

## **INSTALLATION OF SANITARY PIPELINE- MAZBOUD**

### **1. GENERAL INSTRUCTIONS:**

1. Before starting the works, Contractor shall make sure that all working permits are available and he shall be accountable for all irregularities.
2. The contractor shall provide execution drawings and detailed timetable before any site activity.
3. The contractor shall abide by the protection of public facilities.
4. The contractor is responsible for all damages or losses that might occur to individuals or private/public utilities as a result of his work, and responsible for all claims arising from such losses.
5. The contractor must maintain the cleanliness of the site and remove all the debris or excavated material and transport it to allocated dumping sites and following the instructions of the municipalities.

### **2. OBJECTIVES:**

The objectives of this manual are to control the quality of works through:

1. Making sure that all works related to excavation, backfilling and re-asphalting are according to the specifications.
2. Making sure that all supervision measures and decisions are adequate to the good quality control and quality assurance.
3. Making sure that all access roads are cleared and road safety measures are taken into consideration.

### **3. PERMITS FOR ROAD EXCAVATION WORKS:**

The Contractor shall get a written approval from all official establishments prior to the beginning of works. He should get all information related to utilities (Telephone cables, Potable water Lines...) and all buried underground services. The Contractor is the only responsible for any potential damages.

It shall be the contractor's responsibility to place protection barriers, warning tapes and warning signs. He shall also place bridges over the excavation (in specific places) to facilitate pedestrians passage. Nonetheless, the Contractor shall take the adequate measures to avoid any accident with local residents and to prevent any traffic or the like.

The Contractor shall present the execution drawings or maps where all utilities, excavation limits, traffic routes should be located. Also, he should present a detailed work plan for all earthworks. In brief, the Contractor shall present the following, prior to the kick-off:

- Permit to dig, where excavation length shouldn't exceed the 200 m.
- Execution drawings where length, width and depth of the excavation are mentioned.
- All requested material for backfilling and re-asphalting.
- Necessary measures for traffic maneuver and diversions.

#### **4. TRAFFIC SAFETY MEASURES IN WORKING AREAS:**

The Contractor shall ensure all road safety measures through:

- 1- Place a Signboard (1m x 0.6 m) on the beginning and the end of the project with the below information on it:
  - The name of the Company (Contractor), telephone number and address.
  - The name of the Consultant (UN Habitat) and the logo.
  - The name of the Donor (UNICEF) and the logo.
  - The municipality in concern.
- 2- All as dug material to appropriately placed in safe places.
- 3- Secure proper lighting during night works (in case it was allowed), also provide warning blinkers and phosphor signs in the beginning and the end of works.
- 4- Sprinkle as dug material with water to avoid gust and blinding fog caused by dust.
- 5- Use special barriers (New Jersey) painted with appropriate colors.
- 6- The contractor shall remove all as dug material and transport them to an appropriate discharging site. He shall handle a site clean and approved by the Engineer.
- 7- Contractor shall place Pedestrian Access (Bridges) each 100m maximum.

#### **5. WORK UNDER THIS CONTRACT:**

- A. The design drawings are made by the Designer to suit the tender documents. It is important for the contractor to re-survey the whole site and to re-consider the whole layout plans and levels to proceed with his cost estimation and implementation on a later stage.
- B. Gravity Sewer Pipes with Diameter less than  $\phi 300$  shall be POLYVINYL CHLORIDE (PVC), Contractor Shall Present a Technical Data Sheet from Manufacturer to the approval of UN Habitat's Engineer.
- C. PVC pipes shall have a TRY AXIAL Strength not less than 2.5 Tons/m for  $\phi 300$  Pipes and 1.6 Tons/m for  $\phi 200$  pipes. PVC pipes should be connected with a proper joint and sealed to prevent any leakage.

- D. Pipes to be connected with rubber joints and/ or sealed with proper sealant, Technical Data Sheet provided by Contractor should show clearly the type of Joints used and to the approval of UN Habitat Engineer.
- E. Soil underneath the sewer pipes to be well graded and compacted to prevent any future settlements. UN Habitat should approve bottom soil before any activity.
- F. The Connection of sewer pipe with Manhole should be well sealed with proper sealing material. No porous or air entrained materials are allowed to be used. UN Habitat engineer has the full right to reject any non-suitable material.
- G. Manholes are allowed to have Hollow Block walls not less than 20cm thick, if Manhole Height is less than 2m. Otherwise, manholes should be concrete casted with 1% minimum reinforcement if height exceeds 2m. In all cases, Contractor can adopt pre-cast concrete manholes to the approval of UN-Habitat engineer.
- H. Manhole Covers to be Ductile Iron- Class A- Heavy Duty covers, tested and approved by UN-Habitat Engineer.
- I. If Manhole depth exceeds the 1.7m, Contractor should install stairs inside the Manhole's Shaft to allow access.
- J. Backfilling the sewage network should be complete with a well selected backfill material to the approval of the Engineer- Backfill with as dug material to be well selected to the approval of the engineer.
- K. Base Coarse material and sand bedding material: Technical Data sheets to be presented to the Engineer for approval. Noting that: Compaction layers shouldn't exceed 20cm and Engineer can ask for lab tests for samples to exceed 95% MDR.
- L. In Principle, Sewer Pipes are located as shown on the detailed drawings for location of utilities under roads. Final locations shall be modified to suit other existing utilities in the street as directed by UN Habitat engineer. Contractor shall detect all passing utilities and avoid crossings. Contractor shall seek to obtain all available utilities drawings from proper sources. And if somehow utilities were subjected to deterioration, it is the Contractor's responsibilities to fix it.
- M. The drawings provided shall not be scaled. Exact dimensions for locations of Manholes, levels, distances, etc... For the purpose of this contract shall be as indicated on the approved construction drawings and as specified.
- N. The contractor shall provide suitable opening in the inspection chamber to accommodate future house connections.
- O. Details may be modified by UN habitat engineer if site conditions warrant.
- P. All connections shall be completed and terminated as directed by UN Habitat engineer.
- Q. The Following Abbreviations are used:
- |            |  |
|------------|--|
| Dia. (mm)  | Pipe Diameter in Millimeters                                   |
| GRD. ELEV  | Ground elevation in Meters                                     |
| PART. DIST | Partial Distance in Meters                                     |
| CUM. DIST  | Cumulative Distance in Meters                                  |
| I.L.       | Invert Level in Meters (unless otherwise indicated)            |
| PVC        | Polyvinyl Chloride Pipe.                                       |
| MDD        | Maximum Dry Density as determined by AASHTO standards in Labs. |

- R. Contractor shall provide concrete encasement for sewer pipes passing under water pipes with a clearance of less than 150mm, as specified and approved by UN habitat engineer.
- S. Benching details are shown for guidance purposes. Applicable benching shall be determined to suit each condition as directed by the engineer.
- T. Double flexible joint shall be used whenever pipe is connected to a sub-structure such as manhole wall, concrete encasement, or even another pipe...
- U. Whenever the drawings show a sewer line connecting to an existing manhole fitted with a stub, the contractor shall remove the plug and make the connection to the approval of the engineer.
- V. Prior to any construction, the contractor shall establish a new bench mark system, within the project area for setting out of all works, and obtain UN habitat engineer's approval.
- W. Markings of Pipes and Fittings
1. Each pipe shall be clearly marked at the place of manufacture with the following:
    - a. Name or distinctive mark of the manufacturer.
    - b. Date of manufacture.
    - c. Pressure Rating.
    - d. Nominal Diameter and laying length.
    - e. Strength Class.

## 6. SUBMITTALS

- A. The Contractor shall submit sufficient information to UN-Habitat, in order to verify compliance with the specifications.
- B. Quality Assurance QA: Method Statements
1. The contractor shall provide method statements at least for following activities:
    - a. Pipe/ Manhole Installation.
    - b. Pipe Testing.
- C. Shop Drawings
- The Contractor shall submit shop drawings at least for the following items:
2. Pipeline profile together with details of all joints, manholes etc.

## 7. QUALITY CONTROL

- A. Prior TO DISPATCH FROM THE FACTORY, THE Contractor shall notify UN Habitat engineer, in sufficient time to allow them to inspect and test the products.
1. All notifications shall be made by written "Inspection Requests".
    - a. A copy should be scanned and mailed to UN-Habitat engineer; it should arrive before the day of inspection.
- B. Final Inspection:

Any product found to be fabricated from unapproved materials or incorrectly fabricated, incorrectly installed, poorly fitted or damaged, shall be rejected and removed from the works.

1. No site repairs will be allowed, unless authorized by UN-Habitat engineer.
2. The Contractor shall bear all costs for replacing unacceptable work.

## 8. DELIVERY, STORAGE AND HANDLING

A. Delivery, storage and handling shall be according to the manufacturer's recommendations, along with the following provisions:

1. Transportations, storage and handling shall at all times be performed in a manner to avoid product damage.
2. Only nylon slings shall be used for lifting products. Steel chains, clamps or cables shall not be allowed lifting purposes.
3. If stored outside, cover products to prevent weather degradation.
4. Any products found to be incorrectly fabricated shall be marked and set aside.
5. Any products damaged during delivery, storage or installation shall be marked by the Contractor and set aside.

## 9. TESTING

Testing of installed pipelines shall be performed as specified below.

A. Air Test

1. Low-Pressure air test shall be performed in accordance with ASTM 828 (If required by UN habitat engineer).

B. Water Test

1. The part of pipeline under test shall be filled with water to give an effective minimum internal water pressure of 1m at highest point and a maximum of 7m at the lowest point.
2. The pressure of 1m head of water shall be maintained for one hour to allow initial absorption of water. After that, the test pressure shall be maintained for 10 minutes and water added shall be measured. If water consumption in 10 minutes does not exceed one liter per hour per linear meter of pipe per meter of nominal internal diameter of pipe and, if there are no visible leakage through joints, the pipeline shall be deemed to have passed.