

**NUMALIGARH
REFINERY
LIMITED**



A GOVERNMENT OF INDIA UNDERTAKING

TECHNICAL DOCUMENT / DRAWINGS/ DIAGRAMS

FOR

“Supply, Installation, Testing and Commissioning of pipeline network for natural gas supply to NRL Township & CISF Colony (COMM/C08/4512).”

Tender No. OC08000066/BHU

PREPARED & ISSUED BY

NUMALIGARH REFINERY LIMITED

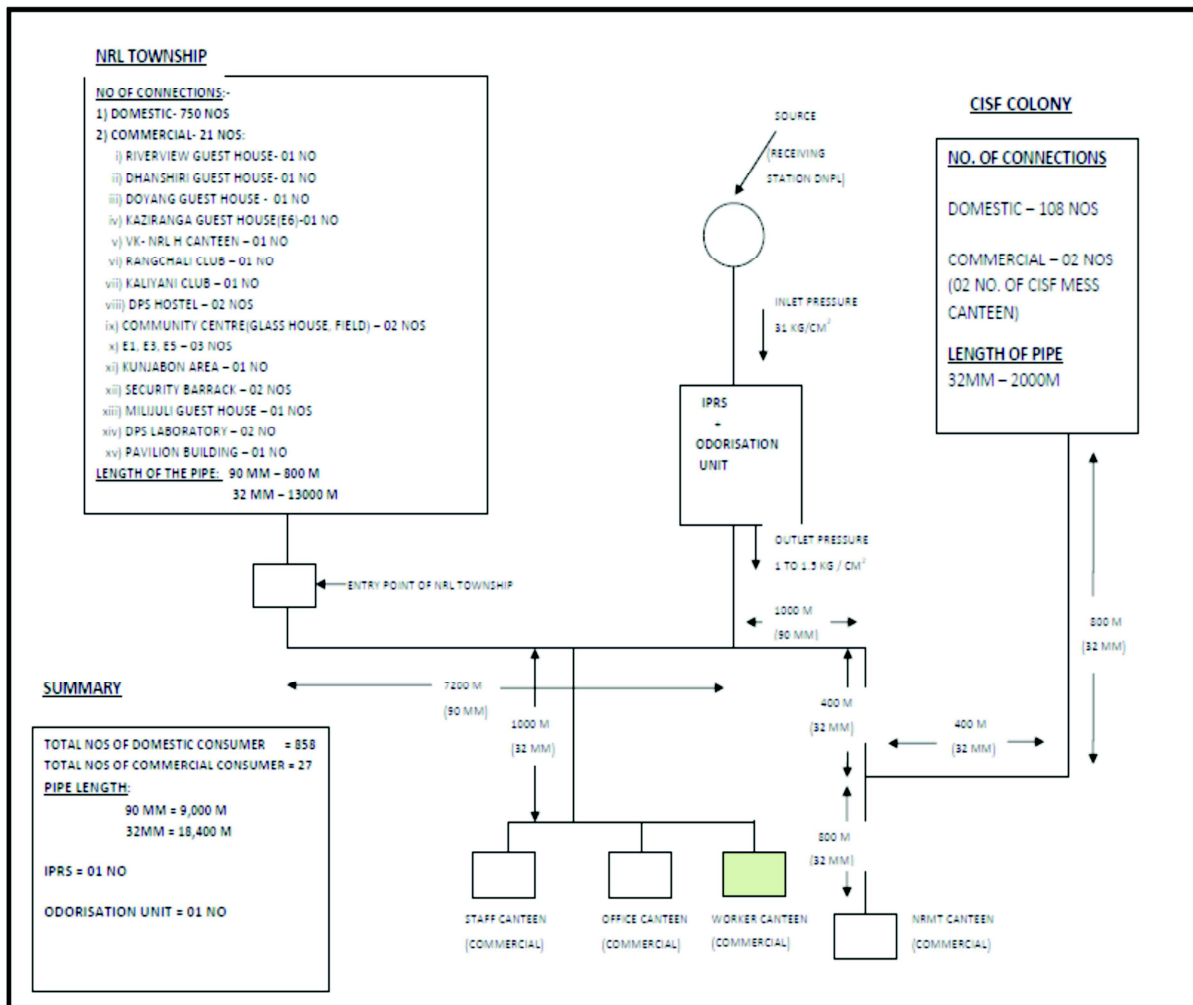
(A Govt. of India Enterprise)

PNG DISTRIBUTION FOR NRL AND ASSOCIATED TOWNSHIP

Background:

Numaligarh Refinery Limited (NRL) is a group company of Bharat Petroleum Corporation Limited. Numaligarh Refinery is located at Numaligarh, District Golaghat, Assam with a capacity of 3 MMTPA. NRL is floating this tender for developing PNG network to utilize Natural Gas as a cooking fuel in the community kitchens inside the Refinery premise as well as its townships replacing both domestic and commercial LPG connections which is approximately 885 numbers. NRL has a Metering and Filtration skid inside the refinery premise which will be utilized as the source of gas for the PNG distribution. There are 02 nos. of townships – first being the NRL employee township located approx. 5 km from the Metering and Filtration skid and the other being the CISF Township at an approx. distance of 2 km.

A schematic drawing depicting approximately the PNG network and the proposed connections are shown below:



SITE INFORMATION

Plant Location	:	Pankagrant, Numaligarh
Co-ordinates	:	26°37'30" N, 93° 43'30"E
District / State / Country	:	Golaghat / Assam / India
Nearest Railway Station	:	Golaghat
Nearest Airport	:	Jorhat
Nearest Sea Port	:	Kolkata
Nearest National Highway	:	NH-39

Scope of Work:

The scope of work includes in general but not limited to the following:

1. Supply, Installation, Testing and Commissioning of PE80 Yellow MDPE pipeline network and related civil works for natural gas supply to NRL Township & CISF Colony.

- a) Supply of PE80 yellow MDPE pipes- as per the list provided in tender.
- b) Supply of PE80 yellow MDPE pipe fittings as per the list provided in tender.
- c) Testing and Inspection of pipes and fittings at plant by the approved Third Party Inspection Agency (TPIA)
- d) Supply of materials at site/ stores at NRL, Numaligarh **(Delivery location to be confirmed by vendor before dispatch from EIC).**
- e) Site Mobilization.
- f) Installation of pipes and pipe fittings at site along with related civil works.
- g) Testing and commissioning of pipeline network followed by submission of test report to NRL.
- h) Restoration of ROU.
- i) Other associated civil works required for completion of the work.
- j) Size of the pipes with wall thickness shall be as specified in the Petroleum and Natural gas Regulatory Board [Technical Standards and Specifications including Safety Standards for city or Local Natural Gas Distribution Networks (T4S)] Regulation 2008 and ISO 4437 & IS14885 for the following:
 1. Pipe size from 20mm to 63 mm – as per SDR 11.
 2. Pipe size from 75mm to 225mm- as per SDR 17.6
- k) Production of pipes, fittings and valves shall be done with the thermoplastic piping (MDPE) conforming to the notification of PNGRB 2008 and its latest updation / revision if any and as per ISO 4437, IS 14885 and EN 1555-4. All MDPE fittings shall conform to ISO 8085 – part 3.

The grade of material must be as per list specified below:

1. SOLVOY ELTEX TUB-172.
2. FINATHENE 3802 Y-CF
3. BP RIGIDEX PC2040.
4. REPSOL 3802 YC.

Approved Manufacturer for MDPE raw materials

1. DOW.
2. BOROUGE
3. INEOS
4. TOTAL PETROCHEMICAL
5. BOREALIS

The Bidder shall have to provide the MDPE pipes in the following size/ length:

SI No	Outer diameter of pipe in mm	Length of pipe per piece or coil (Approx.)
1	20mm	300 mtrs
2	32mm	300 mtrs
3	90mm	06 mtrs.

I) Detail list of MDPE Pipe and Pipe Fittings to be supplied/installed.

SI No	Item Description	UOM	Quantity	Max. qty to be accepted as future maint. stock
	PIPE			
1	90mm OD(SDR 17.6)	Mtr	9000	500
2	32mm OD (SDR 11)	Mtr	18600	1000
3	20mm OD (SDR 11)	Mtr	3000	500
	COUPLER			
4	90mm	Nos	1550	50
5	32 mm	Nos	200	10
6	20 mm	Nos	950	30
	TEE			
7	90mm	Nos	5	2
8	32mm	Nos	50	5
	REDUCER			
9	90mm x 32 mm	Nos	10	2
10	90mm x 63mm	Nos	1	1
	ELBOW 90°			
11	90mm	Nos	15	3
12	32mm	Nos	30	5
	END CAP			
13	90mm	Nos	2	1
14	32mm	Nos	50	5
	REDUCING TEE			
15	90mm X 32 mm	Nos	8	2
	TAPPING SADDLE			
16	32 MM x 20 MM	Nos	800	30

	POLYETHELENE VALVE			
17	90mm	Nos	5	2
18	32mm	Nos	30	5
	PRESSURE LETDOWN SKID			
19	2" dia600# class(L&T)	Nos	3	1
20	2" dia150# class(L&T)	Nos	4	1
21	Control Valve/regulator(3000 SCM / hr, inlet pr 30 to 40 kg/cm2 (g) and outlet 4 to 4.5 kg/cm2 (g))	Nos	2	0
22	Pressure Safety Valve(Set pressure 4.6 kg/cm2 (g))	Nos.	1	1
23	Slam Shut off valve (Set pressure 4.6 kg/cm2 (g))	Nos.	1	0
24	2"/3" API seamless pipe, Reducers, Flanges, Nut-Bolts, Gaskets etc. as required for making the entire network operational from inlet flange of pressure letdown skid – IPRS-Turbine Meter – Odorization unit - Transition Fitting to MDPE Pipe.	LS	Assorted	0
	TRANSITION FITTINGS			
25	63mm X 2"	No	1	1
26	MS Pipe 6" ERW Class C (Thk 5.4mm)	Mtr	150	10
27	MS Pipe 3" ERW Class B (Thk 4.5mm)	Mtr	350	30

m) **LIST OF CIVIL WORKS**

Sl.No	DESCRIPTION	UOM	QTY
01	ROAD CROSSING BY BORING / HDD		
	32mm OD to 90mm OD	Mtr.	170
02	ROAD CROSSING BY OPENCUT		
	32mm OD to 90mm OD	Mtr.	30
03	OVERGROUND NULLAH CROSSING PROVIDING CASING		
	20mm to 90mm OD	Mtr.	200
04	UNDERGROUND NULLAH CROSSING		
	20mm to 90mm OD	Mtr.	50
05	FIXING OF PE VALVES		
	32mm OD	Nos	30
	90mm OD	Nos	5
06	CONSTRUCTION OF VALVE CHAMBER		
	(1000 X 1000 X 1000) cu.mm	Nos	35
07	Supply and installation of pipeline marker post as per specification provided in drawing	Nos	200
08	WARNING TAPE OF 150mm WIDTH X 1mm THICK	Mtr	27000
09	River crossing	Mtr	50
10	Construction of a suitable shed (side open) with MS/RCC post and CGI sheet (0.45 mm TATA make) at Receiving Station of DNPL (Inside Refinery premises) to cover Pressure let down skid, IPRS, Meter and Odorization unit etc.	No	1 (not to be billed separately)
11	Restoration of site (For the entire network starting from source inside refinery up to burner point of each and every consumer just before handing over of the work)	LS (not to be billed separately)	

2. Design, Supply and installation of IPRS including all civil works.

The IPRS should be designed as per the following requirement:

- 1) Flow capacity : 500 m³/ hr.
- 2) Inlet Pressure : 4 to 5 kg/cm² (g)
- 3) Outlet Pressure : 0.5 to 1.5 kg/cm² (g)

3. Design, Supply and Installation of PRESSURE LET DOWN SKID including all civil works.

The **PRESSURE LET DOWN SKID** should be designed and installed before the IPRS as per the following requirement:

- 1) Inlet Pressure: 30 to 40 kg/cm² (g)
- 2) Outlet Pressure: 4 to 5 kg/cm² (g)
- 3) Flow Capacity: 3000 m³/ hr.

4. Design , Supply and installation of Automated Gas Odorizing Unit including all civil works.

The Automated Gas Odorizing Unit should be designed as per the following parameters.

- 1) Flow at source : 500 m³ / hr
- 2) Pressure at source : 1.00 kg/cm² (g)

5. Supply and installation of Gas Turbine Meter:

The gas turbine meter should be as per the following parameters.

- 1) Flow: 500 m³/ hr.
- 2) Maximum Pressure: 2 kg/cm² (g)
- 3) Diameter: As per standard
- 4) Class: ANSI #150.

6. Specification of Warning Tape:

Width: 150mm, Thickness: 1mm, Colour of sheet- Yellow,

Material: Polyethylene high impact grade, virgin quality.

Printing: Non delectable type with very high abrasion resistance quality,

Printing in two colour Red and Black legend.

It should be duly packed in PE woven sack material, material should have anti rodent properties .

The printing should be as per drawing attached.

7. Supply and installation of END CONNECTION, PRV, METER, HOSE PIPE, GI pipe and fittings.

Detail list of GI pipe and Fittings to be supplied and installed.

Sl No	Item Description	Unit	Quantity	Max. qty to be accepted as future maint. stock
	GI Pipe & Pipe Fittings Specification : As per IS 1239 (Part 2), Heavy Grade All the fittings should be as per technical specification given below			
1	½ " Ø GI Pipe NB	Mtr	9000	500
2	½ " Ø GI Elbow 90°	Nos	3000	100
3	½ "Ø GI Union	Nos	2500	100
4	½ " Ø N.B. G.I. Nipple of assorted sizes 3", 4", 6", 8".	Nos	4000	200
5	½ " Ø GI Tee	Nos	100	10
6	G.I.Reducer (1/2 " x 1")	Nos	10	5
7	G.I.Reducer (1/2 " x 1.5")		10	5
8	Transition Fitting (20mm X 1/2 ") without coupler	Nos	900	20
9	Reducer ½"X ¾", ½ "X 1 ½ ", ½ "X 1" as required for end connection of meters etc., as reqd.	Nos.	1700	20 nos. of each item
	PRV CONFORMING TO EN 1706 Pressure reducing range : 1 bar To 20 mbar			
10	Domestic	Nos	900	20
11	Commercial	Nos	30	3
12	Gas Tap (½ " X Rubber hose) CONFORMING TO BS EN 331	Nos	900	20

	METER CONFORMING TO BS EN 1359: 1999			
13	Domestic G 1.6 End connection ¾ "	Nos	880	25
14	Commercial G4	Nos	20	2
15	Commercial G6	Nos	10	1
16	½ " Ball Valve CONFORMING TO BS EN 331(L&T)	Nos	900	10
17	Steel Reinforced Rubber Hose pipe Conforming to IS: 9573 TYPE IV	mtr	1300	100

TECHNICAL SPECIFICATIONS FOR GI FITTINGS

1. Description of fittings: ½ "N.B. GI pipe and pipe fittings, Heavy grade.
2. Service: Natural Gas
3. Working pressure: 4 bar
4. Test pressure: 6 bar
5. Working Temperature: 10°C to 50°C

TECHNICAL REQUIREMENTS: (GI pipes & fittings)

i. Raw Material

- a) Raw material used for manufacturing the fittings shall conform to IS 14329 grade.
- b) The limiting phosphorous contents shall be 0.18% maximum.
- c) Tensile strength of the material shall not be less than 320 MPa and the elongation shall be minimum 10%

ii. Dimension & Dimensional Tolerances

- a) All dimensions shall conform to IS 1879
- b) Dimensional tolerance as per IS 1879 is ± 1.5 mm

iii. Wall Thickness: as per IS 1879 and thickness 2.5mm, tolerance- 0.5mm

In addition, test will be conducted for other specification for GI pipes and fittings as specified in relevant IS codes.

Special terms and Conditions:

- a) M/s DNPL will act as a PMC for the entire job.
- b) Entire work will be carried out by the contractor on turnkey basis. In case, for timely completion of the job NRL's assistance required the same will be provided, if available and on cost. Responsibility of providing ROW will be on NRL.
- c) The quantities mentioned are tentative and the contractor will have to make its own detailed survey/ assessment for ascertaining the exact quantity of materials required prior to procurement of materials/starting of work. Materials ranging from 5% to 10% (or as specified in particular cases like valves etc.) of installed quantity will be accepted as future maintenance stock and payment will be made for the same as per the rate for supply. **ANY VARIATION IN ITEMS OR QUANTITY SHALL BE INTIMIDATED BY BIDDER DURING PRE-BID DISCUSSION. NO ADDITIONAL ITEM SHALL BE PERMITTED POST ORDERING.**

- d) The contractor will have to supply materials as per the specification mentioned along with TPI certificate. The materials will be accepted after joint inspection in presence of contractor's representative.
- e) All materials must be certified by EIC, DNPL before putting it in use at site.
- f) In case of MDPE pipe and Fittings, Gas Meter, IPRS, Pressure Control Valve, Automated Gas Odorizing Unit, MS Valves, PE Valves, the contractor will have to engage an approved Third Party for TPI at factory at own cost.
- g) The pipeline network after completion in all respect of installation and laying is to be tested pneumatically at a pressure 6kg/cm² for 24 hours. Any defect / leakage shall be repaired by the bidder at his own cost. After successful completion of the testing work, the pipeline network is to be commissioned by purging the pipeline with natural gas considering all safety aspect by the contractor.

h) PAYMENT TERMS

- a. **For all Items EXCEPT SI no 00020:** Payment shall be made on certification by EIC against monthly RA Bills in the following terms:

- i) 65% of **supply/material cost** payment will be made against delivery and acceptance of materials on pro-rata basis.
65 % payment towards **Installation cost** will be made on completion of installation on pro-rata basis.
- ii) 15% (of total cost for supply and installation) payment will be made on completion of testing and acceptance on pro-rata basis.
- iii) 10% (of total cost for supply and installation) payment will be made on completion of commissioning section wise and on pro-rata basis.
- iv) 10% (of total cost for supply and installation) payment will be kept as security deposit and will be released after completion of 1 year from the date of final commissioning or handing over whichever is later.

- b. **For Items under SI no 00020** ie Design, Supply and installation of IPRS unit, control valve, Automated Gas Odorizing Unit and Gas Turbine meter): Payment shall be made on certification by EIC in the following terms:

70% payment will be made against delivery and acceptance of materials and 20% against installation and commissioning and 10% will be retained as SD and will be released after completion of 1 year from the date of final commissioning or handing over whichever is later.

BIDDER SHALL INDICATE THE INSTALLATION CHARGE IN TERMS OF % OF THE SUPPLY COST OF ALL THE ITEMS LISTED UNDER SI no 00020 IN THE UNPRICED BID WITHOUT DISCLOSING ANY RATES.

i) PRICE QUOTE PHILOSOPHY (BID REJECTION CRITERIA)

The total quoted Lumpsum Price towards **procurement / supply of items/ materials shall not exceed 70% (seventy percent)** of the total quoted lumpsum price.

j) Pre-bid meeting:

- i. A pre-bid meeting will be held at NRL Site and the interested vendors should visit and participate in the pre-bid meeting for first hand information & data collection and full understanding of the system. The time and date shall be notified and updated in NIT and respective website by NRL.
- ii. During the pre-bid meeting, vendor may propose alternate specifications or design, deviations, exclusions, additional detailing. Bidder is advised to mail the queries and deviations prior to attending the meeting. The final acceptance of such changes same rests with NRL. Such correspondence may be published and made known to other bidders through NRL website or through tender portal.
- iii. NRL reserves the right to ignore queries raised by any participant of the pre-bid meeting subsequently unless same is linked to the earlier pre-queries & responses or is linked to any resultant corrigendum to the tender.
- iv. NRL further reserves the right to ignore queries as well as any deviations sought by interested bidders who have not participated in the pre-bid meeting process

k) PRE QUALIFICATION CRITERIA (PQC)

The bidder must have requisite experience on Natural Gas pipeline (Supply, laying testing and commissioning) Project in any PSU, authorized CGD owner or Govt. organization in India in installation of PE 80/PE 100 yellow/orange MDPE underground natural gas pipeline (Gas pipeline shall be as per specification mentioned by PNGRB in T4S regulation) network of sizes ranging from 20 mm OD to 160 mm OD for a minimum length of 20 km gas pipeline

In addition to above, the bidder must have experience in any PSU, authorized CGD owner or Govt. organization of having successfully completed work on Natural Gas Supply Project in installation & commissioning of PE 80/PE 100 yellow/orange MDPE underground natural gas pipeline network in India during last 10 (ten) years reckoned from the date of publishing the NIT of value as given below-

- a) 3(Three) similar work of value Rs.176.40 Lacs
- b) 2(two) similar work of value Rs.141.12 Lacs
- c) 1(One) similar work of value Rs. 105.84 Lacs

The bidder shall submit the following documents to substantiate their claim in compliance to the Pre Qualification Criteria (PQC) as stated above:

Copy of Work Order and completion certificate issued by any PSU, authorized CGD owner or Govt. organization in India for a completed work as per above must be enclosed with the offer, without which Bidder's qualification will not be considered.

l) ANNUAL TURNOVER:

The bidder must have an average annual turnover of Rs. 120 Lacs (One Crore Twenty Lacs) during the last 03 (Three) financial years ending 31st March 2017.

The Bidder shall enclose the documents with the offer for audited financial results of the above mentioned financial year, without which Bidder's qualification will not be considered.

m) DEFECTS LIABILITY PERIOD

The CONTRACTOR shall guarantee the maintenance of work for a period of 12 months from the date of handing over and taking over of work between the contractor and NRL

Any damage or defect that may arise or lie undiscovered at the time of handing over taking over, connected in any way with the equipment or service supplied by him or in the workmanship, shall be rectified or replaced by the CONTRACTOR at his own expense as deemed necessary or directed by the ENGINEER – IN -CHARGE. If ENGINEER- IN-CHARGE / OWNER carries out such works then actual cost incurred towards labour, supervision and materials consumables or otherwise plus 100% towards overheads (of which the certificate of ENGINEER-IN-CHARGE/OWNER shall be final) shall be deducted from any sums that may then be or at any time thereafter, become due to the CONTRACTOR or from his Performance Bank Guarantee, or the proceeds of sale thereof or a sufficient part on thereof.

If during the period of liability any portion of the WORK/equipment, is found defective and is rectified/ replaced, the period of liability for such equipment/ portion of WORK shall be operative from the date such rectification/ replacement are carried out and Contract Performance Guarantee shall be furnished separately for the extended period of liability for that portion of WORK/ equipment only. Notwithstanding the above provisions the supplier's, guarantees/warranties for the replaced equipment shall also be passed on to the EMPLOYER

n) LIMITATION OF LIABILITY

OWNER shall not be liable to CONTRACTOR for any indirect and consequential damages, loss of profits or loss of production

o) STATUTORY REQUIREMENTS

- i. All construction, operation and maintenance procedures shall be carried out through appropriate relevant standards, regulations laid by NRL/PNGRB or any other agency as and when applicable.

- ii. The tender manual of NRL is provided in its website www.nrl.co.in under the section "Current Tenders". General Conditions of Contract (GCC), General Purchase Conditions(GPC), Circulars for Minimum wages, Tender Conditions for Safety and Security, Formats for Contract agreement and Bank Guarantee and other details of NRL provided in this section, shall be applicable for this contract.
- iii. Further, the bidder and his offered services shall comply with the applicable laws and rules by statutory, regulatory and government agencies. The Bidder should be aware of such requirements and shall not solely depend on NRL to avail information required for the work.
- iv. Entry and exit of materials supplied by vendor will be governed by NRL gate pass system and shall be through material gate. Returnable and Non-returnable Materials are to be segregated. Likewise, entry of workers is governed by gate pass system including police verification. Work inside refinery is governed by Cold work permit and Hot work permit system and safety manuals. Normal working hours are 8 hours to be scheduled within 8 AM to 5:30 PM excluding weekly off days on Sundays and 1st and 3rd Saturdays. Vendor to apprise himself of such procedures prior to proceeding with the bidding process.

1. **Third Party Inspection Agency (TPIA) :** Testing and Inspection of pipes and fittings at plant by the approved Third Party Inspection Agency (TPIA) provided below:

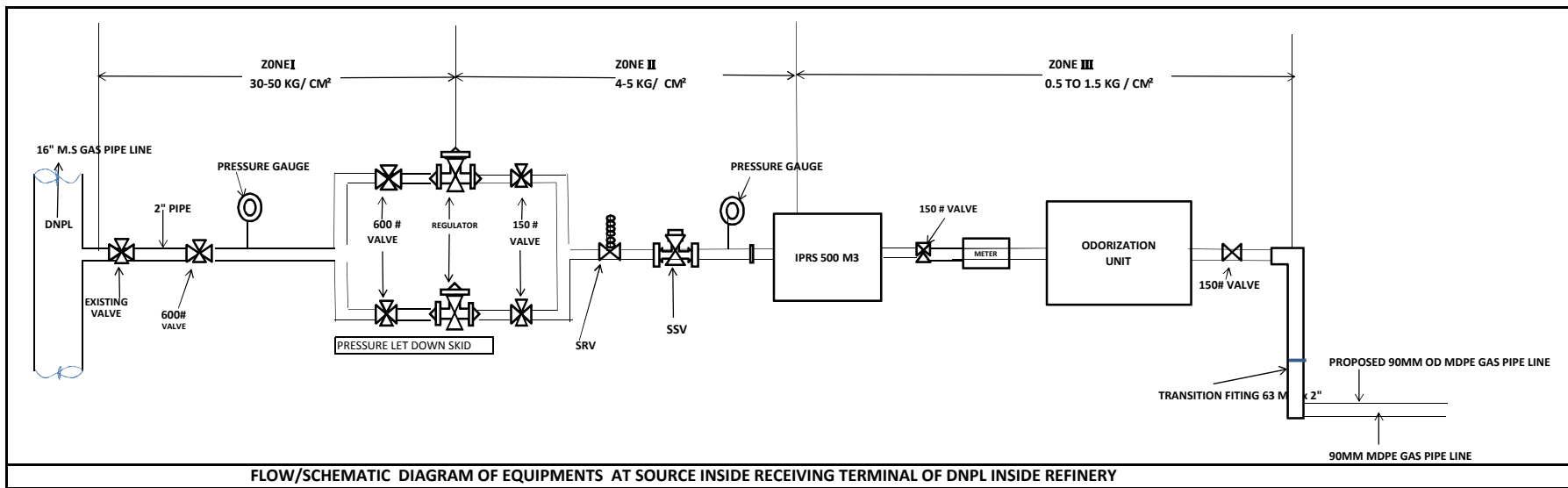
- International Certification Services Pvt. Ltd
- Lloyds Inspection Agency.Pvt.Ltd.
- Det Norske Veritas
- Certification Engineers International Ltd
- SGS India Ltd
- ITENG ENGINEERING (NOW Dr Amin Controllers Pvt Limited)
- CIPET

p) **DOCUMENTATION:** A complete comprehensive operation and maintenance manual complete for end-user shall be supplied (Four sets of prints and one editable soft copy) along with as built drawings in English. The manual shall include complete system details of all the equipments catalogue/manuals, working principle, installation detail, etc. and is to be submitted prior to commencement of Guarantee period

q) **COMPLETION PERIOD**

The completion period for installation, testing including Electrical & Comprehensive Commissioning at site shall be 5 (Five) month from the date of receipt of work order/LOI (soft format).

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LINE DIAGRAM OF GAS SUPPLY TO NRL TOWNSHIP

ANNEXURE-II

NRL TOWNSHIP

NO OF CONNECTIONS:-

1) DOMESTIC- 750 NOS

2) COMMERCIAL- 21 NOS:

- i) RIVERVIEW GUEST HOUSE- 01 NO
- ii) DHANSHIRI GUEST HOUSE- 01 NO
- iii) DOYANG GUEST HOUSE - 01 NO
- iv) KAZIRANGA GUEST HOUSE(E6)-01 NO
- v) VK- NRL H CANTEEN – 01 NO
- vi) RANGCHALI CLUB – 01 NO
- vii) KALIYANI CLUB – 01 NO
- viii) DPS HOSTEL – 02 NOS
- ix) COMMUNITY CENTRE(GLASS HOUSE, FIELD) – 02 NOS
- x) E1, E3, E5 – 03 NOS
- xi) KUNJABON AREA – 01 NO
- xii) SECURITY BARRACK – 02 NOS
- xiii) MILIJULI GUEST HOUSE – 01 NOS
- xiv) DPS LABORATORY – 02 NO
- xv) PAVILION BUILDING – 01 NO

LENGTH OF THE PIPE: 90 MM – 800 M
32 MM – 13000 M

CISF COLONY

NO. OF CONNECTIONS

DOMESTIC – 108 NOS

COMMERCIAL – 02 NOS
(02 NO. OF CISF MESS CANTEEN)

LENGTH OF PIPE
32MM – 2000M

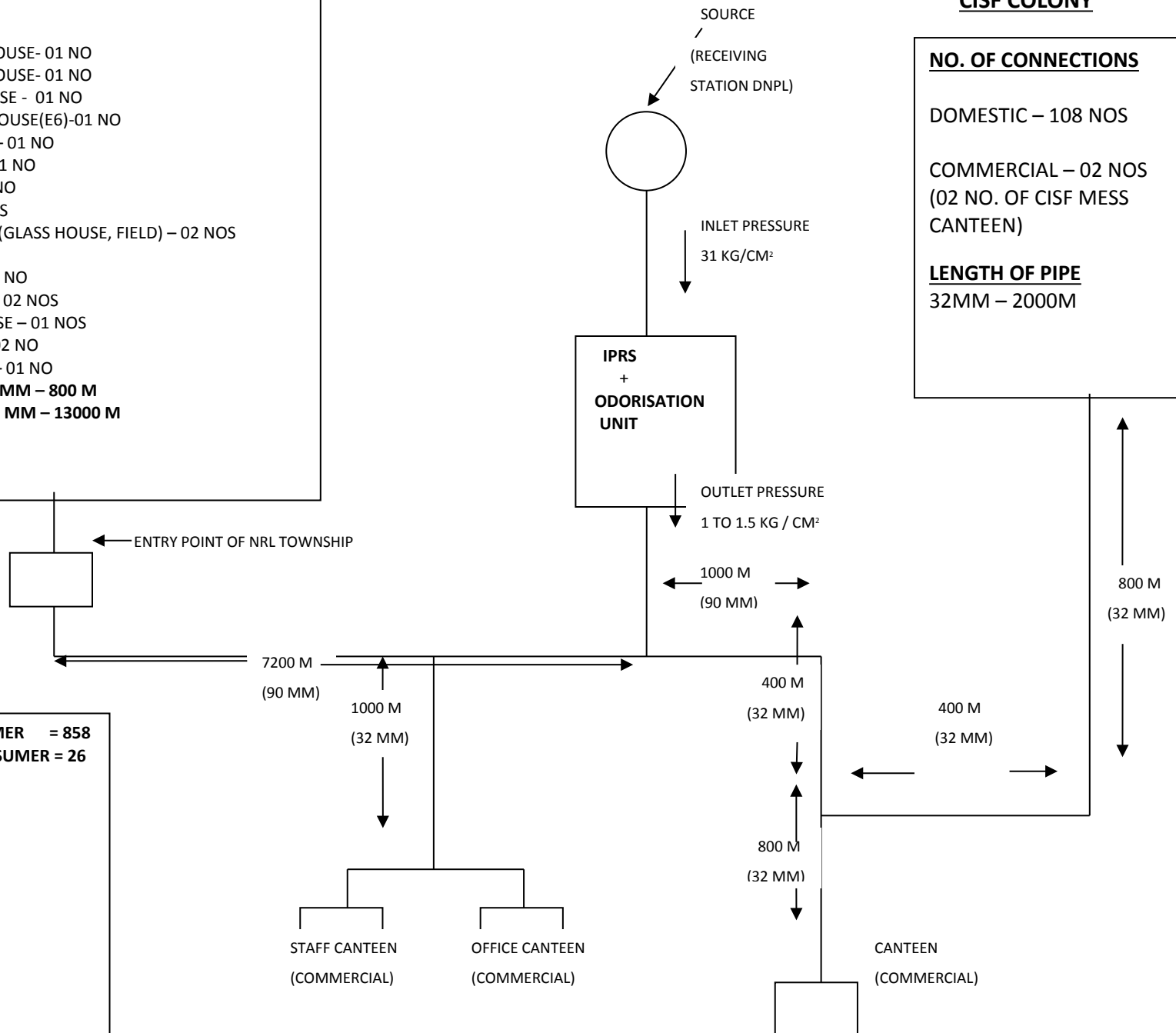
SUMMARY

TOTAL NOS OF DOMESTIC CONSUMER = 858
TOTAL NOS OF COMMERCIAL CONSUMER = 26
PIPE LENGTH:

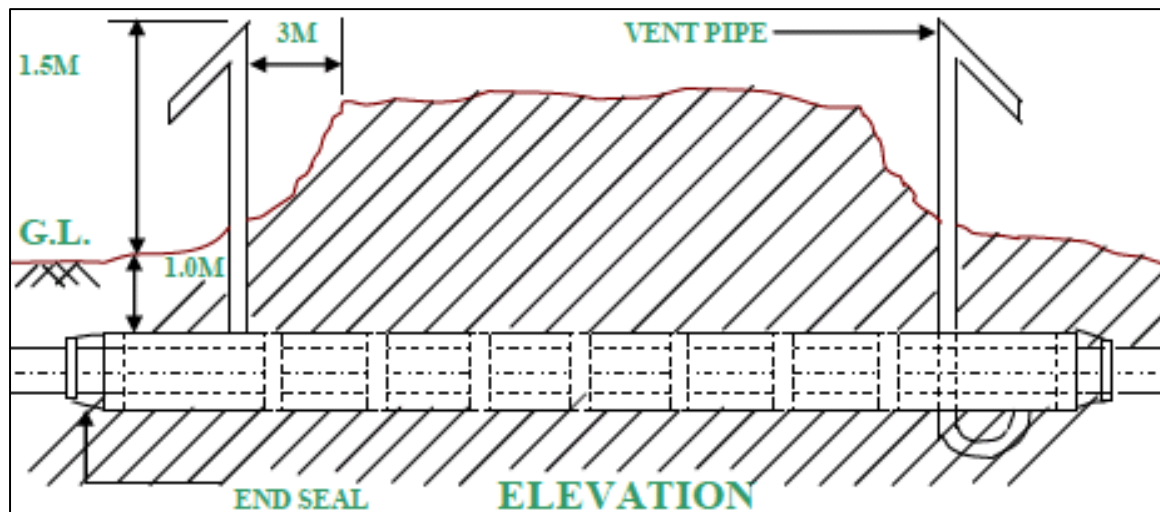
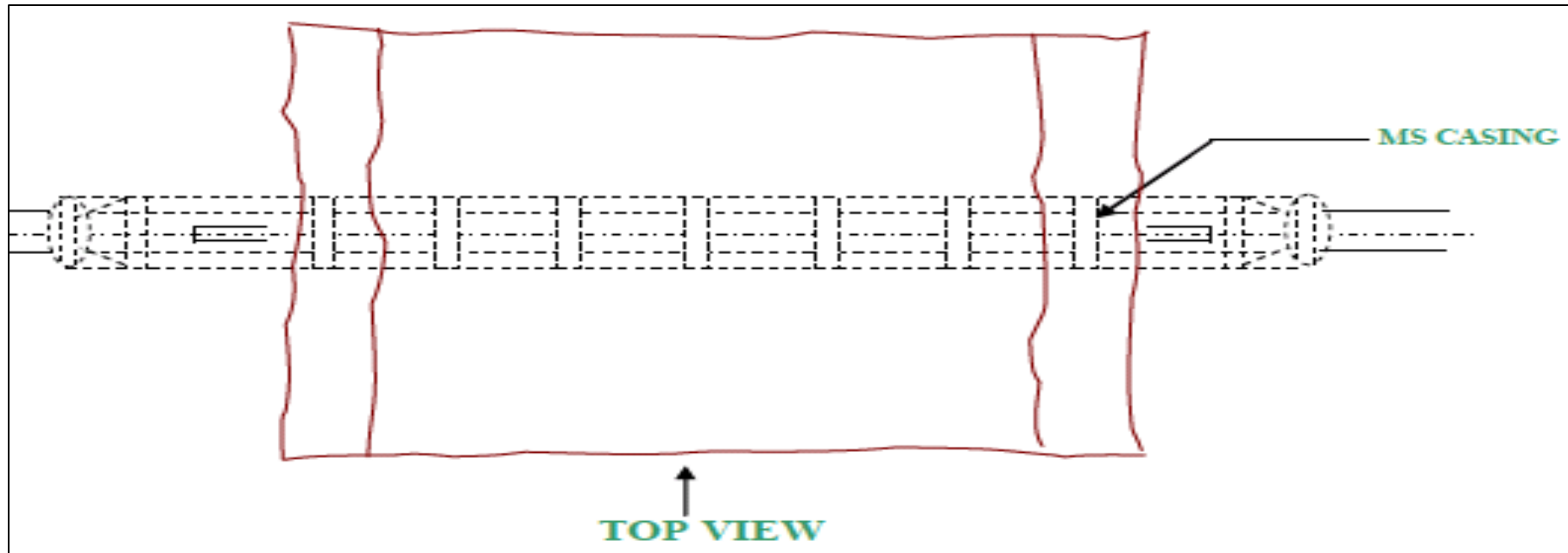
90 MM = 9,000 M
32MM = 18,400 M

IPRS = 01 NO

ODORISATION UNIT = 01 NO



TYPICAL ROAD CROSSING (NOT TO SCALE)



DULIAJAN

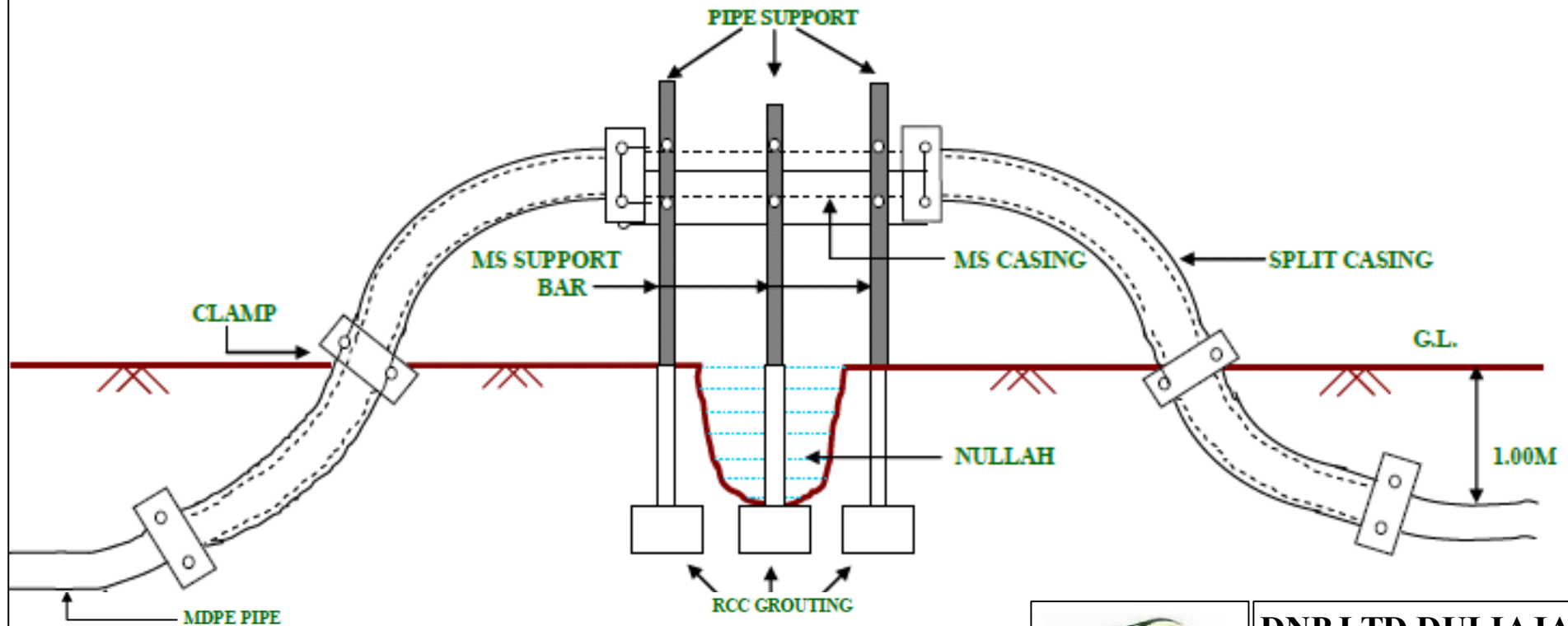
DRG. NO.:

DRAWN BY

CHECKED BY

APPROVED BY

OVER GROUND NULLAH CROSSING (NOT TO SCALE)



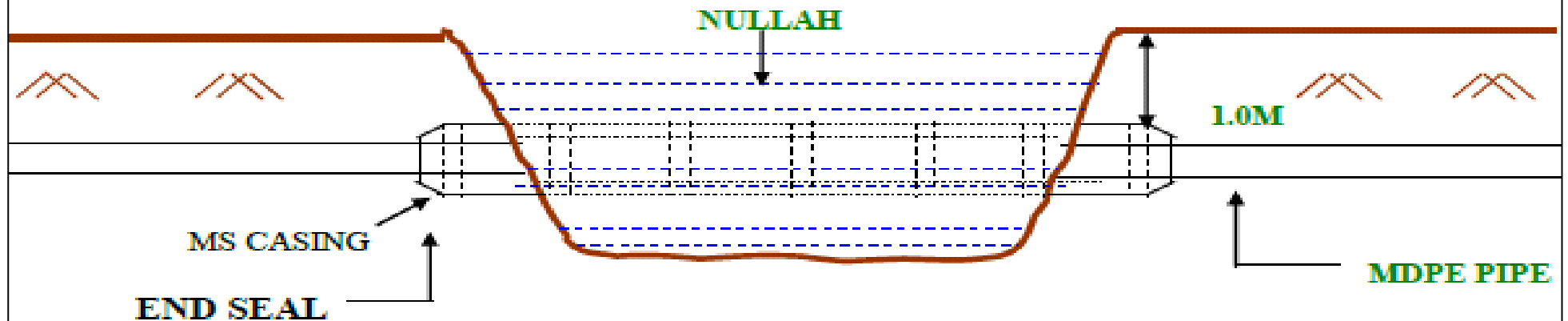
DNP LTD.DULIAJAN
DRG. NO.:

DRAWN BY

CHECKED BY

APPROVED BY

TYPICAL OVERGROUND NULLAH CROSSING
(PROVIDING CASING ONLY)
(NOT TO SCALE)



DNP LTD.DULIAJAN
DRG. NO.:

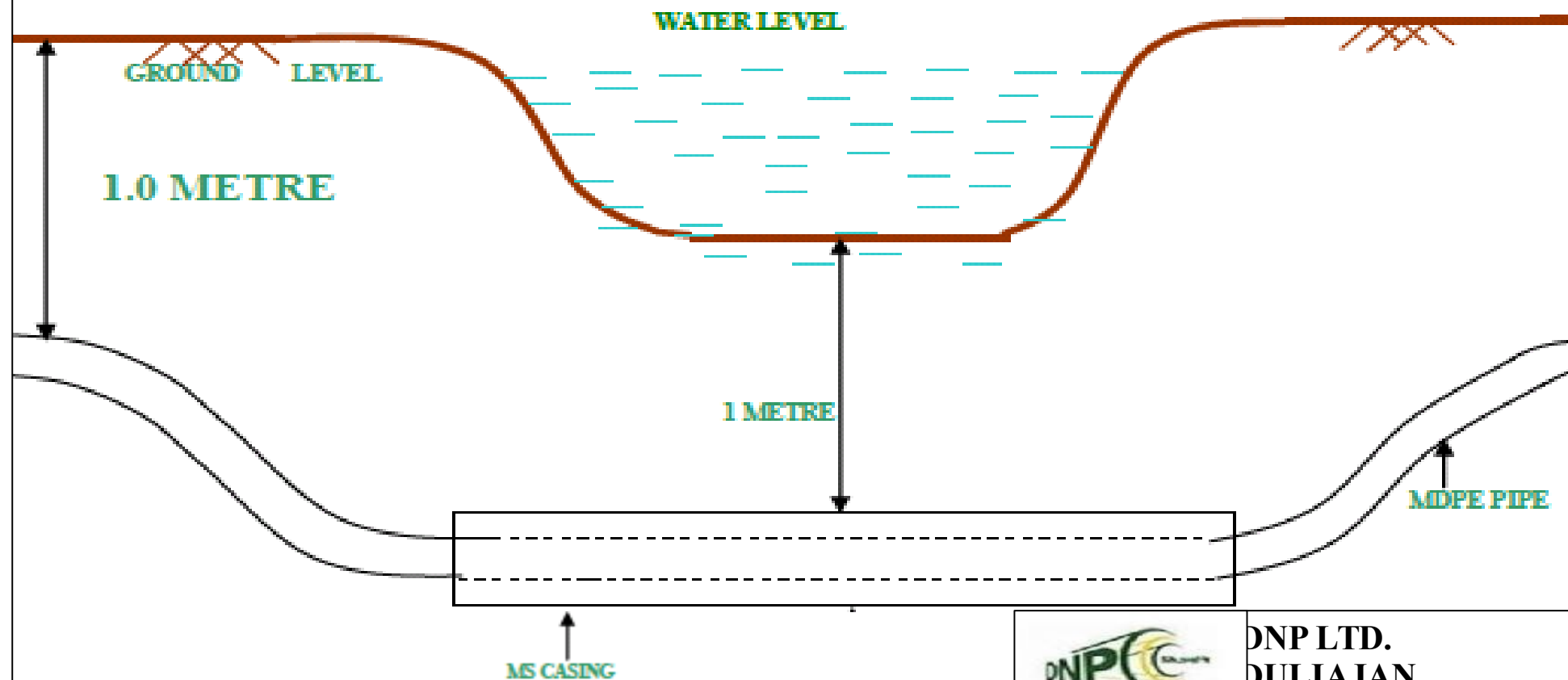
DRAWN BY

CHECKED BY

APPROVED BY

TYPICAL NULLAH CROSSING

(NOT TO SCALE)



DNP Limited

DNP LTD.
DULIAJAN
DRG. NO.:

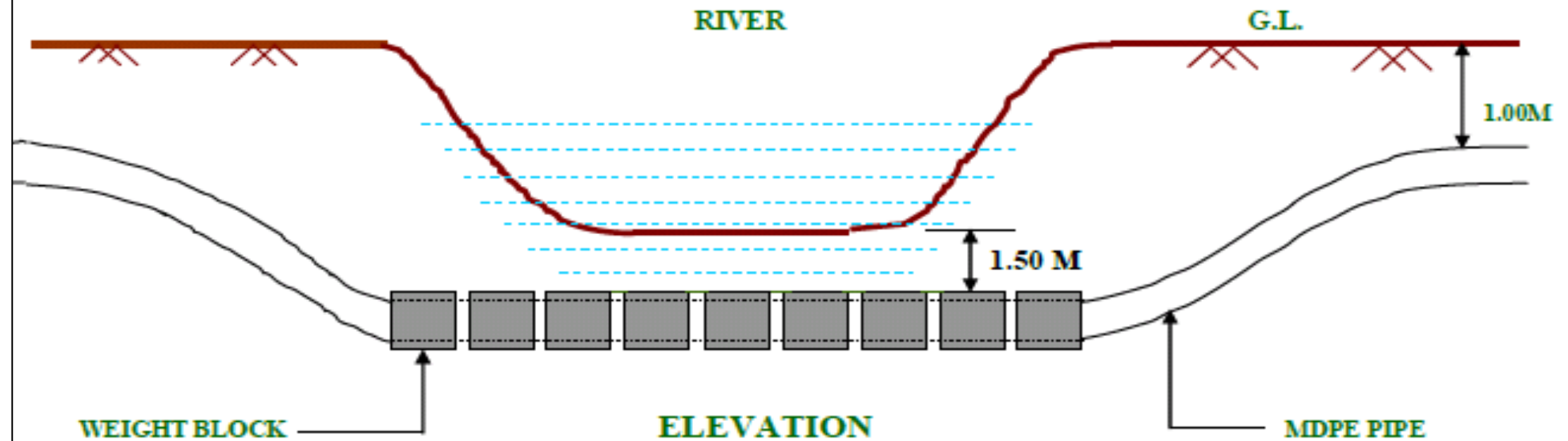
DRAWN BY

CHECKED BY

APPROVED BY

TYPICAL RIVER CROSSING (SUBMERGED)

(NOT TO SCALE)



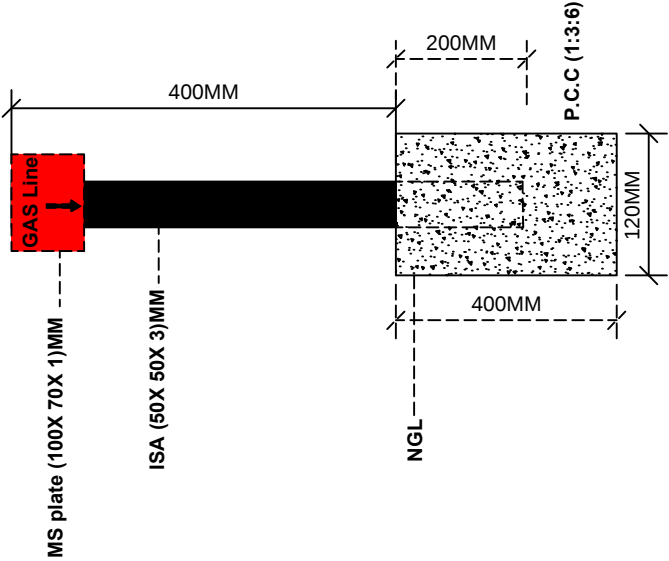
DNP LTD.DULIAJAN
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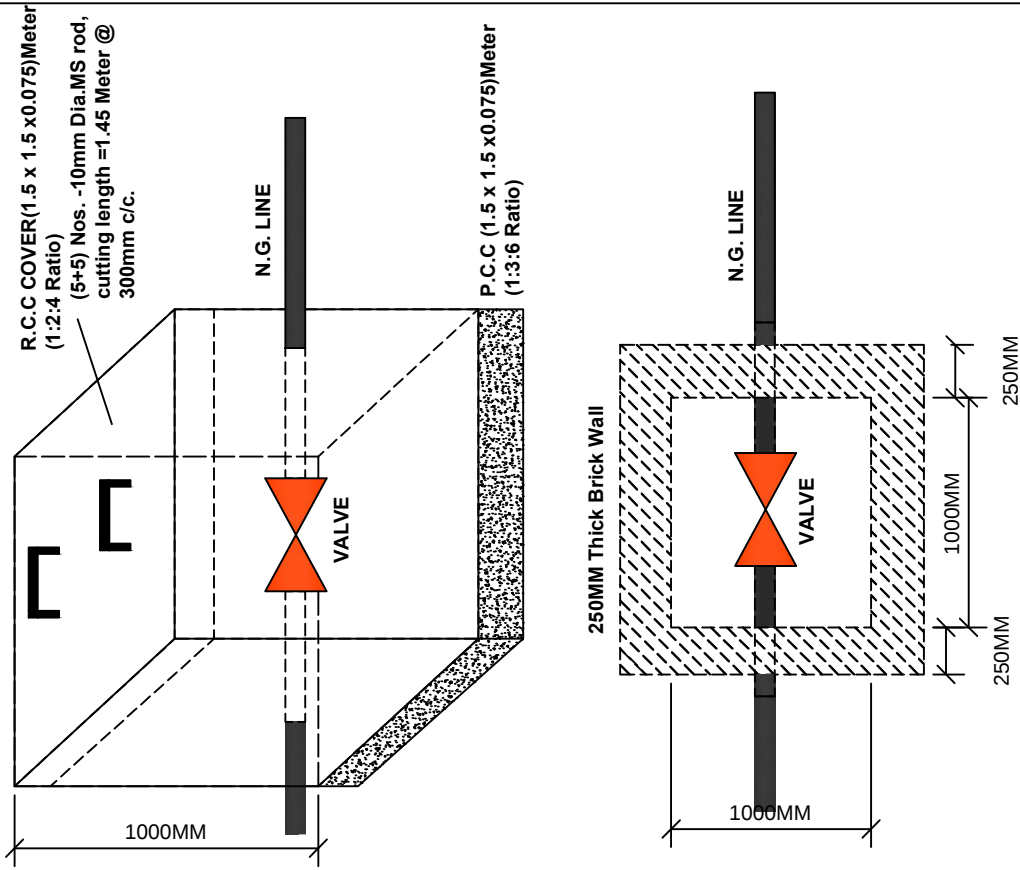
CHECKED BY

APPROVED BY

TYPICAL MARKER POST
(NOT IN SCALE)



TYPICAL VALVE CHAMBER
(NOT IN SCALE)



Warning Tape



FINAL VIEW AFTER CONTINUOUS PRINTING

