SECTION 7

DETAILED DESCRIPTION OF SOR WORK ACTIVITY

Item No.	Work Activity
1.1	**Pipe Laying in any unprepared surface (Katcha surface)/ Normal Surface/Hard surface using open cut methodology or Manual Moling Technique (without casing):** Loading, storing, unloading and laying of PE100 SDR11 line pipes of size 20 mm/32 mm dia including ,proper stacking, identification, and supply of accessories of all sizes & thickness like PE Bends, Couplers, End caps, Tee, Reducer, Warning Mat, GI sleeves etc.. Handling, Stringing/ uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use/route, laying/ installation of PE line pipe along with required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of all materials in contractor's designated store, fabrication, access to construction; procurement and supply of all materials, consumables, equipments, labour and other inputs. PE 20 mm/32 mm dia pipes would be free issue, the scope also includes, receiving and loading from HNGPL designated store, transportation, unloading and stacking of free issue items at Contractor's store. Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings. Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works: Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc. Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition. Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.
	For Laying using Open Trench Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching ,to all depths by excavation of open trench in all types of soils including soft/ rocky strata and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be

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	1.0m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD - 226 & PNGRB latest guidelines whichever is higher]. Dewater of trenches if required as per site condition. repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner/other utility agencies) Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of 1.0mm thk. HDPE warning mat over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, soft soil padding around pipeline including supply of suitable padding material duly approved by EIC , backfilling to its original condition with excavated earth / borrowed select soil duly approved by EIC & its compaction & crowning. At certain specific area of ROU, backfilled trench shall be made ready for restoration. The restoration of trench shall be made motorable wherever pipeline is laid, payments towards restoration shall be paid as per separate SOR item mentioned elsewhere in the SOR. However, all tiles/slabs/curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Roads, pavements, footpaths etc. to be made motorable wherever pipeline is laid. Uncoiling/ stringing & aligning of PE pipes, clamping, jointing of the pipe ends/ fittings/ valves by qualified personnel using approved electro-fusion techniques as per specification.
	For Laying Using Moling Method Laying using moling method without casing includes survey of under ground utilities , execution of work as per specification including excavation of pits in all types of soils strata and different type of pavement / footpath / roads etc. storing of excavated reusable materials at designated area as directed by Engineer in charge and moling to a width to accommodate the pipeline as per the relevant standard/ specification etc., with the hole size not exceeding 20% of the pipe dia including excavation of pits [The minimum depth of the top of pipeline shall be 1.0m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD - 226 & PNGRB latest guidelines whichever is is higher]. Dewater of pits if required as per site condition. repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner/other utility agencies) Installation / lowering the pipeline in bore to required depth as per PJS, Technical Specification & drawings, supply & placement of 1.0mm thk. HDPE warning mat over pit as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC , backfilling to its original condition with excavated earth / borrowed select soil duly approved by EIC & its compaction & crowning. At certain specific area of ROU, backfilled pits shall be made ready for restoration. Payment for making ready for restoration of pits on any type of surface shall is inclusive in this SOR . However, all tiles/slabs/curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Roads, pavements, footpaths etc. to be made motorable wherever pipeline is laid. The scope of work against this item also includes Electro-fusion jointing of valves wherever required, and as directed by Engineer-in-charge including supply and installation of tapping saddles from various sizes of existing PE pipeline network. Any other activities not mentioned/ covered explicitly above, but otherwise required for satisfactory completion/ operation/ safety/ statutory/ maintenance of the works shall also

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	be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to HNGPL All the work shall be executed in accordance with the provision of contract. Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. Submission of all documents required for contract closure in numbers as mentioned in contract. The scope of work against laying of 20 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size (8"X6"X4"), supply and installation of GI Sleeve, filling of sand and installation of TF. Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench / pit and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge. Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work). Handing over the completed works to HNGPL for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from EIC. Preparation and submission of Daily progress report, Laying Graphs/ PE cards on daily basis. On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.
1.2	**Restoration:** Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material requierd, as per local authorities norms, obtaining NOC from land owners/ third party inspection agencies/Consultant designated by HNGPL and to the satisfaction of Engineer-in-charge.
1.3	**Pipe laying using manual moling technique (with casing) for PE pipe sizes of:** Laying of all PE pipe (PE 100 SDR11) ,Including supply of HDPE casing pipe, Couplers, End caps etc. (As per Particular job specification.) Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge.
1.4	**Pipe laying inside Private Property i.e Multistory buildings / apartments with no movement of Heavy Vehicles, surrounded with Boundary wall where pipe top cover could not be achieved 600 mm:** Minimum pipe top cover of 375 mm is required and the line pressure shall not exceed 110mbar Necessary mitigation measures such as RCC slab (150mm thick and 300mm width)

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	at the bip and RCC slab (100mm thick and 300mm width) at bottom. There shall be sand filling across three sides of the line pipe of 100mm each shall be required to be taken by contractor In consultation with EIC as per latest PNGRB Guidelines. No additional payment shall be admissible against the same. Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of 20mm, 32mm & 63mm PE pipe (PE 100 SDR11) including proper stacking, identification, and supply of accessories of below mentioned sizes & all thickness like PE Bends, Couplers, End caps, Tee, Reducer, CS/GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 63 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use route, laying/installation of PE line pipe along with required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designatec store, transportation, unloading and stacking of free issue items at Contractor's store. Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawing. Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details, and submit same to Owner for review/approval. Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/services etc., restoration of the abandoned trial pits to original condition. Barricading the pipeline construction area prior to execution of the works as per drawing enclosed with tender document and to the entire satisfaction of owner/engineer-in-charge Laying using open trench includes survey of underground utilities (through trial pits), trenching by excavation in all types of soils including soft/rocky strata and different type of pavement/footpath/roads/PCC/RCC etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, eusable materiais at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as be the relevant standard/ specification etc. Dewatering of trenches/pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner/other utility agencies) Uncoiling/stringing & aligning of PE pipes, clamping, jointing of the pipe ends/fittings/ valves by qualified personnel using approved electro-fusion techniques as per specification. Installation/lowering the pipeline in trench to required depth, supply & placement of HDPE Yellow colour warning mat over the pipeline along the complete route as per drawing and backfilling to its original condition with excavated earth/borrowed select soil / sand duly approved by EIC & its compection & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made reacy for motorable. All tiles/slabs/curb stones etc removed during excavation shall be placed properly and no separate payment

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	shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner/concerned authorities. The scope of work against laying of 20 mm pipe also includes works like making of PCC pedestal of grade (1:2:4) and size (8"X6"X4"). supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply). Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and/or as directed by Engineer-in-charge. Maintaining the completed pipelines and Installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work) Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate from Owner Consultant. On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statement. Any other activities no mentioned / covered explicitly above, but otherwise required for satisfactory completion/ operation/safety/ statutory/maintenance of the works shall also be covered under the scope o' work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.
1.5	**Supply of GI/ Concrete Sleeves (wherever required as a Special Case as per instructions of the Engineer-in-charge):** Supply, installation of sleeve, insertion of pipe, sealing the annuals, firm fixing of Sleeves with concrete mix. Breaking through any obstructions and their subsequent restoration, as per specifications and instructions of the Engineer-in-charge.
1.6	**Fabrication & Installation of Markers:** Supply, fabrication and installation of plate markers, including application of approved color and quality of primer and paint, stencil letter cutting of lettering, numbers, direction, etc. as per the attached drawings to be installed near regulator.
2.1	**Installation of GI Service Pipe:** Supply, loading, storing, unloading and laying of Powder Coated GI pipes , including supply of GI fittings/accessories including Anaconda, Fittings of all sizes & thickness like Elbows, Tees, unions, sockets, reducers, GI plugs, Sleeves etc., installation of GI line (alongwith installation of required accessories as mentioned above) of following sizes, including fabrication with supply of all materials , consumables, labour and other incidental works. Carrying out all temporary, ancillary, auxiliary works required to make the GI line ready for commissioning as per drawings specifications.

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	Scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works: Preparation and approval of schedules, execution procedures, sketches. Finalisation of optimum route with consent of customer, from transition fitting to cooking oven/ appliance. Making temporay but stable platforms/ scaffolding/ rope ladders and all other safety measures including safety belts wherever required. Installation of GI Pipes, Fittings, including NPT threading, painting as specified . Drillings of holes through walls (Brick, RCC) , Granite, Marble, Glass Cutting with proper heavy duty hammer drill machine tools and tackeles, using proper sealent /grout materialed colors to match the original replacement of damages during drillling, restoring the area to original condition. Supply & Fixing of approved clamps, Dowell Plugs with screws, grout material, suitable thread sealant i.e. Teflon Tape/ lock tight, drilling of holes through tiles/ wood/ marble/ Granite etc. jointing of PE to above Ground service GI pipes, testing, purging with Nitrogen and commissioning of the complete installation as per specification. Painting of entire length of pipe(as applicable) along with fittings after proper surface finish by one coat of approved primer paint and two coats of approved synthetic enamel paint complete as per specification & direction of EIC. Restoring the wall surface to origin All above activities to be carried out as per specification to the complete satisfaction of consumer & as desired by Engineer-in-charge. Handing over the completed works to HNGPL for operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from HNGPL. Any other activity not mentioned/ covered, explicitly above, but otherwise required for satisfactory completion/ safety/ statutory/ maintenance of works shall also be covered under scope of work and has to be completed by contractor within specified schedule time.
2.3 (a)	**Installation of Meter:** Installation & fixing of meters with associated inlet and outlet connections/ fittings, valves approved meter brackets and other supports by proper scaffolding/ grouting, Restoring the area to original complete as per specification and instruction of EIC. (Meter will be Provided as free issue Item.).
2.3(b)	**Flexible Hose & Conversion of Domestic Appliance:** The work includes installation and supply of Steel reinforced Flexible Hose as per IS 9573 Part-2 (Gas tube from end of Isolation Valve upto burner/stove) and conversion of all the burners of the LPG stove (one per household) including supply of all types of burner nozzles/jets and associated controls etc. Cleaning and performing minor maintenance, greasing etc. of appliance, testing/ showing performance to the customer ,signing of Joint Meter Records (JMR) and instructing customer on use & safety norms, complete as per specifications & to satisfaction of customer and instruction of EIC.
2.4	**Installation & Fixing of Commercial regulators, Metres & Flexible hose including Conversion:**

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	Along with supply and installation of associated inlet and outlet connections/ fittings, valves approved meter brackets and other supports by proper scaffolding/ grouting, Restoring the area to original complete as per specification and instruction of EIC. (Meter & Regulator will be Provided as free issue Item.). (G-6/G-10/G16/G-25 AND G-40)
2.6	**Installation of Regulator :** Installation & Fixing of regulator with associated inlet and outlet connections/ fittings, valves approved regulator brackets and other supports by proper scaffolding/ grouting, Restoring the area to original complete as per specification.
2.7	**Service Regulator Boxes:** Supply and installation of Service Regulators Boxes complete with case and locking arrangement and foundation in ratio of 1:2:4 as per drawing/ Photo of IGL attached and as per directions of EIC.
3	**Registration of Domestic PNG Connections:** Carrying out the work of Domestic PNG registration as per directions/instructions of the Marketing In charge of HNGPL/Authorized representative including but not limited to following : 1) Enrolment & Registration of Domestic PNG Customers as per the given target. 2) Collection of filled up form along with Cheque/Demand Draft of Security Deposit amount and documents All other activities as may be required to complete the work in all respect is defined in the Scope of work to be read along with the Special Conditions of Contract and as per instructions of MIC. Carrying out the marketing activities for Domestic PNG connection as detailed in Scope of work, complete in all respects , as per directions/instructions of the Marketing In Charge including but not limited to the following: Distribution of leaflets & FAQ, Installation of banners at prime location, Awareness cum Registration Camp , Audio/Visual Presentations, Organizing Road Shows, etc.
4	**Conversion of Existing GI/ RFC cases of Old Customers and doing of NG:** including Minor Modifications/ Testing of GI Lines Complete as per Engg I/c , cost of NG is included in this any free issue item including fitting will be provided by HNGPL. In case of GI cases TF done will be paid as per above item.

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