



NO. RW/BHP/MP/WaterPipeline(140)/2022-23/1231

**Government of India**  
**Ministry of Road Transport & Highways**  
**(Chief Engineer - Regional Office, Bhopal)**

2<sup>nd</sup> Floor, Nirman Bhawan, Arera Hills, Bhopal-462011  
PH: 0755-2551329, 0755-2571467, Email ID: ro.bpl-morth@gov.in

Date: 15.09.2023

**Invitation of Public Comments**

**Sub: Regarding issuance of permission of pipeline crossing under NAIGARHI micro-irrigation project unit no. 01 on Rewa to Hanumana (MP/UP Border) section of NH-135 at Ch 184+900 to 184+916 in the state of Madhya Pradesh. Reg.-**


DM, MPRDC, Bhopal vide Memo no.1538/Rewa-Hanumana/2023 dated 01.09.2023 forwarded therewith a proposal in this office for permission of pipeline crossing under NAIGARHI micro-irrigation project unit no. 01 on Rewa to Hanumana (MP/UP Border) section of NH-135 at Ch 184+900 to 184+916 in the state of Madhya Pradesh.

2. As per Ministry vide OM No. RW/NH-33044/29/2015/S&R(R) dated 22.11.2016, the Highways Administrator will make available the proposal seeking permission for utility laying for public comments for 30 days on ground of public interest.

3. In view of the above the comments of public are invited on captioned proposal and the same should reach to below mentioned address within 30 days beyond which no comments will be considered.

**The Highways Administration**  
**O/o RO Highways Administration**  
**Ministry of Road Transport & Highways**  
**11<sup>th</sup> Floor, Nirman Bhawan, Bhopal-462011.**  
**Email: ro.bpl-morth@gov.in**

4. This issues with the approval of Highways Administration-cum Regional Officer, MoRT&H, Bhopal. (Computer no. – 228142)

  
(Shubham Kaushal)  
Assistant Executive Engineer  
For RO, MoRT&H, Bhopal

**Copy to:**

1. The Senior Technical Director, NIC, Transport Bhawan, New Delhi-110001 for uploading on Ministry's Website.
2. The CE (BOT), MPRDC, Bhopal-for information.
3. The DM, MPRDC, Division Rewa-for information and requested to furnish the recommendation in view of Ministry's circulars along with verified fees viz. license fee etc. as per latest circular and their detailed calculations
4. The **Executive Engineer, Naigarhi Micro-Irrigation scheme, Division Rewa** - for information with requested to submit the proposal in view of Ministry's circular no. RW/NH-33044/29/2015/S&R (R) dated 22.11.2016 & NH-36094/01/2022-S&R(P&B) (E-



208825) dated 24.04.2023 and submit the license fee through online portal NTRP and BG for restoration charges along with detailed calculation of license fee, restoration charges etc. Receipt of online licences fee deposition should to be submitted to this office through DM, MPRDC, Rewa, BG should be in favour of MPRDCL (as per prevailing procedure in MPRDC) and to be submitted to DM, MPRDC, Division Rewa.





**MADHYA PRADESH ROAD DEVELOPMENT CORPORATION LTD.**

(Govt. of M.P. Undertaking)

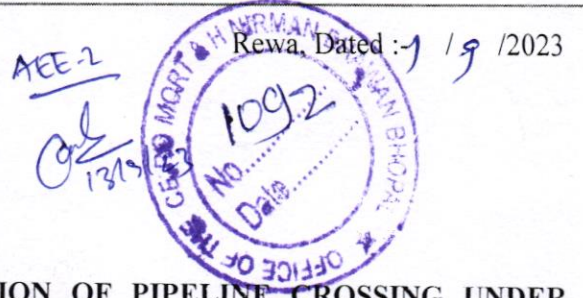
Old PWD, workshop, Chirhula Colony Rewa

PH: 07662494502, email ID-mprdcwewa1@gmail.com

Memo No 1838/Rewa-Hanumana/2023

To,

✓ Chief Engineer cum Regional Officer,  
Ministry of Road Transport & Highway,  
2nd Floor, Nirman Bhawan, Arera Hills,  
Bhopal (M.P)



**Sub :- REGARDING ISSUANCE OF PERMISSION OF PIPELINE CROSSING UNDER NAIGARHI MICRO-IRRIGATION PROJECT UNIT NO. 01 ON REWA TO HANUMANA (MP/UP BORDER) SECTION OF NH-135 AT CH. 184+900 TO 184+916 IN THE STATE OF MADHYA PRADESH.**

**Ref :-** Executive Engineer, Naigarhi Micro-Irrigation Scheme Division Rewa letter no. 1322 dated 01.08.2023.

With respect to above subject, proposal for Pipeline crossing through Trenchless method (Jack Pushing Method) under Micro-Irrigation Scheme was received to undersignatory office vide letter in reference. The said Proposal was analysed and is being forwarded with due recommendation for necessary approval.

**Encl. Original Proposal in 3 sets.**

✓ 01-09-23  
(Umesh Singh)

Divisional Manager  
M.P. Road Development Corp.Ltd.  
Rewa (M.P.)

Endt No ...../ Rewa-Hanumana/ 2023.

Rewa, Dated :- / /2023

Copy to :-

1. Chief Engineer Ganga Kacchar, Water Resource Department, Rewa.
2. Executive Engineer, Naigarhi Micro-Irrigation Scheme, Division Rewa.

81  
Divisional Manager  
M.P. Road Development Corp.Ltd.  
Rewa (M.P.)



## CHECK-LIST

### Guidelines for Project Directors for processing the proposal of laying water pipe line in the land along/across NH/SH/MDR vested with MPRDC

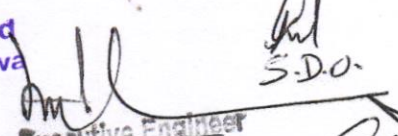
#### Relevant circulars

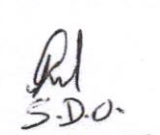
1. Relevant Circular 1 Ministry Circular No. NH-41(58)/68 Dated 31.01.1969
2. Ministry Circular No. NH-III/P/66/76 Dated 18/19-11-1976
3. Ministry Circular No. RW/NJ-III/P/66/76 Dated 01.05.1982
4. Ministry Circular No. RW/NH/11037/1/86-DO (ii) Dated.28.07.1993
5. Ministry Circular No. RW/NH/11067/1/86 DOI Dated 19.01.1995
6. Ministry Circular No. RW/NH/34066/2/95/S&S Dated 25.10.1999
7. Ministry Circular No. RW/NH/34066/7/2003 S&R Dated 17.09.2003

#### CHECK LIST FOR GETTING APPROVAL FOR LAYING OF IRRIGATION WATER SUPPLY PIPE LINE ON NH LAND


S.No.	Item	Information/Status	Remarks
1	General Information	Permission for crossing of <sup>water</sup> pipe <del>Box</del> line <sup>RI</sup> <del>culvert</del> in NH-135. <sup>SPO.</sup> Ch.184/900 to 184/916, near village - Ghoraha	
1.1	Name and Address of the Applicant	Executive Engineer, Naigarhi Micro Irrigation Project Division Rewa (M.P)	
1.2	NH/SH Number	NH-135	
1.3	State	Madhya Pradesh	
1.4	Location	Village-Goraha kothar, near Naudhiya mod, Rewa (M P )	
1.5	Chainage in KM	NH-135, From Ch KM.184/900 to 184/916	
1.6	Length in Meter	16Mtre	
1.7	Width of available ROW	60Mtrs	
	(A) Left side from center line (towards increasing chainage/ km direction.	30Mtrs	

  
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On No.1, Rewa

  
Executive Engineer  
Naigarhi Sub Division  
Rewa

  
S.D.O.



  
Divisional Manager  
M.P.R.D.C Ltd  
On. No 1, Rewa



	(B) Right side from center line (towards increasing chainage/ km direction.	30Mtrs	
1.8	Proposal of construct pipe culvert for crossing of distributory canal.		
	(A) Left side from center line (towards increasing chainage/ km direction.	30Mtrs.	
	(B) Right side from center line (towards increasing chainage/ km direction.	30Mtrs.	
1.9	Proposal to acquire land.	N.A.	
	(A) Left side form center line.	N.A.	
	(B) Right side from center line.	N.A.	
1.10	Whether proposal is in the same side where land is not to be acquired.	N.A.	
	If not then where to lay the Pipe	Nil	
1.11	Details of already laid services, if any, along the proposed route.	Nil	
1.12	Number of lanes (2/4 / 6/8 lanes) existing.	4 Lane	
1.13	Proposed Number of lanes. (2 lane with paved shoulders/4/6/8 lanes)	Nil	
1.14	Service road existing or not) Y/N. if yes then which side.	N.A.	
	(A) Left side from center line. (width)	N.A.	
	(B) Right side from center line. (width)	N.A.	
1.15	Proposed Service Road	No	
	(A) Left side from center Line. (width)	Nil	
	(B) Right side from center line. (width)	Nil	
1.16	Whether proposal to lay pipeline is beyond the service road or between the service road and main carriageway.	In the whole stretch of the main carriageway	
1.17	The permission for laying of water pipeline shall be considered for approval/rejection based on Ministry Circular mentioned as above.	Approval	
	(A) Carrying of sewage/gas pipeline on highway/ bridges shall not be permitted as fumes/gases pipes can accelerate the process of corrosion or may cause explosions, thus being much more injurious that leakage of gas.	N.A.	
	(B) Carrying of Gas pipeline on bridges shall also be discouraged, however if the gas authorities seem to have no other viable alternative and approach the highway authority well in time before the design of the bridge is finalized the may be permitted to carry the pipeline in independent superstructure	N.A.	



	supported on extended portions of piers and abutment in such a manner that in the final agreement enough free space around the superstructure of the bridge remains available for inspection and repairs etc.		
	(C) Cost of required extension of the sub-structure as well as that the supporting superstructure shall borne by the agency in charge of the utilities.	YES	
	(D) Service are not being allowed indiscriminately on the parapet/any part of the bridge safely of the bridge has to be kept in view while permitting a various services along bridge approval are to be accorded in this regard with the concurrence of the ministry's project chief engineers only	YES	
1.18	Is crossing of the road involved, if yes. it shall be either encased in pipeline or through structure or conduit specially built for the purpose at the expenses of the agency owning the line.	YES	
	A. Existing drainage structure shall not be allowed to carry the lines.	Agree	
	B. Is it on a normal to NH	Slightly Skewed	
	C. Crossing shall be too near the Existing structure on the National Highway. The minimum distance being 15m. what is the distance from the existing structure.	N.A.	
	D. The casing pipe (or conduit pipe in case of electric cable) carrying the utility line shall be of steel cast iron or reinforced  Cement concrete and have adequate strength and be large enough to permit ready drawl of the carrier pipe/cable.	N.A.  N.A.	
	E. Ends of the casing/conduit pipe shall be sealed from the outside, so that it does as a drainage path	N.A.	
	F. The casing/pipe shall be sealed from drain to in cuts and toe of slope in the fills.	YES	
	G. The top of the casing/conduit pipe should be at least 1.2m below the surface of the road subject to being at least 03m below the drain invert	YES	



	H. Crossing shall be by boring method (HDD) specially where the exiting road pavement is of cement concrete or dense bituminous concrete type	Jack Pushing	
	I. The casing/conduit pipe shall be installed with an even bearing throughout its length and in such a manner as to prevent the formation of a waterway along it.	YES	
1.18.1	if crossing of the road involved, total no. of crossing	One	
1.18.2	Location of crossing	Village-Goraha kothar, near Naudhiya mod, rewa (M P )	
1.18.3	Total crossing charges @1.00 lakh per crossing	N.A.	
1.18.4	Deposit details of crossing charges.	-----	
	(i) Demand draft no & date.	-----	
	(ii) Issuing bank.	-----	
	(iii) Valid up to	-----	
2	Documents/Drawings enclosed with the proposal.	Design & drawing attached	
2.1	Cross section showing the size of the trench for open trenching method if is normal size of 12 deep x 3 m width.	N.A.	
	(i) Should not be greater than 60cm wider than the outer diameter of the pipe.	N.A.	
	(ii) Located as close to the extreme edge of the right of way as possible but not less than 15m from the center lines of the nearest carriage way.	N.A.	
	(iii) Shall not be permitted to run along the National Highway when the road formation is situated in double culling not shall these be laid over existing culverts and bridges.	N.A.	
	(iv) These should be so laid that their top is at least 0.6m below the ground level so as not to obstruct drainage of the road land	N.A.	
2.2	Cross section showing the size of pit and location of pipe for HDD method	Yes Enclosed	
2.3	Strip plan/Route Plan showing the pipe, Chainage, width of ROW, distance of proposed pipe from the edge of ROW, important mile stone, intersections, cross drainage works etc.	Yes Enclosed	
2.4	Methodology for laying of water pipe line	Attache I	



2.4.1	Open trenching method (may be allowed in the utility corridor only where pavement is neither cement concrete nor dense bituminous concrete type, its methodology of refilling of trench.	N.A.	
?	A. The trench width should be at least 30cm but not more then 60m wider than the outer diameter of the pipe.	N.A.	
?	B. The filling of the trench. Bidding shall be to a depth of not less then 30cm. It shall consist of granular material. Free of lumps clods and cobbles and graded to yield a firm surface without sudden change in the bearing value. Unsuitable soil and rock edges should be excavated and replaced by selected material.	N.A.	
?	C. The backfilling shall be completed in two stages	N.A.	
?	(i) The side to the level the top of the pipe and (ii) Overall, to the bottom of the road crust	N.A.	
?	D. The side fill shall consist of granular material laid in 15m layers each consolidated by mechanical tempering and controlled additional concerned agency.	N.A.	
5.2	Renewal of bank guarantee	In case the submitted expires in between	
5.3	Confirming all standard condition of MPRDC's Guideline.	YES	
5.4	Shifting of water pipeline as and when required by MPRDC at their own cost.	Applicant	
5.5	Shifting due to widening of Road	Applicant	
5.6	Indemnity against all damages and claims	N.A.	
5.7	Traffic movement during laying of water pipeline to be managed by the applicant	YES	
5.8	If any claim is raised by the Concessionaries (if any) then the same has to be paid by the applicant	YES	
5.9	Prior approval of the MPRDC shall be obtained before undertaking any work of installation, shifting of repair of alteration to the showing water pipe line located in the right of ways.	Work will be started after the approval from competent authority	
5.10	Expenditure if any incurred by MPRDC for repairing any damage cause to the Road by the laying maintenance of shifting of the water pipe line will be borne by the agency owning the line	YES	
5.11	If the MPRDC consider if necessary in future to move the utility line for any work of improvement or repair of the road. It will be carried out as	Yes agreed Agency owning the utility line	



	desired by the MPRDC or the cost of the agency owning the utility line within a reasonable time (not exceeding 60 days) of the intimation given		
5.12	Certified from the applicant in the following format		
	(i) Laying of water pipe line will not have any deleterious effects on any of the bridge components and roadway safely for traffic.	Certificate-Attached	
	(ii) for future widening/ development work: "we do undertake that will relocate service road / approach road/ approach road/ utilities at my own cost notwithstanding the permission granted within such time as well be stipulated by MPRDC"	Certificate-Attached	
6	Who will sign the agreement on behalf of water pipe line agency	Executive Engineer, Naigarhi Micro Irrigation Project Division Rewa (M.P)	
7	Certificate from the Divisional Manager		
7.1	Certificate for confirming of all standard condition issued, vide ministry circular no. NH 41/(58)/68, Dated 31.01.1969. Ministry circular NH-IIIP/66/76 Dated 18/18/1/1976. Ministry circular RWIII/P/66/76 Dated 18/19/1/1976. Ministry circular no. RW/NHIII/P/66/76, Dated 11.05.1982. Ministry Circular no. RW/NH-11037/1/88-DOI (ii) dated 02/07/1993. Ministry circular no. RW/NH-11037/186/DOI DATED 19-01-1995	Attached	
	Ministry circular no. RW/NH/31066/2/05/S&R. Dated 25.10.1999 and Ministry circular no. RW/NH 34066/7/2003 S&R (B) Dated 17.09.2003	Attached	
7.2	Certificate for DM MPRDC in the following format (i) It is certified that any other location of the waterpipe line would be extremely difficult and unreasonable costly and the installation of water pipeline with in ROW will not adversely affect the design stability and traffic safety of the highway nor the likely future improvement such as widening of the carriageway casing of curve etc.		
	(ii) for 2/4/6 Lanning	4 Lanning	
	(a) Where there is feasibility available " I do certify that there is will be no hindrance to proposed two/four/six Lanning based on the		

15-05-23  
Divisional Manager  
M.P.R.D.C Ltd  
Dn. No 1. Rewa



	feasibility report considering proposed structure at the side location"		
	(b) In case feasibility report is not available "I do certify that sufficient ROW is available at side for accommodating proposed two/ four/ six Lanning"	YES	
8	If road section proposed to be taken up by MPRDC on BOT basis a clause is to be inserted in the agreement the permitted highway on which licensee has been granted the right to lay water pipe line cable/ duct has also been granted as a right to way to the concessionaire under the concession agreement for up gradation of (----- section from Km-----to Km-----of NH/SH/MDR no.30 on build, operate and transfer basis) and therefore the licensee shall Honors the same	Clause is inserted in the agreement	
9	Who will supervise the work of laying of water pipeline	WRD	
10	Who will ensure, that the defect in road portion after laying of water pipeline are corrected and if not corrected then what action will be taken?	Applicant	
11	Who will pay the claims for damages done/disruption in working of concessionaire, if asked by the concessionaire	Applicant	

*[Signature]*  
**Executive Engineer**  
 Malgrhi Sukshin Dabar  
 Irrigation Project On Rewa (M.P.)

*[Signature]*  
 S.D.O.

*[Signature]*  
 S.D.O.



*[Signature]*  
**A.G.M.**  
**M.P.R.D.C. Ltd**  
**On. No.1, Rewa**

*[Signature]*  
 01-05-23  
**Divisional Manager**  
**M.P.R.D.C Ltd**  
**On. No 1. Rewa**





मध्य प्रदेश MADHYA PRADESH

BY 576607

**AGREEMENT REGARDING GRANTING OF WATER PIPE LAYING PERMISSIONS  
FOR LAYING UTILITY SERVICES ON NATIONAL HIGHWAYS (NH-135)**

Agreement to lay water pipe line from CH. KM 184/900 to 184/916 Km of Mirzapur to Mangawan Road (NH-135).

This Agreement made this day of (month) of (year) between \_\_\_\_\_ acting in his executive capacity through Divisional Manager, MP Road Development Corporation Rewa Division. (Here in after referred to as the "Authority" which expression shall unless excluded by or repugnant to the context, include his successors in office and assigns) on the one part, and M/s Jai Prakash Associates Ltd. A company registered under the Companies Act, 1956 and having its Registered Office at SECTOR-128, NOIDA (U.P.), (hereinafter called the "Licensee") which expression shall unless excluded by repugnant to the context, include his successors/administrator assignees on the second part.

Whereas the Authority is responsible, inter-alia, for development and maintenance of Road at CH/KM 184/900 to 184/916 Km of Mirzapur to Mangawan Road (NH-135).

Whereas the Licensee proposes to lay pipe line referred to as utility services in subsequent paras.

Whereas the Licensee has applied to the Authority for permission to lay underground water pipe line services from Km 184/900 to 184/916 of road.

And whereas the Authority has agreed to grant such permission for laying water pipe line services leave on the MPRDC as per terms and conditions hereinafter mentioned.





railings/parapets and the bridge superstructure. The fixing and supporting arrangement with all details shall be required to be approved in advance from the concerned Highway Administration. Additional cost on account of fixing and supporting arrangement as assessed by the Authority shall be payable by the Licensee.

9. In exceptional cases, where Row is restricted the utility services can be allowed beneath the carriageway of service road, if available, subject to the condition that the utility services be laid in concrete ducts, which will be designed to carry traffic on top. The width of the duct shall not be less than one lane. In such cases, it also needs to ensure that maintenance of the utility services shall not interfere with the safe and smooth flow of traffic. The cost of operation and maintenance will have to be borne by the Licensee.
10. It is to be ensured that at no time there is interference with the drainage of the road land and maintenance of the National Highways. Towards this, the top of the utility services shall be at least 0.6 meter below the ground level. However, any structure above ground shall be aesthetically provided for / landscaped with required safety measures as directed by the concerned Authority;
11. The utility services shall be permitted to cross the National Highway either through structure or conduits specially built for that purpose. The casing / conduit pipe should, as minimum, extend from drain to drain in cuts and toe of slope to toe of slope in the fills and shall be designed in accordance with the provision of IRC and executed following the Specifications of the Ministry.
12. Existing drainage structures shall not be allowed to carry the lines across.
13. The top of the casing/conduit pipe containing the utility services to cross the road shall be at least 1.2 m below the top of the sub grade or the existing ground level whichever is lower, subject to being at least 0.3 m below the drain inverts. A typical sketch showing the clearances is given in Attachment-I.
14. The utility services shall cross the National Highway preferable on a line normal to it or as nearly so as practicable.
15. The casing/conduit pipe for crossing the road may be installed under the road embankment either by boring or digging a trench. Installation by boring method shall be preferred.
16. In case of trenching, the sides of the trench should be done as nearly vertical as possible. The trench width should be at least 30 cm. but not more than 60 cm wider than the outer diameter of the pipe. Filling of the trench shall conform to the specifications contained here-in-below or as supplied by the Highway Authority.
  - a. Bedding shall be to a depth not less than 30 cm. It shall consist of granular material, free of lumps, clods and cobbles, and graded to yield a firm surface





without sudden change in the bearing value. Unsuitable soil and rock edges should be e

- b. The backfill shall be completed in two stages (i) Side-Fill to the level of the top of the pipe (ii) Overfill to the bottom of the road crust.
  - c. The side fill shall consist of granular material laid in 15 cm. Layers each consolidated by mechanical tamping and controlled addition of moisture to 95% of the Proctor's Density. Overfill shall be compacted to the same density as the material that had been removed. Consolidation by saturation or pending will not be permitted.
  - d. The road crust shall be built to the same strength as the existing crust on either side of the trench or to thickness and specifications stipulated by the Highway Authority.
17. The Licensee shall ensure making good the excavated trench for laying utility services by proper filling and compaction, so as to restore the land in to the same condition as it was before digging the trench, clearing debris/loose earth produced due to execution of trenching at least 50 m away from the edge of the right of way;
18. All required restoration work subsequent to laying of the cable shall be required to be undertaken by the Licensee at its cost either by itself or through its authorized representative in consultation with the Authority as per predetermined time schedule and quality standards.
19. Prior to commencement of any work on the ground, a performance Bank Guarantee @ Rs. per route meter/ Rs per sq m with a validity of one year initially (extendable if required till satisfactory completion of work) shall have to be furnished by the Licensee to the Authority/its designated agency as a security against improper restoration of ground in terms of filling/unsatisfactory compaction damages caused to other underground installations/utility services & interference, interruption, disruption or failure caused thereof to any services etc. In case of the Licensee failing to discharge the obligation of making good of the excavated trench/other restoration work, the Authority shall have a right to make good the damages caused by excavation, at the cost of the Licensee and recover the amount by forfeiture of the Bank Guarantee.
20. In case, the Performance Bank Guarantee is invoked as mentioned above, the Licensee shall be required to replenish and reinstate the required Performance Bank Guarantee within one month of such invoking. In case the work contemplated herein is not completed to the satisfaction of the Authority, which has granted the permission, within a period of 11 months from the date of issue of the Bank Guarantee, the Licensee shall either furnish a fresh guarantee or extend the guarantee for a further period of one year. Notwithstanding this, the Licensee shall be liable to pay full compensation to the aggrieved Authority/ its designated agency for any damage sustained by them by reason of the exercise of the Row facility;





- 21 The Licensee shall shift the utility services within 90 days (or as specified by the respective Authority) from the date of issue of the notice by the concerned Authority to shift/relocate the utility services, in case it is so required for the purpose of improvement/widening of the road/route/highway or construction of flyover/bridge and restore the road/land to its original condition at his own cost and risk.
22. The Licensee shall be responsible to ascertain from the respective agency in coordination with Authority, regarding the location of other utilities /underground installations/ facilities etc. The Licensee shall ensure the safety and security of already existing underground installations/utilities/facilities etc. before commencement of the excavation/using the existing cable ducts. The Licensee shall procure insurance from a reputed insurance company against damages to already existing underground installations/utilities/facilities etc.
23. The Licensee shall be solely responsible/ liable for full compensation/indemnification of concerned agency / aggrieved Authority for any direct, indirect or consequential damage caused to them/claims or replacements sought for, at the cost and risk of the Licensee. The concerned agency in coordination with Authority shall also have a right make good such damages/ recover the claims by forfeiture of Bank Guarantee.
24. If the Licensee fails to comply with any condition to the satisfaction of the Authority, the same shall be executed by the Authority at the cost and risk of the Licensee.
25. Grant of License is subject to the Licensee satisfying (a) minimum disruption of traffic and (b) no damage to the highways. As far as possible, the Licensee should avoid cutting of the road for crossing highway, and other roads and try to carry out the work by trenchless technology. In case any damage is caused to the road pavement in this process, the Licensee will be required to restore the road to the original condition at its cost. If due to unavoidable reasons the road needs to be cut for crossing or laying utility services, the Licensee has to execute the restoration work in a time bound manner at its cost either by itself or through its authorized representative in consultation with the Authority as per predetermined time schedule and quality standards. In case of the Licensee failing to discharge the obligation of making good of the excavated trench/other restoration work, the Authority shall have a right to make good the damages caused by excavation, at the cost of the Licensee and recover the amount by forfeiture of the Bank Guarantee.
26. The Licensee shall inform/give a notice to the concerned agency designated by the Authority at least 15 days in advance with route details prior to digging trenches, for fresh or maintenance/repair works. A separate performance Bank Guarantee for maintenance/repair works shall have to be furnished by the Licensee.





27. Each day, the extent of digging the trenches should be strictly regulated so that utility services are laid and trenches filled up before the close of the work that day. Filling should be completed to the satisfaction of the concerned agency designated by the Authority.
28. The licensee shall indemnify the concerned agency in co-ordination with Authority, against all damages and claims, if any due to the digging of trenches for laying cables/ducts.
29. The permission for laying utility services is granted maximum for 5 years at a time, which can thereafter be considered for renewal. On payment of additional fee at the time of renewal, the permission shall automatically be renewed, unless defaults exist. In case of renewal, rate prevailing at the time of renewal shall be charged. Delay in deposition of fee shall attract interest @ 15% per annum compounded annually.
30. The permission shall be valid only for the period it is issued and fee deposited. However, the Authority also has a right to terminate the permission or to extend the period of Agreement.
31. That the Licensee shall not undertake any work of shifting, repairs or alterations to the utility services without prior written permission of the concerned agency in coordination with the Authority.
32. The permission granted shall not in any way be deemed to convey to the Licensee any ownership right or any interest in route/road/highway land /property, other than what is herein expressly granted. No use of NH RoW will be permitted for any purpose other than that specified in the Agreement.
33. During the subsistence of this Agreement, the utility services located in highway land / property shall be deemed to have been constructed and continued only by the consent and permission of the Authority so that the right of the Licensee to the use thereof shall not become absolute and indefeasible by lapse of time.
34. The Licensee shall bear the Stamp Duty charged on this Agreement.
35. Three copies of 'as laid drawings' of utilities (hard and soft copies) with geo tagged photographs and geo-tagged video recordings of laying of cables in the trench (with respect to the NH) and after complete restoration shall be submitted to the Authority for verification and record within a month of completion of works.
36. The Licensee shall allow free access to the Site at all times to the authorized representatives of Authority to inspect the Project Facilities and to investigate any matter within their Authority, and upon reasonable notice, shall provide reasonable assistance necessary to carry out their respective duties and functions.
37. The utility services shall not be made operational by the Licensee unless a completion certificate to the effect that the utility services has been laid in





accordance with the approved specifications and drawings and the trenches have been filled up to the satisfaction of the concerned agency in co-ordination with the Authority has been obtained. Notwithstanding anything contained herein, this Agreement may be cancelled at any time by Authority for breach of any condition of the same and the Licensee shall neither be entitled to any compensation for any loss caused to it by such cancellation nor shall it be absolved from any liability already incurred.

38. The Licensee shall ensure adherence to relevant Indian standards and follow best industry practices, methods and standards for the purpose of ensuring the safe, efficient and economic design, construction, commissioning, operation, repair and maintenance of any part of the utility lines/industrial infrastructure facilities and which practices, methods and standards shall be adjusted as necessary, to take account of: a. operation, repair and maintenance guidelines given by the manufacturers, b. the requirements of Law,
  - c. the physical conditions at the Site, and
  - d. The safety of operating personnel and human beings.
39. The Licensee shall have to provide safety measures like barricading, danger lighting and other necessary caution boards while executing the work.
40. While laying utility services, at least one lane of road shall be kept open to traffic at all times. In case of single lane roads, a diversion shall be constructed. If any traffic diversion works are found necessary during the working period such diversion shall be provided at the cost of Licensee.
41. After the termination/expiry of the agreement, the Licensee shall remove the utility services within 90 days and the site shall be brought back to the original condition failing which the Licensee will lose the right to remove the utility services. However, before taking up the work of removal of utility services the Licensee shall furnish a Bank Guarantee to the Authority for a period of one year for an amount assessed by the Authority as a security for making good the excavated trench by proper filling and compaction, clearing debris, loose earth produced due to excavation of trenching at least 50 m away from the edge of the ROW.
42. Any disputes in interpretation of the terms and conditions of this Agreement or their implementation shall be referred to the redress mechanism prevailing in the Ministry and the decision of the redress mechanism shall be final and binding on all.
43. For PPP Projects, in case of any financial loss incurred by the respective project concessionaires due to such laying/shifting of utility services by the Licensee, compensation for the same shall be required to be borne by the Licensee in mutual agreement with the respective project concessionaires. MoRT&H/ NHAI implementing authorities for the project shall not be liable to the concessionaire in any way in this regard.





This agreement has been made in duplicate, each on a Stamp Paper, each party to this Agreement has retained one stamped copy each.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE CAUSED THIS AGREEMENT TO BE EXECUTED THROUGH THEIR RESPECTIVE AUTHORISED REPRESENTATIVES THE DAY AND THE YEAR FIRST ABOVE WRITTEN.

SIGNED SEALED AND DELIVERED FOR AND ON BEHALF OF AUTHORITY.



(Signature, name & address with stamp)

SIGNED ON BEHALF OF M/S JAL (LICENCEE)

BY SHRI



(Signature, name & address with stamp)

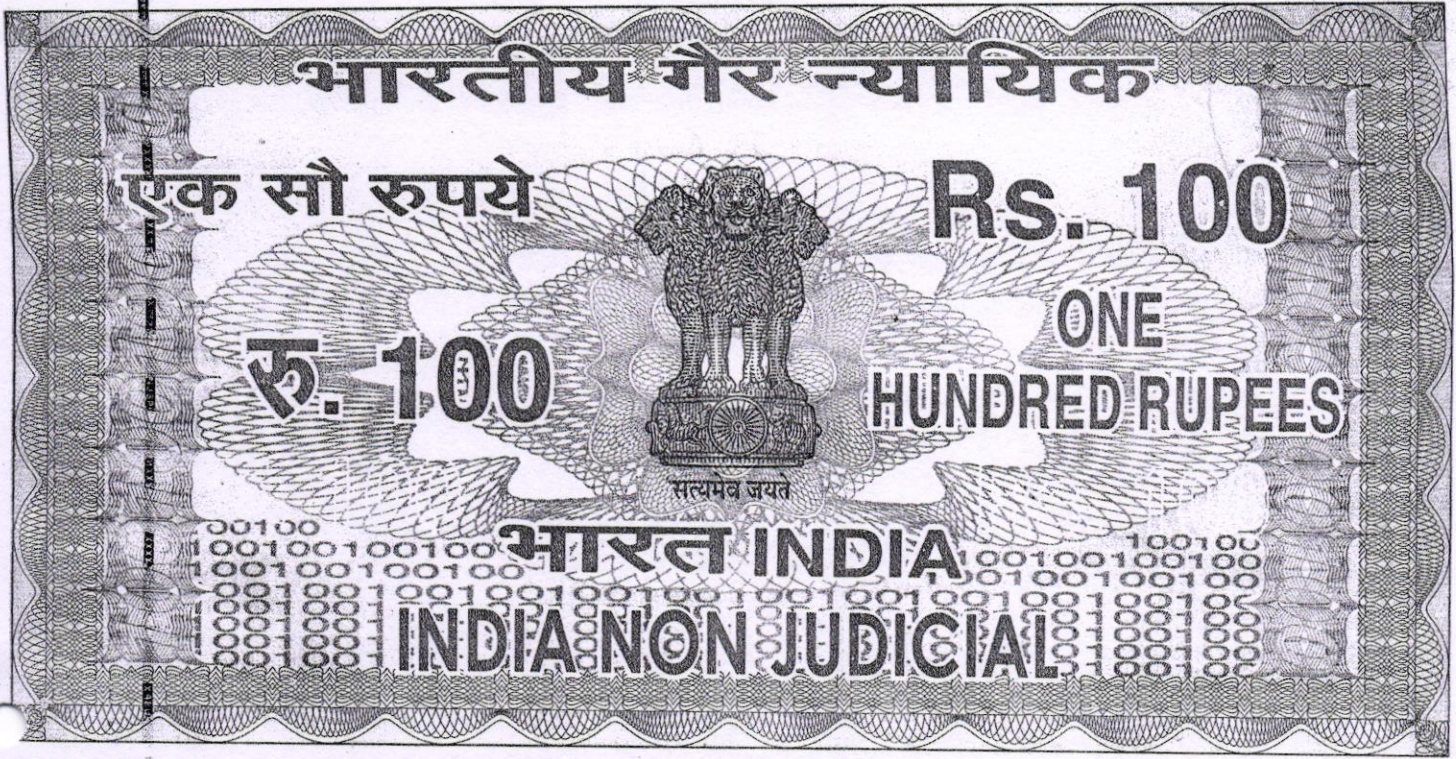
HOLDER OF GENERAL POWER OF ATTORNEY DATED \_\_\_\_\_ EXECUTED IN  
ACCORDANCE WITH THE RESOLUTION NO. \_\_\_\_\_  
DATED \_\_\_\_\_ PASSED BY THE BOARD OF  
DIRECTORS IN THE MEETING HELD ON \_\_\_\_\_

IN THE PRESENCE OF (WITNESSES):

1.

2.





मध्य प्रदेश MADHYA PRADESH

Affidavit

BY 576608

Subject -Permission of Laying Water Supply Pipe Line of 1300MM dia MS pipe and one Crossing for irrigation water line scheme in 113 Village at Rewa along and across the National Highway.

NH-135

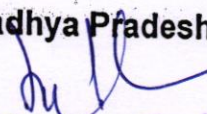
From Mirzapur to Rewa (CH 184/900 to 184/916 KM)

1. I on Behalf of Madhya Pradesh WRD Rewa (M.P.) hereby undertake not damage to other Utility. If Damaged then MP WRD will pay the losses either to MPRDC or too concerned agency
2. I on Behalf of Madhya Pradesh WRD Rewa (M.P.) hereby undertake to renewal of bank guarantee whenever it expires.
3. I on Behalf of Madhya Pradesh WRD Rewa (M.P.) hereby undertake that MP WRD will confirm all standard condition of MPRDC guidelines.
4. I on Behalf of Madhya Pradesh WRD Rewa (M.P.) hereby undertake that MP WRD will shift the Water Pipe Line as and when required by MPRDC at their own cost.
5. I on Behalf of Madhya Pradesh WRD Rewa (M.P.) hereby undertake that MP WRD will shift Water pipe line due to widening of Road.
6. I on Behalf of Madhya Pradesh WRD Rewa (M.P.) hereby undertake MP WRD that it shall be liable to pay compensation to the concerned agency.





7. I on Behalf of Madhya Pradesh WRD Rewa (M.P.) hereby undertake that MPWRD will take care of traffic movement during laying of water supply pipe line.
8. I on Behalf of Madhya Pradesh WRD Rewa (M.P.) hereby undertake to pay claims if any claim is raised by the Concessionaire (if any)
9. I on Behalf of Madhya Pradesh WRD Rewa (M.P.) hereby undertake that prior approval of the MPRDC shall be obtained before undertaking any work of installation shifting or repairs of all alteration of the showing water pipe line located in the right of ways.
10. I on Behalf of Madhya Pradesh WRD Rewa (M.P.) hereby undertake that MPWRD will bear expenditure if any incurred by my MPRDC for repairing any damage caused to the Road by the laying maintenance or shifting of water pipe line.
11. I on Behalf of Madhya Pradesh WRD Rewa (M.P.) hereby undertake that if the MPRDC consider, if necessary, in future to move the utility line for any work of improvement or repair of the road, It will be carried out as desired by the MPRDC at the cost of MPWRD within a reasonable time (not exceeding 60 days) of the intimation given.
12. This certifies that
  - (a) Laying of water pipe line will not have any deleterious on any bridge components and roadway safety for traffic.
  - (b) For future widening / development work "we do undertake that will relocate service road / approach road / utility at my own cost notwithstanding the granted with such time as well stipulated by MPRDC.

For Madhya Pradesh WRD  
  
 Executive Engineer  
 Naigarh Micro Pressurized  
 Irrigation Project Dist. Rewa  
 Distt. Rewa (M.P.)

DEIGNED SEALED AND DELIVERED FOR AND BEHALF OF AUTHORITY

SIGNED ON BEHALF OF M/S (LICENSEE)

BY SHRI \_\_\_\_\_  
 (Signature, Name & Address with Stamp of JAL)



HOLDER OF GENERAL POWER OF ATTORNEY Dated \_\_\_\_\_ EXECUTED IN  
 ACCORDANCE WITH RESOLUTION NO. \_\_\_\_\_ DATED PASSED BY THE  
 BOARD OF DIRECTORS IN THE MEETING HELD ON \_\_\_\_\_ IN THE  
 PRESENCE OF (WITNESSES)



**Pipe Laying Details of NH-135, Mirjapur to Mangawan  
Check List of Pipe line (Across the Road NH-135)**

Name of Road	Chinage		Distance	Village	Laid pipe LHS		Laid pipe RHS	
	From	To	(In Mtr.)		Dia (Mtr.)	Material	Dia (Mtr.)	Material
Varanasi to Rewa NH-135	184+903	184+913	10	Ghoraha	1.3	MS	1.3	MS



*Executive Engineer*  
Naigarhi Micro Pressurized  
Irrigation Project Div. Rewa  
Distt. Rewa (M.P.)

*Sub Divisional Officer*  
Naigarhi Micro Irr. Project  
Sub Dn. No. 1, Mangawan  
Distt. Rewa (M.P.)

*AGM.*  
M.P.R.D.C. Ltd  
Dn No.1, Rewa

*Divisional Manager*  
M.P.R.D.C Ltd  
Dn. No 1, Rewa



# **GOVERNMENT OF MADHYA PRADESH**

**Water Resource Department**



## **NAIGARHI – I MICRO IRRIGATION PROJECT**

**Document for Design and Execution Methodology**

**for**

**Pipe line crossing under National Highway (NH-135)**

**Document No.**

**NAIGARHI-1 – DD – NH– 001**

**August, 2021**

**Contractor – Jaiprakash Associates Ltd.**

**Sector – 128, Noida (U.P.)**

**Consultant – Jaypee Infra Ventures**

**Sector – 128, Noida (U.P.)**





### Design of Raw water Pipe Line crossing under National Highway (NH-135)

#### 1. General Description of Project

The project title "EXECUTION OF NAIGARHI MICRO IRRIGATION PROJECT (PART-I)" supplying of water Bahuti Main Canal (RD - 65.3 Km) and delivering at farmer's field @ duty 0.35 litre/sec/ha through pressurized pipeline system for micro irrigation in the Culturable command area of 25000 hectare with residual head 20M head at 1 ha chak, without exceeding a total electric power requirement of 8.7 MW in the whole system.

In the present scheme the 8.75 cumecs of water is lifted from Bahuti Main Canal by Pump House through 2400 mm dia M.S. Rising Main & carried upto Break Pressure Tank (BPT). The discharge obtained at BPT is divided into 3 areas i.e. Area B1 is 3988.3 Ha, Area B2 is 5244.6 Ha & Area B3 is 15868.3 Ha each. Area B1 is irrigated by Gravity Main - 1 (Discharge capacity = 1.395 cumec), Area B2 is irrigated by Gravity Main - 2 (Discharge capacity = 1.835 cumec) & Area B3 is irrigated by Gravity Main - 3 (Discharge capacity = 5.553 cumec)

#### 1.1 Scope of Document

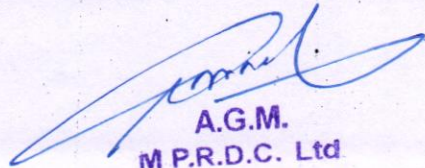
The Gravity Main - 3 at CH-12282 m Crosses National Highway NH - 135 (Rewa to Mirzapur) at RD-12.6 m. The purpose of this document is Design and safe operation and procedure of executing the manual tunnelling by jack pushing method

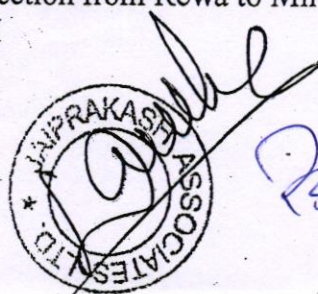
#### 2. The Detail of Gravity main

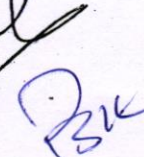
Internal Diameter of Gravity Main	= 1.3 m
Thickness of Pipe	= 8 mm
Type of Material	= Mild Steel Fe 400
Type of Fluid carries	Raw Water for Irrigation
Discharge	= 2.531 cumec
Velocity	= 1.91 m/sec
External Coating	30 mm thk Cement Mortar (Guniting)
Internal Coating	Epoxy coating 400 micron (DFT)

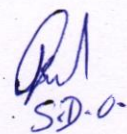
#### 3. Location of Pipe Crossing

Name of the State	Madhya Pradesh
District	Rewa
National Highway Identification No	NH-135 (Rewa to Mirzapur)
Name of the Village	धीरहा 264
Location	575980.034 E, 2730268.90 N
Carriageway width	8.8 m (L/S) & 8.5 m (R/S) (Direction from Rewa to Mirzapur)
Divider/Median	= 4.45 m
Earthen Shoulder	= 2.5 m (L/S) & 1.85 (R/S) (Direction from Rewa to Mirzapur)
Top Level of Road at crown	= RL 339.856 M
Natural Ground Level at R/S	= RL 337.476 M
Natural Ground Level at L/S	= RL 337.82 M

  
**A.G.M.**  
**M.P.R.D.C. Ltd**



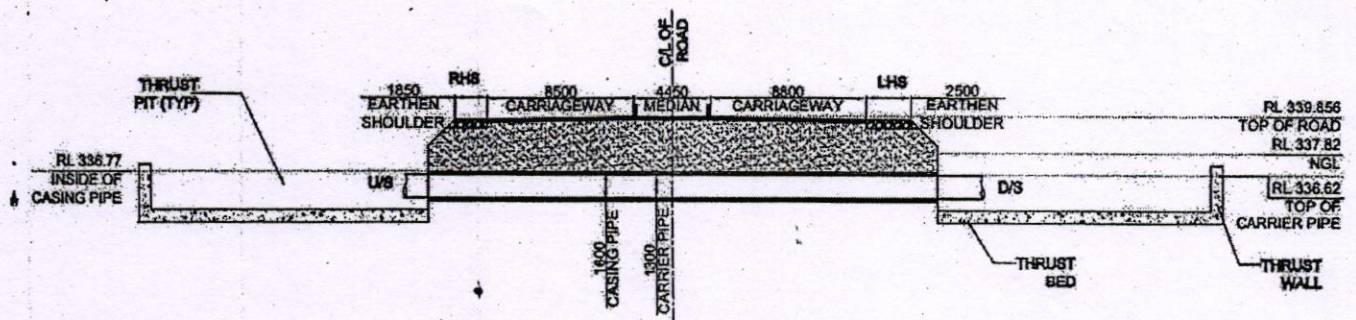
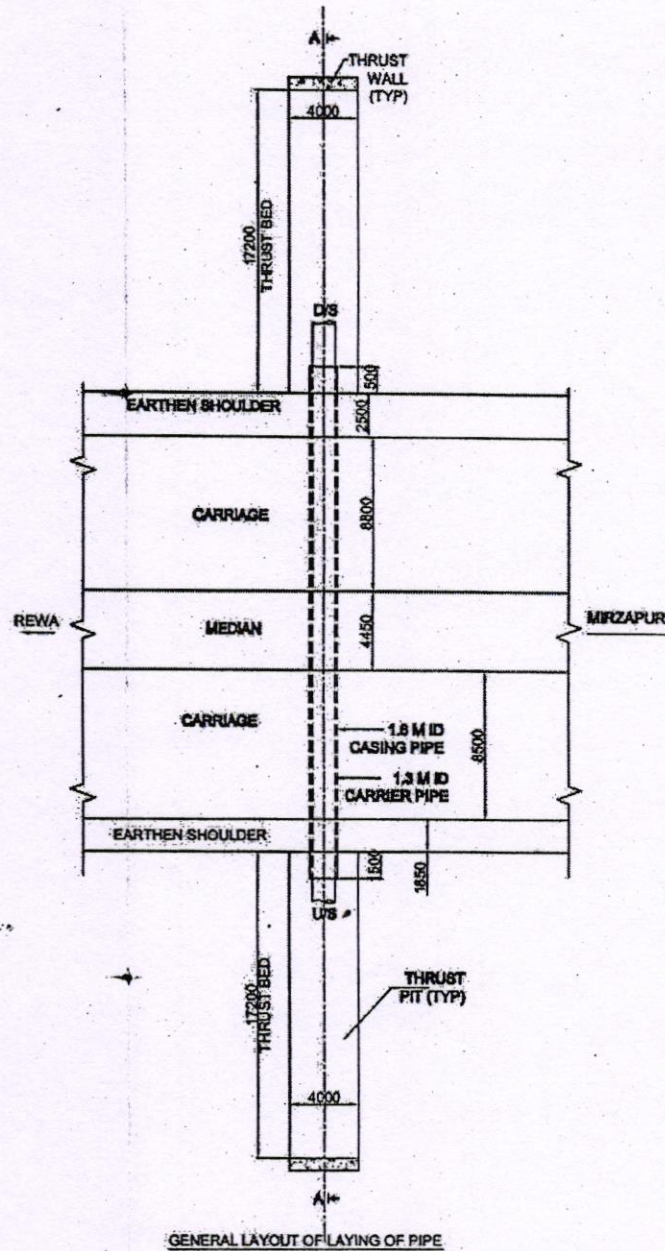
  
**B.K.**

  
**S.D.O.**



# NAIGARHI-I & II MICRO LIFT IRRIGATION PROJECT

## Raw water Pipe Line Crossing under National Highway



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### 4. Sequence of Activity

- Centre line marking and alignment of tunnelling work will be done as per drawing
- Excavation for Drive pit for pushing of pipe will be done as per the drawing
- Inside the Drive pit, necessary support will be provided for Hydraulic jack
- Required strengthening at the back and bottom of drive pit will also be provided
- Inside drive pit welding pit will be provided for easy welding of the bottom of pipe
- Crane having adequate lifting capacity shall be parked at a distance which is not less than the depth of excavation
- The purpose of pushing of pipe is to form a horizontal opening below ground. So that it does not disturb any traffic and structure.
- To reduce the frictional resistance, a thin layer of epoxy coating is provided around the pipe
- Number of jacks are provided in series for distribution of pushing load evenly on the face of the pipe, and all jacks are operated simultaneously with common power pack, which supplies uniform flow of pressure through network of hydraulic pipes of required pressure capacity, commencing from front unit to rear unit.
- Welding of the pipe is carried out with the successive pipe, after pushing the pipe.
- Jacking force is applied in sequence. This way pushing cycles are repeated till total length of the tunnel is completed.

### 5. Major component of Casing pipe pushing

#### a. Thrust Bed

The thrust bed mainly consists of thrust wall, thrust bed with pin pockets on bed, keys for additional resistance. The basic feature of the thrust bed is to provide necessary resistance needed for the jacking operation. For this purpose, a well designed RCC slab will be constructed outside the casing pipe. Thrust bed will have suitable pockets at different locations for housing jacking pins designed for resisting the pushing force exerted by hydraulic jacks as the box is being jacked through the embankment. Over the thrust bed, 50mm screed is to be provided to get exact line, level of the bed for pushing operation. At pockets location, precast cover blocks are provided to cover the pin pockets during pushing operation.

#### b. Front Shield

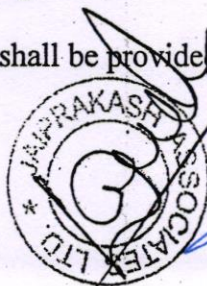
It is a MS Plate which is made up of mild steel material and used in the site for cutting the soil surface under the road pavement. It has cutting edges in the front which helps to cut the soil and move the casing pipe easily

#### c. Rear Shield

It is made up of mild steel will be fixed on rear end of the first unit of the casing pipe. It helps the casing pipe to move properly with out and tilting under the road pavement.

#### d. Drag sheet/Epoxy coating

Drag sheets / epoxy coating shall be provided at the outer periphery of the casing pipe to reduce frictional



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Un No.1, Rewa

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### e. Jacking operation

For pushing the casing pipe, the jacking (if found necessary to control the alignment) will be placed behind the casing pipe along the axis of the pockets and the jacking pins will be inserted in pockets of thrust bed. Jacking rig will help in maintaining the alignment of the casing pipe.

### f. Pockets

Pockets are holes which are made on the thrust bed not less than 50cm x 50 cm x 50 cm deep. After completion of pushing work the pocket shall be filled with sand

## 6. Methodology of Pipe Laying

- Preparation of drawing duly showing line length and level of Raw water pipe
- The raw water pipe is encased by MS Casing pipe.
- The strength of casing pipe is design as per AWWA (American water works Association) - M1 & CPHEEO Manual (Central Public Health and Environmental Engineering Organization).
- The minimum overburden on casing pipe kept more than 1.2 m
- The pipe is designed for 70R Vehicle wheel load.
- The pipe is crossing the road perpendicular to its longitudinal direction
- Excavation of tunnel is done by Horizontal drilling method (Jack Pushing ) as per the standard of MoRT&H

## 7. Horizontal Drilling Method

Two driving pits constructed at the both side of Road. The jack pushing shall be done from both side of road. To get the firm line and level thrust bed and wall shall be constructed in driving pit. This can be RCC

The Hydraulic jacking system consists of number of jacks (Depending the diameter of pipe) and hydraulic power pack

### The Boring Procedure consist of following Steps

- The casing pipe is lower on the driver rig. The line and level is checked
- The casing pipe slowly pushed into the soil by extending the rams of all hydraulic jacks. The jacks in turn take the reaction from thrust wall. The line and level is checked for the final time. Any mis- alignment shall be rectified
- After the alignment the rams are extended further pushing the casing pipe further inside the soil
- Soil is cutting mechanically by means of Auger or by manually with proper safety to prevent any soil collapse at pipe face. Adequate safety measure shall be taken during operation.
- This process of cutting and pushing shall be continue till the pipe reach to the destination.



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- For joining of new pipe, another casing pipe shall be lowered and but welded with previous pipe
- Again the pipe is inserted by cutting and pushing

**8. Safety and Precaution.**

- Working area shall be barricaded and display board shall be provided
- Lighting of 55 Lux shall be provided at working zone during night
- All staff and worker shall be used personal protective equipment like safety helmet, safety gloves, safety shoes, safety goggles as per the requirement
- First Aid Box shall be made available at site office

**Structural Design of Casing Pipe**

Inside Diameter of Carrier Pipe	= 1.3 m
Thickness of Carrier Pipe	= 8 mm
Outer Diameter of Carrier Pipe	= 1.316 m
Inside Diameter of Casing Pipe	= 1.6 m
Thickness of casing Pipe	= 16 mm
Outer Diameter of Casing Pipe	= 1.632 m
Length of crossing under Road	= 29.1 m
Top level of Road	= RL 339.856 M
NGL at both side of Road	= RL 337.82 M
Top level of Carrier Pipe (I/S)	= RL 336.62 M
Top level of Casing Pipe (I/S)	= RL 336.77 M
Overburden over the Casing Pipe	= RL 339.856 M - RL 336.77 M - 0.016 = 3.07 m
Consider vehicle wheel Load	= 70R Vehicle wheel load
Maximum Axle Load	= 20 Ton
Maximum Single wheel Load	= 10 Ton
The Grade of Casing Pipe Material	Fe 250 (Mild Steel)

**i. Calculation of External Load**

External load by Backfill Soil  $W_c = \omega \cdot B_c \cdot H$

H = Height of backfill = 3.07 m

$\omega$  = Unit wt of Top soil in saturated condition = 18.4 Kn/m<sup>2</sup>

Pipe outer Dia (Bc) = 1.632 mm

External load by Backfill Soil  $W_c = 3.07 \times 18.4 \times 1.632 = 92.19 \text{ Kn/Rm}$

**a. Vehicle Load (Provide Tractor wheel load)**

Axle load for Vehicle load = 20 Ton = 200 Kn

Impact Factor = 1.5

Total Axle Load = 200 x 1.5 = 300 Kn

Direct stress on Pipe calculated by Boussinesq Eqn

Simplified Boussinesq Eqn ( $\sigma_z = 0.48 \times P/Z^2$ ) =  $0.48 \times \frac{300}{3.07^2} = 15.28 \text{ Kn/m}^2$

Load per m Run on Pipe =  $15.28 \times 1.632 = 24.935 \text{ Kn/m}$

**b. Load coming from S/W of Casing Pipe**

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Dn. No 1, Rewa



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*[Signature]*  
S.D.O.



Outer Diameter of Pipe	= 1.632 m
Inner Diameter of Pipe	= 1.6 m
S/W of Pipe	$= \pi/4 \times (1.632^2 - 1.6^2) \times 78.5 = 6.38 \text{ Kn/m}$

**c. Load coming from S/W of Carrier Pipe**

Outer Diameter of Pipe	= 1.316 m
Inner Diameter of Pipe	= 1.3 m
S/W of Pipe	$= \pi/4 \times (1.316^2 - 1.3^2) \times 78.5 = 2.58 \text{ Kn/m}$
Assume Thickness of Cement concrete Lining	= 30 mm
Unit wt of cement Concrete Lining	= 22 Kn/m <sup>2</sup>
Load per m Run by Lining	$= \pi/4 \times ((1.316 + 0.03)^2 - 1.316^2) \times 22 = 2.79 \text{ Kn/m}$
Load comes from water	$= \pi/4 \times 1.3^2 \times 10 = 13.27 \text{ Kn/m}$
<b>Load from Carrier Pipe during Full Condition</b>	<b>= 2.58 + 2.79 + 13.27 = 18.64 Kn/m</b>
<b>Add 10% for Saddle, Total load</b>	<b>= 18.64 x 1.1 = 20.5 Kn</b>
<b>Load on top of casing pipe</b>	<b>= 92.19 + 24.935 = 117.125 Kn/m</b>
<b>Load on bottom of casing pipe</b>	<b>= 92.19 + 24.935 + 20.5 + 6.38 = 144.0 Kn/m</b>

**d. Earth pressure at side of Casing Pipe**

Active Earth pressure at top of Pipe	$= 0.33 \times 18.4 \times 3.07 = 18.64 \text{ Kn/m}^2$
Active Earth pressure at top of Pipe	$= 0.33 \times 18.4 \times (3.07 + 1.632) = 28.55 \text{ Kn/m}^2$
Total Earth force	$= \frac{1}{2} \times (18.64 + 28.55) \times 1.632 = 38.51 \text{ Kn/m}$

**ii. Check against Horizontal Buckling**

$$\Delta x = \frac{D_i \cdot K \cdot W \cdot R^3}{EI + 0.061 \cdot E' \cdot R^3}$$

Where $D_i$ = Deflection lag factor	= 1
K = Bedding Constant	= 0.1
W = External Load	= 144.01 N/mm
R = Mean radius	$= \frac{1}{2} \times (1600 + 16) = 808 \text{ mm}$
$E_s$ = Modulus Elasticity of steel	= 207000 N/mm <sup>2</sup>
$I_s$ = M.I per unit length of pipe	$= \frac{1}{12} \times (16)^3 = 341.3 \text{ mm}^4/\text{m length}$
$EI$	$= 207000 \times 341.3 = 70656000.0$

$E'$ = Modulus of soil reaction	= 8.275 N/mm <sup>2</sup> (For Coarse grain Soil 95% Compaction)
AWWA - Table No - 6-1)	

$$\Delta x = \frac{1 \times 0.1 \times 144.01 \times 808^3}{70656000 + 0.061 \times 8.275 \times 808^3} = 22.55 \text{ mm}$$

Allowable Deflection	= 2% = 2% x 1600 = 32 mm > 22.55 mm (Safe)
----------------------	--

**iii. Allowable Buckling**

$q_s = (1/FS) \times (32 \cdot R_w \cdot B' \cdot E' \cdot (EI/D^3))^{1/2}$   
Where,  $q_s$  = Allowable Buckling Pressure

*[Signature]*  
**A.G.M.**  
**M.P.R.D.C. Ltd**  
No 1 Rewa



*[Signature]*  
**SDO**



$FS = \text{Design Factor} = 2$   
 $R_w = \text{Water buoyancy Factor} = 1 - 0.33 \cdot hw/H < 0.67$   
 $hw = \text{Height of water above Pipe} = 3.07 \text{ m (Assume the flood condition)}$   
 $H = \text{Height of Overburden Soil} = 3.07 \text{ m}$   
 $R_w = 1 - 0.33 \times 3.07/3.07 = 0.67 < 0.67$   
 $B' = \text{Empirical Coefficient of elastic support} = 1/(1 + 4 \cdot \exp(-0.213 \times H))$   
 $= 1/(1 + 4 \times \exp(-0.213 \times 3.07)) = 0.325$   
 $E' = \text{Modulus of Soil Reaction} = 8.275 \text{ N/mm}^2$   
 $EI = \text{Pipe Stiffness} = E_s \cdot I_s = 207000 \times 341.3 = 70656000.0$   
 $D = \text{Outside Diameter} = 1632 \text{ mm}$   
 $\text{Allowable Buckling Load} = (1/2) \times (32 \times 0.67 \times 0.325 \times 8.275 \times (70656000.0/1632^3)^{1/2}) = 0.48 \text{ N/mm}^2$

**iv. Calculation of External Load including wheel load**

$\text{External Load} = \gamma_w \cdot H_w + R_w \cdot W_c / D + WL / D$   
 $\text{Where, } \gamma_w = \text{Unit wt of water} = 1000 \text{ kg/m}^3$   
 $hw = \text{Height of water above Pipe} = 3.07$   
 $R_w = \text{Water buoyancy factor} = 0.67$   
 $W_c = \text{Vertical Soil load on pipe per unit length} = 9218.8 \text{ kg/m}$   
 $D = \text{Outside Diameter} = 1.632 \text{ m}$   
 $WL = \text{Vertical wheel load on pipe per unit length} = 2493.48 \text{ kg/m}$   
 $\text{External Load} = 1000 \times 3.07 + 0.67 \times 9218.8 / 1.632 + 2493.48 / 1.632 = 8382 \text{ kg/m}^2$   
 $= 0.084 \text{ N/mm}^2 < 0.48 \text{ N/mm}^2 \text{ (Safe)}$

So External load coming is less than permissible external load

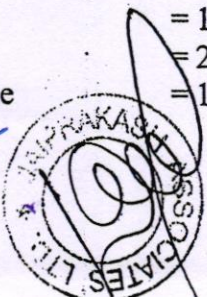
**v. Design against Jacking Force.**

$\text{Coefficient of friction between soil and Casing Pipe} = 0.4$   
 $\text{Provide Length of Pipe inserted from one end} = 29.1 / 2 = 14.55 \text{ m}$   
 $\text{Load on Top of Casing Pipe} = 117.125 \text{ Kn/m}$   
 $\text{Load on Bottom of Casing Pipe} = 144.01 \text{ Kn/m}$   
 $\text{Load on sides of Casing Pipe} = 2 \times 38.51 = 77.02 \text{ Kn/m}$   
 $\text{Total Force on Casing Pipe around Periphery} = 117.125 + 144.01 + 77.02 = 338.15 \text{ Kn/m}$   
 $\text{Total Axial Compressive Force} = 338.15 \times 14.55 = 4920.1 \text{ Kn}$   
 $\text{Frictional Force} = 0.4 \times 4920.1 = 1968 \text{ Kn}$   
 $\text{C/S Area of Pipe} = \pi / 4 \times (1.632^2 - 1.6^2) = 0.081 \text{ m}^2 = 81000 \text{ mm}^2$   
 $\text{Assume the force will exert on pipe cross section uniformly}$   
 $\text{Compressive Stress} = \frac{1968 \times 1000}{81000} = 24.29 \text{ N/mm}^2$   
 $\text{Allowable compressive strength of steel} = 150 \text{ N/mm}^2 > 24.29 \text{ N/mm}^2 \text{ (Safe)}$

**vi. Design of Carrier Pipe at the location of Saddle**

$\text{Maximum Spacing of Saddle} = 3.0 \text{ m}$   
 $\text{Thickness of Carrier Pipe} = 8 \text{ mm}$   
 $\text{Inner Diameter of pipe} = 1.3 \text{ m}$   
 $\text{Outer Diameter of Pipe} = 1.3 + 2 \times 0.008 = 1.316 \text{ m}$   
 $\text{Total UDL} = 2.58 + 2.79 + 13.27 = 18.64 \text{ Kn/m}$   
 $\text{Reaction force from each Saddle} = 18.64 \times 3.0 = 55.93 \text{ Kn}$

*[Signature]*  
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**M.P.R.D.C. Ltd.**



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*[Signature]*  
**S.D.O.**



$$S_{cs} = k \times \frac{P}{t^2} \times \log_e \left( \frac{R}{t} \right)$$

Where,

$S_{cs}$  = Local Bending Stress at Saddle

$k = 0.02 - 0.00012(A-90)$

$A$  = Contact Angle

= 120°

$k = 0.02 - 0.00012(120-90)$

= 0.0164

$P$  = Saddle Reaction Force

= 55.93Kn

$t$  = Pipe wall thickness

= 8 mm

$R$  = Radius of Pipe

= 650 mm

$$S_{cs} = 0.0164 \times \frac{55.93 \times 1000}{8^2} \times \log_e \left( \frac{650}{8} \right) = 63.03 \text{ N/mm}^2$$

Assume Maximum Temperature

= 50°

Assume Normal Temperature

= 27°

Coefficient of Thermal Expansion

= 0.000013 /°C

Young modulus of Steel (E)

= 200000 N/mm²

Longitudinal Thermal Stress ( $S_{TS}$ ) =  $E\alpha\Delta T$  =  $200000 \times 0.000013 \times (50 - 27) = 59.8 \text{ N/mm}^2$

$$\text{Combine Stress} = \sqrt{S_{CS}^2 + S_{TS}^2} = \sqrt{63.03^2 + 59.8^2} = 86.88 \text{ N/mm}^2 > 250 \text{ N/mm}^2 \text{ (Yield Stress)}$$

Deflection of Pipe by UDL ( $y$ )

=  $5/384 \times wL^4/EI$

Where,  $w$  = UDL

= 18.64Kn/m

$L$  = Span in mm

= 3000 mm

$E$  = Young Modulus of Steel

= 207000 N/mm²

$I$  = Moment of Inertia

=  $\pi/64 (D1^4 - D2^4)$

$D1$  = Outer Diameter

= 1316 mm

$D2$  = Inner Diameter

= 1300 mm

$I$  = Moment of Inertia

=  $\pi/64 (1316^4 - 1300^4) = 7030550797 \text{ mm}^4$

Vertical Deflection by UDL =  $5/384 \times 18.64 \times 3000^4 / (207000 \times 7030550797) = 0.0135 \text{ mm}$

Allowable Deflection =  $L/360 = 3000 / 360 = 8.33 \text{ mm} > 0.0135 \text{ mm}$  (Safe)

Bending Moment due to UDL

=  $1/8 \times w \times L^2 = 1/8 \times 18.64 \times 3.0^2 = 20.98 \text{ Knm}$

$I$  = Moment of Inertia

=  $\pi/64 (1316^4 - 1300^4) = 7030550797 \text{ mm}^4$

Total Longitudinal Stress =  $\frac{20.98 \times 10^6 \times \left(\frac{1316}{2}\right)}{7030550797} = 1.963 \text{ N/mm}^2 < 150 \text{ N/mm}^2$  (Allowable tensile stress of Pipe Material) (Safe)

#### vii. Geometric Design of Thrust Pit

Assume Length of Cutting edge = 0.75 m

Length of Pipe (Single MS Pipe) = 12 m

Assume Length of Jack = 1.5 m

Assume Length of Pocket = 0.5 m

Provide gap between Jack, Casing Pipe and Thrust wall = 0.25 m

Thrust wall thickness = 0.7 m

Thrust bed thickness = 0.75 m

Casing Pipe extended from the face of Earthen Shoulder = 1.5 m

Total Length Thrust Pit =  $0.75 + 12 + 1.5 + 0.5 + 0.25 + 0.7 + 1.5 = 17.2 \text{ m}$

Width of Thrust Bed = 4.0 m

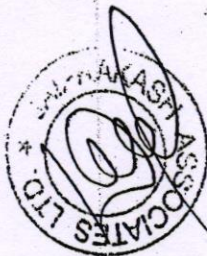
Number of Pockets in one row = 4 Nos

Spacing of pockets along length = 2.0 m



**NAIGARHI-I & II MICRO LIFT IRRIGATION PROJECT**  
*Raw water Pipe Line Crossing under National Highway*

No of Rows =  $12.0 / 2 + 1 = 7$  Nos  
 Total Number of Pockets =  $7 \times 4 = 28$  Nos  
 The Size of Pocket =  $0.5 \text{ m (L)} \times 0.5 \text{ m (W)} \times 0.5 \text{ m (D)}$   
 Load on each Pocket =  $1968 / 4 = 492 \text{ Kn}$   
 Length of Thrust wall =  $4.0 \text{ m}$   
 Height of Thrust wall =  $2.5 \text{ m}$   
 Dead load of Thrust Bed =  $(17.2 \times 4.0 \times 0.75 - 28 \times 0.5 \times 0.5 \times 0.5) \times 25 = 1202.5 \text{ Kn}$   
 Dead load of Thrust wall =  $4.0 \times 2.5 \times 0.7 \times 25 = 175.0 \text{ Kn}$   
 Total Dead Load =  $1202.5 + 175.0 = 1377.5 \text{ Kn}$   
 Frictional Resistance =  $0.4 \times 1377.5 \text{ Kn} = 551 \text{ Kn}$   
 Balance Jack Force =  $1968 - 551 = 1417 \text{ Kn}$   
 Take clearance from bottom of casing pipe =  $0.5 \text{ m}$   
 Bottom Level of Thrust Bed =  $\text{RL } 336.77 - 1.6 - 0.016 - 0.5 - 0.75 = \text{RL } 333.904 \text{ M}$   
 Depth of soil from NGL at bottom of Thrust Bed =  $\text{RL } 337.82 \text{ M} - \text{RL } 333.904 \text{ M} = 3.916 \text{ m}$   
 Depth of soil from NGL at Top of Thrust wall =  $3.916 - (2.5 + 0.75) = 0.666 \text{ m}$   
 Passive E.P at top of Thrust wall =  $3.0 \times 18.4 \times 0.666 = 36.76 \text{ Kn/m}^2$   
 Passive E.P at Bottom of Thrust wall =  $3.0 \times 18.4 \times 3.916 = 216.16 \text{ Kn/m}^2$   
 Passive force on Thrust wall  
 =  $\frac{1}{2} \times (36.76 + 216.16) \times 4.0 \times (2.5 + 0.75) = 1644 \text{ Kn} > 1417 \text{ Kn (Safe)}$



*[Signature]*  
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 Naigarhi Micro Pressurized  
 Irrigation Project Div. Rewa  
 Dist.

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 Sub Divisional Engineer  
 Naigarhi Micro Irr. Project  
 Sub Div. No. 1, Mangawan  
 Dist. Rewa (M.P.)

*[Signature]*  
**A.G.M.**  
 M.P.R.D.C. Ltd  
 Dn No.1, Rewa

*[Signature]*  
 Divisional Manager  
 M.P.R.D.C. Ltd  
 Dn. No 1. Rewa



कार्यालय कार्यपालन यंत्री नईगढ़ी सूक्ष्म दबाव सिंचाई परियोजना संभाग रीवा (म0प्र0)

दूरभाष 07662-225514 मेल - eenmpirewa@gmail.com

पत्र क्रमांक.....1322/कार्य-1/ 2023/रीवा  
प्रति,

दिनांक 01/08/2023

संभागीय प्रबंधक  
म.प्र.सड़क विकास निगम लिमिटेड  
संभाग क्रमांक.1 रीवा  
जिला-रीवा (म0प्र0)

विषय:- नईगढ़ी सूक्ष्म दबाव सिंचाई परियोजना यूनिट क्र0.1 अन्तर्गत राष्ट्रीय राजमार्ग-135 (OLD NH-7) में पाईप लाईन क्रासिंग अनुमति बावत्।

सन्दर्भ:- मुख्य अभियंता सड़क परिवहन और राजमार्ग भोपाल का पत्र क्र0./RW/BHP/MP/141/1963  
Dated- 16.11.2022

—00—

उपरोक्त विषयान्तर्गत नईगढ़ी सूक्ष्म दबाव सिंचाई परियोजना यूनिट क्र0.1 अन्तर्गत राष्ट्रीय राजमार्ग-135 (OLD NH-7) में पाईप लाईन क्रासिंग हेतु सन्दर्भित पत्र के माध्यम से मुख्य अभियंता सड़क परिवहन भोपाल द्वारा ली गई आपत्तियों का निराकरण जे.पी.एसोसियेट्स लिमिटेड के पत्र क्र0.1050 दिनांक- 24.07.2023 द्वारा इस कार्यालय को प्राप्त हुआ है।

उक्त प्रकरण का परीक्षण कार्यालय स्तर पर किये जाने के उपरान्त आवश्यक कार्यवाही हेतु अभिलेख आपकी ओर आवश्यक कार्यवाही हेतु प्रेषित है।

सहपत्र :- मूल फाईल मय अभिलेख।

कुल 4 फाइले।

(बी0पी0मिश्रा)

कार्यपालन यंत्री

नईगढ़ी सूक्ष्म दबाव सिंचाई  
परियोजना संभाग रीवा (म0प्र0)

दिनांक.....08/2023

पृष्ठा0 क्रमांक...../कार्य-1/2023/रीवा  
प्रतिलिपि:-

1. मुख्य अभियंता गंगा कछार जल संसाधन विभाग रीवा की ओर सादर सूचनार्थ सम्प्रेषित।
2. अधीक्षण यंत्री बाणसागर नहर मण्डल रीवा की ओर सादर सूचनार्थ सम्प्रेषित।
3. जे.पी. एसोसियेट्स लिमिटेड कैम्प मनगवों की ओर लेख है कि म.प्र. सड़क विकास निगम कार्यालय में उपस्थित होकर प्रकरण में स्वीकृति प्राप्त करे।



(बी.पी.मिश्रा)

कार्यपालन यंत्री

नईगढ़ी सूक्ष्म दबाव सिंचाई  
परियोजना संभाग रीवा (म0प्र0)