an interest on the amount payable at Prime Lending Rate of the designated bankers of the Employer during the execution of the Contract for the delay, which interest shall be applicable from the due date of payment until the actual payment date.

5.4.6 COMPENSATION EVENTS

5.4.6.1 The following – unless they are attributable to the Contractor – are compensation events:

a) The Employer does not provide access to a part of the site by the site possession date stated in the **Contract Data [SECTION 6]**.

b) The Employer orders a delay or does not certify or release Drawings, Specifications or instructions required for execution of Works on time.

c) The Employer instructs the Contractor to uncover or to carry out tests upon Work which is found to have no defects upon completion of such tests.

d) The Employer provides instructions to deal with an unforeseen condition caused by the Employer or toward an additional Work required for safety or other reasons.

e) The effect on the Contractor of any of the Employer's risks;

f) The Employer delays issuing a certificate of completion without just cause.

g) Other compensation events that may be listed in the **Contract Data [SECTION 6]** or mentioned in the Contract.

5.4.6.2 If a compensation event would cause additional cost or would prevent the Work being completed by the intended completion date, the Contract Price shall be increased and / or the intended completion date may be extended, as required. The Employer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the intended completion date shall be extended.

5.4.6.3 As soon as information demonstrating the effect of each compensation event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the Employer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Employer shall adjust the Contract Price based on Employer's own forecast made in consultation with the Contractor. The Employer will assume that the Contractor will react competently and promptly to the event.

5.4.6.3 The Contractor shall not be entitled to compensation in the event the contractor does not report the change in circumstances within a reasonable time or in the event non co-operation by the Contractor with the Employer has adversely affected the Employer's interests.

5.4.7 TAX

5.4.7.1 The rates quoted by the Contractor shall be deemed to be inclusive of the sales and other taxes that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at source as per applicable law.

5.4.8 *Price Adjustment [(as applicable) – as per a relevant Act / Bye law / Rule / Government Order / Government Resolution / Notification etc. or amendment(s) to any of these (as applicable)]*

5.4.9 LIQUIDATED DAMAGES

5.4.9.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the **Contract Data [SECTION 6]** for each day that the completion date is later than the ICD. The total amount of liquidated damages shall not exceed the amount defined in the **Contract Data [SECTION 6]**. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities in this **CoC**.

5.4.9.2 If the ICD is extended after liquidated damages have been paid, the Employer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment of bill.

5.4.10 ADVANCE PAYMENTS

5.4.10.1 The Employer shall make payment to the Contractor of the amounts stated in the **Contract Data [SECTION 6]** by the date stated in the **Contract Data [SECTION 6]**, against provision by the Contractor of an unconditional bank guarantee in a form acceptable to the Employer issued by a nationalised / scheduled bank in amounts equal to the advance payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest will not be charged on the advance payment.

5.4.10.2 The Contractor is to use the advance payment only to pay for mobilisation expenses required specifically for execution of the Works. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other relevant documents to the Employer.

5.4.10.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor following the schedule of completed %ages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuation of the Work done, variations, price adjustments, compensation events or liquidated damages.

5.4.11 SECURITY DEPOSIT

5.4.11.1 The security deposit (including additional security for unbalanced Tenders) shall be provided to the Employer no later than the date specified in the LoA and shall be issued in an amount and form and type of instrument acceptable to the Employer. The security deposit shall be valid until a date [_____(as applicable)] days from the date of expiry of DLP and the additional security for unbalanced Tenders shall be valid until a date [_____(as applicable)] days from the date of issue of the certificate of completion. [_____(as applicable)]% of security deposit is repaid to the Contractor after completion of DLP [_____(as applicable)] to the satisfaction of Employer and another % of security deposit is repaid after completion of maintenance period to the satisfaction of Employer.

5.4.12 COST OF REPAIRS

5.4.12.1 Loss or damage to the Works or materials to be incorporated in the Works between the start date and the end of the DLP shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

5.5 FINISHING THE CONTRACT

5.5.1 COMPLETION

5.5.1.1 The Contractor shall request the Employer to issue a certificate of completion of the Works and the Employer will do so upon deciding that the Works are completed in accordance with the Contract.

5.5.2 TAKING OVER

5.5.2.1 The Employer shall take over the site and the Works within [_____(as applicable)] days of issuing a certificate of completion.

5.5.3 FINAL ACCOUNT

5.5.3.1 The Contractor shall supply to the Employer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the DLP [_____(as applicable)]. The Employer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within [_____(as applicable)] days of receiving the Contractor's account if it is correct and complete. If it is not, the Employer shall issue within [_____(as applicable)] days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still not in terms of this Contract, after it has been re-submitted, the Employer shall decide on the amount payable to the Contractor based on the terms of this Contract and make such payment within [_____(as applicable)] days of receiving the Contractor's revised account.

5.5.4 AS-BUILT DRAWINGS

5.5.4.1 The Contractor shall supply as-built Drawings by the dates stated in the **Contract Data [SECTION 6]**.

5.5.4.2 If the Contractor does not supply the as-built Drawings by the dates stated in the Contract Data [SECTION 6], or the Employer rejects the same, the Employer shall withhold the amount stated in the Contract Data [SECTION 6] from payments due to the Contractor. In case of rejection, the amounts shall be withheld until such Drawings are amended and re-submitted for the Employer's approval.

5.5.5 OPERATING AND MAINTENANCE MANUAL(S)

5.5.5.1 The Contractor shall supply Operating and Maintenance Manual(s) for the Works by the dates stated in the Contract Data.

5.5.5.2 If the Contactor does not supply the Operating and Maintenance Manual(s) by the dates stated in the Contract Data or the Employer rejects the same, the Employer shall withhold the amount stated in the **Contract Data [SECTION 6]** from payments due to the Contractor. In case of rejection, the amounts shall be withheld until such Manuals are amended and re-submitted for the Employer's approval.

5.5.6 TERMINATION

5.5.6.1 The Employer may terminate the Contract if the Contractor causes a fundamental breach of the Contract.

5.5.6.2 Fundamental breach(es) of Contract (by the Contractor) include, but shall not be limited to the following:

a) stopping Work for [____(as applicable)] days continuously when no stoppage of Work is shown on the current program and the stoppage has not been authorised by the Employer;

b) going bankrupt or goes into liquidation other than for a re-construction or amalgamation, in which case, the new entity so formed, shall be liable and responsible for all obligations of the Contractor under this Agreement;

c) failing to correct it within a reasonable period of time determined by the Employer after the Employer gives a notice to correct a particular defect;

d) not maintaining security, as required by the Employer and stipulated in this **CoC;**

e) delaying the completion of Works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the **Contract Data [SECTION 6]**; and

f) engaging in corrupt or fraudulent practices in competing for and / or in the executing the Contract (in the judgment of or as determined by the Employer).

5.5.6.3 The Contractor may terminate the Contract if the Employer causes a fundamental breach of the Contract. Fundamental breach(es) on the part of the Employer shall mean:

a) instructing the Contractor to delay the progress of the Works and not withdrawing the instruction within [____(as applicable)] days; and

b) not paying a payment due (from the Employer) to the Contractor within [____(as applicable)] days of the date of the submission of the bill by the Contractor

c) The Employer may terminate the Contract for legitimate reasons such as new requirement in the larger public interest or orders of a court or the government or poor quality of Work by the Contractor based on an assessment by a third party.

5.5.6.5 If the Contract is terminated, the Contractor shall stop Work immediately and make the site safe and secure and vacate it with immediate effect by handing over possession to the Employer.

5.5.7 PAYMENT UPON TERMINATION

5.5.7.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Employer shall prepare bill for the value of the Work done less advance payments received up to the date of the bill, less other recoveries due in terms of the Contract, less taxes due to be deducted at source as per applicable law and less the %age to apply to the Work not completed as indicated in the **Contract Data [SECTION 6].**

5.5.7.2 Additional liquidated damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable by the Contractor to the Employer.

5.5.7.3 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Employer shall prepare bill for the value of the Work done, the reasonable cost of removal of equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the Contract, and less taxes due to be deducted at source as per applicable law and make payment accordingly.

5.5.8 PROPERTY

5.5.8.1 All materials on the site, plant, equipment, temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of Contractor's default.

5.5.9 RELEASE FROM PERFORMANCE

5.5.9.1 If the Contract is frustrated by any event entirely outside the control of either the Employer or the Contractor, the Employer shall certify that the Contract has been frustrated.

5.5.9.2 The Contractor shall make the site safe and stop Work immediately after receiving a certificate to this effect and shall be paid for all Work carried out before the issuance of such a certificate.

5.6 SPECIAL CONDITIONS OF CONTRACT

5.6.1 LABOUR:

5.6.1.1 The Contractor shall make his own arrangements for and bear and pay all costs and expenses with respect to the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

5.6.1.2 The Contractor shall, if required by the Employer, deliver to the Employer a return in detail, in such form and at such intervals as the Employer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the site and such other information as the Employer may require.

5.6.2 COMPLIANCE WITH LABOUR REGULATIONS

5.6.2.1 During continuance of the Contract, the Contractor shall, at all times, abide by all existing labour enactments and rules made thereunder, regulations, notifications and bye laws of the State or Central Government or a local authority and any other labour law (including rules,

regulations and bye laws) that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority.

5.6.2.2 The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the Competent Authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications / bye laws / Acts / rules / regulations including amendments, if any, on the part of the Contractor, the Employer shall have the right to deduct any money due to the Contractor including his amount of security deposit.

5.6.2.3 The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

5.6.2.4 The Employees of the Contractor and the Sub-Contractor shall – in no case – be treated as the employees of the Employer at any point of time.

5.6.3 PROTECTION OF ENVIRONMENT:

5.6.3.1 The Contractor shall take all reasonable steps to protect the environment, in the performance of this Contract, on and off the site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation.

5.6.3.2 During continuance of the Contract, the Contractor and his Sub-Contractors shall – at all times – abide by all existing enactments on environmental protection and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authorities and any other law, bye law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or a local authority.

5.6.4 ARBITRATION (SUB-CLAUSE 5.1.24 OF THIS COC)

5.6.4.1 The procedure for arbitration shall be as follows:

a) In case of dispute or difference arising between the Employer and the Contractor relating to any matter arising out of or connected with this Agreement it shall be settled in accordance with the 'Arbitration and Conciliation Act, 1996'. The disputes or differences shall be referred to a 3-member-panel of Arbitrators. The Arbitrator panel shall be appointed by the Indian Council of Arbitration – comprising at least 1 member from the Indian Road Congress (IRC) or the NHAI and an expert in Civil Engineering.

b) Arbitration proceedings shall be held at [_____place_____(as applicable)], [Name of State / Union Territory / National Capital Territory (as applicable)], India.

c) The cost and expenses of arbitration proceedings will be paid as determined by the panel of Arbitrators. However, the expenses incurred by each party in connection with the preparation, presentation etc. shall be borne by each party itself.

d) Performance under the Contract shall continue during the arbitration proceedings and payments due to the Contractor by the Employer shall not be withheld, unless they are the subject matter of any arbitration proceeding(s).

Note: Pl. also refer to **Annex – 5-A-i (pg. no. 67)** in this regard.

5.6.4.2 In the case of death of a Contractor after executing the Agreement / commencement of the Work, his legal heir – if an eligible registered Contractor and willing, can execute and complete the Work at the accepted Tender rates irrespective of the cost of the Work.

Annex-5-A-I

CONDITIONS OF CONTRACT

List of Organisations considered as Appointing Authority for Appointment of Arbitrators

LIST OF ORGANISATIONS CONSIDERED AS APPOINTING AUTHORITY FOR APPOINTMENT OF ARBITRATORS

1 Indian Council of Arbitration, New Delhi.

2 International Centre for Alternative Disputes Resolution (India).

3 Indian Roads Congress.

4 Indian Building Congress.

5 Indian Institute of Bridge Engineers.

6 Indian Institute of Public Health Engineers.

7 Institute of Water Works.

#6

Contract Data

KEY RELEVANT CLAUSES	Sub-clause Reference {in CoC [SECTION 5]}
Note: Items marked "N/A" do not apply in this Contract.	
The **Employer**	--
Name: *Name of Competent Authority] (as applicable)]* >>	5.1.1
Address: *[Name of Municipal Corporation / Municipality / City Council / Notified Area (as applicable)]*	--
Name of authorized Representative: _____	--
The name and identification number of the Contract _____ _____	--
Work(s) consists of:- **ROAD WORK**:	--
Development / Redevelopment / Upgrading of [No. of road(s) (as applicable)] in [__location(s)____(as applicable)] in ____[Name of city / town (as applicable)] as per **Tender S.U.R.E.** standards.	--
Tender Reference _____	--
Start date: Date of issue of notice to proceed with the Work >>	5.1.1
Site possession date: Date of Work order >>	5.1.21
Site location: at [_____place_____(as applicable)], [____City / Town / Notified area / Other(s)_____(as applicable)] >>	5.1.1
and is defined in Drawings nos.:[____(as applicable)]	--
The DLP is [____(as applicable)] years after submitting CR and maintenance period is 3 years after DLP >>	5.3.3
Schedule of Operating and Maintenance Manuals >>	5.5.4
Methodology and program of construction >>	5.2.1
Site investigation reports >>	5.1.14
Schedule of key and critical equipment to be deployed on the Work as per agreed program of construction >>	5.2.1
Insurance requirements are in **Table 6.1** of this **Contract Data SECTION >>**	5.1.13

	Type of Cover	Minimum cover for Insurance
a	Works. Plant. Material.	Sum stated in the Agreement plus [____(as applicable)]%
b	Loss or damage to equipment	Full replacement cost
c	Loss or damage to property of third party	Full replacement cost
d	Personal injury or death insurance	
	for third party (for [____ (no. as applicable)] persons	` [____(as applicable)] lakhs covering a minimum of [____(as applicable)] persons.
	For Contractor's employees / labour	In accordance with the statutory requirements applicable to [Name of State / Union Territory / National Capital Territory (as applicable)]

Table 6.1: Insurance requirements

Clause Reference {in CoC [SECTION 5]}

Price adjustment formula *[(as applicable) – as per a relevant Act / Bye law / Rule / Government Order / Government Resolution / Notification etc. or amendment(s) to any of these (as applicable)]* >> 5.4.8

The liquidated damages for the whole of the Works are [____(as applicable)]% of the final Contract Price per day for the whole of the Works. ------

The maximum amount of liquidated damages for the whole of the Works is [____(as applicable)]% of final Contract Price >> 5.4.9

The amounts of advance payment are mentioned in Table 6.2 of this Contract Data SECTION >> 5.4.10

Nature of advance	Amount (`)	Conditions to be fulfilled
a) Mobilisation	[____(as applicable)]% of the Contract Price	On submission of unconditional Bank Guarantee (to be drawn before the end of [____(as applicable)]% of the Contract period
b)		
c)		
d)		

Table 6.2: Amounts of advance payment

	Clause Reference {in CoC [SECTION 5]}
Advance payment will be paid to the Contractor no later than [_____(as applicable)] days after fulfilment of the above conditions. Repayment of advance payment for mobilisation >>	5.4.10
The advance loan shall be repaid with %age deductions from the interim payments certified by the Engineer under the Contract. Deductions shall commence in the next interim payment certificate following that in which the total of all such payments to the Contractor has reached not less than [_____(as applicable)]% of the Contract Price or [_____(as applicable)] months from the date of payment of first instalment of advance, whichever period concludes earlier, and shall be made at the rate of [_____(as applicable)]% of the amounts of all Interim Payment Certificates until such time as the loan has been repaid, always provided that the loan shall be completely repaid prior to the expiry of the original time for completion >>	5.1.17 & 5.2.2
The date by which "as-built" Drawings (in appropriate scale) in [_____ (no. as applicable)] sets are required is within [_____(as applicable)] days of issue of certificate of completion of the whole or a section of the Work as the case may be >>	5.5.4
The date by which operating and maintenance manuals are required is within [_____(as applicable)] days of issue of certificate of completion of the whole or a section of the Work as the case may be >>	5.5.4
The amount to be withheld for failing to supply "as-built" Drawings or supply of operation and maintenance manuals by the date required is ` [_____(as applicable)] lakhs >>	--
The following event(s) shall also be fundamental breach of the Contract:	
a) The Contractor has contravened **Sub-clauses 5.1.7.1** and **5.1.9** of the **CoC [SECTION 5]**.	5.5.5.2
[_____(as applicable)]% shall to apply to the value of the Work not completed representing the Employer's additional cost for completing the Works >>	5.5.6.1

#7

Specifications

7.1.1 PREAMBLE

7.1.1.2 This SECTION contains the Specifications for the proposed Work and shall be read in conjunction with various other SECTIONS forming the Contract namely Notification, Inviting Applications, **ITT**, General Conditions, Special Conditions, BoQ, Drawings and other related documents mentioned in this Tender Document and together with any Addendum issued thereto.

7.1.2 GENERAL SPECIFICATIONS

7.1.2.1 This shall comprise Tender S.U.R.E along with the Specification Annexure and the Specifications of the Ministry of Road Transport and Highways (MoRTH) for Road and Bridge Works (most recent revision) published by the IRC, New Delhi (and its latest re-printed version) and shall be deemed to be bound into this document.

7.1.3 SUPPLEMENTARY SPECIFICATIONS

7.1.3.1 These shall comprise various supplements enclosed separately in **Annexes – 7-B - i-xiii** (as listed below):

- **i.** *General*
- **ii.** *Geotechnical Information*
- **iii.** *Availability of Site*
- **iv.** *Contractor's General Obligation*
- **v.** *Programming and Planning*
- **vi.** *Design Requirements*
- **vii.** *Safety & Environmental Considerations*
- **viii.** *Traffic Control and Road Safety at Work Zone*
- **ix.** *Utility Services*
- **x.** *Drains*
- **xi.** *Maintenance*
- **xii.** *Constructions*
- **xiii.** *As-Built Drawings*
- **xiv.** *Electrical specifications*

7.1.3.2 Words like 'Contract', 'Contractor', 'Drawings', 'Works', 'Site', 'Provisional Sum' used in the above mentioned Specification shall be deemed to have the same meaning as understood from the definition of these terms in and as included in the Special **CoC [SECTION 5]**.

7.1.3.3 In the absence of any definite provisions on any particular issue in the aforesaid Specification, reference may be made to the latest MoRTH and Indian Standards Organisation (ISO) Specifications in that order. Where even these are silent, the construction and completion of the Works shall conform to sound engineering practice and in case of any dispute arising out of the interpretation of the above, the decision of the Engineer-in-Charge shall be final and binding on the Contractor.

7.1.4 SPECIFICATIONS FOR MATERIALS, PLANT AND MACHINERY

7.1.4.1 MATERIAL

All materials to be provided by the Contractors shall be in conformity to the Specifications laid down in the Contract and the Contractor shall if required by the Engineer-in-Charge furnish proof about their suitability and fitness to the full satisfaction of the Engineer-in-Charge.

7.1.4.2 STORAGE OF MATERIALS

a) All materials brought and kept at site of Work by the Contractor or by his orders for the purpose of forming part of the Works are to be considered to be the property of the office of [_____(as applicable)] and the same shall not to be removed or taken away by the Contractor or any other person without the permission of the Engineer-in-Charge.

b) The Engineer-in-Charge shall not be responsible for any loss or damage which may occur to / or in respect of any such Work or materials either by their being lost or stolen or damaged by weather or otherwise (including by natural calamities like flood, earthquake, rains, riots, fire etc.).

i. *Materials required for the Works shall be stored by the Contractor only (in standard profiles and in the manner) and at places approved by the Engineer-in-Charge. Storage and safe custody of all materials shall be the sole responsibility of the Contractor. Special care should be taken as per relevant Specification(s) for storage of bitumen etc.*

ii. *The Contractor shall construct suitable go-down at the site of Work for storing the material safely (against damage due to sun, rain, dampness, fire, theft etc.). He shall also employ necessary security measures for the purpose of safety and no extra claim whatsoever shall be entertained on this account.*

iii. *From commencement till completion, all materials and Works shall be under the safe custody of Contractor. The Contractor is solely responsible for and / or to make good all injuries, damages and repairs accrued to or rendered necessary to all materials and Works by fire, storm, rain, traffic or other causes and to hold the Engineer-in-Charge indemnified from any claim for injuries to a person or for structural damage to property occurring from (only) neglect, default, want of proper care or a misconduct on the part of the Contractor.*

iv. *The Contractor shall produce samples of all materials to be procured by him sufficiently in advance to obtain approval of the Engineer-in-Charge. Subsequently, the materials to be used in the actual execution of the Work shall strictly conform to the quality of samples approved. In case of variation in quality, such materials shall be liable for rejection. The rejected materials shall be removed from the site within [_____(as applicable)] hours of their rejection. The Engineer-in-Charge shall be authorised to remove the same at the risk and cost of the Contractor.*

7.1.4.3 QUALITY CONTROL AND TESTING OF MATERIALS

a) The in Contractor, at his own expense, shall make arrangements with necessary equipment to carryout tests such as grading of aggregate, fineness modulus of sand, bulking of sand, silt content in sand, tests on cement and concrete etc. at the site of Work. The Contractor shall be required to provide such appliances as weighing scale, graduated cylinder, standard sieves, [_____ (no. as applicable)] wooden / metal boards of size 0.5 x 0.5 Mtr. = 0.25 Sqm area, [_____ (no. as applicable)] digital contact thermometer, [_____ (no. as applicable)] screw drivers, [_____ (no. as applicable)] measuring scale, camber board, depth gauge, [_____ (length in metres as applicable)] long wooden or aluminium beam or straight edge, [_____ (no. as applicable)] graduated scale bit or wedge scale, etc., in order to enable the Engineer-in-Charge to conduct field tests, whenever required by him to ensure that the quality is consistent with the prescribed Specification. Similarly a well-equipped laboratory for testing of concrete, aggregates including earth Work shall be provided by the Contractor at the site of the Work.

b) Materials including, but not limited to water, sand, cement and aggregate to be used in the Works such as concrete, masonry, road Work, amongst others shall comply with **Annexure 9** of **Tender S.U.R.E.** and shall pass all the tests and analysis required.

c) All the necessary tests shall be conducted in the laboratory established at site by the Contractor or in any recognized laboratory approved by the Engineer-in-Charge. The samples shall be taken for carrying out all or any of the tests stipulated in the particular Specifications or as directed by the Engineer-in-Charge or his authorised representative. The Contractor shall at his risk and cost make all arrangements and shall provide all such facilities as the Engineer-in-Charge may require for collecting, preparing, forwarding the required number of samples for test and for analysis as per the frequency of test stipulated in the Contract Specifications or as considered necessary by the Engineer-in-Charge.

d) The decision of the Engineer-in-Charge regarding type of tests, their frequency, suitability of any of the materials to be used in the Work shall be final and binding on the Contractor – notwithstanding any other provision elsewhere in the Tender Document.

e) The Contractor or his authorised representative shall co-operate in collection, preparation, forwarding and testing of such samples. Even if the Contractor or his authorised representative is not present, the result of such tests and consequences thereon shall be binding on the Contractor – provided the Contractor has been provided with prior intimation of such tests. The Contractor or his authorised representative shall remain in contact with the Engineer-in-Charge or his authorised representative for the conduct of all such operations.

f) The Contractor shall give not less than [____(as applicable)] days' notice of all tests in order that the Engineer-in-Charge or his authorised representative may be present. The Contractor shall supply [____ (no. as applicable)] copies of all test certificates to the Engineer -in-Charge for approval, immediately after the completion of the tests. Test certificates shall invariably be supplied to the Engineer-in-Charge before the material or components are used in the Works, unless the Engineer-in-Charge directs otherwise.

g) All materials, which are specified to be tested, at the place of manufacture, shall satisfactorily pass the test before being used in the Works.

h) Other Materials: Any material, for which there is no relevant **Indian Standard**, shall be the best of their kind and to the approval of the Engineer-in-Charge. The Contractor shall, at his own expense, submit to the Engineer-in-Charge for approval, samples of any of the materials and components to be used. The quality of materials and components, subsequently, used in the Works shall not be inferior to the approved samples.

7.1.4.4 CONSTRUCTION EQUIPMENT

a) The methodology and equipment to be used on the project shall be furnished by the Contractor to the Engineer-in-Charge well in advance of commencement of the Work and his approval obtained prior to its adoption and use.

b) The Contractor shall give a trial run of the equipment for establishing the capability to achieve the laid down Specification and tolerance to the satisfaction of the Engineer-in-Charge before commencement of the Work.

c) All equipment provided shall be of proven efficiency and shall be operated and maintained at all times in a good working condition.

d) No equipment or personnel shall be removed from the site without prior permission of the Engineer-in-Charge.

e) No tools and plants will be supplied by the Department and the Contractor will have to make his own arrangements at his expense.

f) All construction tools, plant and machineries provided by the Contractor shall – when brought to the site – be deemed to be exclusively intended for the construction and completion of this Work and the Contractor shall not remove the same or any part thereof (save for the purpose of moving it from one part of the site to another) without the written permission of the Engineer-in-Charge.

Other Specifications that shall be referred to (as necessary) have been listed below:

a) Building Specifications of [Name of State / Union Territory / National Capital Territory / reference to Government of India (as applicable)];

b) Standard Rate Analysis for Building of [Name of State / Union Territory / National Capital Territory / reference to Government of India (as applicable)];

c) Roads and Bridges Specifications of [Name of State / Union Territory / National Capital Territory / reference to Government of India (as applicable)];

d) Standard Rates Analysis for Roads and Bridges of [Name of State / Union Territory / National Capital Territory / reference to Government of India (as applicable)];

e) Specifications of the Ministry of Shipping and Transport, Government of India;

f) National Building code and Specifications of the Bureau of Indian Standards; and

g) For water supply and sanitary Works, Technical Specifications of [Public Authority concerned of the Government of the State / Union Territory / National Capital Territory (as applicable)].

Annex-7-B-I

General

B1. GENERAL

1.1 INTRODUCTION

The Works under Contract comprise construction of proposed Development / Redevelopment / Upgrading of [No. of road(s) (as applicable)] in [____location(s)____(as applicable)] in ____[Name of city / town (as applicable)] as per Tender S.U.R.E. standards.

Note: In case of upgrading / improvement per se of the roads, this would include junction, drainage Works, re-cambering / re-surfacing of the existing and adjacent roads, construction of new carriageway, construction of utility ducts, cross drains, culverts, foot path, cycle track, development of parking areas & bus bays, landscaping, electrification of the road and all other structures required for the completion of the Works.

1.2 CONTRACT

The duration of the Contract shall continue for [____(as applicable)] calendar months from the Contract commencement date stated in the LoA.

1.3 SCOPE OF WORKS

1.3.1 This Contract involves the design (wherever required, including submission and obtaining of all necessary approvals from the relevant authorities), construction and completion of the following:

a) Site clearance, demolition Works, earth Works, temporary Works, traffic diversion, barricading the construction site, utility shifting and all ancillary Works as shown in the Drawings and deemed necessary for the carrying out of temporary and permanent construction Works;

b) Widening / re-cambering / raising / milling down and overlaying of existing carriageways, flexible / rigid pavement at at-grade road intersections and accesses to adjoining developments;

c) Tree-cutting (if any) as indicated in the Drawings;

d) Excavation of trenches;

e) Construction of utility ducts, cross drains as per the Drawings;

f) Construction of footpath, cycle track, kerbs, railings, vehicular impact guardrails and other road-related facilities;

g) Formation of slopes, berm and embankments;

h) Close turfing to all slopes, berm, embankments and all other areas as indicated in the Drawings;

i) Supply and installation of new traffic signage, directional signage, street name signs and re-sitting of such existing signs and other road signs to be retained, inclusive of support and foundations by Manufacturer of Retro Reflective **ASTM** Type XI sheet or their Indian subsidiary;

j) Supply and installation of new electric poles and light fittings as shown in the Drawings;

k) Temporary and permanent diversion and restoration of footpath, drains, roads and street furniture including the supply and painting of road / lane markings for all temporary and

permanent carriageway in accordance with the Employer's requirements and to the satisfaction of the Engineer-in-Charge;

l) Re-sitting / re-construction of existing fencing, posts, gates, footpaths, signages, boundary walls, guardrails, railings, parapet walls, bollards and all others affected by the Works. The boundary wall / fencing affected shall be reconstructed to a standard equal to or better than the existing condition of the boundary wall / fencing, abutting the road reserve line and to its current exposed height with new foundation after raising of the road level to the proposed level; and

m) All other Works and services ancillary or related to the full completion of the Works in accordance with the Employer's requirements.

I.3.1 The Contractor shall ascertain, determine and verify the locations of all Utility Services (whether or not indicated on the Drawings), in the vicinity of the Works and co-ordinate with Utility Agencies for the diversion of affected services and the laying of new services. The Contractor shall support and protect services that need not be diverted or pending diversion and remove all abandoned services.

I.3.2 The Contractor's responsibility for the design and building of Works includes the submissions to relevant Government Authorities / Technical Departments for obtaining all necessary clearances / approvals.

I.3.3 The Contractor shall co-ordinate and interface his Works with that of all other Contractors, Sub-Contractors, Utility Services, Statutory Authorities etc. and achieve the completion of the Works to the satisfaction of the Engineer-in-Charge.

I.3.4 The Contractor shall verify the proposed road reserve, cadastral boundary and Contract boundary and all dimensions on-site prior to submission of Tender. The Contractor is responsible for clarifying any discrepancy between the Drawings and actual condition on the site.

I.3.5 The Contractor shall make good all Works including road surfaces, drains, concrete slabs, gratings, kerbs, pavements, turfing, railing, fence, boundary wall etc. affected or damaged during the course of construction to the satisfaction of the Engineer-in-Charge. The costs of making good all these defects shall be borne solely by the Contractor and deemed included in his Contract sum.

I.3.6 All Works specified in this clause shall include the provision of all labour, tools, equipment, material, traffic control, transport and everything else necessary for the satisfactory completion of the Work by the Contractor to the satisfaction of the Engineer-in-Charge.

I.3.7 The Contractor shall provide all electrical Works as outlined in the Drawings and Specifications for the Works, including provision of a comprehensive plan / section layout indicating the proposed locations of conduits, lightning tape, junction boxes etc. obscured and concealed to the satisfaction of the Engineer-in-Charge.

I.3.8 A description of the Works involved in this Contract is given in the Specifications for the guidance of the Contractor. The Contractor shall be solely and fully responsible for investigating and ensuring the actual extent and nature of the Works comprised in this Contract prior to submission of his Tender.

I.3.9 Construction, management and quality of the Works shall comply with the Drawings and Specifications.

I.4 WORKS EXCLUDED

I.4.1 Exclusion will be only on approval from any other Departments. However, liaising with other Departments is included in the scope of Work.

I.5 SPECIFICATIONS

I.5.1 The term "the Specifications" used throughout the Contract shall be deemed to include-

a) Particular Specification(s) with Annexes;

b) Material and Workmanship Specification for civil and structural Works;

c) Civil design criteria for road and transit systems;

d) Code of practice for traffic control at Work zone, (including all other subsequent amendments);

e) Code of practice for road signs – IRC: 67-2012;

f) Code of Practice for Works on public streets including all other subsequent amendments; and

g) Road inventory specifications.

I.5.2 All these shall be deemed to form part of the Contract and shall be supplementary to one another.

I.6 A particular Specification is to be read in conjunction with all other Specifications listed above which sets out generally the Employer's requirement(s) with regard to quality of materials and workmanship.

I.7 Where specific provision is made in the particular Specification for any workmanship or materials, such provision shall have precedence over all other Specifications listed above.

I.8 The term 'the Drawings' used throughout the Contract shall be deemed to include:-

a) Drawings with Specification notes as per **Tender S.U.R.E.** standards suggested / mandated by the Employer; and

b) Ministry of Urban Development / MoSRT&H / IRC Standard Details of Road Elements and all other subsequent amendments on details of road elements; and

c) Supplementary Drawings which are issued by the Engineer from time to time together with Engineer's instructions.

1.9 In the event of any conflict or inconsistency between the Drawings in I.16 (above) of Particular Specification and the Standard Details of Road Elements forming part of the Contract, the Drawings in **I.16 a)** (above) shall take precedence.

I.10 NOMENCLATURE

a) The term "the Authority" used throughout the document shall mean the Employer.

b) The term "the Engineer" used throughout the document shall mean the representative of Tender Inviting Agency / Authority.

c) The term "Qualified Person (QP)" used throughout the document shall mean the Employer [i.e. the Officer concerned (as applicable)] in [Name of Municipal Corporation / Municipality / City Council / Notified Area (as applicable)] or his authorised representative(s).

I.11 PRELIMINARIES FOR THE WHOLE PROJECT

I.11.1 The Contractor shall comply with all the requirements of Preliminaries and all other requirements as specified in the Contract.

I.12 SCHEDULE OF RATES

I.12.1 The Contractor shall be deemed to have read and agreed to the use of the rates contained in the Fixed Schedule of Rates as the basis for deriving the cost of any variation authorised by the Engineer. Where there is a discrepancy between the rate for the same item of Work in the section on Provisional Quantities and the Fixed Schedule of Rates, the rate inserted in the section on Provisional Quantities shall prevail. The term "Schedule of Rates" used throughout the Contract shall mean Fixed Schedule of Rates.

I.13 CONTRACT SUM

I.13.1 Where no price, "NA", "N.A", "NIL", "-", "INC", "INCL", "INCLD". "[ ]", "included" and "blank" is entered against items in the pricing column under the Contractor's submissions, then it shall be deemed that the cost of the said items are covered by other rates and prices and have been included in the total sum of the relevant bills. The Contractor shall re-allocate the sum to reflect the actual cost upon award of Contract for payment purposes. The Contractor shall be deemed to have allowed – in his Contract Sum – the Employer's requirements and all other obligations under the Contract – whether expressly stated in the Specifications or which may be reasonably implied from them.

I.14 CONTRACT LIMIT

I.14.1 The extent of the Contract limit is as indicated in the Employer's Drawings. Notwithstanding the Contract limits shown in the Employer's Drawings, the Contractor shall note the full extent of the Works which includes road markings, re-location, re-construction, re-configuration of driveways, site accesses, temporary and permanent drains, pipe conduits and necessary connections for public lighting and traffic lighting, earth Works, turfing, environmental assessments, necessary safety measures and protection Works, sewer lines etc., which may extend beyond the Contract limits for the necessary completion of the Works. The Contractor shall be deemed to have allowed this in his Contract sum and his baseline program as no claim on account of this provision will be entertained by the Employer.

Annex–7–B–II

Availability of Site

II.1 AVAILABILITY OF SITE

II.1.1 The Contractor shall note that other Contractors may be working along _____(place)____ (as applicable) and its vicinity at the commencement of the Contract. The Contractor shall liaise closely with these Contractors on the interfacing Work and proper handling over of the site. He shall schedule his baseline program to ensure that the whole project can be completed within the Contract period.

II.2 ACCESSIBILITY TO THE SITE

II.2.1 The Contractor shall be deemed to have acquainted himself with the actual location and conditions of the site and allow for any contingency with regard to the means of access and any special site restrictions including making good all Works disturbed or damaged to match the existing.

11.2.2 The Contractor shall ensure that all approved accesses shall not impose any constraints and hazard to existing establishments, other Works by other Contractors, or adjoining Contracts. If such accesses are required to be re-located, deleted or closed as may be directed by the Engineer, the Contractor shall do so at no costs and loss of time to the Works.

II.2.3 Creation of any access shall not be permitted without approval from the authorities concerned (as applicable) [_____, _____, _____,] _____] other relevant authorities, and the Engineer. The Contractor shall be responsible for seeking such approvals if he wishes to secure such accesses and comply with all conditions and requirements including all necessary protection to existing drainage facilities, landscaping, services etc. that may be imposed.

II.2.4 In cases where the Contractor requires land outside his Contract boundary to carry out construction Works such as construction of temporary site access etc., the Contractor shall liaise with the owners of the properties for the temporary use of the land. He shall comply with all the requirements of the landowners, pay all necessary charges, reinstate and return the land to the respective owners at the end of the stipulated period of usage. Any additional tree felling needed due to the above Works shall only be carried out with the prior approval from the Engineer and the relevant authorities.

II.2.5 The Contractor shall provide proper access to the Work site for Engineer's inspection of the Works and make his own arrangements – subject to the Engineer's approval – for provision of all necessary temporary footbridge / footpaths, crossing over the existing Drainage Reserves and any protection measures during the course of the Works.

II.3 WORKSITE ACCESS CONTROL

II.3.1 The Contractor and his Sub-Contractors shall provide all personnel with distinctive badges showing the Contractor's name and the employee's name and / or number. Each employee of the Contractor shall display his badge in a prominent manner while on the site. The Contractor shall establish a system of badge control acceptable to the Engineer.

II.4 SITE RESTRICTIONS

II.4.1 The Contractor shall carry out his own investigation and shall pay attention to the site constraints within the Work area. He shall note that in general, restraints would be imposed on the working hours, noise levels produced, environmental pollution, access requirements etc.

II.4.2 The Contractor shall be deemed to have visited the site, have familiarised himself with site conditions and have understood local conditions, the full extent and character of the Works,

the supply of and conditions affecting labour and probable adverse effects of the weather on the general execution of the Contract before tendering as no claim would be entertained for delays or designs or methods of constructions because of unforeseen circumstance(s) arising out of the Contractor's lack of knowledge of these conditions.

11.4.3 The Contractor is advised that there may be other Contractors, Government or Statutory Bodies working in the same area. He shall ensure that there is no interference with the Works of such other Contractors, Government or Statutory Bodies and shall maintain close liaison with them and allow this in his Work programme such that his own Works can progress in a smooth and satisfactory manner. The Employer will entertain no claim on account of this provision.

11.4.4 The Contractor shall note that no vehicles, equipment and any temporary staging Works are allowed to station at / occupy the drainage reserve unless prior written approval has been given by the public authority / public authorities concerned (where applicable) and by the Department(s) concerned of the of Urban Local Body (ULB) / Competent Authority concerned .

11.4.5 The Works must be carried out with minimum noise and no nuisance in any form will be tolerated. No inconvenience should be caused to the occupants residing in the vicinity. The Contractor shall maintain all existing local access. All entrances and exits to and from existing properties shall be kept open at all times throughout the duration of the Contract. The Contractor shall also provide alternative / additional access (if required to do so).

11.4.6 The Contractor shall note the pedestrian flow on-site and make his own arrangements for provision of any alternative / additional temporary footpaths, crossings, protection etc. during the course of the Works – subject to the approval of the Engineer.

11.4.7 All Works must be carried out with utmost care and caution. No damage shall be caused to any existing wires, cables, service pipes and any part of the existing property. Any such damage shall be made good by the Contractor at his own expense.

Annex-7-B-III

Contractor's General Obligation

III.1 SITE RESPONSIBILITY CHART

III.1.1 The Contractor shall submit, within [____(as applicable)] days after the date of commencement of the Contract, a site responsibility chart to show the functions and responsibilities of various personnel from the Project Manager to the workmen responsible for executing the Works as well as the functions and responsibilities of the Sub-Contractors involved.

III.1.2 The key representatives [Project Manager, Design Co-ordinator, Construction Manager(s), Safety and Health Officer, Environmental Control Officer, Site Engineer(s) and Site Supervisor(s) etc.] proposed by the Contractor shall possess similar work experiences in construction Works as required for this Contract. The Contractor shall submit curriculum vitaes and particulars of the project team including name, designation, appointment, qualification, relevant experience, responsibilities etc. to the Engineer for approval.

III.1.3 The Contractor shall submit an Organisation Chart including but not limited to the following project team members - all full-time on site unless otherwise specified - to manage the Works:

a) Project Manager with at least [____(as applicable)] years of relevant experience and a [____(as applicable)] Degree in Civil Engineering;

b) Site Engineers in Civil & MEP with at least [____(as applicable)] years of relevant experience in respective branches and a [____(as applicable)] Degree in Engineering in respective branches;

c) Planning Engineer with at least [____(as applicable)] years of relevant experience with a Degree in Civil Engineering;

d) Plant Engineer with Degree / Diploma in Mechanical Engineering with [____(as applicable)] years of relevant experience respectively;

e) Quality Controlling Engineer with Degree / Diploma in Civil Engineering with [____(as applicable)] years of relevant experience respectively;

f) Quantity Surveyor Degree / Diploma in Civil Engineering with [____(as applicable)] years of relevant experience respectively;

g) Land Surveyor [____(as applicable)];

h) Safety and Health Supervisor [____(as applicable)];

i) Site Supervisor / Foreman with [____(as applicable)] years of experience in road construction and traffic control with certificate in Pavement Construction and Maintenance awarded by _____Name of the Authority / Organisation (as applicable)_____;

j) Qualified Supervisor for temporary Traffic Control [____(as applicable)];

k) Licensed Cable Detection Worker, whenever required [____(as applicable)]; and

l) Lifting Supervisors [____(as applicable)] with certificate in Lifting Operations awarded by Building _____Name of the Authority / Organisation (as applicable) _____.

III.1.4 The Contractor shall note that the number of personnel specified above is the minimum required for the Contract. The actual number of personnel shall be increased by the Contractor where situations arise in relation to the Works which require more supervision effort.

III.2 SETTING OUT AT EXISTING LEVELS

III.2.1 The Contractor shall take levels and set out for the whole of the Works including other surveying Works throughout the construction and DLP as and when required by the Engineer.

III.2.2 The Contractor shall determine and mark out on site the minimum clearance where the proposed structures cross over the existing carriageways and shall inform the Engineer within [____(as applicable)] month(s) of award of the Contract.

III.2.3 The information on existing levels as shown on the Drawings is provided in good faith for the general guidance of the Contractor. The Contractor is to note that accuracy of information shown on the Drawings is not guaranteed. The Contractor shall visit the site and carry out field surveys if he considers it necessary to ascertain the full extent of the Works.

III.2.4 Within [____(as applicable)] day(s) / week(s) after the commencement of the Works, the Contractor shall submit to the Engineer for his verification and endorsement, records of levels of the existing site condition. Similarly, the Contractor shall submit the as-constructed levels of the site to the Engineer upon completion of the Works. Such records shall be certified and endorsed by a Registered Surveyor engaged by the Contractor at his own cost.

III.3 SITE MEETINGS

III.3.1 The Contractor shall provide all facilities at the site for the purpose of conducting joint site meetings between the Contractor and the Engineer (or his representatives), as well as ensure notice of meetings and participation by all relevant department agencies (as applicable) – [_____, _____, _____,] _____] – to monitor the progress of the Works.

III.3.2 Site progress meetings shall be convened at a minimum of [_____ (frequency as applicable)] a [(as applicable) week / month / year] as well as when arranged by the Engineer. A full progress review will be conducted by the Contractor at these meetings and minutes would be recorded and sent to all Agencies. All the Sub-Contractor' representatives shall also be present at these project review meetings

III.3.3 The Contractor's key representatives (Project Manager, Construction Managers, Safety and Health Officer, Environmental Control Officer and Site Engineers etc.) are required to attend [(as applicable) daily / weekly] pre-work meeting punctually prior to commencement of site activities and submit [(as applicable) daily / weekly / monthly] Works programme to the Engineer [or his authorised representative(s)].

III.3.4 The Contractor will be required to attend meetings as and when notified and he shall make available a responsible person with authority to accept and make decisions and to act on his behalf. All site meetings shall be properly minuted and recorded by the Contractor and a copy of the minutes for each meeting shall be submitted to the Engineer for his record.

III.4 ACCESS FACILITIES FOR CHECKING WORKS

III.4.1 The Contractor shall provide at all times during the execution of the Works and the DLP proper means of access with ladders, gangways, etc. and necessary attendance to move and adapt the same as directed for the inspection or measurement of the Works by the Engineer or his representatives.

III.4.2 The Contractor shall provide all assistance, supply and maintain necessary facilities such as digital camera with adequate flash, close up and zoom lenses, torch, measuring staff etc. to enable the Engineer or his representatives to check and record the progress of Works.

III.5 OBSTRUCTION AT SITE

III.5.1 The Contractor must clear all obstacles which may cause obstruction to the Works. In the case of a parked vehicle, he shall, at the direction of the Engineer's representatives, serve notice to inform the driver to move it from site.

III.5.2 All construction plant and equipment shall not be parked on main roads and shall be moved from site as soon as Work completes. In cases where the construction plant and equipment are left on site for the purpose of Works on the next day, then, subject to the Engineer's approval, the Contractor shall ensure that such items are properly parked and that there is no obstruction to traffic flow.

III.6 NOISE CONTROL

III.6.1 The Contractor shall maintain noise levels for construction premises as stipulated under the 'Environmental Pollution Control (Control of Noise at Construction Site Regulations) (Amended) Regulations' latest and subsidiary legislation and any amendments and / or re-enactment thereto.

III.6.2 All vehicles and mechanical construction plants used for the purpose of the Works shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order.

III.6.3 All compressors shall be sound-reduced models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use and all ancillary pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturer.

III.6.4 All construction plants shall, where appropriate, be muffled and the Engineer shall have the authority to instruct the Contractor to shut down any which is / are not adequately muffled and to remove it / them from the site.

III.6.5 All machines in intermittent use shall be shut down or throttled down to a minimum in the intervening periods between Works. Noise emitting equipment running continuously shall be housed in a suitable acoustic enclosure.

III.6.6 Constructional plant shall be maintained in good and workmanlike condition so that extraneous noises from mechanical vibration, creaking and squeaking are reduced to an acceptable minimum.

III.6.7 Percussive methods will not be permitted for breaking concrete. Equipment which breaks concrete or is used for bending or such other equipment as is approved by the Engineer shall be used.

III.6.8 All pile driving, demolition Works etc. shall be carried out by a recognised noise reducing system. Rotary drills and busters actuated by hydraulic or electrical power shall – where practicable – be used for excavating hard material. Noisy constructional plant shall be sited as far away as possible from occupied buildings. The use of barriers (noise barriers, site huts, acoustic sheds, screens or partitions) to absorb and or deflect noise away from occupied buildings shall be employed wherever possible.

III.6.9 Care shall be taken when loading or unloading vehicles, dismantling scaffolding or moving materials to reduce impact noise. Access to the working areas shall be such as to ensure minimum disturbance to persons in occupied buildings. The Contractor shall not execute any of the Works or carry out maintenance of construction plants in such a manner as to cause

nuisance unless the Work is absolutely necessary to save life or property or for the safety of the Works in which case the Contractor shall immediately advise the Engineer.

III.6.10 The Contractor shall provide all that is necessary, including competent and qualified personnel and suitable equipment for all the measurements and recordings of the noise levels as and when requested by the Engineer during the Contract duration and submit a detailed report including analysis within [____(as applicable)] days after the day of measurements to the Engineer.

III.6.11 The Contractor shall provide and use construction plant and equipment, which have been specifically designed or modified to reduce the noise of normal operation. All-night-work-after-6-pm shall be subject to the approval of the Engineer.

III.7 QUALIFIED PERSON (SUPERVISION) – PMC

III.7.1 The Employer will engage an independent consultant to act as the Qualified Person (PMC) as required under the _____ including any subsequent amendments and subsidiary legislation.

III.7.2 The Qualified Person (PMC) will supervise, review, evaluate and assess the Contractor's proposal for permanent Works, temporary Works, risk analysis report, instrumentation monitoring strategy and other submissions from the Contractor in relation to this Contract.

III.7.3 The Contractor shall provide necessary information and co-operation to the appointed Qualified Person (PMC) so as to enable him to discharge his statutory duties under the _____satisfactorily.

Annex–7–B–IV

Programming and Planning

IV.1 BASELINE PROGRAM

IV.1.1 Within [____(as applicable)] days after the award of the Contract, the Contractor shall submit [____ (no. as applicable)] hard copy / copies and [____ (no. as applicable)] soft copy / copies of a Baseline Program to the Engineer for his acceptance. The Contractor's project manager shall make a presentation of his proposed program to the Engineer to demonstrate his understanding of the Contract requirements, planning, control, monitoring of Works program and resources of the Works.

IV.1.2 Upon acceptance of the Baseline Program by the Engineer, the Contractor shall adhere to it strictly. The Contractor shall ensure that preparation, updating and revision of the program of Works are carried out by experienced and qualified personnel.

IV.1.3 The Baseline Program shall be developed by the computerised Critical Path Method (CPM) using the Precedence Diagramming Method (PDM). The programming software shall be [_____ (as applicable)] – subject to the Engineer's approval.

IV.2 PROGRAM DETAILS

IV.2.1 The level of program development, information and detail shall be sufficient to accurately define the Contractor's intentions and sequence of Works. The program shall show every significant activity required for the completion of the Contract that should include but may not limited to the following:

a) key dates, milestones, interface and handover dates, phased completion and completion of the whole of the Works;

b) Contractor's design (where applicable) including dates for submission to and acceptance by the Engineer;

c) submission and acceptance of road diversion plan, utilities diversion plan, temporary Works and other Works requiring approvals from authorities;

d) procurement of major equipment and material in particular long lead items and the delivery to site;

e) all on-site Works including preliminary and temporary Works by the Contractor, his Sub-Contractors and suppliers;

f) any off-site Work such as the production and / or fabrication of any components or materials;

g) the different stages of traffic diversion and specific requirements with regard to traffic aspects as given in this Specification;

h) interface with Utility Agencies and Work done by Utility Agencies or the Contractor for diversion;

i) interface with other Contracts / Contractors; and

j) any outside influence which will or may affect the progress of Works.

PROGRAM METHODOLOGY

The format and content of the CPM network shall adhere to the following requirements:

a) Activities shall be logically linked in accordance with planned sequence of Works. Lag time when used shall be clearly explained;

b) Program constraints shall not be imposed except those specifically accepted by the Engineer. Full explanations shall be provided to substantiate the need of these constraints. Where the use of constraints is appropriate, constraint types such as "Start No Earlier Than" and "Finish No Later Than" shall be used. Mandatory and zero total float constraints shall not be used;

c) Activity shall be planned with float time except for activities which are subject to constraints beyond the control of the Contractor and where additional resources by the Contractor cannot reduce the duration required for the task. Such activities shall be highlighted and substantiated for the Engineer's acceptance in the programme submissions;

d) Activity description shall be sufficiently detailed to clearly convey the specific geographical location, nature and scope of the Work included;

e) Each activity in the network shall be coded such that activities can be summarised and grouped based on phase, geographic locations and major items of Works; and

f) Each activity shall be cost- and resource-loaded. The cost attached to each activity shall be agreed with the Engineer.

IV.4 PROGRESS REPORT

IV.4.1 Monthly Contractor's report:

a) Not later than the [____ (no. as applicable)] day of each month, the Contractor shall prepare and deliver to the Engineer [____ (no. as applicable)] copies of the Contractor's [____ (frequency – weekly / monthly as applicable)] report with progress photographs (hereafter referred to as the "Contractor's Report") on the execution of the Works in the preceding month. [____ (no. as applicable)] soft copy / copies of the updated Baseline Programme shall also be submitted.

b) The Report shall be typed, printed and bound. It shall be supported by graphics and photographs. Unless the Engineer directs otherwise, the Contractor's Report shall comprise:
- Introduction;
- Monthly progress report;
- Performance report;
- Status report; and
- Narrative report.

IV.5 MONTHLY / WEEKLY / DAILY PROGRESS

IV.5.1 The Contractor shall keep a record of [(as applicable) daily / weekly / monthly] progress of Works on site in the form of colour photographs with appropriate annotations and dates stated;

IV.5.2 The Contractor shall deliver to the Engineer's representative a daily report as to the number of workmen employed on the Works in each trade, etc. and records of delivery notes of all goods and materials delivered to the site;

IV.5.3 Not later than [____ (no. as applicable)] AM on each [____ (day of the week (as applicable)], the Contractor shall deliver to the Engineer a program of the Works he intends to execute in the following week. The program shall be of a format as agreed with the Engineer and shall clearly show the nature of those Works, their locations any significant manpower, material and plant

resource required therefore. The program shall identify the Contractor's personnel who will be responsible for the supervision of the various activities; and

IV.5.4 Not later than [____ (no. as applicable)] AM on each [____ (day of the week (as applicable)], the Contractor shall deliver to the Engineer a program of the Works he intends to execute on that day. The program shall be of a format as agreed with the Engineer and its requirements shall be as those for the weekly program of Works.

Annex-7-B-V

Design Requirement

V.1 SAMPLES OF MATERIALS AND LIGHT FITTING

V.1.1 The Employer will provide additional detailed Drawings as needed and developed during the course of the project's implementation – to guide the Works' details. The Contractor shall supply suggested details and construction Drawings and technical literatures (Specifications, brochures, material data), proposed material samples of items as required in the working Drawings to demonstrate full compliance of the Employer's requirements and specifications or as required to supplement the working Drawings.

V.1.2 All construction Drawings, technical literatures and proposed material samples shall be submitted for the Employer's approval prior to commencement of the Works and before any orders or bulk delivery of the said materials to the site is made. All samples which are approved will indicate the standard to be maintained in the execution of the Works and shall be Engineer-marked and retained by the Engineer until the completion of the Works. In the case of a rejection, further samples shall be submitted until they are approved. The Engineer may reject any material or workmanship, which in his opinion, is not up to the approved standard. All samples submitted shall be deemed included in the Contract sum.

Where reference is made to trade names or manufacturer's catalogue numbers, the Contractor may use any article or material similar and equal to those described only when specifically approved by the Engineer. No claim due to neglect in this respect shall be entertained.

V.2 TRAFFIC SIGNS, ROAD MARKINGS AND ROAD FURNITURE

V.2 The Contractor shall provide all signage, road furniture (including supports and foundations) and road markings in accordance with the details and locations shown on the Employer's Drawings and as specified in the Materials and Workmanship Specification. Thermoplastic materials as per section MoRTH & IRC shall be used for all road markings.

V.2.1 The Contractor shall provide additional signage if deemed necessary in his design or as instructed by the Engineer. The Engineer's acceptance shall be obtained before any installation on site.

V.3 INSTRUMENTATION AND MONITORING

V.3.1 The Contractor shall carry out instrumentation and monitoring Works. The Contractor shall comply with the minimum instrumentation given in the Design Criteria. Upon award of the Contract, the Contractor shall, in addition to the above, propose additional instrumentations to suit his construction method / temporary Works scheme and to ensure the safety and control of the Works subject to the approval of the SO.

V.3.2 The Contractor shall carry out installation of instruments and monitoring of the Works in a timely and safe manner.

Annex–7–B–VI

Safety and Environmental Consideration

VI.1 SAMPLES OF MATERIALS AND LIGHT FITTING

VI.1.1 The Contractor shall throughout the progress of the Works have full regard for the safety, health and welfare of all persons entitled to be upon the site and shall keep the site and Works in an orderly state, appropriate to the avoidance of danger to such persons and shall maintain at his own cost all ventilation, lights, security personnel, fences, warning signs, watching etc. – when and where necessary or required by the Engineer or by any Statutory or other Agency for the protection of the Works or for the safety and convenience of the public or other.

VI.1.2 The Contractor is advised to take note of the **CoC [Section 5]**, which stipulates the demerit points and administrative charges for safety and housekeeping infringements.

VI.2 OCCUPATIONAL SAFETY & HEALTH (OSH) COMPETENCE & RESOURCE ALLOCATION ASSESSMENT

VI.2.1 The employer aims to set a standard of OSH environment consistent with the best international practices for the management of the project.

Annex–7–B–VII

Traffic Control and Road Safety at Work Zone

VII.1 TRAFFIC CONTROL AND ROAD SAFETY

VIII.1.1 The Contractor shall comply strictly with the Specifications given in the code of practice for traffic control at Work zone which sets out the requirements, standards and procedures and provides guidance to implement traffic control plan necessary for carrying out Work activities on the road so as to protect the public, equipment and workmen.

VIII.1.2 The Contractor shall submit detailed construction sequence and detailed traffic diversion schemes including scaled cross-sectional Drawings and layout plans to the Employer for Tender evaluation. All construction sequences proposed by the Contractor shall have primary considerations for the safety of road users. Protective measures shall be presented to the Employer for evaluation and approval before award of Tender.

VIII.1.3 The Contractor shall note the traffic conditions at the site and his proposed traffic diversion schemes shall be based on his investigation and appreciation of the site for the completion of the whole of the Works.

VIII.1.4 The Contractor shall note that the construction methods and schedule of his Works proposed shall not cause any disruption to traffic flow. All accesses to premises affected shall be maintained at all times. Unless authorised in writing by the Engineer, the Contractor shall not be allowed to close off any traffic lane along any existing roads. He shall not be allowed to place anything near or on the carriageway or otherwise cause obstruction near or on the carriageway in a manner which would cause a reduction in the traffic capacity of the road.

VIII.1.5 Closure of any traffic lane or any carriageway required shall be implemented in accordance with the approved traffic diversion scheme for all affected traffic movements.

VIII.1.6 All temporary traffic diversion schemes proposed for the Works shall be provided with a one-to-one replacement of all affected traffic lanes, footpath, pedestrian crossing, bus-stop and other road-related facilities. Alternative pedestrian crossing facilities shall be provided prior to the dismantling of existing facilities.

VIII.1.7 The Contractor shall adhere to the minimum provisions of the Work zone safety as per IRC SP55. The Contractor's qualified Engineer shall submit all detailed temporary traffic diversion schemes for the Works to the Engineer and relevant authorities including the Traffic Police etc. for approval. These proposed traffic diversion schemes shall be submitted in properly scaled engineering Drawings and shall be supported with traffic analysis report. Such Drawings shall include traffic layout plans showing all traffic signs, lane-markings, advance warning and directional signs etc., longitudinal section Drawings and all other Drawings necessary for the implementation of the schemes. The Contractor shall comply with the requirements of all relevant authorities in his implementation of the temporary traffic diversion scheme. The temporary diversion road pavement shall be asphalted or made usable by other equivalent means.

VIII.1.8 The Contractor shall also liaise, co-ordinate with and assist the Employer in scheming and designing the provision of adequate street lighting along the diversion route. Foundations for lamp-posts and all ancillary Works shall be provided by the Contractor.

VIII.1.9 For traffic diversion schemes which are to be implemented for a period of more than [____(as applicable)] months, all lane-markings shall be done in thermoplastic material. Lane-markings for each stage of the traffic diversion shall be maintained and, if necessary, replaced and repainted in good condition at all times to the satisfaction of the Engineer. All existing lane markings affected by the temporary diversion of traffic are to be properly grinded off. Diverted lane / arrow markings must be properly painted and must not be confused with the existing markings.

VIII.1.10 The Contractor shall note that all vehicular impact guardrails or kerbs removed during the construction stage shall be replaced with water filled safety barriers complete with safety reflective discs.

Annex–7–B–VIII

Utility Services

Note:
IRC 98 latest revision to be included
IRC SP55 under revision to be followed

VIII.1 EXISTING SERVICES

VIII.1.1 Prior to commencement of any part of the Works under the contract, the Contractor shall locate (by cutting trial trenches, using cable detector etc.) the exact positions of all existing sewer mains, gas mains, water mains, electrical cables, telecommunication cables and other Utility Services. The Contractor shall take all precautionary measures to prevent damage to the services and minimise all inconvenience to residents during the cutting of trial trenches.

VIII.1.2 Where Utility Services which are in the way of the Works are not diverted or not to be diverted, they must be supported and protected during the construction of the Works. The Contractor shall submit to the Engineer and the relevant Utility Services Authorities, calculations and detailed Drawings, endorsed by an independent professional Engineer – for the necessary support and protection of these services. Any requirement that may be imposed by the Utility Services Authorities in this connection shall be met fully and without compromise. Approval of the Contractor's proposals must be obtained from the respective Utility Service Authorities prior to commencement of Works affecting these Utility Services.

VIII.1.3 The Contractor shall note that the employer will not be responsible for any damage of the existing services caused by the construction Works etc. The Contractor will be liable for any damage to the existing services and carry out the repair Works to the satisfaction of the Engineer and the appropriate Utility Services authorities at his own expense.

VIII.1.4 All relevant Utility Service Authorities shall be kept informed of any changes affecting their services.

Annex–7–B–IX

Drains

IX.1 DIVERSION AND MAINTENANCE OF EXISTING DRAIN

Ix.1.1 Upon award of the Contract and prior to the commencement of the Works, the Contractor shall submit his proposal for the diversion and maintenance of existing drains for the whole period of construction to the Engineer and to the respective authority for approval. The Contractor shall be responsible for the maintenance of the free flow of the drains at all times. At no time shall the Contractor obstruct or reduce the free flow area of the existing canal / drain without the prior approval of the Engineer and respective authority.

IX.1.2 If, in the opinion of the Engineer, the Contractor has not carried out or is unable to carry out such maintenance of temporary drain diversion to his satisfaction, he reserves the right to employ others to carry out such Works and deduct the cost of all such Works from any money due to or to become due to the Contractor.

IX.1.3 The Contractor shall remove all temporary Works as soon as these are no longer required and reinstate the site to its original condition to the satisfaction of the Engineer and respective authority.

IX.1.4 The Contractor shall take all necessary precautions to prevent any damage to the existing culverts and drains.

IX.1.5 Existing drains / culverts / sumps etc. made redundant when the new drains / culverts / sumps are completed shall be completely removed and filled with suitable materials to the satisfaction of the Engineer.

Annex–7–B–X

Maintenance

X.1 MAINTENANCE DURING CONSTRUCTION

X.1.1 During construction, the Contractor shall maintain, keep tidy and make good all carriageways / pavement structures, kerbs, footpaths, lane markings and turfing within the Contract limit to a standard equivalent to existing condition and to the satisfaction of the Engineer. The Contractor shall ensure that free drainage of road carriageways is maintained at all times. Adequate side outlets including scuppers, drop-inlet chambers etc. shall be provided and maintained to facilitate the outflow of the carriageway water. Existing scuppers, road side drains and other carriage drainage facilities shall be kept in an unobstructed and serviceable condition in the interim till the Works are effectively drained by the new carriage drainage facilities such as drop-inlet chambers etc. to be constructed under this Contract.

X.1.2 Additional temporary drop inlet chambers, scuppers to prevent any ponding of water on any part of the carriageway shall be installed where necessary. Construction materials and debris shall have to be suitably placed away from the roadside drains, scuppers and other road drainage facilities to avoid obstruction to these drainage channels. The Contractor shall ensure that the existing structures that are not affected by the Works are properly protected to the satisfaction of the Engineer. He shall provide a system of monitoring the stability and structural integrity of the existing structures and ensure that these are fully integrated in his construction methods for the Works.

X.2 MAINTENANCE DURING & AFTER DLP

X.2.1 The Contractor shall regularly maintain all Works in a tidy and satisfactory condition and shall make good any defect which may appear during the DLP. For painted items of structures and roadside furniture, the Contractor shall provide everything necessary and repaint all such items with 2 coats of approved paints at the end of the DLP. All defects such as rust, chipped or dented surfaces etc. shall be satisfactorily attended to prior to repainting. In this respect, the Contractor shall arrange a joint site meeting with the Engineer before any remedial Work is carried out, and he shall comply with all requirements pertaining to the Engineer. Repainting of road lines, lanes and arrow markings shall not be required during or after the DLP.

X.2.2 The maintenance of trees, plants and grass shall include watering, weeding, fertilising and cutting [_____ (frequency as applicable)] per [(as applicable) week / month / year] as specified and maintaining their growth in a tidy and satisfactory state.

X.2.3 The Contractor shall notify the Engineer prior to commencement and on completion of each trimming of trees, shrubs, turfing etc. in order that a joint site inspection can be made.

X.2.4 Post DLP, maintenance clause is applicable for [(as applicable)] months as per. During this period, the Contractor shall maintain drains, landscaping and other Works to the satisfaction of the Engineer and the Employer.

X.3 INSPECTION OF WORKS DURING DLP

X.3.1 During the DLP of [(as applicable)] months post construction, the Contractor shall carry out [_____ (frequency as applicable)] inspection of the Works for any defects. He is required to immediately rectify all defects determined during the inspection or when informed by the Engineer and complete the rectification Works within the timeframe stipulated by the Engineer.

X.3.2 The Contractor shall also attend [_____ (frequency as applicable)] meetings conducted by the Engineer to monitor the status of rectification Works and to clear any outstanding matters regarding the Contract. All meetings shall be properly minuted and recorded.

X.3.3 [(as applicable)] months before the end of the DLP, the Contractor shall arrange and conduct a joint site inspection with his pertinent Sub-Contractors and suppliers to determine any defective Works. Rectification Work for all the defects identified shall be completed within [(as applicable)] month.

X.3.4 At the end of the DLP, the Contractor shall take all necessary action to ensure that all the Works are free from any defects and in a good and satisfactory condition for handing over to the relevant authorities for maintenance. The Engineer and the relevant authorities shall ascertain the acceptability of the Works to move into the "Maintenance" phase of the Contract.

X.4 PROVISION OF WASH BAY

X.4.1 The Contractor shall provide properly designated area as wash bay at all entrances/exits to the Site and ensure that all vehicles, plant or equipment leaving the Site are properly cleaned before travelling on public roads. The location of the wash bays shall be subject to the approval of the Engineer.

Annex-7-B-XI

Construction

Note: *With reference to the Drawings provided*

XI.1 METHOD STATEMENTS

XI.1.1 The Contractor shall submit comprehensive method statements for all temporary Works before the start of any Works to the Engineer's approval. Submission of this method statement shall be sufficiently (minimum [(as applicable)] weeks) in advance of the construction of the Works to allow adequate time for review, resubmission as necessary and future review. The statement shall clearly identify in details, the Contractor's proposed methods (including machinery / equipment material and other resource needed), sequence of working with necessary plans, Drawings and calculations.

XI.1.2 Designs and Drawings for temporary Works shall be submitted for the acceptance of the Engineer and relevant authorities.

XI.1.3 All temporary Works shall be removed after use and – if not – approval must be sought from the Engineer by justification where required .

XI.1.4 Bentonite slurry waste shall not be discharged into the public sewerage and drainage systems.

XI.2 SITE CLEARANCE AND DEMOLITION WORKS

XI.2.1 The Contractor shall clear site of shrubs, bushes and all other forms of vegetation with the prior permission of the Engineer including grubbing up roots etc. The Contractor shall note that the felling of trees without the written consent of the Engineer is strictly prohibited.

XI.2.2 The Contractor shall demolish and remove with the prior permission of the Engineer all existing structures, obstructions and fixtures made redundant by the Works which are within the overall road reserve or Contract limit and / or related with the proposed Works.

XI.2.3 The Contractor shall break up and remove (or seal up if directed by the Engineer) existing redundant pavement, scupper drains, pipes and backfill with approved materials to the required level unless otherwise indicated.

XI.2.4 The Contractor shall break up existing redundant road kerbs and foundations, cart away debris and backfill with approved materials to the required level unless otherwise indicated.

XI.2.5 The Contractor shall remove debris and surplus earth from the site to a location suggested by the Engineer.

XI.2.6 The Contractor shall raise all other items e.g. boundary walls, fixtures, fences etc. affected by road raising but not specifically mentioned herein including making good all Works affected on completion.

XI.2.7 The Contractor shall reinstate all damaged roads, drains, kerbs, fencing, boundary walls, fixtures and all other Works disturbed to the satisfaction of the Engineer.

XI.2.8 The Contractor shall liaise with Utility Service Departments, Telecommunications operators such as BSNL, Airtel etc. for the location and relocation of all pipes, cables, main ducts, posts, manholes, boxes along or beneath the road reserve or in any part of the Work in order to ensure that all service requirements are met before commencement of the Work.

XI.3 RE-CONSTRUCTION, RE-LOCATION AND REINSTATEMENT WORKS

XI.3.1 The Contractor shall visit the site to ascertain for himself, prior to Tender submission, all Work

items affected by the Works which require raising, demolition, reconstruction, extension or relocation including fence, boundary wall, entrance, gate, driveway, compound drains, posts, lights, sign boards, fixtures, services such as cabling, sanitary, plumbing, sewers, water pipes, landscaping features such as turfing, plants, trees, flower troughs belonging to statutory or private properties etc.

XI.3.2 The Contractor shall liaise closely with the owners of the private houses and shop houses and owners of other private properties on any reconstruction, reinstatement and relocation Works. The Contractor shall plan his construction Works so as to cause minimum obstruction and inconvenience to the owners and the public. The Contractor shall take note of the existing facilities such as tiling, fencing, automatic gate, boundary walls, fixtures, etc. of these houses. At the end of any construction Work, these facilities shall be reinstated to match existing to the satisfaction of the private property owners. The Contractor shall liaise with these owners before carrying out his Work.

XI.3.3 The Contractor shall seek approval from the Engineer before any Work can be carried out.

XI.3.4 The Contractor shall be fully responsible for the suitability, adequacy, integrity, durability and practicality of the design as set out in the Drawings, Specifications, manuals, calculations and other information submitted for the acceptance of the Engineer, including any subsequent amendments of such design.

XI.3.5 The Contractor shall not proceed with the execution of any reinstatement Works until he has submitted to the Engineer, Work method statements, design calculations, Specifications, and other information as shall be necessary to demonstrate the suitability, adequacy, integrity, durability and practicality of such design and the Engineer has issued his acceptance in writing of such design. Acceptance by the Engineer of such submission shall not relieve or in any way limit the responsibility of the Contractor. All such submissions shall be duly endorsed by the Contractor's Professional Engineer (PE).

XI.3.6 Such submission shall be made well in advance to enable the Engineer sufficient time to check, study and comment on the Contractor's proposal without affecting the progress of the Works.

XI.3.7 The Contractor may in the course of his Works be required to execute Works beyond the Contract boundary encroaching into other's properties. The Contractor shall exercise strict control over his workmen not to use or trespass into, any of the properties without prior written permission of the property owners. Any fence or fence walls dismantled should be replaced immediately or other equivalent to ensure the security of affected properties.

XI.3.8 In cases where the Contractor need to enter private land to execute Works where prior permission have not been obtained, the Contractor must obtain the necessary permission from the owners before entering the lands. The Contractor shall complete the Works in the private land within the shortest period and shall not store any material, equipment and plant within the private lands.

XI.3.9 The Contractor shall take precautions to avoid damaging the existing signboards during re-siting. Should any signboard be damaged during the course of the Works, the Contractor shall replace the signboard with a new one to match the existing.

XI.3.10 In executing any of the relocation Works, the Contractor shall make good any deficiency in length, height, amount of materials (e.g. fence, fence walls, boundary walls etc.) with new materials. The Contractor shall also replace all damaged or corroded Works or Works that cannot be relocated satisfactorily (e.g. foundations, walls, cables etc.) to the Engineer's satisfaction.

XI.3.11 The Contractor is required to reinstate all landscaping areas including turfing, any plants or trees affected by the Works. The costs of the reinstatement Works shall be deemed to be included in the Contract sum.

XI.4 SITE CONTROL AND TESTING INSTRUMENTS

XI.4.1 The Contractor shall provide all the necessary labour, plant, tools, instruments and materials for carrying out all tests at the site including the provision of all necessary transport for the transportation of test materials, samples and the Engineer etc. to and from an approved laboratory as and when directed by the Engineer or his appointed site representative.

XI.4.2 The Contractor shall provide penetrometer on site. The Contractor shall maintain this instrument in good condition at all times throughout the Contract period. The instrument must be approved by the Engineer before it is used.

XI.4.3 The following control tests on road sub-grade and sub base shall be carried out by the Contractor in the presence of the Engineer:

a) Minimum [(as applicable)] numbers in situ dry density tests with a Volumenometer at every [(as applicable)] Mtr. intervals per carriageway;

b) Minimum [(as applicable)] number in situ test with a cone penetrometer at [(as applicable)] Mtr. intervals per carriageway; and

c) Any other tests that the Engineer may carry out from time to time during the Contract period.

XI.4.4 If settlement plates and / or markers are required, the Contractor shall maintain, protect and monitor the settlement plates and / or markers until the expiry of the DLP.

XI.4.5 The Contractor shall provide at all times, electronic detectors of an approved brand to be used on site to help in locating Utility Services. It is to be noted that the deployment of the electronic device will not absolve the Contractor his responsibility in locating the exact locations of all existing services and all readings of electronic device are to be confined by cutting trial trenches.

XI.5 FIELD LABORATORY

XI.5.1 The Contractor shall provide and maintain adequately equipped field laboratory as required for site control on the quality of material and the Works. It shall have a minimum of [(as applicable)] Sqm Area. The field laboratory shall be located as directed by the Employer or his approved representative. It shall be provided with amenities like water supply, electric supply, etc.

XI.5.2 The laboratory will have all services, furniture, equipment etc. A minimum of the following items shall be provided in the field laboratory. Any additional items as required for testing / evaluation in line with the standard procedures and codal provisions shall also be provided.

Table: 7.1: General equipment required

	EQUIPMENT	No(s). of unit(s)
a)	Oven – electricity-operated, thermostatically-controlled. Range up to 2,000C, Sensitivity 10C.	1
b)	Platform balance 300 kg. capacity.	1
c)	Balance 20 kg. capacity – self-indicating type.	1
d)	Electronic balance 5 kg. capacity – Accuracy 0.5 gm.	1
e)	Water bath – electrically-operated and thermostatically-controlled with adjustable shelves. Sensitivity 100C.	1
f)	Thermometers: • Mercury- in-glass thermometer. Ranges 0 to 2500C, • Mercury-in-steel thermometer with 30 cm stem. Ranges up to 3000C .	4 (each)
g)	Glass wares, spatulas, wire gauzes, steel scales, measuring tape, casseroles, pans, enamelled trays of assorted sizes, pestle mortar porcelain dishes, gunny bags, plastic bags, chemicals, digging tools like pickaxes, shovels, etc.	As required
h)	IS sieves with lid and pans 450 mm diameter with sizes of 63 mm, 53 mm, 37.5 mm, 26.5 mm, 13.2 mm, 9.5 mm, 6.7 mm and 4.75 mm, 200 mm, diameter of sizes 2.36 mm, 2 mm, 1.18 mm, 600 micron, 425 micron, 300 micron, 150 micron and 75 micron.	1 set
i)	Water testing kit for pH, SO_3 and CL.	1 set
j)	First-aid box.	1

Table: 7.2: Equipment required – Soil & Aggregate

	EQUIPMENT	No(s). of unit(s)
a)	Atterberg's limits (liquid and plastic limits) determination apparatus.	1 set
b)	Compaction test equipment both 2.5 kg and 4.5 kg rammers (light and heavy compact efforts).	1 set
c)	Dry bulk density test apparatus (sand pouring cylinder, tray, can, etc.) complete.	1 set
d)	Speedy moisture meter complete with chemicals.	1 set
e)	Pothole auger with extensions.	1 set
f)	Core cutter apparatus complete with dolly, rammer, etc.	1 set
g)	Flakiness and elongation test gauges.	1 set
h)	Standard measures of 30, 15 and 3 litres capacity along with standard tamping rod.	1 set

Table: 7.3: Equipment required – cement & cement concrete

	EQUIPMENT	No(s). of unit(s)
a)	Slump test apparatus.	1 set
b)	Compression and flexural strength testing machine of 200t capacity with additional diameter for flexural testing.	1 set
c)	Cube moulds for concrete tests.	40 nos.
d)	Surface moisture and density meter for soil aggregate and concrete.	1 no.

XI.6 MONITORING WORK ON ADJOINING PROPERTIES / STRUCTURES AND SURROUNDING GROUND

XI.6.1 The Contractor shall provide and implement an program to monitor the effect of excavation, demolition and compaction Works or existing structures, including supply, installation, monitoring, maintenance of all submissions of all results by a professional engineering consultant, etc. all in accordance with the Materials and Workmanship Specification.

XI.6.2 The Contractor shall submit his detailed instrumentation program and locations for the adjoining properties / structures, proposed structures and surrounding ground to the Engineer and the relevant authorities for approval prior to commencement of Works.

XI.6.3 The duration of the instrumentation period shall be the Contract period including any extension of time and the whole of DLP.

XI.6.4 Survey bench marks and datum readings of all instruments must be taken before commencement of any Works. No excavation Works, demolition Works and compaction Works shall commence until the instrumentation programme has been approved and all necessary instrumentation are properly installed, calibrated and functioning.

XI.6.5 Provisional quantities have been set aside for the type of instruments and monitoring requirements. The Contractor shall price his rates against the provisional quantities items. If the Contractor requires any additional instrument other than those specified in the provisional quantities, the Contractor shall include all costs and the required number of such instruments in the item under the breakdown of Costs. The Contractor is deemed to have included all costs and number of any additional instruments in his Contract Sum. No claim on account of this clause will be entertained by the Employer.

XI.6.6 The monitoring system must include its own independent power supply and no reliance should be placed on obtaining power supplies from the surrounding buildings or other public facilities and utilities.

XI.6.7 The Contractor shall be required to carry out additional monitoring in critical situations where the Engineer deems that the safety of the surrounding structures, adjoining properties, proposed structures and public is at risk. Under such circumstances, the Contractor shall out the monitoring Work at a frequency of [_____ (frequency as applicable)] a [(as applicable) week / month] or as requested by the Engineer and to mobilise additional suitable equipment and trained personnel within [_____ (as applicable)] hours of receiving instruction from the Engineer. No claims for extra cost or time incurred by the Contractor as a result of such additional monitoring Work shall be allowed.

XI.6.8 The Engineer reserves the right to increase the frequency of monitoring of some or all the instruments as he deems necessary. The Contractor is deemed to have made all due allowance(s) in his Tender in compliance with this requirement.

XI.6.9 The Contractor shall monitor all readings taken and submit a detailed assessment report duly endorsed by his PE for the Engineer's approval. The Contractor shall submit to the Engineer the raw readings within [_____ (as applicable)] hours after the readings are taken. The detailed assessment report shall be submitted within [_____ (as applicable)] days after the readings are taken. Readings taken from instruments found disturbed or damaged will not be accepted by Engineer and no payment shall be made for such defective Works. All costs associated therewith shall be deemed to be included in the Contract sum.

Table 7.4, below, depicts the minimum frequency of readings to be taken for the instrumentation programme during the construction period.

Table 7.4: Minimum frequency of readings for instrumentation programme during construction period

INSTRUMENT TYPE	MINIMUM FREQUENCY DURING CONSTRUCTION PERIOD
Inclinometer	Twice a week
Tiltmeter	Twice a week
Crackmeter	Twice a week
Ground settlement points	Daily
Building settlement points	Daily
Vibration sensors	To be decided by engineer based on activities

XI.6.10 For the avoidance of doubt, construction period shall mean period from the commencement date stated in the LoA up to the date of substantial completion.

XI.6.11 The minimum frequency of readings to be taken for the instrumentation program during the DLP shall be [_____ (frequency as applicable)] a [(as applicable) week / month], subjected to the approval from the Engineer.

XI.6.12 The Contractor shall provide, install and protect all instrumentation equipment installed and in use during the Contract period including removal upon completion. Any instrumentation equipment found not in working condition shall be replaced by the Contractor immediately upon detection and all replacement cost shall be deemed included in the Contract sum.

XI.6.13 The appointment of the geotechnical instrumentation specialist by the Contractor shall be subject to the Engineer's approval.

XI.6.14 The Contractor shall submit [_____ (no. as applicable)] sets of [_____ (frequency as applicable – weekly / monthly)] interpretive monitoring report analysed and interpreted by the PE for temporary Works. The PE for temporary Works shall also prepare a report duly endorsed by him and make recommendations, if any, regarding prevention of damage to surrounding structures and services and the safety of the Works. The Contractor shall carry out the PE's recommendation immediately at his own cost.

XI.7 TEMPORARY WORKS

XI.7.1 The Contractor shall employ a PE to design the temporary Works. The PE responsible for the design of temporary Works shall be an independent person / consultant – not under direct employment of the Contractor's firm. The PE must be registered with the [Name of Municipal Corporation / Municipality / City Council / Notified Area Authority (as applicable)] or a technical body like, the Indian Institute of Engineers etc. He shall be responsible for submission to the relevant authorities for approval of the temporary Works for construction. The PE shall inspect all temporary Works and ensure compliance with requirements in the design and as stipulated by the relevant authorities. He is also responsible for recommending and implementing any modification and rectification of the temporary Works as necessary – subject to the Engineer's approval.

XI.7.2 [_____ (no. as applicable)] copies of the design submissions shall be given well in advance of the date indicated on the construction program for the commencement of the activity. The Contractor shall allow for sufficient lead time in obtaining the necessary approvals from relevant authorities and clearance by QP (Supervision) engaged by the Employer. The Contractor shall make all amendments or corrections which the Engineer may require and re-submit the amended or corrected submissions until the Drawings and / or calculations are finally accepted and approved by the relevant authorities.

XI.7.3 The Contractor shall submit his PE Certificate stating that the temporary Works have been constructed according to the design for all stages of Works. The PE must comply with the conditions as laid down in the Contract Document. The PE shall ensure adequacies in the structural elements at all stages prior to proceeding to the next stage of Works and to conduct regular inspections on all temporary Works.

XI.7.4 Works shall not commence without the prior acceptance of the Engineer. If in the opinion of the Engineer and / or QP (Supervision) engaged by the Employer, any such temporary support proposed by the Contractor is deemed to be insufficient, the Engineer may order the provision of additional supports entirely at the Contractor's own expense. Any such instructions and / or acceptance of the Contractor's design proposal for the temporary Works given by the Engineer and / or QP (Supervision) engaged by the Employer shall not relieve the Contractor of his

responsibility for the proper design and safe execution of the temporary Works and for the safety of all personnel.

XI.7.5 The design of all temporary Works shall comply with the requirements of the design criteria and Materials and Workmanship Specification for civil & structural Works. All temporary Works shall be designed to the similar standards as the permanent Works unless otherwise accepted – in writing – by the Engineer.

XI.7.6 The Contractor shall note that all existing traffic movement at all existing roads shall be maintained during the period of construction. The Contractor shall note that no temporary / false Work shall be erected on the roadway including the centre median.

XI.7.7 Monitoring of the movement of Utility Services shall be proposed for the acceptance of the Engineer and the relevant Utility Agencies.

XI.7.8 Whilst the Engineer will attempt to respond to such submissions speedily, the Contractor shall in no case assume that it can be undertaken in less than [_____ (no. as applicable)] working days.

XI.7.9 The Contractor shall inspect the temporary Works, supervise the loading of the temporary Works and ensure the design criteria are not invalidated.

XI.7.10 The Contractor shall ensure that the removal of the temporary Works does not cause adverse effects on the completed structures, adjacent structures, roads and other properties and that full compliance with the dismantling proposals recommended by the PE (and approved by the Engineer) are met.

XI.8 EARTH WORKS

XI.8.1 The Contractor shall carry out earth Works to the required lines and levels, forming verge and embankments, including grading, levelling, trimming, ramming and consolidating all as specified and as shown on the Drawings.

XI.8.2 The Contractor shall note that all levels stated in the Drawings are for information only. The Contractor is advised to verify the actual level(s) at the site. He shall be deemed to have priced his Tender based on the actual level(s) at the Site.

XI.8.3 Fill shall be of approved earth material obtained from Contractor's own sources. The Contractor shall obtain the Engineer's approval prior to using his earth filling materials for the Works.

XI.8.4 The Contractor shall remove all surplus excavated materials from Site to the Contractor's own dump.

XI.8.5 The Contractor shall be deemed to have taken into consideration difficulties due to the soil conditions affecting piling, concreting, etc. for the Works. The Contractor shall make his own arrangement such as providing temporary sheet piling, water pumps, temporary drains and temporary soil stabilising necessary to overcome the problem of water and vibration during the construction.

XI.8.6 The Contractor shall note that certain parts of the existing areas within the Contract Limit (i.e. the low lying areas) would need to be backfilled up to the appropriate level before constructing the road Works. Earth filling shall be with approved earth obtained from the Contractor's own source. Earth filling shall be placed and compacted in layers to the required levels. The Contractor shall seek the approval of the Engineer on the extent of area to be backfilled. He shall ensure that the backfill materials, method of backfilling and workmanship are to comply

strictly with the Materials and Workmanship Specification for Civil & Structural Works.

XI.8.7 Where excavation Works are to be executed under existing carriageways, for instance, construction of box culvert, the Contractor shall design and erect steel decking fit for the purpose subject to Engineer's approval. The design of the steel decking shall be endorsed by a PE and the installation supervised and checked by the PE at the Contractor's own costs.

XI.8.8 Where cutting of ground is to be executed next to existing structure, the Contractor shall submit method statement including stability check, protective measures and monitoring details to be duly endorsed by a PE prior to commencement of excavation. The Contractor shall monitor all readings taken and submit a detailed assessment report duly endorsed by his PE for Engineer's approval. All costs associated therewith shall be deemed to be included in the Contract sum.

XI.9 SLOPE CUTTING WORKS & REINSTATEMENT WORKS

XI.9.1 The Contractor shall ensure proper safety measures are taken during the whole period of excavation Works or related Works.

XI.9.2 The Contractor shall fully indemnify the Authority at all times against all liabilities of whatever nature and description which may be suffered by the Employer arising from the slope cutting Work in / on State land.

XI.9.3 The Contractor shall make good all Works affected to the satisfaction of the respective developers or landowners after slope cutting Work in / on State land.

XI.9.4 The Contractor shall be responsible to reconstruct all boundary walls, fencings, fixtures, access roads, entrances / exits, footpaths, open drains and other facilities at the affected area after slope cutting Work.

XI.9.5 Reinstatement Works shall be done in regular sections and in good workmanship to match the surrounding areas.

XI.9.6 The Contractor shall liaise with the respective landowners or authorities for site inspection before commencement of Work and after the completion of the reinstatement Works.

XI.9.7 The DLP of [_____(as applicable)] months shall commence upon the successful handing over of the above Works to the respective owners.

XI.9.8 The Contractor shall be responsible for the design and construction of all excavation systems. The Contractor shall engage a PE who is experienced in Geotechnical Engineering to design and supervise and check on the excavation systems. It is the Contractor's responsibility and duty to conduct site investigation at his own expense to satisfy himself of the soil conditions of the site for the purpose of design and construction of the excavation systems. The Contractor shall engage a qualified Engineer to provide standing supervision of all excavation Works at the site.

XI.9.9 The design of the excavation system shall take into consideration the use of suitable methods of installation of wall element and bracing system to minimise ground settlement, vibration of the surrounding structures and particularly heaving of the area. The methods and sequence of construction shall be clearly indicated.

XI.9.10 The Contractor shall take every precaution during excavation to prevent base heave and piping. Any damages to completed Works and surrounding structures caused by bases heave or piping shall be made good at the Contractor's expense and to the satisfaction of the Engineer.

XI.9.11 Excavation shall be carried out in stages strictly in accordance to the proposed excavation method. Under no circumstances shall the Contractor be permitted to over excavate at any location of the excavation. Any over excavation shall be immediately backfilled with approved materials to the required level.

XI.9.12 The Contractor shall immediately provide additional support or bracing to the wall if there is any sign of movement approaching the allowable limit and review the design. All such provisions shall be made at the Contractor's expense.

XI.9.13 The Contractor shall note that all Work program and construction method are also subject to the approval of the other relevant authorities. He shall fully comply with all requirements, rules, regulations and bye-Laws. The Contractor shall be deemed to have allowed for the time required for authorities' clearances in his programme and shall pay any dues as need for any license or other concessions granted.

XI.9.14 The Contractor shall allow in his Tender for any extra costs and expenses that may be incurred due to inconvenience, idling of plants, labour or machinery arising from site, difficulties or obstructions of any form or nature and / or arising from compliance with any rules, regulations, bye-laws and requirements of the relevant authorities.

XI.10 RE-CAMBERING AND RAISING EXISTING CARRIAGEWAY

XI.10.1 The Contractor shall clean and sweep road surface and apply tack coat at the rate of 0.54 lit / Sq.m.

XI.10.1.1 Re-cambering

Re-cambering shall be carried out in accordance with the details of re-cambering for various thicknesses where thickness of re-cambering is less than [_____(as applicable)] mm, the existing carriageway shall be milled off and replaced.

Raising

XI.10.1.2 The Contractor shall supply and lay asphalt hot-mix base course and hot-mix wearing course to the required levels. Where it is not possible to lay the entire thickness of premix required in a single operation, the road surface shall be cleaned and swept and tack coat applied again before laying another layer of asphaltic concrete on the subsequent occasion.

XI.11 RE-SURFACING OF EXISTING CARRIAGEWAY

XI.11.1 The existing carriageway shall be milled off and replaced, wherever necessary, as per the design and Drawings issued to the Contractor.

XI.12 MILL AND PATCH

X.12.1 In milling and patching over at-grade roads, the Contractor shall check for existing services and conduits before proceeding with the Works. Care shall be exercised by the Contractor to ensure that no existing features are damaged in any way during the Works. The Contractor shall submit method statements on how he intends to carry out the Works for the Engineer's approval.

XI.12.2 The milling shall be carried out using mechanical means and the Contractor shall determine the thickness of the premix to be milled off before proceeding with the Works.

XI.12.3 The pre-mixing shall be carried out to the levels as indicated in the longitudinal sections.

XI.13 KERBS AND FOUNDATIONS

XI.13.1 The Contractor shall construct pre-cast concrete kerb as per designs and laid jointed with cement mortar (1:3) to correct line and levels and proper connection to existing, including mass concrete foundation, painting, all as specified and shown on the Drawings.

XI.14 DRAIN WORKS

XI.14.1 As per the structural Drawing issued to the Contractor.

XI.14.2 The Contractor shall construct pre-cast concrete composite channel drain including forming cascade, excavating, laying of sand base and jointing with cement mortar (1:3) to proper line and gradient and close turf on [_____(as applicable)] mm topsoil to all exposed adjacent slopes of drain.

XI.14.3 The Contractor shall construct R.C. circular drains inclusive of precast concrete weather flow channel, concrete benching, hardcore packing, weep holes and aluminum rung to the required lines and gradients including proper connections to drains etc. and all ancillary Works.

XI.14.4 The Contractor shall construct pre-cast / cast in situ concrete box culvert inclusive of pre-cast concrete weather flow channel, concrete benching, hard core packing, weep holes complete with concrete base, quarry dust backfill, parapet and head wall etc. and proper connection to drains, sumps at inlet and outlet ends to the required lines and levels and all ancillary Works.

XI.14.5 The Contractor shall design and construct temporary support to uphold and maintain the sides of earth Work by whatever means considered necessary. He shall be fully responsible for the suitability, adequacy, integrity, durability and practicality of the temporary support. The Contractor shall not proceed with the Work until he has submitted the design of the temporary supports to the Engineer for approval. The design shall be duly endorsed and installation supervised and checked by the Contractor's PE.

XI.14.6 The Contractor shall construct [_____(as applicable)] mm diameter UPVC scupper pipes at [_____(as applicable)] m intervals along both sides of the normal cross-fall carriageway at side tables to the required lines and gradients including forming proper connections to pre-cast concrete drop inlet chambers and ancillary Works.

XI.14.7 All existing scupper drains / pipes made redundant by the project shall also be demolished and removed and the ground backfilled with approved materials to the required levels.

XI.14.8 Where new drains, culverts and sumps are to connect to existing culverts and drains, the Contractor shall submit the connection details to the Engineer for approval before commencement of Work.

XI.14.9 Modification of existing sumps for inlet / outlet connections of drain, culverts etc. to the required levels shall include all ancillary Works.

XI.14.10 The Contractor shall construct pre-cast concrete drop inlet chambers of reinforced concrete, complete with mild steel gratings coated with epoxy primer including forming connections to scupper pipe and installation on site and all ancillary Works.

XI.15 PEDESTRIAN FACILITIES

XI.15.1 As per the Drawings issued to the Contractor

XI.15.2 The Contractor shall note that the notes, Specifications, testing, submission of warranties and

any other requirements indicated in the Standard Details of Road Elements shall be strictly complied with, for all aluminium alloy railings to be installed on Site.

XI.15.3 The Contractor shall construct footpath with interlocking paver blocks as per the Tender Drawing.

XI.15.4 The Contractor shall construct footpath as per the Tender Drawings.

XI.15.5 All intersections shall be appropriately raised to meet the kerb-stone for pedestrian crossings. Strom water drains shall be located at the finish of the intersection slope on all arms to ensure there is proper fall of rainwater into the drains.

XI.15.6 The Contractor shall design and construct pre-cast reinforced concrete circular drain, with supply and install scupper pipes to replace existing ones, and hot dipped galvanised grating with chequer plates.

XI.15.7 The Contractor shall install tactile warning indicators as specified in the Standard Details of Road Elements for footpath ramps. The tiles used shall be homogenous tactile tiles.

XI.15.8 The Contractor shall make good all Works disturbed to the satisfaction of the Engineer.

XI.16 TRAFFIC FACILITIES

XI.16.1 The Contractor shall paint road markings, arrows, etc. with thermoplastic paint.

XI.16.2 The Contractor shall supply and erect directional signs, traffic signs, plastic bollards, raised pavement markers etc. inclusive of support and mass concrete foundations and all ancillary Works as shown on the Drawings. All traffic signs and directional signs shall be of retro-reflective sheeting or approved equivalent.

XI.16.3 The Contractor shall paint road kerbs as shown on Drawings.

XI.16.4 The Contractor shall re-site existing gantry sign, cantilever signs, information signs, directional signs and traffic signs affected, including cleaning the existing signs and erect at the new positions, inclusive of mass concrete foundation and all ancillary Works as shown on the Drawings. The Contractor shall make or replace any damaged signs to the satisfaction of the Engineer.

XI.16.5 The Contractor shall price for the removal / relocation of existing street lightings, sign boards, street furniture and / or other road facilities which belongs to the private owners that fall outside the road reserve subject to the approval of the respective land owner.

XI.17 REFLECTIVE SHEETING AND RAISED PAVEMENT MARKER

XI.17.1 The Contractor shall comply with Specifications for reflective sheeting and raised pavement marker in the Materials and Workmanship Specification.

XI.17.2 The Contractor shall supply and erect directional signs, traffic signs, plastic bollards, raised pavement markers, delineators, median markers etc. inclusive of support and mass concrete foundations and all ancillary Works as shown on the Drawings. All traffic signs and directional signs shall be of retro-reflective sheeting or approved equivalent as per IRC:67-2012 supplied and installed by the manufacturer of Retro Reflective ASTM Type XI sheet or their Indian subsidiary.

XI.18 REFLECTIVE SHEETING AND RAISED PAVEMENT MARKER AND ROAD FURNITURE

XI.18.1 The Contractor shall comply with Specifications for reflective sheeting and raised pavement marker and other road furniture such as delineators, median markers in the Materials and Workmanship Specification.

XI.19 VEHICULAR IMPACT GUARDRAILS

XI.19.1 The Contractor shall construct all vehicular impact guard rail including foundation to complete details as shown in the Drawings.

XI.20 WORKS IN CONJUNCTION WITH SERVICES

XI.20.1 The Contractor shall supply and lay [_____(no. as applicable)] no. of [_____(as applicable)] mm diameter Heavy Duty UPVC pipes along the side tables and [_____(no. as applicable)] nos. [_____(as applicable)] mm Heavy Duty UPVC pipes at depth below road level across junction, with fish-wire going through it and both ends of pipe to be temporary sealed and reinstate trenches.

XI.20.2 The Contractor shall supply and lay cable warning slab over UPVC pipes as shown in the Drawings.

XI.20.3 Notwithstanding the other provisions under the Contract, the Contractor shall be required to raise or lower all existing manholes (except telecom manholes), sumps affected by the Works to the final level where necessary. The Contractor shall engage a licensed plumber to carry out the Works and liaise with the relevant authorities for all necessary submission and approval. The Contractor is deemed to have included in his Tender for all costs arising out of the aforesaid Works.

XI.21 REQUIREMENTS FOR DESIGN MIXES

XI.21.1 The Engineer reserves the right to instruct the Contractor to modify and improve the mix design from time-to-time during the progress of Work as and when he considers necessary to meet the requirements for design mixes. This shall not entitle the Contractor to any extra payment.

XI.22 CONSTITUENT MATERIALS OF CONCRETE

XI.22.1 The Contractor shall allow in his Contract sum the provision of materials for tests and delivery to approved Empanelled and accredited laboratories. Testing fees shall also be borne by the Contractor.

XI.23 FORM WORK

XI.23.1 Notwithstanding the acceptance by the Engineer, the strength and adequacy of the form Work shall remain the responsibility of the Contractor and / or his PE.

XI.24 OTHER ITEMS

XI.24.1 The Contractor shall paint all exposed metal parts with two coats of primer, one undercoat and two finishing coats of synthetic enamel paint unless otherwise stated.

XI.24.2 The Contractor shall allow for all other items referred to in the Specifications and Drawings but not specifically covered under items mentioned above and items not specifically mentioned in the documents but otherwise necessary for the completion of the Works.

Note: For detailed Specification [_____(No. as applicable)] can be referred.

Annex-7-B-XII

As-Built Drawings

XII.1 The Contractor shall within [_____(as applicable)] months after the completion of the Works provide the following documentation:

a) As-constructed site plan / As-built topographical survey, inclusive of retained topographic features within the Contract boundary {[_____(scale as applicable)]};

b) As-constructed longitudinal section plan {[_____(scale as applicable)] for horizontal alignment and {[_____(scale as applicable)] for vertical alignment};

c) Setting out plan {[_____(scale as applicable)]};

d) As-constructed traffic plan {[_____(scale as applicable)]};

e) As-constructed civil and structural plans of all structures, these shall be submitted progressively upon completion of the structures; and

f) As-constructed drains submission.

XII.1.1 The as-constructed Drawings shall be prepared in accordance with the Employer's Drawing and Computer Aided Drafting (CAD) Standards (Auto-CAD) to be issued to the Contractor upon award of the Contract.

XII.1.2 The above plans shall be prepared in either Two-Dimensional (2D) or Three-Dimensional (3D) CAD format (DWG File). The as-constructed site plan and setting out plan shall be endorsed by a registered surveyor and other plans endorsed by a PE.

XII.1.3 All the Drawings shall be submitted to the Engineer within [_____(as applicable)] after completion of Works in the following format:

a) Master Transparency;

b) [____ (no. as applicable)] set(s) of paper prints in A1 / A0 size and [____ (no. as applicable)] set(s) of paper prints reduced to A3 size. All the A3 size Drawings should be properly ring bound with plastic sheet cover;

c) [____ (no. as applicable)] set(s) of the softcopy in Compact Disc (CD)/ pen drive; and

d) [____ (no. as applicable)] set(s) of A1 size paper prints marked up structural Drawings that indicate clearly the actual as-constructed details for all structural elements. These Drawings shall include that of vehicular bridge, box culvert, pile and pile cap etc. The marked up Drawings shall be clear, accurate and legible to the SO's satisfaction.

Annex–7–B–XIII

Electrical Specifications

XIII.1 SCOPE

XIII.1.1 Supply, erection, testing & commissioning of energy efficient street lighting with LED fixtures having die cast aluminium body, IP66 tightness, each up to 115W with extra clear glass & hot dip galvanised octagonal poles complete with other accessories & components.

XIII.1.2 The successful Contractor shall submit computer calculated lux levels giving the maximum possible uniform illumination achieved for the area with specified light fittings. Illumination quality criteria shall be as given in Table 7.2 below:

Table 7.5: Illumination quality criteria

Sr. No.	Road	Average Illuminance	Overall Uniformity Main Carriage way	Min/Max, Main carriage way	Pole height above ground
1					
2					
3					
4					
5					
6					
7					
8					

XIII.1.3 All pedestrian lanes & cycle track shall preferably have average luminance not less than 5 lux with overall uniformity not less than 0.2.

XIII.1.4 Maintenance factor for IP66 LED fixtures to be considered should be 0.8.

XIII.1.5 Materials: The Contractor shall submit samples of each type of fitting / pole / item and obtain the approval of Consultant / Engineer in charge in writing for all the materials / equipment etc. to be used by him prior to supply and installation. Equipment / Material damaged in course of handling, installation or testing shall be replaced by the Contractor without any additional charges and subject to approval of Engineer-in-Charge.

XIII.2 FIXTURE SPECIFICATIONS

XIII.2.1 High power LED street light luminaire equipped with photometric engine which offers a high-performance photometry. The luminaire shall have 48 LEDs driven at 700 mA. The average power consumption shall be 113 W. The LED's will be of neutral white. The luminaire shall have a minimal nominal flux of 9600 lumens & shall have IP66 optical compartment sealed by an extra-clear toughened glass protector for an optimal luminous flux. The control gear / driver compartment shall have IP66 tightness level. The luminaire shall be made of sustainable and recyclable aluminium die cast materials. The glass protector should have IK08 impact resistance. 90% lifetime residual flux @ 60,000 hours, at Performance Temperature of 25 degree C, Luminaire should function normally up to ambient temperature of 40 degree C.

XIII.2.2 Other features include:

a) Direct access to gear and electronic compartment

b) Surge protection up to 10kV

c) Universal modular mounting: Inclination adjustment system on-site.

d) Side-entry or vertical mounting.

e) LED Fixtures shall be guaranteed for [_____(as applicable)] years against any manufacturing defect and performance.

XIII.2.3 The LED luminaire should offer the following advantages:

a) Long LED service life and reduced maintenance costs

b) Recyclable and durable materials, such as glass and aluminium

c) Compliance with "Green Light" label.

XIII.2.4 The fitting shall have colour: AKZO light grey 150 sand-blasted or as required

XIII.3 CHARACTERISTICS OF LUMINAIRE

XIII.3.1 Tightness of electronic & optical compartment: IP66. Driver & optical compartments should be thermally separated for better thermal management.

a) Protector: Extra clear glass;

b) Impact resistance (glass): IK 08;

c) Rated voltage: 230 V - 50 Hz & wattage per luminaire should be within 113 W;

d) Electrical class: I or II.

XIII.4 POWER SUPPLY OF LED LUMINAIRE

XIII.4.1 The luminaire shall be equipped with constant current power supplies. They ensure an efficiency of 90% and fulfill the SELV regulations (Safety Extra Low Voltage).

XIII.4.2 The supply current shall be limited to 700mA for optimal LED efficacy and maximum life time of the equipment.

XIII.4.3 Driver compartment should also be equipped with surge protector up to 10 kV against unpredictable power surges.

XIII.5 POLES

XIII.5.1 Supply of Octagonal Poles 7 or 8m Height above the ground shall be fabricated out of HT steel, single hot dip galvanised as per BS EN 10025, S-355 or the applicable Indian standards . Bottom diameter Of pole shall be 135 mm A / F, top dia.70 mm A / F, thickness-3mm & Base Plate 225 mm x 225 mm x 16 mm thick along provision for pole top mounting of luminaires.

XIII.5.2 PCC foundation for the poles shall be inclusive of excavation, pcc, centering shuttering, cable lead in and lead out pipes, grouting bolts as required, making good etc. as required complete.

XIII.6 CABLES

XIII.6.1 Standards: Cables shall conform to the following standards except where specifically stated otherwise. The following list records those IS in force, which are acceptable as good practice and accepted standards.

SP 30: 1984	:	National Electrical Code
SP 7 (Group 4): 2005	:	National Building Code
IS 1255: 1983	:	Code of practice of installation and maintenance of armoured cable up to 33 kV
IS 3961: Part 2: 1967	:	Recommended current ratings of PVC cables.
IS 1554: Part 1: 1988	:	PVC insulated (heavy duty) Electric cables: Part 1 for working voltages up to and including 1100 Volts (V).
IS 1554 : Part 2 : 1998	:	PVC insulated (Heavy duty) Electric cables: Part 1 for working voltages up to and including 3.3 kV to 11 kV
IS 10810: Part 63: 1993	:	Method for Test of cables, part 63 smoke density of electric cables under fire condition.

XIII.6.3 The cables shall be reputed company from approved supplier. If there is any doubt about the authenticity of the cables supplied, the Engineer-in-Charge will send a sample of the cable to a Government-approved laboratory for testing and all expenses incurred for this purpose will have to be borne by the Contractor. The Engineer-in-Charge may also send for verification a sample of the cable along with the test certificates and excise duty gate passes, to the Company claimed to have manufactured the cable.

The cables shall be supplied, inspected, laid, tested and commissioned in accordance with Drawings, Specifications, relevant standard Specifications and cable manufacturer's instructions.

Annex–7–B–XIV

Water Supply and UGD Specifications

XIV.1 GENERAL

XIV.1.1 SCOPE OF WORK

The scope of Work under this Contract includes the following:

a) Laying of various dia MS pipeline including providing MS pipes of specified thickness with cement lining and Corrosion resistance tape wrapping;

b) Manufacturing, providing, transporting, testing & commissioning of various dia MS specials as per site requirement;

c) Fixing and connecting all pipelines fixtures like valves, bends, tees and other specials as specified in the construction Drawings, construction all appurtenant structures such as pipe supports, valve chambers, thrust blocks etc;

d) Testing and commissioning of the pipe line after laying;

e) Maintenance of all the pipelines for 24 months after commissioning. During this period, the Contractor has to set right the defect of any kind in the manufacture, laying and jointing of all the pipelines and in the other Works in this scope of Tender;

f) All Work shall be done as per the specifications. The Works shall include providing all materials, equipment, labour, tools, plants, transport etc., and all other services necessary for the complete construction including necessary sub-soil investigations; and

g) The alignment of the pipeline and other typical details of pipe bedding, valve chambers, thrust blocks, pipe supports, and the general arrangement of reservoir are furnished in Drawings. Further details shall be furnished in the construction Drawings during the construction stage if found necessary.

XIV.1.2 ROYALTIES

The Employer shall deduct royalties on materials used in the Works from the progress payments to the Contractor at the rates specified in relevant instruments like _____ including all amendments to them in force as on date as published by Department (Mines) and as illustrated in Annexure-1, attached.

XIV.1.3 SITE ORDER BOOK

The Contractor shall maintain an identical pair of Site Order Books (one marked original and the other marked duplicate) at the Site at all times during the execution of the Works for the use of the Engineer and the Contractor. All instructions issued by the Engineer to the Contractor shall be recorded in both sets of the Site Order Book and shall be signed by the issuer and countersigned by the Contractor. After compliance with the instruction, the Contractor shall record the same in both sets of the Site Order Book duly signed and countersigned by the Engineer. Acceptance of any part of the Work executed by the Contractor shall be subject to verification with respect to compliance of respective instructions of the Engineer through the Site Order Book. The Engineer shall retain the original copy of the Site Order Book while the Contractor shall retain the duplicate one.

XIV.1.4 QUARRY MATERIALS

The Contractor shall be wholly responsible to identify the suitable sources for quarry materials required for the Works, such as earth, sand, stone, muram etc. and to make his own arrangements for collection and transportation of the materials irrespective of the leads and lifts

lifts required. The quarry thus identified by the Contractor should have proper license from the Government of [Name of State / Union Territory / National Capital Territory (as applicable)]. All materials supplied by the Contractor shall satisfy the requirements set forth in the Specifications and shall be subject to the approval of the Engineer. The Contractor shall take this into account while offering his rates and no claims whatsoever shall be entertained for extra costs on this account.

XIV.1.5 INSPECTION AND TESTING

Inspection of Material to be procured
Inspection and certification of all materials used on the Works such as MS plates / pipes and specials, valves, cement, size stones, sand aggregate, lead, rubber gaskets etc., for conformity with specifications of BIS. If insisted, inspection of materials at the manufacture place shall be arranged by the Contractor at his cost including the travelling and accommodation of the inspecting officer.

XIV.1.6 INSPECTION AND CERTIFICATION OF THE VARIOUS COMPONENTS OF WORKS.

Construction of MS pipeline with all fixtures, construction of Valve Chamber including back filling of trench in layers with compaction as specified to ensure that all components of Works are carried out as per Specification and to required standards.
Inspection & Certification of Hydraulic Test on Completed pipe line in reaches as specified.

XIV.1.7 TECHNICAL SPECIFICATIONS

Engineer shall have the right to modify / alter the particular specifications and / or standard specifications at any time which promise to confer equal or better quality than the standard specified in the Tender Document. Such modification or alteration shall be acceptable to the Contractor subject to no additional financial burden on either the Contractor or the Employer.

XIV.1.8 STORAGE OF MATERIALS AND PLANT

The Contractor shall provide appropriate storage facilities for materials like cement, steel, aggregates, consumable supplies, equipment, mechanical and electrical items, etc. and shall take all safety and security measures against theft and deterioration in quality – at his own cost.

XIV.1.9 PROCUREMENT OF MATERIALS:

Cement: The Contractor shall use only 43 grade cement conforming to IS 8112 / 89 with latest amendments with ISI mark. The Contractor should furnish the manufacturer test certificate for the above brand of cement for having manufactured the cement as per relevant BIS and guarantee certificate before using the cement.

Steel: The Contractor shall procure the steel from VISL / SAIL / VSP / TISCO and manufacturers' test certificate is to be produced.

SL.NO.	DESCRIPTION	MAKE
1	Sluice Valves Conforming to IS 14846/2000	KIRLOSKAR, IVI, FOURESS, DURGA, JASH, JUPITER, BSJ, SHAU, UPADYAYA, CALSEN
2	Butterfly valves – Conforming to IS 13095 / 1991	KIRLOSKAR, FOURESS, IVI, DURGA , L & T, JASH
3	MS plate/HR coil to Manufacture MS pipes Conforming to IS: 2062	SAIL, TISCO,ESSAR STEEL, ISPAT Industries
4	Kinetic Air Valves	KIRLOSKAR, IVI, BSJ, SHAU, DURGA, CALSEN
5	Double Ball Kinetic Air Valves	KIRLOSKAR, IVI, BSJ, SHAU, DURGA
6	Bolts, Nuts and Washers	GKW, TEXSO MAKE, T.V.S. UNBRAKO

Table 7.6: MS pipes, valves and others

Procurement-related stipulations for pipes, valves etc. (Any other reputed makes as may be approved by [Public Authority concerned of the Government of the State / Union Territory / National Capital Territory (as applicable)] at a later date by producing the credentials.). The above branded makes are preferred. In the bid, the bidder should specify the make for which the rate is quoted without which the [Public Authority concerned of the Government of the State / Union Territory / National Capital Territory (as applicable)] can specify any make among the above brands.

Equivalency of Standards and be procured, and Work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards which ensure an equal or higher quality than the standards and codes specified will be acceptable subject to the Engineer's prior review and written approval. Differences between the standards specified and the proposed alternative standards must be fully described in writing by the Contractor and submitted to the Engineer at least [_____(as applicable)] days prior to the date when the Contractor desires the Engineer's approval. In the event the Engineer determines that such proposed deviations do not ensure equal or higher quality, the Contractor shall comply with the standards specified in the documents.

XIV.1.10 SIGN BOARD

The Contractor shall provide a sign board at the site of the Works of approved size and design which provides: a) the name of the Project; b) the names and addresses of the Employer, the Contractor and the Consultant; c) the name and short description of the Project; d) the amount of the Contract Price; and e) the starting and completion dates.

XIV.1.11 SAMPLES AND TESTS

The Contractor shall be responsible to develop a quality control program and to provide all necessary materials, apparatus, instruments, equipment, facilities and qualified staff for sampling, testing and quality control of the materials and the Works under the Contract. Without limiting the generality of the foregoing, the Contractor shall either: a) establish a testing laboratory at the site of Works which is adequately equipped and staffed to carry out all sampling and testing in accordance with the requirement set out in the general specifications and / or these special specifications and provide all field equipment and apparatus as necessary

to conduct all specified in-situ tests and / or any tests on completion, provided the correctness of the equipment are ensured; or b) arrange for routine sampling, testing and reporting - as required through a certified independent testing laboratory acceptable to the Engineer. All costs of such sampling, testing and reporting of test results will be borne by the Contractor and the Contractor shall include sufficient provisions in his tendered rates to allow for independent sampling and laboratory testing under the direction of the Engineer up to [_____(as applicable)]% of the required tests at no additional cost. The Contractor shall furnish certified copies of all test reports to the Engineer within [_____(as applicable)] days of completion of the specified tests.

The Contractor shall, within [_____(as applicable)] days after the date of the Letter of Acceptance, submit to the Engineer for his consent a detailed description of the arrangements for conducting the quality control program during execution of the Works, including details of his testing laboratory, equipment, staff and general procedures. If after submission, or at any time during the progress of Works, it appears to the Engineer that the Contractor's quality control program is not adequate to ensure the quality of the Works, the Contractor shall produce a revised program which will be adequate to ensure satisfactory quality control.

The Contractor shall, within 14 days after the date of the Letter of Acceptance, submit to the Engineer for his consent a detailed description of the arrangements for conducting the quality control programme during execution of the Works, including details of his testing laboratory, equipment, staff and general procedures. If following submission, or at any time during the progress of Works, it appears to the Engineer that the Contractor's quality control programme is not adequate to ensure the quality of the Works, the Contractor shall produce a revised programme which will be adequate to ensure satisfactory quality control.

XIV.2 SLIPS AND SLIDES

The Contractor is responsible for proper protection of excavations made by him from any slips and slides. All slides and caving shall be handled, removed or corrected by the Contractor without any extra compensation at whatever time and under whatever circumstances they may occur. The excavations shall be made good and brought to necessary depth, width and levels without any extra cost.

XIV.2.1 SAFETY MEASURES

a) The Contractor shall provide adequate safety measures during excavation. They shall include:

b) Barricading all sides of the open trenches;

c) Red danger lights which can be easily visible from dusk to dawn placed at an interval of [_____(as applicable)] Mtrs.;

d) Traffic signals and display boards giving direction for diversion of traffic at the appropriate places as may be directed by the Engineer;

e) Adequate safe wooden plank / board or steel plate over the trenches to facilitate crossing by the public residing on either side of the trench; and

XIV.2.2 Round-the-clock watch and ward maintaining all safety regulations at the site of Work and protecting the site from unauthorised intrusions.

PROGRESS OF EXCAVATION OF PIPE TRENCHES

XIV.2.3 The Contractor shall adjust excavation of trenches in such lengths that the pipes can be laid in such exposed portion of the trench within [_____(as applicable)] days.

SHORING AND BRACING

The Contractor shall supply, fix and maintain necessary sheathing, shoring and bracing etc., in steel or wood, as may be required to support the sides of the excavation, to protect workmen in the trench and to prevent any trench movement which might, in any way, injure or delay the Work, change the required width of the trench, make unsafe condition for adjacent pavements, utilities, buildings or other structures above or below ground.

Sheathing, shoring and bracing shall be withdrawn and removed as the backfilling is being done, except when the Engineer may agree that such sheathing, shoring and bracing be left in place at the Contractor's request. In any case, the Contractor shall cut off any such sheathing at least 600 mm below the surface and shall remove the cut off material from the trench. All sheathing, shoring and bracing which are left in place under the foregoing provisions shall be removed in a manner so as to not endanger the completed Work or other structures, utilities or property, whether public or private.

XIV.2.4 WORKS INCLUDED IN EXCAVATION

The following Works as per specifications are also included in excavation and the term 'Excavation' shall construe to mean all such items of Work. The quoted rates should include the same as stated below:

a) Provision of side space or additional space in the trench / pit for working and / or accommodating sheathing, shoring, bracing etc.;

b) Supply, installation and removal after the Work, all sheathing, shoring and bracing required to protect the excavation where required or where such Work is recommended by the Engineer;

c) Protection of excavations;

d) Providing adequate safety measures;

e) Additional Work in connection with overhead wires and poles;

f) Excavation for Socket hallows; and

g) Supplying and fixing of sight rails and boning rods in the trench to facilitate measurement of Work.

XIV.3 BEDDING

XIV.3.1 BEDDING FOR THE PIPE

Bedding shall be provided all along the stretch of the pipe line, which differs based on the area through which the pipe line passes. However, the type of bedding to be provided shall be as decided by the Engineer.

XIV.3.2 EARTH BEDDING

The pipes shall be placed on the natural, undisturbed earth bedding, which has been carefully shaped to fit the lower part of the pipe for a width of at least [_____(as applicable)]% of its external diameter. The trench shall be excavated to an extra breadth and depth, wherever weld joints are coming. Filling and removing earth or similar materials beneath the pipe to adjust with the grade will not be permitted except filling with compacted granular bedding material or *murrum*.

XIV.3.3 GRAVEL BEDDING

Wherever rock is met with, it shall be removed up to [_____(as applicable)] mm below the bottom level of the pipe to a minimum width equal to the width of the trench and the resulting space shall be filled up with good quality compacted gravel. The granular material shall be filled in the trench up to the level of ¼ the outer diameter of the pipe line, above the bottom of trench and well compacted. Unless otherwise directed by the Engineer, rock excavation shall progress at least [_____(as applicable)] Mtr. in advance of the pipe length proposed to be laid.

XIV.3.4 MEASUREMENT FOR BEDDING:

The Contractor shall include the cost of earth bedding required for the pipeline in the tendered rate for pipe laying, for providing gravel bedding. The surplus quantity of excavated earth shall be disposed off. The quantity shall be measured in Cum correct to two decimal points.

XIV.4 BACK FILLING

XIV.4.1 GENERAL

The Contractor shall use selected surplus spoils from excavated materials for backfilling. All fill material shall be subject to Engineer's approval. The excavated materials suitable for backfilling shall be stored not closer than [_____(as applicable)] mm from the edge of the trench and shall not obstruct any public utilities or interfere with travel by local inhabitants or general public. Handling and storage of excavated materials must meet with the regulations of the authorities of Government(s) at that level. The detailed specifications for backfilling shall be as per **Clause 8 of IS: 3114-1994** and **Clause 4.11 of IS 12288-1987**.

XIV.4.2 METHOD OF BACK FILLING

Trenches and excavated pits for structures shall be backfilled to original ground level or to such other levels, as the Engineer may direct. All backfilling shall be carried out in orderly manner expeditiously and consistent with good workmanship.

Backfill material put into the trenches / pits for backfilling, shall unless otherwise specified be compacted and built up as to minimise future settlement as much as is reasonably possible. For this, care shall be exercised in selecting backfill material free from large hard clay lumps, especially, in cramped areas directly adjoining the walls of structures.

Backfilling in trenches shall be done as pipe laying progresses, with the permission of the Engineer, after the pipe or conduit is properly bedded, jointed and inspected and all measurements for the location of Y-Junctions, tees, etc. are properly recorded by the Engineer and sufficient time is allowed for the joint materials or cement concrete or mortar to set. However the joints shall be left open for inspection during testing, which shall be backfilled after successful completion of testing, after obtaining permission from the Engineer. Backfilling around and over the pipe, conduit or structure shall be taken up uniformly on all sides and in the sequence and manner specified hereinafter, with care to avoid the displacement or damage to the pipe, conduit or structure. For the purpose of backfilling, the depth of trench shall be divided into the following three zones measured from bottom to top of trench, as follows:

i. Zone A : From bottom of trench to the centre line of pipe.

ii. Zone B : From the level of centre line of pipe to a level of [_____(as applicable)] mm above the top of pipe.

iii. Zone C : From a level of [_____(as applicable)] mm above the top of pipe to the top of trench.

Backfilling in the trenches and around structures shall be carried out in horizontal layers of uniform thickness of not more than 150 mm when measured loose. As may be necessary to attain maximum compaction, the backfill material shall be moistened by sprinkling with water. After placing each layer of backfill material, the layer shall be thoroughly and uniformly compacted by means of mechanical or hand tampers. The compacting equipment and the manner of its use shall be subject to the approval of the Engineer.

After the backfill material is placed in Zone A and Zone B as specified above, the remaining portion i.e. Zone C of the trench may be machine backfilled. Even in this case the backfill material shall be placed in uniform horizontal layers of not more than [_____(as applicable)] mm thickness. Small pebbles of size less than 50 mm, if any, shall be so distributed throughout the mass, that all interstices are solidly filled with fine material. The backfill material shall be tamped with mechanical tamping equipment, after moistening the backfill by sprinkling with water to obtain maximum compaction (minimum 95% proctor density).
Machine backfill shall be so conducted that the material deposited in the trench shall not fall directly on top of the pipe from such a height as might result in damage to the pipe joints or alignment.

If the trench is subjected to conditions which might cause flotation of the pipe before sufficient backfill has been placed, the Contractor shall take the necessary precautions to prevent floatation of the pipe, conduit or structure.
Before final acceptance of the Work, additional tamped earth shall be added to restore the settled trench surface to the required level of the adjacent earth surface or to the base of crushed rock wearing surface or to the finished earth base.
If from the excavated soil, enough backfill material is not available, imported, selected and approved backfill material from the borrow pits is required to be placed for backfill, on approval of the Engineer backfilling of trenches where the excavation is in the rock shall be with the surplus soft soil, with all lead and lift.

XIV.4.3 DISPOSAL OF SURPLUS EXCAVATED MATERIAL

The excavated material which is in surplus to the requirements after backfilling shall be removed and spread at places shown by the Engineer, with all lead and lift from the site of Work, for which payment shall be made as per the quoted rates. No surplus or excess material shall be disposed in a stream / channel or in any place where the pre-construction surface drainage may have to be provided, without written permission of the Engineer.

XIV.5 MILD STEEL PIPELINE

XIV.5.1 SCOPE

This Specification covers the general requirements for fabrication, laying, testing and commissioning of longitudinal & circumferential welded mild steel SAW pipes above / below ground, including associated civil Works required for the same.

XIV.5.2 STANDARDS

The following specifications, standards, and codes are part of this specification. All standards, specifications and codes of practice referred herein shall be the latest edition including all applicable official amendments and revisions.
In case of discrepancy between this Specification and those referred to herein, this Specification shall govern,

	IS 2062	Steel for general structural purposes
	IS 808	Dimensions for hot rolled steel beam, column channel and angle sections
5	**IS 814**	Covered Electrodes for manual metal arc welding for carbon and carbon manganese steel
5.1	**BS 5155**	Specifications for butterfly valves
	AWSS-5.1	Specification for mild steel covered arc welding electrodes
	IS 3613	Acceptance tests for wire flux combination for submerged arc welding
	AWS: A-5.17	Specification for Bare Mild Steel Electrodes and Fluxes for submerged arc welding
	IS1367	Technical supply conditions for threaded steel fasteners.
	IS2016	Plain washers
5.2	**IS2074**	Ready mixed paint, air dying, red oxide zinc chrome. Priming
	IS1786	High yield strength deformed steel bars and wires for concrete reinforcement
	IS432 (Part-1)	Mild steel & Medium Tensile bars and hard drawn steel wire for concrete reinforcement: Part 1 Mild steel and medium tensile steel bars
	IS432 (Part 2)	Mild steel and Medium tensile steel bars and hard drawn steel wire for concrete reinforcement: Part 2 Hard drawn steel wire
	IS 269	33 grade ordinary Portland cement
	IS8112	Specification for 43 grade Ordinary Portland Cement
	IS8041	Specification for Rapid hardening Portland cement
	IS383	Specification for coarse and fine aggregate from natural source
	IS12330	Specification for Sulphate Resisting Portland cement
	IS 4353	Submerged arc welding of mild steel and low alloy steels recommendations
	IS456	Code for practice for plain and reinforced concrete
	IS800	Code of practice for general construction in steel
	IS816	Code of practice for use of Metal arc Welding for General construction
	IS817	Code of practice for Training and Testing of Metal Arc Welders
	IS1182	Recommended practice for Radiographic examination of Fusion Welded Butt joints in steel plates
	IS2595	Code of Practice for Radiographic Testing
	IS3658	Code of practice for Liquid Penetrant Flew Detection
	IS5334	Code of practice for Magnetic Particle Flaw Detection of welds
	ASTM E 94	Recommended Practice for Radiographic Testing
	ASTM E 109	Dry powder Magnetic Particle Inspection
	ASTM E 138	Wet magnetic Particle Inspection
	IS 483	Recommended practice for Radiographic inspection of fusion welded butt joints in steel pipes
	IS 3589	Specification for seamless or Electrically welded pipes for water, Gas and Sewage
	IS 6631	Steel pipes for Hydraulic purposes
	IS 7343	Code of practice for ultrasonic testing for ferrous Welded Pipes and Tubular Products
	IS 2598	Safety code for Industrial Radiographic Practice
	IS 5822	Code of Practice for laying of electrically welded steel pipes for water supply
	IS 1566	Hard drawn steel wire fabric for concrete reinforcement
	IS 6419	Welding rods and bare electrodes for glass shielded are welding of structural steel
	IS 1974	Bare wire electrodes for submerged arc welding
	IS 7307	Approval tests for welding procedures
	IS 7310	Approval tests for welders working to approved welding procedures
	IS 2720	Methods of test for soils
	IS 780	Specification for Sluice valves for water work purposes. (50 to 300mm size)
	IS 2906	Specification for sluice valves for water work purposes (350 to 1200mm size)
	IS 1916	Steel cylinder pipe with concrete lining and coating
	IS 7322	Specials for steel cylinder reinforced concrete pipes
	IS 11906	Recommended for cement mortar lining for cast iron, mild steel and ductile iron pipes and fittings for transportation of water.

XIV.5.3 MATERIALS

Steel plates – The steel plates for pipes fittings, specials and stiffeners shall be of mild steel conforming to IS 2062 Grade B, with no negative tolerances on the plate thickness.
Cement – Ordinary portland cement conforming to IS 269.

Aggregate – The aggregate shall confirm to IS 383.

Water – The water used in preparation of concrete mix shall conform to the requirements of mixing water specified in IS 456.

Welding consumables – such as electrodes, filler rods and wires shall conform to IS 814, IS 3613, IS 6419 and IS 7280.

When requested by the Engineers, the Contractor shall provide test sample of the materials to be used in the Works for testing. The cost of such tests shall be borne by the Contractor and shall be included in his item rates.

XIV.5.4 INSPECTION

All Works and material under Specification will be rigidly inspected during all phases of manufacture and testing and such inspection shall not relieve the Contractor of his responsibility to furnish materials and performed Work in accordance with this specification.

The Contractor will notify the Engineer, in advance of the procurement of materials and fabrication thereof, in order that the employer may arrange for mill and shop inspection. The Engineer may reject any or all materials or Work that does not meet with any of the requirements of this specification. The Contractor shall rectify or replace such rejected material / performed Work at his own cost to the satisfaction of the Engineer.

The Engineer shall have free access to those parts of all plants or any other premises and sites that are concerned with the furnishing of materials or the performance of the Work under this specification.

The Contractor shall supply free of cost required specimen of materials for testing by the employer at any time during the progress of Work and shall bear the cost of all such tests or retests to the satisfaction of the Engineer.

The Contractor shall provide [_____(no. as applicable)] sets of accurate "GO" and 'NO GO' ring gauges to measure the diameter of pipes, specials and fitting for the use of the Engineer at no extra cost.

XIV.5.5 MANUFACTURES OF PIPES AND SPECIALS

GENERAL

The pipes shall be truly cylindrical and straight in axis. The ends shall be accurately cut and prepared for field welding the external circumference of the pipe pieces which are to be fixed adjacent to the flange adapter with fixed outer diameter shall not deviate from theoretical one by more than [_____(as applicable)] mm. to obtain this accuracy the pipe shall be rolled several times, if necessary, as pipe pieces should be truly cylindrical. The external longitudinal welding of this pipe shall be ground smooth flush with surface to the satisfaction of the Engineer for a length of 200 mm from the ends of the pipe. No extra cost shall be charged by the Contractor for this grinding Work.

Minor repair by welding or otherwise shall be permitted at the discretion of the Engineer, but such repairs shall be done only after obtaining the prior permission from the Engineer. Any pipe or part thereof, which develops injurious defects during welding or other operations shall be rejected.

FABRICATION YARD

This fabrication yard meant for fabrication of pipes, specials etc. shall also be equipped with facilities for testing, painting, lining etc. For completing the Work under the present Contract within the Contract period, the fabrication yard shall be equipped with adequate numbers of equipment and plant including:

a) Plate bending machine for rolling of pipe drums;

b) Automatic welding machines (suitable for circumferential as well as longitudinal welding);

c) Hydraulic welding machines;

d) Traveling gantry or crane of capacity [_____(as applicable)] tons or above;

e) Mobile cranes for loading/unloading of plates, pipes etc. [_____(as applicable)] tons capacity each;

f) Lathe for machining of the flange rings, plates etc.; and

g) Equipment for sand blasting, cement mortar lining and facilities for bitumen wrapping.

The fabrication yard shall have adequate area and shall also have stacking areas for the stacking of plates, pipes and fittings. The Contractor shall make his own arrangements for any area required for this purpose.

DEMONSTRATION

Contractor shall demonstrate the Works in this Contract at fabrication yard before commencement of Works and during the Works at intervals specified and as directed by the Engineer. No payment shall be made in this regard.
The Works under demonstration shall include but not limited to the following:

a) Manufacture of pipe and specials;

b) Machine and manual welding to qualify 'Welding Procedures';

c) Hydraulic testing; and

d) Pipe-handling procedures.

CUTTING PLATES TO SIZE

The plate provided shall be utilised so as to minimise wastage and so as to make the pipe as far as possible with one longitudinal joint. Plate sizes shall generally suitable for fabrication of [_____(as applicable)] Mtr long shells (minimum), to be made up to pipes of [_____(as applicable)] Mtr to [_____(as applicable)] m lengths to suit Contractor's proposed working methods.

Before cutting, all the edges of the plates shall be cleaned by brushing / grinding both the sides.

After the plates are cut, the edges shall be made smooth and even by polishing with an electrical or pneumatic grinder to remove all inequalities. Care shall be taken to see that the cut edges of the plate are perfectly straight. Jigs to be used for this purpose shall depend upon the types of cutting machine used. The plates cut to the required shapes shall be checked for the correctness before they are rolled into pipe drums. If any correction is required, the Contractor shall do the same by re-cutting, if necessary. If any plate or flat is found to be warped or to have corrugations, the defects shall be removed by putting the plate or flat into a roller press and rectified. Laminated or heavily corroded plate shall not be used in manufacturing of the pipe.

The ends of the finished pipe in the factory shall necessarily have level ends conforming to IS 3589 to facilitate field welded joints.

ROLLING OF PLATES

The plates cut to the exact size shall be put into a rolling machine to form a pipe of the required diameter. The Contractor shall adjust the rolling machine so as to give a uniform curvature to the pipe throughout its circumference. The curvature obtained shall be checked by the Contractor's foremen during the process of rolling and if proper curvature is not obtained at any place including the ends, the rolling operation shall be repeated at this stage or even after the longitudinal welding of the drum where directed. Heating of plates to obtain the desired curvatures shall not be permitted.

TRACKING THE DRUMS

The rolled drums shall be kept on an assembly platform for tracking while care is being taken to ensure that the tacked drums have either of the faces at right angles to the axis of the pipe. A gap of [_____(as applicable)] mm to [_____(as applicable)] mm shall be maintained while tacking the drum where the manual arc welding is permitted. However, where the welding is to be done by automatic welding machine, there is no need to maintain such gap. To achieve this objective, clamp spiders, tightening rings and / or any other approved gadgets shall be used. Each drum, before being taken to the assembly platform, shall be numbered on the inside with oil paint stating the plate thickness as well.

ASSEMBLY OF DRUMS INTO PIPES

The tacked drums shall then be transported to an assembly platform where they shall be welded together to form suitable pipe-lengths. Plate shall be bent in the maximum possible width to reduce the number of circumferential joints. The number of longitudinal joints shall be as per IS 3589.

The longitudinal joints shall be staggered at 90 degrees. The drums shall be tacked together as above. The assembly shall be truly cylindrical and without any kinks. The faces shall be at right angles to the axis of the cylinder. A suitable arrangement for testing the correctness of the pipe shall be provided by the Contractor at the assembly platform.
Specials

Specials shall be fabricated to the dimensions shown on Drawings. Specials, such as tees, Y-pieces, bends, tapers etc. shall necessarily be in steel and shall be in accordance with IS 7322 / BS 534 / AWWA C208 and ASME standards and tested and laid in the same manner as the pipes. Standard fittings shall be used wherever possible in preference to fabricated fittings. Standard fittings shall be manufactured in accordance with standards above. Where fabricated fittings are supplied with approval of Engineers they shall be fully workshop fabricated and tested in accordance with above standards.

Tee and branches on steel pipelines must be reinforced by welding collars around the base of

the branch and in the case of large diameter branches, increasing the main pipe wall thickness or making use of crotch plates. Unless shown otherwise on the Drawings, branches shall comply with the requirement stated in Table 7.4 below.

Table 7.7: Compliance requirements for branches

Fitting Description Pipe work O.D. (mm)	Main Pipe wall Thickness (mm)	Branch Pipe Wall Thickness (mm)	Collar Details (mm)
324 off 1320	10	5.0	150 Wide x 14 to 25 Thick
324 off 1320	14/12	5.0	150 Wide x 14 to 25 Thick
324 off 1999- Level Invert Tee	14/12	5.0	150 Wide x 14 to 25 Thick
324 off 1647	11/12	5.0	150 Wide x 14 to 25 Thick
324 off 1241	8/10	5.0	150 Wide x 14 to 25 Thick

The fittings shall be designed and, if considered necessary by the Engineer, fabricated by a specialist Contractor and the design calculations and Drawings shall be submitted to the Engineer for approval. For oval shaped collars, the width given in the Table 7.4 shall be at the narrowest point. All other fittings, tees, branches, crosses and bends are to be designed by the fabricator.

Steel specials shall have the same chemical and mechanical properties and shall be compatible in all respects with the pipes with which they are to be used. The marking of pipes and fittings shall be as specified.

ELECTRODES

The Contractors shall use appropriate type and size of electrodes with suitable flux covering depending on the thickness of plate and the type of joint. They shall also use standard current and voltage required for the machine in use as per manufacturers' directions. Welding electrodes shall conform to IS 814 and IS 4353. Electrodes from reputed manufacturers like Advani Oerlikon, D & H, Philips etc. shall be used with the approval of Engineer. India-made or equivalent foreign-made electrodes of the approved quality shall be used. The Contractor shall provide suitable equipment and ovens to keep the electrodes dry at the desired baking temperature.

WELDING

Upon receipt of the order and prior to the start of fabrication, the Contractor shall submit to the Engineer for his approval the 'Welding Procedure Method Statement' that he intends to use in the workshop. At the same time the procedure for the field welding must be submitted to the Engineer for his approval.

All components of pipe shell, either straight or bent etc. shall be welded by use of automatic arc welding machine by submerged arc process with alternating current. The strength of the joint shall be at least equal to that of the parent material. Manual welding shall be adopted only when machine welding is not possible.

The Contractor shall use electrodes of approved make and size, the size depending on the thickness of the plate and the type of joint. Standard current and arc voltage required for the machine shall be used with necessary modifications as may be found necessary after experimental welding. For this purpose, samples of welded joints shall be prepared and tested

in the presence of the Engineer for qualifying the welded procedure method statement. Only approved welding procedures of the Engineer shall be obtained.

All the shop and the field welding should conform to IS 4353, IS 9595, IS 816.

All longitudinal and circumferential joints shall be Single-V or Double-V butt joints with or without backing plates. After completing the welding joints of pipes or plates from one side, and before the welding on the other side, the joints shall be back chipped / gouged and ground to remove irregular penetration till the even surface is exposed. Gouging shall be restored to when the plate thickness is above 6 mm.

All circumference welds involving plates of unequal thickness shall be so kept that the inside surface of plates match to provide streamlined joints without alteration in the internal diameter.

The welding shall be of the best workmanship – free from weld defects. In order to maintain a good standard in welding, welders shall be tested by the Contractor before they are entrusted with the job. Qualification standard for welding procedures, welders and welding operators shall confirm IS 7307 and IS 7310 (latest). Only those who pass this test shall be allowed to work on the job. Periodical tests as regards their competence shall also be taken at suitable intervals and those found incompetent shall be removed from the job. If an incomplete welder has already welded some pipes, all welding done by him previously shall be fully checked by X-ray over and above the regular X-ray inspections. The defects, if any, shall be rectified to the satisfaction of the Engineer. All such check-tests and rectification of defects shall be entirely at the cost of the Contractor. No pipes or steel sections shall be erected unless the work of the welders concerned has been proved to be satisfactory and qualified. Site welds shall be done by welders qualified for the various welding positions as per the applicable IS codes and standards. A record shall be maintained showing the names of welders and operators who have worked in each individual joint. Manual arc welding shall preferably be carried out by a pair of welders so that by, observing proper sequence, distortion can be avoided. A joint entrusted to a particular individual or a pair shall be, as far as possible, completed by them in all respects - including sealing run. No helper or other unauthorised person shall be permitted to do any welding whatsoever.

The weldment should not become brittle or sensitive to blows and there should be no loss of toughness due to welding or heat treatment. The material after welding and heat treatment shall match with the base metal properties including original ductility. The weld should in no point be less than the nominal thickness of plate a slight reinforcement as per the IS code shall be maintained on all weld joints. Final welding of closure gaps should be carried out within a temperature range of average air temperature ± 8o C.

Where required by the Contractor's working methods, the pipes shall have cable holes / entries installed in the fabrication shop; they shall comprise a hole in the pipe with a reinforcing plate welded to the pipe with a tapped hole in it large enough to allow the passage of the cables and other paraphernalia necessary for welding the pipes. A screwed plug shall be provided to close the hole.

XIV.5.5.7 TESTING OF WELD COUPONS

Test pieces shall be provided by the Contractors for both longitudinal and circumferential welded and joins at the positions pointed out by the Engineer the sample so taken out shall then be cut to the exact shape and dimensions and machined as described in relevant standards before testing for chemicals and mechanical properties.

The entire cost of the tests including provision of test samples, machining the test pieces,

, transport to and from the laboratory and testing them in a laboratory, payment of all testing fees, cleaning and painting etc. shall be borne by the Contractors. The tests shall be carried out in a Government or semi-Government institute approved by the Engineer. This shall be arranged by the Contractor with the approval of Engineer. The testing laboratory shall have instruments / equipment which are having calibration requirements traceable to national or international standards.

The following tests shall be carried out:

Mechanical tests
The test plates shall be subjected to all mechanical tests as per the approved method statement or as otherwise reasonably directed by the Engineer. The test(s) shall be carried out in the accordance with relevant standards. The tests shall include determination of yield strength, tensile strength, elongation and bend tests. Tensile test(s) shall be carried out in accordance with IS 1894. One test plate shall be provided for from each lot of 100 lengths.
If a test specimen shows defective machining or develops flaws not associated with welding, it may be discarded and another specimen submitted. The welded joint shall exhibit mechanical properties not lower than those specified for highest 2062 Grade B.
Guided bend test shall be in accordance with IS 3589 / IS 3600. One bend test shall be carried out from each lot of 50 lengths. The test shall comply with the requirements specified in IS 3589 / IS 3600.

Field joints
The field welded joints shall be tested in accordance with the procedure laid down in IS 3600. One test plate shall be taken for every 10 joints and shall be subjected to mechanical and chemical tests as specified above.

RE-TESTS

If the results of tests of any lot do not conform to the requirements specified, re-tests of two additional specimens from the same lot shall be made each of which shall have to conform to the required specifications, in case of failure of one or both, gouging and repairing shall be carried out for the particular lot of joints from which the samples have been taken as directed by Engineer before the lot can be accepted. The rectification process shall also have adequate tests plates and they shall be tested for complaints with the IS codes / standards.
In case both the samples yield satisfactory results in the re-test described above, gouging and repairing will be required to the carried out on the joint which has failed in the initial test only.
All charges in connection with re-testing of the welded sample including machine, testing etc. shall be borne by the Contractor.

RADIOGRAPH OF WELDED JOINTS

As soon as practicable, after welding is done, every longitudinal and circumferential welded length minimum [_____(as applicable)]% length of the weld at random for each pipe shall be radio graphed, to detect welding defects as per the requirement of IS4853 and as directed by Engineers. This 10% sampling will be at random but ensured 100% coverage of junctions of longitudinal and circumferential joints. If the results of such radiography fail to conform to the requirements, the Contractor shall carry out 100% radiography test for the pipe as directed at the Contractors cost to the satisfaction of the Engineer.
The weld repels or welds surface irregularities and slag etc., on both inside and outside shall be removed by any suitable mechanical process to a degree such that result in radiographic contact due to any remaining irregularities cannot mark or be confused with that of objectionable defect. The radiograph shall be made in strict accordance with the latest requirements and as per the latest and most efficient technique either with x-ray or gamma ray equipment. The safety requirement during radiography shall be in accordance with IS 2598.

The radiographs are to be marked in such a way that the corresponding portion of the welded seam and the welder can be readily identified. All radiographs will be reviewed by the Engineers to identify the defects and determine those, which requires rectification. Defects that are not acceptable shall be removed by chipping; grinding or flame gouging to sound metal and resulting cavities shall be welded. After rectification, the joint is to be radiographed again to prove the quality of the repair. The radiograph will be judged as acceptable or unacceptable by the Engineer based on the latest standards prescribed by the relevant Indian standard specification.

All X-rays shall be taken with equipment and by personal of the Contractor. Films shall be developed within [_____(as applicable)] hours of exposure and be ready in accessible at all times for inspection by the Engineer. The Contractor shall provide for the use of the Engineer suitable x-ray viewing equipment. x-ray films shall be properly maintained by the Contractor. A complete set of radiographs and records – as described in IS 2595 - op shall be retained by the Contractor for each job and shall be handed over to the [Public Authority concerned of the Government of the State / Union Territory / National Capital Territory (as applicable)] on completion of the Contract. All films shall be identified by the number and chart prepared indicating location of any Work associated with the pipe erection and such inspection shall be performed by the radiographer at the discretion of the Engineer.

RADIOGRAPHIC INSPECTION OF WELDED JOINTS:

All welded joints to be radiographed shall be examined in accordance with:

IS 2595	-	Code of practice for radiographic testing
IS 4853	-	Recommended practice for radiographic examination of fusion welded butt-joints in steel pipe
IS 1182	-	Recommended practice for radiographic examination of fusion welded butt-joints in steel pipe
IS 2598	-	Safety code for industrial radiographic practice

Radiographer performing radiographs shall be qualified in accordance with SNT-TC-1A . Supplement and appendices "Recommended Practice for Non-destructive Testing Personal Qualification and Certification" published by the American Society for Non-Destructive testing as applicable for technique and methods used.

Final acceptance of radiographs shall be based on the ability to see the prescribed pentrameter image and the specified hole.

Sections of welds that are shown by radiography to have any of the following types of imperfections shall be judged unacceptable and shall be repaired. The imperfections are:

a) Any type of crack, or zone of incomplete fusion or penetration.

b) Any elongated slag inclusion which has length greater than 6 mm.

c) Any group of slag inclusion in line that have an aggregate length greater than thickness in a length of [_____(as applicable)] times thickness, except when the distance between the successive imperfection exceeds 6 L – where L is the length of the longest imperfection in the group.

d) Rounded indication in excess of that specified by the acceptance standards given earlier.

TOLERANCES

Tolerances of the plate thickness shall be ± [_____(as applicable)]%. Minimum width of the plate shall be [_____(as applicable)] Mtr.

A tolerance for straight pipes shall be in accordance with IS 3589 or as amended below.

Finished pipe sections shall be truly straight with walls parallel to the axis of the pipe and shall not be out of the alignment by more than 0.2% of the total length.

The outside circumference of the pipe shall not vary by more than [_____(as applicable)]%.

Outside diameter of the pipe shall not vary by more than [_____(as applicable)]%.

The permissible tolerance for specials for diameter, arm length and angular deviation shall be in accordance with IS 7322 / BS 534.

Whenever any dent, i.e. a significant alteration of the curvature of the pipe shell is noticed, the depth of the dent shall be measured between the lowest point of the dent and the pipe shell curvature line. All dents exceeding [_____(as applicable)]% of the outer diameter of the pipe shall be removed by cutting out a cylindrical portion of the pipe and replacing the same by an undamaged piece of the pipe. The Engineer may permit insert patching if the diameter of the patch is less than [_____(as applicable)] % of the nominal diameter of the pipe. Repairs by hammering with or without heating shall not be permitted. Any damage to the coating shall also be carefully examined and rectified.

PIPE TESTING IN FABRICATION YARD

A hydraulic test shall be carried out at the fabrication shop for each pipe length fabricated, in the presence of and to the satisfaction of the Engineer. All pipes and specials shall be subjected to hydraulic test at the fabrication yard after fabrication, but before application of protective coatings.

Prior to testing, the pipe shall be inspected thoroughly and all the apparent defects in welding such as slag, prosperity etc. shall be repaired by gouging and re-welding.

Each pipe shall be filled with water slowly and the pressure increased uniformly until the required test pressure is reached. The test pressure shall be [_____(no. as applicable)] bars for pipes and specials with [_____(as applicable)] mm thick MS plate.

The pipe tested shall be given a serial number which shall be painted with details such as pipe number, shell thickness, diameter, length etc. as directed by Engineer. It shall be entered in the register to be maintained by the Contractor. The register shall be maintained in suitable format giving the following information for each shell tested:

a) Serial No.

b) Pipe No.

c) Date of test.

d) Specification and thickness of steel.

e) Weight of pipe shell tested.

e) Weight of pipe shell tested.

f) Maximum test pressure.

g) Details of test performance.

h) Details of radiographic examination of welds.

i) Name of Engineer's representative witnessing tests

j) A copy of these details shall be furnished to the Engineer.

For indicating the pressure inside the pipe an accurate pressure gauge of approved make duly tested and calibrated for the accuracy of readings shall be mounted on one of the closures which close the pipe ends.

The pressure shall be applied gradually by approved means and shall be maintained foe at least 10 minutes or till the inspection of all welded joints is done during which time the pipe shall be hammered throughout its length with sharp blows, by means of a 1 kg hand hammer.
The pipe shall withstand the test without showing any sign of weakness, leakage, oozing or sweating. If any leakage or sweating is observed in the welded joints, the same shall be repaired by gouging and re-welding after de-watering the pipe. The repaired pipe shall be re-tested to conform to the specified pressure.

If any leak or sweating is observed in the pipe shell, the pipe under test shall be rejected temporarily. The Contractor shall stack such rejected pipes separately in his yard. The Engineer shall inspect the same as shall determine the nature of repairs to be carried thereon and shall then decide as to how and where they shall be used. No payment shall be made of handling or carrying out repairs, but, payment for, fabrication and shop hydraulic testing of the pipe shall be released only after acceptance of the pipe with necessary repairs and subsequent testing etc. are carried out by the Contractor to the satisfaction of the Engineer. The Engineer shall be supplied with two copies of the results of all the tests carried out.

No pipe shall be transported out of the fabrication yard to the site unless they have been hydraulically tested except permitted by the Engineer in writing to do so.

MARKING

All pipes and specials shall bear the following markings. The marking shall be on the side which will be the inside of the pipe after bending. The marking operation shall be conducted with full-size rulers and templates. Only blunt nose punches should be used.

The plates used for fabrication of pipes shall be laid out in such a way that when the shells are completed one set of original identification markings for the material will be plainly visible. In case these markings are unavoidably cut out, they shall be accurately transferred by the Contractor to a location where these markings will be visible on the completed Work.

After the hydraulic tests on the specials, the direction of the flow shall be stamped in a prominent manner.

a) Outside diameter (mm)

b) Length of pipe / angle of the bend (m / degrees)

c) Plate thickness (mm)

d) Approximate of weight of the pipe (/ special (tons)

JOINTS

GENERAL

Unless detailed otherwise, all pipes and fittings shall have welded joints as detailed in the Drawings. Where shown on the Drawings, flanged joints or collar sleeve joints shall be provided.

WELDED JOINTS

The use of butt welded joints for joining pipes shall be in accordance with clause 6.6.10 and end preparation shall be in accordance with IS 3589.

SLEEVE COLLAR JOINTS

The use of sleeve collars shall generally be limited to the jointing of pipes at tie-ins. The thickness of the external steel sleeve collar shall be not less than that of the pipe itself and the length a minimum of 300 mm. the sleeve shall be joined to the pipe with an internal full depth structural weld and external sealing welds to allow the joint to be gas tested. A gas testing hole shall be made at each end of the sleeve and for the purpose of gas testing joints.

FLANGED JOINTS

Flanged shall comply with IS 7322 / BS 4504. The nominal pressure rating shall be at least equal to the highest pressure rating of the pipes of fittings to which they are attached, but with a minimum PN 16. The Contractor shall fabricate flanges meeting the requirements of the pipe sizes under this Contract or otherwise to suit the abutting valves or other connections, if they are not readily available. Flanges shall be provided with all necessary nuts, bolts, washers and gaskets as specified herein. The Contractor shall also supply in suitable containers sufficient graphite grease for application to the bolt threads when joints are made.

SLIP OF TYPE COUPLINGS

a) Slip on Type Couplings shall include the following coupling:

b) Straight flexible couplings;

c) Stepped flexible couplings;

d) Flange adopters; and

Dismantling joints.

Slip on Type Couplings shall be from the Viking Johnson System manufactured by the Victaulic Company or form approved suppliers whose fittings meet the same specifications.

The preparation of pipe ends for slip-on Type Couplings shall be in accordance with the requirements of and the tolerances specified by the joint manufacturer. Couplings shall be installed fully in accordance with the manufacturer's recommendations.

Slip on Type Couplings shall be protected if buried with Densomastic and Densotape wrapping or similar approved material applied in accordance with the manufacturers recommendations. Flexible joints shall be harnessed or tied where shown on the Drawings. Flexible couplings and flange adaptors shall be supplied with transit protection.

STORAGE

Pipes and fittings shall be stored raised off the ground and shall be carefully supported, cushioned and wedged. Special care shall be taken to ensure the steel pipe is cradle and supported in a manner that prevents any distortion of the pipes.

All gaskets, nuts and bolts flange adaptors and other similar items shall be stored in the dry conditions, raised off the ground in sheds or covered areas.

Where items required special storage requirements, the method of storage shall be as per the approval of the Engineer and in accordance with manufacture requirements.

Storage areas shall be set out to facilitate unloading, loading and checking off materials.

All pipe materials shall be inspected when deposited in the storage area any defects or damage shall be noted and reported to the Engineer. The pipe material shall only be repaired or replaced with the Engineer's approval.

End covers and other protection shall not be removed until incorporation of the pipes or fitting into the Works has been done .

TRANSPORTATION AND HANDLING

All pipes and specials fabricated in the yard and temporarily stacked in the factory shall be transported carefully to the site of laying after internal cleaning.

Any vehicles on which pipes are transported shall have a body of such length that the pipes do not overhang. Last pipes shall be placed on cradles and the loads properly secured during transit.

Additional precautions shall be taken to avoid deformation of flexible pipes. To maintain their circular cross-section internal struts shall be fitted in the pipes. Details of the proposed strutting system shall be submitted to the Engineer for approval and, if required by the Engineer, the method of strutting shall be demonstrated and tested on site.

The pipes and specials shall be handled in such a manner as to not distort their circularity or cause any damage to their coating. Wide non-abrasive or other approved slings shall be used and all hooks and other metal devices shall be well padded. Hooks engaged on the corner wall surface at pipe ends shall not be used. Steadying ropes shall be employed.

The positions of lifting slings shall ensure that stresses and tendency towards deformation in the pipes are kept to a minimum.

Pipe-handling-equipment shall be maintained in good condition and any equipment, which is in the opinion of the Engineer, may cause damage to the pipes shall be discarded.

Under no circumstances shall pipes be dropped, be allowed to strike one another, be rolled freely or dragged along the ground.

No valves shall be lifted by the spindle.

Fabricated materials such as man-hole covers, appurtenances, bolts, nuts, flanges, saddles, collars, bypass arrangements etc. shall be transported to the site of laying from the fabrication yard in accordance only with the needs of the laying operations.

PIPELINE CONSTRUCTION

GENERAL

Laying / Erection of fabricated pipe lengths shall be carried out by the Contractor who shall equip himself, at his cost with all necessary tools, machinery, labour etc., required for the purpose. The pipeline shall be constructed in lengths with a separate full-time gang working on each length.

Except for routine welding of joints, no other Work shall be done in the absence of Engineer. The components of the sections of the pipeline such as plates, and pedestals have been so designed that the centers of the plates and pedestals shall coincide at the mean temperature of the locality. For this reason, all Works such as fixing flanges, plates etc. shall be in in true alignment and in correct position and tack welding pipes shall be done at the mean temperature. For ascertaining the temperature, the Contractor shall provide mercury cups and fix them to the pipe shell from outside and shall also provide thermometers of the required type and range. No extra payment shall be made for this.

LAYING PROGRAM

The Contractor shall submit a detailed bar chart for manufacturing and laying of the pipeline, which shall be subject to the Engineer's approval. In preparing this bar chart, the Contractor shall plan his activities such that the laying of pipes shall closely follow the manufacturing schedule and no pipes shall remain in the factory or at the site for a period more than [_____(as applicable)] months.

Together with the chart, he shall submit a methodology describing how he will carry out this Work within the contractual period and the required resources in terms of construction equipment and other facilities that he shall utilise to complete the Works.

CONTRACTOR TO RE-SURVEY THE PIPELINE ROUTE

While setting up the site, the Contractor shall undertake a survey of the pipeline route and compare this with the survey supplied at the time of the Tender and a joint record. Levels are to be taken at [_____(as applicable)] Mtr intervals and at any sharp changes in level. Where practical, the change points shall coincide with those in the original surveys. Not less than [_____(as applicable)] days before commencement of pipe laying the Contractor shall supply the Engineer, any discrepancies, if observed, with two hard copies and one computer disk copy of the survey.

The format of the survey shall be identical to the longitudinal sections which formed part of the Tender Document. The Engineer shall supply the Contractor a copy of the longitudinal section and the Contractor is to use this to produce new Drawing. Details of all the benchmarks which were used in the original survey of that length of pipeline shall be supplied to the Contractor by the Engineer.

The Engineer shall resolve any problem arising from discrepancies between the two surveys and supply the Contractor with any revised Drawings that may be required.

EXTERNAL COATING WITH CORROSION RESISTANT TAPES

Unless otherwise specified or stated on the Drawings, the pipeline to be laid underground and the exposed pipeline supported on saddles shall be coated with the corrosion resistant tapes confirming to IS 10221-1982 Ref.: Appendix B.

MATERIAL

Primer: Primer shall be a coal tar / asphalt or suitable resin product. It shall be a liquid that can be applied without heating and shall produce an effective bond between the surface to be protected and the subsequent coating of coal tar / asphalt tape. Primer shall contain no benzol and shall not settle in the container to form a cake that cannot be mixed easily by hand stirring. Primer shall have good sparing and / or brushing properties and a minimum tendency to produce bubble during application.

Tapes: Tapes shall be comprised of coal tar / asphalt component supported on fabric of organic or inorganic fibers. The coal tar / asphalt component shall comply with quality provisions as in 4.1.2 & Table 13 of IS 10221-1982. The fabric shall be thoroughly coated and completely covered on both sides with coal tar / asphalt component. Tape shall be furnished in standard width as recommended by the manufacturer. Rolls shall be warmed on hallow course having a minimum inside diameter of [_____(as applicable) mm. Tape shall have sufficient pliability at a temperature of [_____(as applicable)o C to unwind from the roll without disbanding the coal tar / asphalt component from the fabric.

a) **Length:** the standard length of tape on one roll shall be [_____(as applicable) Mtr.

b) **Thickness:** the variation in the thickness of the tape shall not exceed ± [_____(as applicable) mm from the thickness specified. In no case shall thickness of the tape be less than [_____(as applicable) mm.

C) **General requirement:** when heated to a condition permitting conformation to the surface to be coated, the tape shall withstand, without tearing, the tensile force necessary to obtain a tightly wrapped coating free of voids. The tape shall provide a minimum thickness of [_____(as applicable) mils of coating between the steel surface and the inner face of the fabric when applied under tension necessary to provide a void free warp. Should the tape have plastic film separator of the type that is not removed prior to application, the thickness of the separator shall not adversely affect the bond between the overlapped sections of tape.

APPLICATION OF WRAPPING TAPES

Cleaning: Pipe surfaces shall be thoroughly cleaned and dried before the primer is applied and shall be free of dirt, grease, oil, rust, scale or other foreign matter. The pipe shall be cleaned by any one of the following mutually agreed methods:

a) Grit / shot blasting

b) Sand blasting &

c) Mechanical cleaning.

Primer shall be applied by brush, glove or spray so as to give a coating thickness i.e., between two & four mills when wet. The primer shall be allowed to dry to the touch prior to tape application. Primer & tape shall be furnished by the same manufacturer.

If the application is done in cold whether, the surface of the pipe shall be pre-heated until it is warm to the touch and until traces of moisture are removed and then the primer shall be applied allowed to dry.

FIELD APPLICATION OF TAPE

The tape shall be wrapped in accordance with the manufacturer's recommendations in a

manner that shall meet the adhesion and holiday detection requirements of IS 10221-1982. In any event, there shall be a minimum of [_____(as applicable) mm overlap per single wrap. Earlier single or double wraps shall be specified by the purchaser. In the application of this, care shall be taken that there are no air pockets or bubbles beneath the tape and shall be in intimate contact with the primed steel surface. The manufacturer shall provide assistance in demonstrating the proper method of application if requested by the Contractor.

FIELD ADHESION TEST

Adhesion tests shall be made to determine the proper bond between the coal tar / asphalt component of the tape and the properly primed pipe. The number of adhesive tests required to determine quality of application is at the inspector's option, but, desirably, no more than one test per special section, connection or fittings should be performed to avoid extensive repair unless defects are found in the first test.

The temperature of the tape and pipe to be tested shall be between [_____(as applicable)] o C and [_____(as applicable)] o C. If the temperature is outside this range, hot or cold water shall be poured over the test area until this temperature range is attained. A test area shall be selected by the inspector where the tape is smooth for [_____(as applicable)] cms in the longitudinal direction of the tape. Two knife cuts that are [_____(as applicable) cm long and [_____(as applicable)] cms apart shall be made through the tape. A flat blade shall be used to pry up [_____(as applicable)] cm of the fabric. This [_____(as applicable)] cm flap of fabric shall be grasped firmly in one hand and shall be pulled in a quick motion in the direction of the remaining [_____(as applicable)] cm of the [_____(as applicable)] cm knife cut.

The adhesive is satisfactory if the tape tears at the point of stripping or the fabric strips from the under laying coal tar component, leaving exposed not more than [_____(as applicable)] % of the primer or metal.

BURIED PIPELINES

TRENCHING

Trenching includes all excavation which is carried out either by hand or by machine and shall be carried out in accordance with all general requirements of Part-5. In addition to those general requirements, the following requirements shall apply to pipelines:

The width of the trench shall be kept to a minimum consistent with the working space required and having regard to the safety of the trench, the method of laying and jointing the pipe and the need to avoid damage to pipe coating and so as to provide the minimum horizontal clearance as stated in the **Table 7.8** below. The bottom of the trench shall be properly trimmed to permit even bedding of the pipeline.

The portion of the trench which extends from the formation level to not less than [_____(as applicable)] mm above the crown of the when laid in its correct position, shall unless otherwise specified or ordered by the Engineer, be formed with vertical sides. The clearance between the sides and the bottom of the trench and the barrel of the pipe shall not exceed the following (as specified in **Table: 7.8**) - inclusive of any allowances required for temporary trench supports:

Table 7.8: Clearance specifications

Pipe Nominal Bore (mm)	Bottom Clearance (mm)	Site Clearance (mm)
600 to 1000	250	400
1050 to 2500	300	500

The clearance at joints may be increased to allow the joints to be made and inspected, any proposed increased shall be approved by the Engineer.

All trenches deeper than [_____(as applicable)] Mtr shall have the trench walls battered or supported to ensure the safety of all persons working in the trench of required. The Contractor is to provide details of these arrangements for approval by the Engineer prior to any Work being undertaken in such a trench.

No excavations with battered sites shall be made in roads, footpaths, private gardens or within [_____(as applicable)] Mtr. of any buildings or other structures.

The Contractor shall erect temporary fencing around all open excavations and post warning signs in English and in local languages. All fencing shall be at least [_____(as applicable)] Mtr. tall, rigid in nature and strong enough to prevent people falling into the trench. The Contractor shall also take all other necessary measures to ensure the safety of the public and others. The maximum length of excavation which may be left open in any length is [_____(as applicable)] Mtr. the opening of two lengths within [_____(as applicable)] Mtr of each other shall require the approval of the Engineer.

The excavation shall be kept free of water to allow: placing of bedding, laying of pipes, welding of pipes, inspection and testing of joints, coating of joints, placing of backfill and other activities within the pipe trench to be carried out in a satisfactory manner.

BEDDING

The depth and type of bedding shall be as shown in the Drawings or as directed by the Engineer. Where rock or boulders are encountered, the trench shall be transmitted to a depth of at least [_____(as applicable)] mm below the level at which the bottom of the barrel of the pipe is to be laid and filled to a like depth with sand as shown on the Drawings or as directed by the Engineer.

The class of bed and surround to be used are indicated below in **Table: 7.9:**

Table 7.9: Specifications regarding class of bed and surround

Class of bed and surround	Brief description of bedding material
Class N	Well Graded Sand
Class S	Granular material

Class S bed and surround shall be used on all pipes unless otherwise specified or shown on the Drawings.

Class N bed material shall only be used where the pipe trench is founded in hard rock or otherwise directed by the Engineer. The sand shall be clean and well-graded and free from topsoil, clay or vegetable matter and to the approval of the Engineer. If the sand supplied is unclean, it shall be washed. In no case, shall the sand containing more than [_____(as applicable)]% by dry volume or [_____(as applicable)]% by wet volume of clay, loam or silt be accepted. Tests specified for determining silt in sand and organic impurities as described in IS 383 shall apply.

The graded granular bed material for use in Class S bedding and surround shall consist of durable gravel, crushed stone or disintegrated rock. Selected material excavated from the pipe trench may be used, provided it contains no topsoil, clay or vegetable matter and is to the approval of the Engineer and shall be supplied with the certification which gives details of its content of the granular material shall not exceed [_____(as applicable)]% and [_____(as applicable)]% by weight respectively.

GRADED MATERIAL.

The Contractor's method of grading the excavated material shall be to the approval of the Engineer. All Class S graded material shall pass through test sieves as stipulated in IS 460 (Part 1) in the following proportions by mass:

Table 7.10: Specifications for grading material

Aperture Size	Percentage passing
50 mm	100%
37.5 mm	90 - 100%
20.0 mm	35 – 70%
14.0 mm	25 – 55%
10.0 mm	10 – 40%
5.0 mm	0 - 5%

CONSTRUCTION OF CLASS S BED AND SURROUNDS

Class S pipe bed and surround shall be constructed as indicated on the Drawings.
The granular material shall be evenly spread over the full width of the formation and lightly compacted to a level slightly higher than level corresponding to the underside of the pipe barrel to allow for settlement of the pipe to the correct level.

Following placement and jointing of the pipe further granular material shall be placed in the trench, special care being taken to fill under the sides of the pipes to ensure full contact with the barrel of the pipe.

Field joints which have not been tested shall be left exposed for a minimum length of [_____(as applicable)] mm each side of the joint. The granular material shall then be placed and compacted evenly on both sides of the pipe to a depth of [_____(as applicable)] mm above crown of the pipe.

Trench supports shall be withdrawn gradually in accordance with the progress of the fill with the provisions that such withdrawal shall not prejudice the safety of the Works.
The Contractor shall ensure that the material to the sides of the pipe is adequately compacted in layers having a maximum thickness of [_____(as applicable)] mm and that the method of compaction used shall achieve not less than 95% of the maximum dry density as determined from IS 2720: Part 7

After each section of the pipeline has passed the hydraulic test, the exposed joints shall be backfilled and compacted to the above specification.

The same general requirements shall apply to Class N bedding.

PIPE LAYING

Pipe shall be laid in accordance with IS 5822 unless otherwise specified herein.
The pipeline shall be constructed in lengths with a separate full time gang working on each length. The Work on lengths may proceed concurrently. The program for pipe laying shall be submitted to and be approved by the Engineer at the start of the Contract. Any subsequent changes to the programme shall be submitted and approved by the Engineer before Work on a different programme is started. Excavation for the pipeline in any one length shall not, at any time, proceed more than [_____(as applicable)] km beyond the end of a hydraulically tested, completed and backfilled length of pipe, unless otherwise approved by the Engineer. The exposed joints between tested sections shall be disregarded in the above definition.

No metal tools or heavy objects shall be permitted to come into contact with the pipes or fittings. External coated pipe shall be handled at all times with wide non- abrasive canvas, rubber or leather straps or other equipment to prevent damage to the coating. The use of chains, wire slings or any other handling equipment found to be injurious to the coating shall not be permitted. The timber or skids used to support the coated pipe prior to lowering into the trench shall be properly padded with sufficient bags stuffed with sand or straw for protecting the coating. Alternatively, the pipe may be supported alongside the trench on mounds of sand. Any injury to the protective coating from any cause must be repaired before the pipes or fittings placed in the trench. During laying operations, no debris, tools cloth or other material shall be placed in the pipe. Pipes and fittings shall be lowered into the trench with equipment suitable for the weight of the pipes and fittings and they shall be carefully cleaned before jointing.

Pipe shall be laid accurately to the lines and levels shown on the Drawings, within a tolerance of ± [_____(as applicable)] mm.

Pipe alignments shall be straight between bends or curves. Length laid to curves shall only be allowed where shown on Drawings or in accordance with detailed proposals approved by the Engineers.

Properly painted sight rails shall be supplied and erected, with boning rods of pre-determined measurement for the boning of individual pipes to the correct gradient. The sight rails shall be situated vertically above the line of the pipe or immediately adjacent thereto and there shall at no time be less than three sight rails in the position on each length of the pipe under construction to any one gradient.

The Contractor may submit to the Engineer for his approval an alternative method of the control of pipe laying to the correct levels and alignment.

The joining of pipes shall be made in accordance with the requirements of this Specification. The Contractor shall obtain from manufactures all special information regarding the handling of the pipes, joints and other fittings and he will be deemed to have made him thoroughly conversant with all the phases of pipe laying before commencing the Works.

A "badger" or "bung" about 10 mm smaller than the internal diameter of the pipe shall be kept in the pipe at all times and pulled forward as the Work progresses. When pipe laying is not in progress, including overnight, the open ends of the pipeline shall be blanked off with a temporary watertight fitting approved by the Engineer. The pipe shall be suitably held down so that the pipe does not become buoyant in the event of the trench becoming flooded.

To restrict the flow of rain runoff along the trench the Contractor shall plug the trench with backfill material at distances not exceeding 250 m until the pipeline can be filled in. The plugs shall be removed when trench filling is taking place. In granular bedding areas the plugs shall be of clay and shall be left in.

LEVEL CONTROL

The criterion for the level to which transmission main shall be laid should be such that the cover above the crown of the pipe to ground level shall be as specified in the Drawings but in no case shall be less than 1,200 mm unless otherwise directed by the Engineer.

LAYING TO CURVES

Where pipes are to be laid to curves, the deflection at each joint shall not exceed one degree. For sharper curves specifically made bends shall be provided.

LOWERING AND JOINTING

The pipe shall be lowered into the trenches such that no part of any shoring is disturbed or damaged and, if necessary, additional temporary struts may be fixed during the lowering operations. Care shall be taken to ensure that the longitudinal joints of two consecutive pipes at each circumferential joint are staggered by 90 degrees. While assembling the pipes, the ends shall have to be brought close enough to leave a uniform gap not exceeding [_____(as applicable)] mm. There shall be no lateral displacement between the pipe faces to be joined. If necessary, spiders from inside and tightening rings from outside or other suitable equipment shall be used to bring the two ends in perfect contact and alignment. In no case shall hammering or longitudinal slitting be permitted. Jacking may be permitted for this purpose in particular circumstances and approval by the Engineer.

When the pipe is properly assembled, firmly supported on wooden beams and wedges or by other approved means, it shall be checked for correct line and level and tack welded. The tack welded circumferential joints shall then be welded fully.
On completion of the pipe jointing, the external portion shall be coated with M15 concrete and the trench and the welding pits shall be cleaned. The welding pit shall be filled with approved bedding.

FLOATATION

The Contractor shall take proper precautions against the risks of floatation and the flooding of the excavated Works and shall make due allowances in his program for any closure he considers necessary on account of monsoon.

Should any section of the pipeline be affected by floating in the course of Works, the entire Work shall be removed and then re-installed to the satisfaction of Engineer. The entire cost of laying it again to the correct line and level shall be borne by the Contractor.

STEEL PROPS

In order to effectively provide cement mortar lining to the inside of the pipes and to avoid difficulties during the Work, it is necessary that the roundness of the pipes is maintained circular till the lining Work is taken up. To achieve the same, steel adjustable screw type props of screw or similar approved type consisting of minimum [_____(as applicable)] legs ([_____(as applicable)] props) shall be fixed inside the pipe and the diameter correctly set.

The design and Drawings of the props that the Contractor intends to use should be approved by the Engineer before starting the Work. These props shall be fixed vertically at intervals as directed by the Engineer. The props should be kept in position at least for [_____(as applicable)] days after the encasing of the pipe in that section is completed or until refilling is done to the full height of fill over the pipe in case the pipes are not encased. The props shall be removed only after obtaining permission from the Engineer.

INTERNAL CEMENT MORTAR LINING

All pipes and fittings shall be internally lined with cement mortar in accordance with IS: 11906 / AWWA C602. Cement mortar in lining shall be applied in-situ after pipe laying and after sectional hydraulic testing.

Cement shall be Portland cement in accordance with IS 8112

Sand used for lining shall be tested with standard sieves as per IS 460 and requirements specified in IS 11906

The minimum cement content shall be 100 kg. / m3 and the water : cement ratio by mass shall be between 0.3 and 0.45:1

The mortar shall stop 100 mm back from the faces of any joints. The end face shall be vertical.

surface Preparation

The interior surface of the pipe to be lined shall be cleaned to remove all rust, chemical or other deposits, oil, grease and all accumulations of water, dirt, and debris. The cleaning of the surface shall be carried out by the use of suitable chemical or mechanical means to the approval of the Engineer. The extent of cleaning shall be to the satisfaction of the Engineer.

All loose mill scale, dirt, rust, and accumulation of construction debris shall be removed from the interior of the steel pipeline. The pipeline shall be cleaned by use of a power-driven cleaner incorporating revolving brushes on rotating arms.

Immediately prior to the travel of the lining machine through the pipeline, all foreign material shall be removed. This includes small sand and loose mortar that might have accumulated since the Work of preparation of surfaces was completed.

Mix Proportion

Proportion of sand to cement shall not be more than 1.5 parts sand to 1 part by volume. Mortar composing of cement, sand and water shall be well mixed and of proper consistency to obtain a dense, homogeneous lining that will adhere firmly to the pipe surface. The cement mortar mix shall comply with strength and density requirements specified in **IS 11906 / AWWA** C602. No admixtures shall be permitted unless approved by the Engineer.

Thickness Of Lining

The lining shall be placed by centrifugal method in one course by a machine traveling through the pipe and discharging the mortar at a high velocity over all pipe sections and long radius bends. The discharge shall be from the rear of the machine so that the freshly applied mortar will not be marked. The rate of travel of the machine and the rate of mortar discharge shall be mechanically regulated so as to produce uniform thickness throughout. The mortar must be densely packed and shall adhere to the pipe wherever applied.

Surface Finish

Mortar lining shall be mechanically trowelled except for the places where hand towelling is expressly permitted by the Engineer.

The lining shall be provided with attachments for mechanically trowelling the mortar. Both the application and trowelling of the mortar shall take place at the rear of the machine so that the

In the stretch of pipe that has been lined and trowelled in each day's run, ten places shall be selected in straight sections of the pipe by the Engineer. In each of the ten places the thickness of the lining shall be re measured by non-destructive means as directed by the Engineers. Defects in lining including but not restricted to sand pockets, voids, over sanded areas, blisters, cracked and dummy areas and thin spots shall be removed, and the area shall be repaired to the full required thickness of the mortar lining. Defective areas encompassing the full diameter to the pipe shall be replaced by using a machine. Defective lining rejected at the time of lining shall be removed before initial set of the mortar. Defective lining rejected after initial set shall be replaced or repaired by the most practical method - as determined by the Engineer.

Hair cracks or cracks up to 0.25 mm width and not over 300 mm in length in finished linings may be considered acceptable at the discretion of the Engineer, but larger cracks shall be repaired or removed and redone – all as directed by the Engineer.

Hand application

Cement mortar lining of bends, specials, areas closely adjacent to valves and other such places where machine placing may not be practical shall be performed by hand. The Engineer may order the correction for any defect by hand-application.
Cement mortar for hand Work shall be of the same material(s) as the mortar for machine placed lining.

The areas to be lined shall be thoroughly cleaned as specified earlier and, if necessary, shall be moistened with water immediately prior to placing the hand- applied mortar.

Steel finishing trowels shall be used for the hand application of cement mortar, except at bends. The outer edges of hand trowelled areas may be brushed in order to reduce the abutting offset.

All hand-finishing Work in a section of the pipeline shall be completed within [_____(as applicable)] hours after completion of the machine application of mortar lining that section. If necessary, application of mortar lining by machine shall be delayed or stopped to assure compliance with this schedule.

Hand-placed mortar shall have a uniform and smooth surface with smooth transitions to adjacent machine placed linings.

Curing

Curing shall commence immediately after completion of the mortar lining and hand finishing of a section of pipeline. This shall, not be later than [_____(as applicable)] hours after mixing of mortar. The lining shall be kept continuously in moist condition for a period of [_____(as applicable)] days. During the operation of lining, finishing and curing, exterior surface of the pipe exposed to sunlight shall be sprinkled with enough water to keep the pipe cool. Open ends of pipes shall be suitably closed so as to maintain a moist atmosphere and prevent draught. Curing of mortar lining and simultaneous cooling of the pipeline externally shall be continued even beyond the period of [_____(as applicable)] days if so directed by the Engineer.

Tests

Test blocks of the same material as used for the lining shall be made in [_____(as applicable)] mm cube moulds and subjected to cube-crushing tests. Each block shall be removed from its mould as soon as practicable and cured under the conditions of temperature and humidity identical with those in which the lining of the pipe is cured. The number of tests shall be at least 4 cubes for each age and water cement ratio for each day's Work. The Work cube strength of the test cube shall not be less than [_____(as applicable)] kg. / cm2 after [_____(as applicable)] days of curing or [_____(as applicable)] kg / cm2 of [_____(as applicable)] days of curing. The density of the test cube shall not be less than [_____(as applicable)] kg / m3

VALVES

GENERAL

Valves shall be as per IS recognised standards. Flanges shall be machined on faces and edges to ISO 7005, IS 6392 or BS 4504.

Valves shall be double-flanged type and the face shall be parallel to each other and flange face should be at right angles to the value center line. Backside of value flanges shall be machined or spot faced for proper seating of the head and nut.

Valve buried or installed in underground chamber, where access to a hand wheel would be impractical, shall be operated by means of extension spindle and / or keys.

Valves of diameter [_____(as applicable)] mm and above shall be provided with lifting eyes and shall have detachable bolted covers for inspection, cleaning and servicing.

Valves shall be suitable for frequent operation as well as operation after long periods of idleness in either open or closed position

The valve stem, thrust washers, screw, nuts and all other components exposed to water shall be of a corrosion-resistant grade of stainless steel.

Valves shall be free from sharp projections.

Butterfly and non-return values shall be provided with bypass arrangement. This may be integral with value or connected between pipes.

Butterfly valves

Metal-seated butterfly value shall be as per IS 13095 / BS 5155. Valve shall be suitable for mounting in any position.

The valve seat shall be of integrally cast or replaceable design. When the value is fully closed, the seal shall seat firmly so as to prevent leakage. The seat surface shall be machined-smoothed to provide a long life for the seal.

All fasteners shall be set flush so as to offer the least resistance possible to the flow through the valve.

All valve, spindles and hand wheels shall be positioned and vice versa shall be limited to about [_____(as applicable)] minutes. The valve shall be suitable for controlling flows by throttling. Valves shall be provided with enclosed gear arrangement for ease of operation. The operation gear shall be such that they can be opened and closed by one man against an unbalanced head 15% in excess of the maximum specified rating. Valve and any gearing shall be such as to permit manual operation on a reasonable time and not exceed a required rim pull of [_____(as applicable)] N.

All hand wheels shall be arranged to turn in a clockwise direction to close the valve, the direction of rotation for opening and closing being indicated on the hand wheels. The hand wheel shall be provided with an integral locking device to prevent operation by unauthorised person.

Valves shall be provided with enclosed gear arrangement for ease of operation. The operation gear shall be such that they can be opened and closed by one man against an unbalanced head 15% in excess of the maximum specified rating. Valve and any gearing shall be such as to permit manual operation on a reasonable time and not exceed a required rim pull of of [_____ (as applicable)]N.

All hand wheels shall be arranged to turn in a clockwise direction to close the valve, the direction of rotation for opening and closing being indicated on the hand wheels. Hand wheel shall be provided with an integral locking device to prevent operation by unauthorized person.

MATERIAL OF CONSTRUCTION:

Body:	Cast steel (Conforming to ASTM A216 Gr WCB)
Disc:	Cast steel (Conforming to ASTM A216 Gr WCB)
Shaft:	Stainless Steel (BS 970 431 S29)
Seat Ring:	Stainless Steel: ASTM A 743 CF8
Bearing:	Teflon

Size of valves and pressure rating as per Bill of Quantities. Location of valves shall be as per contract drawings.

The contractor shall provide test certificates for materials, strength and leakage shall in accordance with BS5155 or relevant international standards.

SLUICE VALVES

Sluice valve shall conform to IS 780 and IS 2906 or relevant internationally recognized standards.

They shall be of non-rising spindle type. The valve shall be furnished with a bushing arrangement for replacement of packing without leakage. They shall also have renewable channel and shoe linings. The gap between the shoe and channel shall be limited to 1.5 mm
The gate face rings shall be screwed into the gate or alternatively securely pegged over the full circumference.

All valves, spindles and hand wheels shall be positioned to give good access for operational personnel.
All hand wheels shall be arranged to turn in a clockwise direction to close the valve, the direction of rotation for opening and closing being indicated on the hand wheels.

MATERIALS OF CONSTRUCTION:

Body of gate	Cast iron to IS: 210 Gr FG 200
Spindle	Stainless steel BS 970 gr 431 S29
Seat Rings	Stainless steel ASTMA 743 CF8
Back Seat Bush	Bronze; IS 318 Gr LTB2
Shoe & Channel Lining	Bronze; IS 318 Gr LTB2

Size of valves and pressure rating as per Bill of Quantities. Location of valves shall be as per contract drawings. The contractor shall provide test certificates for materials, strength and leakage shall be in accordance with BS 5150/ IS 750.

The design and locations of washouts are shown in Drawings. Exact positioning shall be determined by the Engineer with regard to topography. With regard to washouts at least [_____(as applicable)] Mtr. of the washout pipe Work, inclusive of the isolating valve, measured from the center line of the pipeline shall be laid at the same time as the pipeline and suitably capped to prevent ingress of foreign material. The minimum gradient for the washout pipe Work shall be [_____(as applicable)], if not shown in Drawings.

AIR VALVES

The air valve shall be capable of exhausting air form pipe Work automatically when being filled. The air being released at a sufficiently high rate to prevent the restriction of the inflow rate. Similarly, the valve shall be capable of ventilating pipe Work automatically when being emptied, the air inflow rate being sufficiently high to prevent the development of a vacuum in the pipelines. The valve shall also automatically release air accumulating in pipe Work during normal working conditions.

Air valve shall be of the double orifice type with a large orifice for air entry into the pipeline and smaller orifice for automatic release of air under normal working pressure. The valve shall be suitable for the maximum working pressure in the systems. All air valves shall be provided with isolating valve and flanged end connections.

Air valve shall be designed to prevent premature closure prior to all air having been discharged from the line. The orifice shall be positively sealed in the closed position but the float (ball) shall only be raised by the liquid and not by a mixture of air and liquid spray.
The seating shall be designed to prevent the floats sticking after long periods in a closed position.

Air valve shall comprise of cast iron body having a faced and drilled flange at inlet and with two chambers each housing a ball. One of the two chambers shall have a small orifice and the other a large orifice. Balls shall be of injection-moulded plastic having high impact strength or any other suitable approved material.

MATERIALS OF CONSTRUCTION:

Body / cover	Cast Iron (IS 210 Gr FG 220)
Seat ring	Gun metal (IS 318 Gr II)
Float / Balls	Vulcanite

Valves shall be DN 200 and shall be PN16 pressure rating. Location of valves shall be as per Contract Drawings.

The Contractor shall provide test certificates for the materials and the properties shall be in accordance with relevant standards.

Before carrying out pipeline pressure testing, the Contractor shall verify with the supplier of the air valves that the valves have the capacity to sustain the pipeline test pressures. In the event that they do not sustain the pressure, the valves shall be removed and the stubs off the pipeline shall be blanked-off before pressure testing the pipeline.

STUBS

Stubs for air valves, scour valves and pressure relief valves of required dimensions as specified in the Drawings shall be fabricated by the Contractor and shall be fixed to the pipeline.

NUTS, BOLTS AND WASHERS

Unless otherwise specified, nuts, bolts and washers shall be galavanised and / or zinc-electroplated to conform to the requirements of IS 1364. Bolts shall be of sufficient length so that at least one thread, but not more than three threads, shall show through the nut when in the fully-tightened condition.

ANCHOR BLOCKS

Anchor blocks shall be provided at horizontal bends, vertical bends and at intervals on pipelines with gradients in excess of 1 in 6 – as noted on the Drawings and at other locations ordered by the Engineer. The anchorages shall be made from concrete and constructed to the dimensions shown on the Drawings. Where faces of anchor blocks are shown to bear against undisturbed ground, the Contractor shall take all necessary measures to ensure that such bearing is given over the full dimensions shown.

Curves formed by welded bends and pipe lengths will not require anchoring unless specifically shown in the Drawings.

Welded pipelines shown on the Drawings as having tied couplings and flanges shall require anchor blocks only at the positions specifically noted on the Drawings.

VERTICAL THRUST BLOCKS

Vertical thrust blocks shall be located wherever there is a transition between above ground and buried pipelines. All vertical thrust blocks shall have flexible joints at either end to allow for small amounts of settlement to occur. The Contractor shall undertake the construction of thrust blocks as early the programme as possible for settlement to occur. The Contractor shall undertake the construction of the thrust blocks as early in the program of Work as practicable and at least [_____(as applicable)] months prior to the installation of the above ground pipeline, in order to reduce the risk settlement of imposing additional loads on the pipeline supports.

Where possible, the base of the thrust block shall be cast against solid rock in order to prevent any settlement. Any material overlaying the rock shall be excavated and replaced with class M15 mass concrete. In the event of no rock being encountered the base of the thrust block shall be cast against undisturbed ground. Any ground which, in the Engineer's opinion, is unsuitable shall be excavated and replaced with class M15 mass concrete.

INTERNAL CLEANING OF PIPELINE

Pipeline shall be cleaned of all dirt, debris, dust or other deposits by repeated hosing of copious quantities of water on the pipe surface and simultaneously rubbing the surface with gunny cloth to the satisfaction of Engineer. Cleaning with metal cleaning solution, acid, wire brushes, scrappers or sand paper shall not be permitted.

The section of the pipeline once cleaned shall not be entered into for any purpose later. Sufficient precaution shall be taken to prevent the ingress of any dirt, debris, or dust inside the section. Failing this the section shall be cleaned again at the discretion of the Engineer.
In the case of above ground pipeline, the length of the section to be taken up for cleaning shall be decided in consultation with the Engineer from the point of view of ventilation etc.
In case of buried pipeline a section shall be taken up for cleaning after the Work of back filling around and over the pipeline is completed and the spiders have been removed from inside with approval of Engineer.

During the pipeline operation in the adjoining section, the Contractor shall take all the precaution to prevent ingress of water, debris, dirt etc. in the cleaned section, failing which the section shall be cleaned again at the discretion of the Engineer. When deemed necessary by the Engineer, suitable closures shall be provided at the open end or the ends of the cleaned section.

No separate payment will be made for the Work of cleaning and providing closures. The rates coated for the laying of pipes shall include the cost of cleaning also.

HYDRAULIC TESTING PIPELINE

Pipelines and fittings shall be subjected to hydraulic pressure test in the presence of the Engineer which shall comply with IS 5822 unless otherwise specified.
Testing shall be carried out in two stages:

a) A test of section as construction proceed before internal cement mortar lining; and

b) A test of the hole of the pipeline on completion

The Contractor shall be equipped with all plants, equipment, fittings and water necessary for the hydraulic tests. The Contractor shall submit to the Engineer, well in advance, of the test, details of proposals - including the supply of water either by tankers or bore holes. No connections from the existing pipelines will be allowed, nor will any connection to the pipeline and pipe Work which would involve cutting, tapping or altering the permanent Works be allowed.

The test gauges used shall be of approved manufactures having dials of at least 200 mm diameter, graduated such that the test pressure is at least 75% of the full-scale reading. If necessary, different gauges shall be supplied for different pipeline sections. Two gauges shall be provided for the sole use of the Engineer and shall remain in the Engineer's possession through the duration of the Contract. All gauges shall be dead-weight-tested and calibrated at the commencement of work and at regular intervals as required by the Engineer.
The Contractor's arrangements for testing shall include a suitable means of quick installation and removal of the Engineer's gauges during the testing.

TESTING PROCEDURE

Sectional hydraulic test shall be carried out after the pipeline section to be tested as been laid, jointed and back filled to a depth that is sufficient to prevent flotation, but by leaving exposed the joints which have not been tested. The sections to be tested shall be to the approval to the Engineer and shall be not longer than 2,000 Mtr. or 500 Mtr. when either pipeline is laid adjacent to or underneath the carriage way or when a section includes an air valve chamber. The joints between each tested section shall be left exposed until the pipeline has passed the test on completion.

This test shall be undertaken within [_____(as applicable)] month of the Contractor commencing the laying of the pipes. Should the pipeline fail the test or the Contractor fail to undertake the test, all laying and welding Work shall be halted until that section of pipeline passes a hydraulic test.

Each length of the pipeline to be tested shall be capped or blanked off at each end and securely strutted or restrained to withstand the forces which will be exerted when the test pressure is applied. Testing against closed valves will not be permitted. Washout valves shall be fitted with blank flanges and these together with in-line valves shall be left open. Air valves already fitted shall be permitted to function during the test.

Proposals for testing where thrusts on structures are involved, even where thrust flanges on the piping are installed, shall be submitted, with the calculations of the forces to be carried to the Engineer for approval.

The method of filling the pipeline with water shall be approved by the Engineer. The length under test shall be filled making certain that all air is displaced through an air valve installed at the top of the blank flange situated at the high end of the line. The length shall then remain under constant moderate pressure, 10 m to 20 m head of water, for a period of several hours until the pressure can be maintained without additional pumping.

The pressure shall then by slowly increased at a maximum rate of 1 bar per minute to the full test pressure and pumping discontinued for 3 hours or until the pressure has dropped by [_____(as applicable)] Mtr., whichever occurs earlier. Thereafter, pumping shall be resumed and continued until the test pressure has been restored. The quantity of water pumped to restore the pressure shall be the measure of leakage from discontinuation of pumping till its resumption.

The pipe length shall have to pass the test if the leakage is not more than [_____(as applicable)] head of pressure applied.

Notwithstanding the satisfactory completion of the hydraulic test, if there is any discernible leakage of water from any pipe or joint, the hydraulic test shall have to be repeated.
No pipeline shall be accepted until the leakage on any length is not more than the rate of leakage specified above and all sources of leakage have been rectified.

The test on completion shall be carried out after all the pipeline sections have been satisfactorily tested and the joints between each section are completed so as to provide a continuous test length between pipelines, which shall be tested as above except where the Engineer issues necessary instructions for testing parts of the Works that have been designed for stresses limited by considerations other than those that apply to the pipeline systems.

TEST PRESSURES

Test pressures are to be measured in bars at the center of the blank flange situated at the lowest end of the pipeline under test. Unless otherwise specified or shown on the Drawings pipeline test pressure shall be in accordance with the following:

Steel pipe and fittings 8, 10 and 11 mm wall thickness 18 bar

Test pressure for sections of pipeline containing air valve chambers shall be such that the pressure at the chamber does not exceed valve design pressure as specified by manufacturer. When undertaking a Test on completion of the pipeline length may contain pipes of different wall thickness in such cases the lower of the different test pressures shall be used.

PIPELINE DISINFECTIONS

Upon completion of a newly laid main, the main shall be cleaned, disinfected and de-watered as directed by the Engineer.

The internal surface of pipelines, specials, appearances shall be disinfected using chlorine solution in accordance with procedure specified in IS 5822. Alternative methods may be adopted with the approval of the Engineer. The chlorinated water shall stand in pipeline for a minimum period of [_____(as applicable)] hours and all valves in the system shall be operated twice during this period.

The chlorinated water shall be neutralised and disposed off as directed by the Engineer.

After final flushing and before the pipeline is placed into service, water samples shall be collected and tested for bacteriological quality and shall not indicate the presence of coliforms. If the initial disinfections fail to produce satisfactory results, the disinfections shall be repeated until satisfactory samples are obtained.

The Contractor is expected to carry out the cleaning, disinfecting and de-watering Work as a part of laying the pipes and his rates for laying the pipes should include the cost of cleaning and other related Works.

MARKINGS

Details like valves type, size and cistern number shall be painted on the valve chambers as directed by Engineer.

MEASUREMENT AND PAYMENT

The measurement of the pipes for items specified in the BoQ shall be on running meters of net length along the center line of the pipe excluding the length of specials and appurtenances.

Specials shall be paid separately on the basis of provision made in the BoQ. For the purpose of payment, the flanges shall be either included in or excluded as described in the BoQ. However materials such as nuts, bolts, and washers etc. shall be included in the respective terms.

Valves shall be paid on number basis as mentioned in the Contract Data.

Payment for fabrication of pipes and specials shall be made after successful testing and delivery to the Work site. Payment for laying the pipes and specials shall be made as mentioned in the Contract Data.

Lining and coating shall be measured by surface area coated or lined in Sqms. For coating the outer diameter (before coating) of pipe barrel shall be considered and for lining internal diameter (before lining) of pipe barrel shall be considered.

XIV.6 ANCILLARY STRUCTURES

The Contractor shall build Valve Chambers & Thrust Blocks / Anchor blocks and such other miscellaneous structures that may be required at the locations shown by the Engineer and as shown in the Drawings or as may be otherwise specified or directed – unless otherwise specified in this Chapter or advised by the Engineer based on the site conditions.

The various structures shall be built as the pipe laying progresses and the Engineer may, at his discretion, stop Work entirely on the laying of pipe or construction of other structures until the construction of the structures already approved by the Engineer are completed by the Contractor.

XIV.6.1 THRUST BLOCKS

Thrust blocks shall be provided for both horizontal and vertical bends as suggested, for effective transfer of the hydrostatic thrust developed during the operation of the rising main. They shall be constructed at the locations shown in the alignment Drawings and shall be of respective dimensions shown therein. The surrounding virgin land of the thrust blocks shall not be disturbed so that the thrust developed in the main is effectively transferred. .

XIV.6.2 VALVE CHAMBERS

RCC valve chambers shall be provided for all valves. These valve chambers are of different sizes suitable for air valves, scour valves & control valves with RCC pre-cast slab covering.

XIV.6.3 STRUCTURES FOR CROSSING CANAL / NALLAHS AND OTHER MISCELLANEOUS STRUCTURES

Structures for crossing the pipeline over canals / nallahs and other miscellaneous structures not listed in these specifications but may be required to be built shall be as per construction Drawings and as described in the BoQ. The materials of construction of workmanship for those structures shall conform to the relevant Standard Specifications. The measurement of quantities involved in these structures for payment shall be done as per dimensions of the respective Drawings.

GRADE OF CONCRETE

ORDINARY CONCRETE

In case of ordinary concrete, the mix is not required to be designed by preliminary tests and proportions of cement, fine aggregates and coarse aggregates are specified by volume. The ordinary concrete shall be in four grades designated as M 7.5, M 10, M 15 and M 20. It can also be specified by volumetric mix as given in **Table: 7.11** below. For cement which normally comes in bags and is used by weight, volume shall be worked out by taking [_____(as applicable)] kg of cement as [_____(as applicable)]cubic meters in volume. Shaking, ramming or hammering shall not be done. Proportioning of sand shall be as per its dry volume and in case it is damp, allowance for 'bulkage' shall be made as per IS 2386 (Part III).

Ingredients required for ordinary concrete containing one bag of cement for different proportions of mix shall be as given in **Table: 7.11** below.

Table 7.11: Ingredients required for ordinary concrete

Grade of Concrete*	Nominal Mix by volume Cement: Fine Aggregate: Coarse Aggregate**	Total quantity of dry in kg (max) by mass per 50 kg of cement (to be taken as the individual masses of fine and coarse aggregates)	Quantity of water in liters (max) per 50 kg of cement***
M 7.5	1:4:8	625	45
M 10	1:3:6	480	34
M 15	1:2:4	350	32
M 20	1:1.5:3	250	30

* In the designation of a concrete mix, the letter 'M' refers to the mix and the number refers to the specified [_____(as applicable)] days' Works compressive strength of that mix on [_____(as applicable)] mm cubes, expressed in N / sq. mm.

** The proportions of the aggregate shall be adjusted from upper limit to lower limit progressively as the grading of the fine aggregates becomes finer and the maximum size of coarse aggregate becomes larger.

*** The amount of water should be kept minimum required for proper workability. The quantity given in the column should not be exceeded.

STRENGTH REQUIREMENT OF CONCRETE

Where Ordinary Portland Cement conforming to IS 269 or Portland Blast Furnace Cement conforming to IS:455 is used, the compressive strength requirements for various grades of concrete controlled as well as ordinary shall be as given in Table: 7.12 below. Where rapid hardening Portland cement is used, the [_____(as applicable)] days compressive strength requirements specified in **Table: 7.12** shall be met in [_____(as applicable)] days.

For controlled concrete, the mix shall be so designed as to attain in preliminary tests, a strength of at least [_____(as applicable)]% higher than that required on Work tests for concrete up to and including M 25 and [_____(as applicable)]% higher for higher grades. Preliminary tests need not be carried out in case of 'ordinary concrete'.

Table 7.12: Strength requirements

Grade of Concrete	Compressive test Strength on 150 mm cubes after testing in accordance with IS: 516 (N/sq.mm)	
	Minimum at [(as applicable)] days	Minimum at [(as applicable)] days
M 10	7	10
M 15	10	15
M 20	13.5	20
M 25	17	25

In all cases, the [_____(as applicable)] days compressive strength specified in Table: 7.12 shall alone be the criterion for acceptance or rejection of the concrete.

Where the strength of a concrete mix, as indicated by tests, lies in between the strength for any two grades specified in Table: 7.12, such concrete shall be classified for all purposes as a concrete belonging to the lower of the two grades between which its strength lies.

USE OF PLUMS IN ORDINARY CONCRETE

Stone Plums shall not be used unless specified in the Drawings. When stone plums are used, the size may be from [_____(as applicable)] mm to [_____(as applicable)] mm. The maximum dimension of these stones or plums shall not exceed 1/3rd of the least dimension of the members.

All plums shall be hard, durable, clean and free from soft materials or loose pieces or deleterious substances in them and shall not have sharp corners.

During concreting the first layer of concrete of the specified mix shall be laid to a thickness of at least two and a half times the thickness of the maximum size of plums to be used. The plums shall then be laid while the top portion of this concrete is still green but sufficiently stiff to prevent complete submergence of the plums under their own weight. These plums shall be about half embedded in the concrete and the remaining part exposed so as to form a key with the next layer of concrete. No plums shall be used for concrete-laid under water.

While placing the plums, care shall be taken to see that the clear distance between any two plums is not less than either the width or thickness of either of the plums. The distance from plums to the outer surface or from any steel reinforcement shall be equal to greatest width of the plum.

If plums of stratified stone are used, they shall be laid on their natural bed. Stones with concave faces shall be laid with the concave portion upwards. The thickness of the next and successive layers of concrete shall be at least twice that of the largest plums. The total volume of plums shall not exceed 15% of the volume of the finished concrete.

#8

Tender Drawings

8.1.1

Table 8.1 Drawings Accompanying The Tender Document, Required For Estimation Of Bill Of Quantities

Road Name		
	Title:	Drawing Name
I	ROW_Existing and Proposed _Locator Key Map	Row key map_existing containing :- road locator - strip segmentation-intersection numbering -crosssection location and numbering -Drawing number legend Row key map_existing containing :- road locator - strip segmentation-intersection numbering -crosssection location and numbering
II	RoW Plan_Existing and Proposed-Intersections RoW Plan_Existing and Proposed-Segments	Right of way Intersection plan-Existing Right of way Intersection plan-Proposed Right of way Segement plan-Existing Right of way Segment plan-Proposed
III	RoW Proposed Plan Dimension-Intersections RoW Proposed plan Dimension-Segments	Right of way Intersection plan-Proposed Geometric Dimension Right of way Intersection Plan- Proposed Landscape and Social Service Right of way Segment plan-Proposed Geometric Dimension Right of way Segment plan-Proposed Landscape and Social Services
IV	Proposed utilities-Intersections Proposed utilities -Segments	Right of way Intersection plan- Proposed Utilities Cross Section Ao-Ao Cross Section A1-A1 Right of way Segment plan-Proposed Utilities Cross section A-A Detail: Horizontal grating
V VI	Cross section-horizontal chainage section Longitudinal section	

Detailed Construction Drawings for the following items
Road markings
Paving details
Bus shelter and bay details
Tree guard / tree grating details
Access chamber details for all utilities
Footing details for signposts and street lights

8.1.2 Any deviation in the execution of Works from the Drawings due to unexpected conditions or otherwise, must be brought to the notice of the Employer along with suggested alternatives.

8.1.3 The Employer may continue to provide details for construction and design and the Contractor may request for same as desired at any time during the project-execution phase

#9

Bill of Quantities (BoQ)

Sl.No	Unit	Item Code		Est Qty	Est Rate	Rate quoted by Agency in Rs.	
						In Figures	In words
1	Sqm		Cleaning the existing black-topped surface with brooms, soft brushes and finally dusting with old gunny bags and / or compressed air to receive bituminous treatment including cost of all materials, labour, HOM of machineries complete as per Specifications, with all lead, lift, loading and unloading complete as per the direction of Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
2	Sqm		Milling of existing bituminous layers at identified distressed locations on the pavement with milling machine reclaiming excavated material including hauling and stock-piling and adding rejuvenators as required, mixing in a hot mix plant, transport-ing and laying at site and compacting to the required grade, level and thickness, with all lead, lift, loading and unloading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
3	Sqm		Providing and applying tack coat on the prepared black topped surfaces @ [(as applicable)] kg. per [(as applicable)] Sqm, heating bitumen in a boiler fitted with spray set (excluding cleaning of road surface) including cost of all materials, labour, complete as per Specifications. [(as applicable)]% for milled portion completed including all lead and lifts and as per the directions of the Engineer-in–Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
4	Cum		Construction of granular sub-base by providing close-graded material, mixing in a mechanical mix plant at OMC, carriage of mixed material to Work site, spreading in uniform layers with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per the Specifications. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				

5	Cum		Providing, laying, spreading and compacting graded stones aggregate to wet mix macadam Specifications including pre mixing the material with water at OMC in mechanical mix plant carriage of mixed method of tipper to site, laying in uniform layers with paver in sub-base / base course on a well-prepared surface and compacting with vibratory roller to achieve the desired density complete as per the Specifications. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
6	cum		For profile correction with BM. Providing and laying bituminous macadam on prepared surface with crushed coarse aggregates as per design mix formula for base / binding course including loading of aggregates with F.E. loader, hot mixing of stone aggregates and bitumen in hot mix plant [(as applicable)] tonne capacity, transporting the mixed material in tipper to paver and laying mixed materials with paver finisher to the required level and grade, rolling by power roller to achieve the desired density, [(as applicable)] mm compacted thickness with [(as applicable)]% bitumen but excluding cost of primer / tack coat with lead up to [(as applicable)] km including cost of all materials, labour, HOM of machineries complete as per specifications including all lead and lifts and as per the directions of Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
7	cum		Providing and laying dense bituminous macadam [(as applicable)] mm compacted thickness with [(as applicable)] bitumen 60 / 70 grade, contents on prepared surface with specified graded crushed aggregates for base / binder course including loading of material with F.E. loader, heating of binder aggregates and filter in hot mix plant [(as applicable)] TPH, transporting the mixed material by tipper and laying with paver finisher to the required level and grade, rolling by power roller to achieve the desired density (but excluding primer / tack coat) to a lead up to [(as applicable)] km. including cost of all materials, labour, HOM of machineries complete as per Specifications with all lead, lift, loading and unloading complete as per the direction of Engineer-in-Charge. Road 1:_____				

			Road 2:_____ Road 3:_____ Road N: _____				
8	cum		Providing and laying bituminous concrete with 60 / 70 grade using [(as applicable)] HMP producing an average output of [(as applicable)] TPH using crushed aggregates of specified grading, pre-mixed with bituminous binder at 6% of mix and filler, transporting the hot mix to Work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per complete in all respects as per Specifications [(as applicable)] mm compacted thickness including all lead and lifts and as per the directions of Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
9	Sqm		Road marking with hot applied thermoplastic compound with reflectorising glass beads on bituminous surface:- Providing and laying of hot applied thermoplastic compound [(as applicable)] mm thick including reflectorising glass beads at [(as applicable)] gms per Sqm. area, thickness of [(as applicable)] mm is exclusive of surface applied glass beads as per IRC35. The finished surface to be level, uniform and free from streaks and holes complete as per specifications. with all lead, lift, loading and unloading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
10	Nos		Specification for Raised Pavement Marker (RPM) (Road Studs): Providing and fixing of Reflective RPMs / Cat eyes / Road studs confirming to ASTM D4280 type H, having reflective panels made of prismatic lens of total internal reflection, the prismatic lens should be electronically fixed (welded) to the body made of polycarbonate mould, with a height of [(as applicable)]., size of [(as applicable)]. and reflecting area of [(as applicable)] Sq cm. with the slope of retro reflective surface				

			reflective surface within the limit of [(as applicable)] degree to the base on either side. The marker shape will display an initial minimum luminous intensity of [(as applicable)] Mcd / lux at an entrance angle of [(as applicable)] degree and observation angle of [(as applicable)] degree. The corresponding values for [(as applicable)] degree entrance and [(as applicable)] degree observation angle shall be [(as applicable)] Mcd / lux with color-multiplying-factor on either cases for white, yellow and red markers being 1.0, 0.6 and 0.25 respectively. The RPM's should be fixed by using two numbers of polymer shanks using appropriate adhesive as recommended and certified by the RPM manufacturer. The raised pavement marker should support a sufficient minimum load [(as applicable)] Kg. in accordance with Ministry specification. including all lead and lifts and as per the directions of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
11	Nos		Providing and fixing of Retro Reflectorised [(as applicable)] mm cautionary sign boards with [(as applicable)] years warranty & supported by [(as applicable)] years outdoor weathering test report as per IRC: 67 2010, made out of retro reflective sheeting of Wide Angle Cube Corner Micro prismatic grade conforming to IRC: 67: 2010 & Type XI standards, fixed over [(as applicable)] mm thick ACP sheet supported with Back support frame of 1 No. [(as applicable)] mild steel angle as approved , supported on a mild steel angle iron post [(as applicable)] firmly fixed to the ground by means of properly designed foundation with M20 grade cement concrete [(as applicable)], [(as applicable)] below ground level as per approved Drawing. [(as applicable)] equilateral triangle. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
12	Nos		Providing and fixing of Retro Reflectorised [(as applicable)] Mandatory sign boards with [(as applicable)] years warranty & supported by [(as applicable)] years outdoor weather-				

			weathering test report as per IRC:67 2010, made out of retro reflective sheeting of Wide Angle Cube Corner Micro prismatic grade conforming to IRC:67 2010 & Type XI standards, fixed over [(as applicable)] mm thick ACP sheet supported with Back support frame of [(as applicable)] mild steel angle as approved , supported on a mild steel angle iron post [(as applicable)] firmly fixed to the ground by means of properly designed foundation with M20 grade cement concrete [(as applicable)], [(as applicable)] below ground level as per approved Drawing. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
13	Nos		Providing and fixing of Retro Reflectorised [(as applicable)] mm Facility sign boards with [(as applicable)] years warranty & supported by [(as applicable)] years outdoor weathering test report as per IRC:67 2010, made out of retro reflective sheeting of Wide Angle Cube Corner Micro prismatic grade conforming to IRC-67: 2010 & Type XI standards, fixed over [(as applicable)] mm thick ACP sheet supported with Back support frame of [(as applicable)] mild steel angle as approved , supported on a mild steel angle iron post [(as applicable)] firmly fixed to the ground by means of properly designed foundation with M20 grade cement concrete [(as applicable)], [(as applicable)] cm below ground level as per the approved Drawing. Road 1:_____ Road 2:_____ Road 3:_____ Road N _____				
14	Nos		Manufacturing, supply and fixing of Retro Reflective Road Name Sign Board Single Arrow of size [(as applicable)] made out of Wide Angle Cube Corner Micro-prismatic grade sheeting conforming to IRC-67: 2010 & Type XI standards of ASTM D 4956 –09 specifications and fixed over [(as applicable)] thick Aluminium sheet & back support frame of [(as applicable)] MS Angle. Frame supported by 38 OD Stainless Steel pipe Grade 304 AISI with wall thickness of [(as applicable)] all around and 50 OD Pipe Vertical post with wall thickness of [(as				

			applicable)] firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete [(as applicable)] cm etc complete. The information message shall be made out of cut out letters in Blue 1.00 Each 37422 colour transparent overlay film as per IRC 67-2010 Guidelines. A 7–year-warranty for Retro Reflective Sheeting from the original sheeting manufacturer & certified copy of outdoor exposure report for 3 years from an independent test lab for the product offered shall be submitted by the Contractor. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
15	Sqm		Providing and supplying fixing MS Grating of size [(as applicable)] mm at gully-trap along kerb channel at interval as indicated in Drawing and details and size as per approved Drawing including transportation to site, all charges of labour, loading and unloading etc. complete for fixing as indicated in the Drawing with all lead and lifts as per detailed Tender specifications and as directed by the Engineer etc. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
16	Each		Providing and fixing [(as applicable)]cms to [(as applicable)] cms dia. NP grating [(as applicable)] mm dia. with all lead, lift, loading and unloading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
17	Nos		Providing and fixing pre-cast solid cement concrete kerb stones made out of C.C. 1:2:4 with top and bottom width [(as applicable)] and [(as applicable)] mm respectively, [(as applicable)] mm high and [(as applicable)] mm in length finished with CM 1:3 plastering and finishing cutting, including form Work, curing, including cost of all materials, labour, hire charges of machinery, loading, unloading, lead and lift, transportation etc. complete against Main carriageway, footpath / bicycle lane, with all lead, lift,				

			loading and unloading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
18	mtr		Cast-in-Situ Cement Concrete M20 Kerb with Channel. Construction of cement concrete kerb with channel with top and bottom width [(as applicable)] and [(as applicable)] mm respectively, [(as applicable)] mm high in M 20 grade PCC on M10 grade foundation [(as applicable)] mm thick, kerb channel laid with kerb laying machine, foundation concrete laid manually, all complete as per Clause 400.8 complete as per the Specifications. Using Concrete Batching and Mixing Plant with all lead, lift, loading and unloading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
19	Sqm		Painting two coats after filling the surface with synthetic enamel paint in approved shades on new plastered concrete surfaces, with materials, labour complete as per Specifications. Complete including all lead and lifts and as per the directions of the Engineer-in–Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
20	Sqm		Providing and laying heavy duty cobble stone 60mm thick shot blasted grey and yellow of size [(as applicable)] / [(as applicable)] with border tile [(as applicable)] interlocked pavers using cement and coarse sand for manufacture of block of approved size, shape and colour with a minimum compressive strength of [(as applicable)] kg / sq. m over [(as applicable)] mm thick sand bed (average thickness) and compacting with plate vibrator having 3 tonnes compaction force there by forcing part of sand underneath to come up in between joints final compaction of paver surface joints into its final level including cost of material labour and HOM of machineries complete as per Specifications, with all lead,				

			lift, loading and unloading complete as per the direction of Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
21	Nos		Supply and installation of street lighting. Street light luminaire shall be equipped with the second generation LensoFlex2® photometric engine which offers a high-performance photometry. The luminaire shall have 48 LED driven at [(as applicable)] mA. The average power consumption shall be 113W. The LED's will be of neutral white. The luminaire shall have a minimal nominal flux of [(as applicable)] lumens & shall have IP 66 optical compartment sealed by thermally hardened extra-clear glass protector for an optimal luminous flux. The control gear compartment shall have IP 66 tightness level. The optical compartment and control gear compartment shall be mechanically and thermally separated for heat management and optimum performance. The luminaire shall be made of sustainable and recyclable aluminum die cast materials. All hardware of luminaire shall be of stainless steel. The glass protector should have IK 08 impact resistance. Each LED is associated with a specific lens that generates the complete photometric distribution of the luminaire. Luminaire shall have [(as applicable)]% lifetime residual flux @ [(as applicable)] hours at Ta 25 degree. The complete fixture (including driver) shall be guaranteed for 5 years against any manufacturing defects and performance of light quality. Besides these, the luminaires shall also have the following features. a. Direct access to gear and electronic compartment; b. ThermiX®: large surface area for best possible heat extraction; c. Surge protection up to [(as applicable)]kV; and d. Universal mounting piece: Inclination adjustment system on-site. Side-entry or vertical mounting. For primary roads light level of [(as applicable)] lux average with overall uniformity [(as applicable)] and for secondary roads light level of [(as applicable)] lux average with overall uniformity [(as				

			uniformity [(as applicable)] shall be achieved. Cycle track shall have [(as applicable)] Avg lux with [(as applicable)] uniformity and pedestrian foot paths shall have [(as applicable)] Avg lux with [(as applicable)] uniformity. The luminaire shall confirm to ENEC or equivalent European certification. The fixture shall be supplied with and installed on suitable pole of [(as applicable)] Mtr. height. The pole shall be supplied with base plate and must be made of mid steel, galvanised, primed and PU painted. The pole shall be equipped with lockable flush door strengthened at cut out complete including all lead and lifts and as per the directions of Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
22	Nos		Providing and fixing tree guard [(as applicable)], [(as applicable)] height fabricated with MS angle [(as applicable)], MS iron [(as applicable)] and steel wire [(as applicable)] mm dia. blended and fabricated as per design in two halves bolted together complete as per Specifications including all lead and lift as per the directions of the Engineer-in-Charge. Using angles, square bars, trees and channel grills, grating frames, gates and tree guards of any size and design etc. complete including all lead and lifts and as per the directions of Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
23	Nos		Providing and fixing tree grating fabricated to required sizes and shapes and installed in position with necessary hold fast and embedding in position with [(as applicable)] cement concrete including all incidental operation like cutting, welding, grinding, bending, drilling, hoisting, scaffolding as required synthetic enamel paint and other operations, all incidental Works complete as per Drawings & directions of Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				

24	mtr		Horticultural Work that includes ploughing or trenching of existing ground to a depth of [(as applicable)] cm. and watering the same of all kind of soil, rough dressing of the trenched ground, supplying and stacking of good earth and read earth at site by mechanical transport, cow dung or sludge manure, river sand, uprooting weeds, fine dressing of ground, grassing and supply and applying of chemical fertilizer and including cost of planting complete including all lead and lifts and as per the directions of Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
25	cum		Dismantling of existing structures like culverts, bridges, retaining walls and other structures comprising of masonry, cement concrete, wood Work, steel Work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and lead of [(as applicable)]Mtrs. complete as per Specifications. Dismantling Stone Masonry. Rubble Stone masonry in cement mortar. Complete including all lead and lifts and as per the directions of Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
26	sqm		Removing BS Slab of Drain and Stacking as directed by the Engineer with all leads and lifts including charges for loading, unloading, labour charges, etc., complete. As per detailed Tender Specifications. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
27	cum		Dismantling of existing structures like culverts, bridges, retaining walls and other structure comprising of masonry, cement concrete, wood Work, steel Work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and lead of [(as applicable)] metres complete as per the				

			Specifications. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
28	mtr		Removing and Re-setting of kerb Stones complete including all lead and lifts and as per the directions of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
29	cum		Earth Work in excavation of foundation of structures as per Drawing and technical Specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom, backfilling the excavation earth to the extent required and utilising the remaining earth locally for road Work complete as per Specifications. i) Ordinary soil - A. Manual Means (i) Depth up to 3 m. complete including all lead and lifts and as per the directions of Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
30	Nos		Removal of telephone / electric poles including excavation and dismantling of foundation concrete and lines under the supervision of concerned Department, disposal, with all lifts and stacking the serviceable material separately complete as per Specifications. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
31	Mtr		Dismantling guard rails by manual means and disposal of dismantled materials with all lifts and stacking serviceable materials and unserviceable material separately complete as per Specifications. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				

32	sqm		Compaction of original ground with maximum of [(as applicable)] passes of [(as applicable)] tons power roller including filling in depression occurring during rolling including cost of all labour, HOM of machinery complete as per Specifications complete including all lead and lifts and as per the directions of Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
33	cum		Construction of dry lean cement concrete sub- base over a prepared sub-grade with coarse and fine aggregate conforming to IS: 383, the size of coarse aggregate not exceeding [(as applicable)] mm, aggregate cement ratio not to exceed [(as applicable)], aggregate gradation after blending to be as per Table 600-1, cement content not to be less than [(as applicable)] kg. / cum., optimum moisture content to be determined during trial length construction, concrete strength not to be less than [(as applicable)] Mpa at [(as applicable)] days, mixed in a batching plant, transported to site, laid with a paver with electronic sensor, compacting with [(as applicable)] tonnes vibratory roller, finishing and curing complete including all lead and lifts and as per the directions of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
34	rmtr		Providing and laying reinforced cement concrete pipe NP3 for culverts including pointing ends, and fixing collars with cement mortar [(as applicable)] including cost of all materials, labour, curing complete as per the Specifications complete including all lead and lifts and as per the directions of the Engineer-in-Charge {[(as applicable)] mm dia.}. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
35	mtr		Supplying HDPE pipes confirming to IS 4984:1995 with latest amendments and conveying to Work site including loading and				

			unloading at both destination and rolling, lowering into trenches, laying true to line and joining of pipes and specials including encasing the pipe around to a depth of not less than [(as applicable)] cm with soft gravel or selected earth available from the excavation etc., complete, giving hydraulic test as per relevant ISS with all lead and lift including testing and commissioning, The rate is exclusive of required specials and fittings etc., complete (Contractor will make his own arrangement for procuring water for testing) [(as applicable)] mm dia for OFC / Telecom / Surveillance Complete including all lead and lifts and as per the directions of Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
36	mtr		Supplying HDPE pipes confirming to IS 4984:1995 with latest amendments and conveying to Work site including loading and unloading at both destination and rolling, lowering into trenches laying true to line and joining of pipes and specials including encasing the pipe around to a depth of not less than [(as applicable)] cm with soft gravel or selected earth available from the excavation etc. complete giving hydraulic test as per relevant ISS with all lead and lift including testing and commissioning, The rate is exclusive of required specials and fittings etc. complete (The Contractor will make his own arrangement for procuring water for testing) double-walled Corrugated HDPE - [(as applicable)] dia. for power complete including all lead and lifts and as per the directions of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
37	mtr		Supplying HDPE pipes confirming to IS 4984:1995 with latest amendments and conveying to Work site including loading and un-loading at both destination and rolling, lowering into trenches, laying true to line and joining of pipes and specials including encasing the pipe around to a depth of not less than [(as applicable)] cm with soft gravel or selected earth available from the excavation etc., complete, giving hydraulic				

			test as per relevant ISS with all lead and lift including testing and commissioning, The rate is exclusive of required specials and fittings etc. complete (The Contractor will make his own arrangement for procuring water for testing) HDPE ducts for gas complete including all lead and lifts and as per the directions of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
38	mtr		Supplying HDPE pipes confirming to IS 4984:1995 with latest amendments and conveying to Work site including loading and un-loading at both destination and rolling, lowering into trenches, laying true to line and joining of pipes and specials including encasing the pipe around to a depth of not less than [(as applicable)] cm with soft gravel or selected earth available from the excavation etc., complete, giving hydraulic test as per relevant ISS with all lead and lift including testing and commissioning, The rate is exclusive of required specials and fittings etc. complete (The Contractor will make his own arrangement for procuring water for testing) double-walled corrugated HDPE ducts for street lights complete including all lead and lifts and as per the directions of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
39	mtr		Laying of HDPE pipes confirming to IS 4984:1995 with latest amendments and conveying to Work site including loading and unloading at both destination and rolling, lowering into trenches, laying true to line and joining of pipes and specials including encasing the pipe around to a depth of not less than [(as applicable)] cm with soft gravel or selected earth available from the excavation etc. complete, giving hydraulic test as per relevant ISS with all lead and lift including testing and commissioning, The rate is exclusive of required specials and fittings etc., complete (The Contractor will make his own arrangement for procuring water for testing) Laying of OFC / Power / Gas ducts complete including all lead and lifts and as per the directions of the				

			Engineer-in-Charge Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
40	Each		SWD with M20-ready-mixed cement Concrete [Ref. (as applicable)] Access Chamber with inner dimension [(as applicable)], Depth [(as applicable)] Mtr, side walls of 0.15m thick, top cover [(as applicable)] Mtr thick, PCC bed of M15 concrete [Ref. (as applicable)] complete including all lead and lifts and as per the directions of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
41	Each		POWER [Ref. (as applicable)]Access Chamber with Inner Dimension [(as applicable)], depth [(as applicable)], side walls of [(as applicable)] Mtr thick, top cover [(as applicable)] Mtr thick, PCC bed of M15 concrete [Ref. (as applicable)] complete including all lead and lifts and as per the directions of the Engineer-in-Charge.				
42	Each		OFC-GAS with M20 Ready Mixed cement Concrete [Ref. (as applicable)] Access Chamber with Inner Dimension [(as applicable)], Depth [(as applicable)] Mtr., side walls of [(as applicable)] Mtr. thick, top cover [(as applicable)] Mtr. thick, Partition wall with [(as applicable)] Mtr. length, [(as applicable)] Mtr. depth, [(as applicable)] Mtr. thick with a removable CI cover plate hinged at one side and provision to lock it. PCC bed of M15 concrete [(as applicable)] complete including all lead and lifts and as per the directions of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
43	cum		Filling available excavated earth (excluding rock) in sides of foundations up to plinth in layers not exceeding [(as applicable)] cms in depth, compacting each deposited layer by ramming after watering with lead up to [(as applicable)] Mtr. and lift up to [(as applicable)] Mtr. including cost of all labour complete as per specifications complete				

			including all lead and lifts and as per the directions of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
44	cum		Providing and stone dust in foundation up to plinth to required depth for sub-soil treatment including watering ramming with all lead and lift complete as per the Specifications. Stone dust complete including all lead and lifts and as per the directions of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
			PART B - [Public Authority concerned of the Government of the State / Union Territory / National Capital Territory (as applicable)] WATER & UGD WORKS				
45	Rmt		Manufacturing, providing, transporting, rolling, lowering, laying & jointing, testing, commissioning of Electric Resistance Welded ERW, SAW MS pipe (Fe 410 grade) conforming to IS 3589 - 2001 with latest amendments including perfect linking and welding of joints to correct position include cost and conveyance of pipe and materials with all lead and loft, cost of labour and giving satisfactory hydraulic test as per IS 3589-2001 with latest amendments for test pressure and working pressure both factory and site etc., complete as per detailed specifications with inside C.M. 1:1.5 lining of minimum [(as applicable)] mm thick up to [(as applicable)] mm OD & minimum [(as applicable)] mm thick beyond [(as applicable)] mm OD and outside minimum [(as applicable)] mm thick coating in CM 1:3 over [(as applicable)] weld mesh of 13 gauge, including loading and unloading of pipes for the following diameters and specified thickness of plate as noted below, including bailing out of water wherever necessary. The rates are inclusive of all taxes and duties. (The Contractor will make his own agreement for procuring water for testing) [(as applicable)] mm Dia {[(as applicable)] mm thick}, with all lead, lift, loading and un-loading complete as per the direction of				

			Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
46	Rmt		Manufacturing, providing, transporting, rolling, lowering, laying and jointing, testing, commissioning of ERW / SAW MS pipes (Fe-410 Grade) confirming to IS 3589-2001 with latest amendments including perfe [(as applicable)] mm dia {[(as applicable)] mm thick}, with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
47	Rmt		Manufacturing, providing, transporting, rolling, lowering , laying and jointing, testing, commissioning of ERW / SAW MS pipes (Fe-410 Grade) confirming to IS 3589-2001 with latest amendments including perfe [(as applicable)]mm dia. {[(as applicable)] mm thick} with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
48	Rmt		Manufacturing providing, transporting, rolling, lowering , laying and jointing, testing, commissioning of ERW / SAW MS pipes (Fe-410 Grade) confirming to IS 3589-2001 with latest amendments including perfe [(as applicable)] mm dia {[(as applicable)] mm thick} with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
49	Rmt		Manufacturing, providing, transporting, rolling, lowering , laying and jointing, testing, commissioning of ERW / SAW MS pipes (Fe-410 Grade) confirming to IS 3589-2001 with latest amendments including perfe [(as applicable)] mm dia {[(as applicable)] mm thick}, with all lead, lift,				

			loading and un-loading complete as per the direction of the Engineer-in-Charge Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
50	Kgs		Manufacturing, providing, transporting, lowering, laying and jointing, testing and commissioning of MS specials confirming to IS 7322:1985 with latest amendments, perfect linking and welding of joints to correct position including cost and conveyance of m [(as applicable)] mm dia. {[(as applicable)] mm thick}, with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
51	Kgs		Manufacturing, providing, transporting, lowering, laying and jointing, testing and commissioning of MS specials confirming to IS 7322:1985 with latest amendments, perfect linking and welding of joints to correct position including cost and conveyance of [(as applicable)] mm dia {[(as applicable)] mm thick}, with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
52	Kgs		Manufacturing, providing, transporting, lowering, laying and jointing, testing and commissioning of MS specials confirming to IS 7322:1985 with latest amendments, perfect linking and welding of joints to correct position including cost and conveyance of [(as applicable)] mm dia {[(as applicable)] mm thick}, with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				

53	Kgs		Manufacturing, providing, transporting, lowering, laying and jointing, testing and commissioning of MS specials confirming to IS 7322:1985 with latest amendments, perfect linking and welding of joints to correct position including cost and conveyance of [(as applicable)] mm dia {[(as applicable)] mm thick}, with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge.				
54	Kgs		Manufacturing, providing, transporting, lowering, laying and jointing, testing and commissioning of MS specials confirming to IS 7322:1985 with latest amendments, perfect linking and welding of joints to correct position including cost and conveyance of [(as applicable)] mm dia {[(as applicable)] mm thick}, with all lead, lift, loading and un-loading complete as per the direction of Engineer- in-charge Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
55	Rmt		Providing house connection with excavation in all types of soils without damaging the other utilities and supplying and laying of [(as applicable)] mm ODMDPE pipe (PE80) manufactured in accordance with ISO 4427 / 1996 with minimum required strength of [(as applicable)] Mpa. Hydraulic de... these fixtures should be standard quality confirming to IS)and compression fittings for MDPE pipes confirming to ISO 14236 and its latest versions the excavated trench should be re-filled with soft selected earth and the dismantled masonry of the drain for a length of minimum [(as applicable)] Mtrs. with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
56	Rmt		Providing House connection with excavation in all types of soils without damaging the other utilities and supplying and laying of [(as applicable)] mm ODMDPE pipe (PE80) manufactured in accordance with ISO 4427 / 1996 with minimum required strength of 8				

56	Rmt		Mpa. Hydraulic de... these fixtures should be of standard quality confirming to IS) and compression fittings for MDPE pipes confirming to ISO 14236 and its latest versions the excavated trench should be re-filled with soft selected earth and the dismantled masonry of the drain for an additional length (per every meter & part thereof) [(as applicable)] Mtr. with all lead, lift, loading and unloading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
57	Nos		Providing, supplying, & fixing CI valves of sizes this includes jointing of tail pieces etc., (rubber insertions and bolt & nuts to be supplied by the Contractor approved by board) and fixing in pipeline etc. including construction new RCC valve chambers of [(as applicable)] as per the available depth [(as applicable)] mm with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
58	Nos		Providing, supplying, & fixing CI valves of sizes this includes jointing of tail pieces etc. (rubber insertions and bolt & nuts to be supplied by the Contractor approved by board) and fixing in pipeline etc. including construction new RCC valve chambers of [(as applicable)] as per the available depth [(as applicable)]. with all lead, lift, loading and unloading complete as per the direction of the Engineer-in--Charge Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
59	Nos		Providing, supplying, & fixing CI valves of sizes this includes jointing of tail pieces etc. (rubber insertions and bolt & nuts to be supplied by the Contractor approved by board) and fixing in pipeline etc. including construction new RCC valve chambers of [(as applicable)] as per the available depth [(as applicable)] with all lead, lift, loading and un-loading complete as per the				

			direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
60	Nos		Providing, supplying, & fixing CI valves of sizes this includes jointing of tail pieces etc. (rubber insertions and bolt & nuts to be supplied by the Contractor approved by board) and fixing in pipeline etc. including construction of new RCC valve chambers of [(as applicable)] as per the available depth [(as applicable)] mm. with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
61	Nos		Providing, supplying, & fixing CI valves of sizes this includes jointing of tail pieces etc., (rubber insertions and bolt & nuts to be supplied by the Contractor approved by board) and fixing in pipeline etc. including construction of new RCC valve chambers of [(as applicable)] as per the available depth [(as applicable)] with all lead, lift, loading and unloading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
62	Rmt		Supplying S&S RCC spun pipes NP-3 class confirming to IS 458: 1988 with latest amendments and conveying to Work site, rolling and lowering into trenches, laying true to line and level including loading and unloading at both destinations and jointing of pipe [(as applicable)] with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
63	Rmt		Supplying S&S RCC spun pipes NP-3 class confirming to IS 458:1988 with latest amendments and conveying to Work site, rolling and lowering into trenches, laying true to line and level including loading and				

			un-loading at both destinations and jointing of pipe [(as applicable)] with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
64	Rmt		Supplying S&S RCC spun pipes NP-3 class confirming to IS 458:1988 with latest amendments and conveying to Work site, rolling and lowering into trenches, laying true to line and level including loading and un-loading at both destinations and jointing of pipe [(as applicable)] with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
65	Rmt		Supplying HDPE pipes conforming to IS 4984:1995 with latest amendments and conveying to Work site including loading and un-loading at both destination and rolling, lowering into trenches, laying true to line and jointing of pipes and specials (excluding cost of specials) giving hydraulic test as per relevant ISS to the all need & lift including encasing the pipe around to a depth of not less than [(as applicable)] cms. with soft gravel or selected earth available from the excavation, testing and commissioning. the rate is exclusive of required specials & fittings wherever necessary like saddle T stub ends flanged sets, bends, reducers etc. complete. The Contractor will make his own arrangements for procuring water for testing) with all lead, lift, loading and un-loading complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
66	Nos		Supplying and providing RCC manholes of different depth varying from 1mtr 3 mtr inside GRP lining of [(as applicable)] mm thick and fixing CI steps at [(as applicable)] cms apart and providing, supplying, and fixing SFRC rings and covers of Heavy Duty with all lead, lift, loading and unloading				

			complete as per the direction of the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				
67	Nos		Constructing inspection chambers of [(as applicable)] of interior clear dimensions with wire cut brick [(as applicable)] thick in CM 1:6 on a bed of [(as applicable)] thick [(as applicable)] cement concrete and plastered with C.M 1:4 and fixing [(as applicable)] cms. CI frame and cover on a bed of C.C. 1:2:4 of [(as applicable)]cms thick, as per the detailed specifications for depth of chamber of [(as applicable)]Mtrs. (including cost of frame and cover of [(as applicable)] kg. {[(as applicable)]" x [(as applicable)]"} or required pre-cast RC cover as per site requirements as directed by the Engineer-in-Charge. Road 1:_____ Road 2:_____ Road 3:_____ Road N: _____				

Note:

1 Item for which no rate or price has been entered in will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the BoQ {Ref.: **Sub-clause 2.3.2.2** of the **ITT [SECTION 2]**and **Sub-clause 5.4.5.2** of the **CoC [SECTION 5]**}.

2 Unit rates and prices shall be quoted by the Tenderer in Indian Rupees (`).

3 Where there is a discrepancy between the rate in figures and words, the lower of the two will govern. {Ref.: **Sub-clause 2.5.6.1** of the **ITT [SECTION 2]**}

4 Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by quantity, the unit rate quoted shall govern {Ref.: **Sub-clause 2.5.6.1** of the **ITT [SECTION 2]**}

5 The cost for the three year Maintenance clause included in the Contract is to be added separately based on the considerations of the following guidelines:

[Specification of Public Authority concerned of the Government of the State / Union Territory / National Capital Territory (as applicable)]: Filling of cracks using slow-curing bitumen emulsion and applying crusher dust in case crack are wider than [(as applicable)] mm. complete as per the MoRTH Specifications No.3004.3.3;

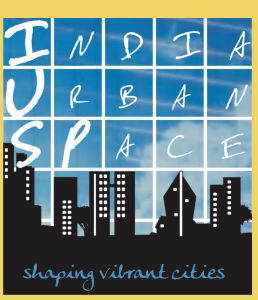
[Specification of Public Authority concerned of the Government of the State / Union Territory / National Capital Territory (as applicable)]:Filling pot holes with patch repairs with bituminous concrete, [(as applicable)] mm

[Specification of Public Authority concerned of the Government of the State / Union Territory /

National Capital Territory (as applicable)]: Removal of all failed material, trimming of completed excavation to provide firm vertical faces, cleaning of the surface, painting of tack coat on the sides and base of excavation as per clause 500.3, back filling the pot holes with hot bituminous material as per clause 500.4, compacting, trimming and finishing of the surface to form a smooth continuous surface – all as per clause 3004.2; and

[Specification of Public Authority concerned of the Government of the State / Union Territory / National Capital Territory (as applicable)]: Maintenance of flowering plants and shrubs.

Maintenance costs estimations may be provided at 0.4% / annum of the cost of PART A of this BoQ.



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