*Republic of the Philippines*

**ZAMBOANGA CITY WATER DISTRICT**

Pilar Street, Zamboanga City

# -TECHNICAL SPECIFICATIONS-

## FOR THE

# MAINLINE REPLACEMENT PROGRAM (LGU FUNDED) PHASE II

**TECHNICAL SERVICES GROUP**
**ENGINEERING & CONSTRUCTION DEPARTMENT**
**DESIGN DIVISION**

**FEBRUARY 2024**

Version_4

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## BACKGROUND

Zamboanga City represents the entire Zamboanga Peninsula for its rapid economic growth and stability for over a century. The city's water system has existed over decades consisting of diversion weir, intake, water treatment facilities and pipelines. Apart from the uPVC pipelines that ZCWD is normally using in the contemporary time, many among old pipelines are of ACP Asbestos Cement Pipes and CI Pipes Cast Iron Pipes which are common in the 1940's, 1960's and 1970's.

The Mainline Replacement Program is aimed to rehabilitate the existing ACP, CI and old PVC pipeline to further reduce Non-Revenue Water (NRW) and upgrade decade-old pipelines to efficiently receive the 50MLD Bulk Water through its transmission lines and existing distribution lines. More so, the program's objective focuses on maximizing the carrying capacity of the pipelines according to their sizes.

Existing pipelines were determined through ZCWD pipeline map that was earlier established by the Engineering Department throughout its years of operation intended for monitoring and pipeline asset documentation. Through age and workability, ACP and some of CI existing pipelines were considered for replacement. The pipe materials which will be used for this project are PVC and Ductile Iron Pipes.

This is one of the mainline replacement projects of ZCWD to be implemented *by Contract* which has been funded by the City Government of Zamboanga. The project is expected to reduce the *Non-Revenue Water (NRW),* maximize the carrying capacity of the pipelines to be replaced, upgrade the decade-old pipelines, and address the outgrowing number of illegal connections at all predetermined strategic areas.

## I. GENERAL BIDDING REQUIREMENTS

1.1. All eligibility documents shall conform to the requirements stipulated in the Republic Act 9184 & its Revised Implementing Rules and Regulation.

1.2. Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid shall refer to CONSTRUCTION OF WATER SUPPLY SYSTEM particularly laying/installation of water pipeline project.

1.3. For single contractor, PCAB LICENSE shall be in compliance with the DTI PCAB Categorization Table, Board Resolution No. 201 Series of 2017. For this project, the PCAB License shall be GE-4 (Water Supply) Classification with Size Range Medium A with License Category of B.

1.4. Joint Venture bidders' eligibility requirements for infrastructure projects shall be in accordance with the section 23 of the Updated Revised IRR of RA 9184.

1.5. The Bidder may subcontract portions of the Project to the extent allowed by the Procuring Entity as stated in the Philippine Bidding Documents (PBD), but in no case more than fifty percent (50%) of the Project. All subcontracting arrangements should be disclosed at the time of bidding, and subcontractors shall be identified in the bidding documents submitted by the eligible bidder. Subcontractors shall also pass the eligibility check for the portions of the contract that they will undertake. The Supplier may identify its subcontractor during the contract implementation stage. Subcontractors identified during the bidding may be changed during the implementation of this Contract. Subcontractors must submit the documentary requirements under Section 23.1 of the 2016 revised IRR of RA No. 9184 and comply with the eligibility requirements. Subcontracting of any portion of the Project does not relieve the Contractor of any liability or obligation under the Contract. The Contractor will be responsible for the acts, defaults, and negligence of any subcontractor, its agents, servants, or workmen as fully as if these were the Contractor's own acts, defaults, or negligence, or those of its agents, servants, or workmen.

1.6. Other documents to be submitted upon implementation of the project:

1.6.1 The manufacturers of PVC and Ductile Iron pipes and fittings shall have their product certified by the following (depends on the standards adopted):

1.6.1.1 For Ductile Iron Pipes: ISO 2531 C or K Series / EN 545:2010 / AWWA C151 or latest equivalent;

1.6.1.2 For PVC Pipes: uPVC Pipes Series 8, PNS 65 Standard, ASTM D1784 / ISO 4439 or PVC-O Pipes: ISO 16422 PN 16 Standard;

And all other standards mentioned in the material specifications herein.

1.6.2 Documents that will certify the pipes, pipe material, fittings and appurtenances including water meters from overseas must be Apostilled by countries of origin whose party to the Apostille Convention. For countries not party to Apostille Convention, the documents must be authenticated by the Philippine Embassy of whichever country it may originate unless otherwise manufactured and procured locally which must be completed with all the required documents and submit during project implementation stage. The said documents shall be prerequisite in the 15% advance payment to the contractor for the mobilization.

## II. GENERAL SPECIFICATION

2.1 The pipe laying components of this project shall be implemented in accordance with the latest established standards set by LWUA and as indicated in the plans and bill of quantities. While the backfilling, compaction, restoration and concreting works shall follow the latest edition Department of Public Works & Highways (DPWH) Standard Specifications for public works & highways following its schedule of Minimum Test Requirements.

*In the case of slight inconsistencies between the plans provided and LWUA standards, the discretion shall be based depending on the complexity of the situation and on the decision of ZCWD project in-charge (Technical Services Group)*

2.2 ZCWD will be providing map/schematic diagram to the contractor that contains the alignment of the existing pipeline on the project site/route which is intended to be decommissioned after pipelaying activities. The existing pipeline has a depth of approximately not less than 0.76m depth. The said map of existing pipeline shall serve as guide to the contractor in the project implementation in order to avoid damages on existing pipeline, as all leakages caused by the implementation of the pipelaying project must be reported to ZCWD for immediate assessment. The material, equipment and labor components of the immediate repair works shall be provided and shouldered by the contractor once assessed culpable to the pipeline damage. The contractor shall organize a leak repair team within its manpower to cater the immediate leak repair. Leakages shall not be a reason for stoppage of work. It shall be the responsibility of the contractor to complete the project amidst any impediments that will arise during the implementation phase. Only force majeure shall be sufficient reason for time extension.

2.3 Further, the leakages on the ZCWD existing physical asset that occurs in the course of the project's activities, shall be computed with a corresponding amount of the volume of water that continuously went to leak multiply by the water rates to be determined by the ZCWD Water Crisis Act Assessment Committee and shall be deductible against the monies due to the Contractor as well as the manpower, materials and equipment that will be used in the leak repair shall also be shouldered by the Contractor, this is in accordance with the Section 8 in relation to Section 11 of RA 8041 otherwise known as the Water Crisis Act. The volume of water wasted during the leak shall be computed by means of Torricelli's Theorem as follows:

$Q = C_d A V$ where $V = \sqrt{2gh}$, (Velocity of water)

Q=flow of leakage
g=9.81m/s^2 (gravity in S.I.)
h = pressure head (pressure within the area)
A = area of opening (leak opening)
$C_d$ = coefficient of discharge (average)

Volume of leak = Q x Duration of Leak before it was completely repaired

2.4 Any equipment breakdown or damaged during the implementation of the project shall subject to immediate replacement at the cost of the contractor as this will not toll the running of the period to complete the works called for under this Technical Specifications. Delays will be subjected to liquidated damages provided in Section 68 and Annex E of the Updated Revised IRR of RA 9184.

2.5 The Procuring Entity has the authority to suspend the work wholly or partly by written order for such period as may be deemed necessary due to the following:

2.5.1 Force majeure or any fortuitous event;
2.5.2 Failed on the part of the contractor to:
a. Correct bad conditions which are unsafe for worker or for the general public;
b. Carry out valid orders given by the Procuring Entity;
c. Perform any provisions of the contract; or
d. Adjustment of plans to suit field conditions as found necessary during construction

2.6 The contractor shall furnish As-Built Plan as part of the requirement for issuance of Completion Certificate and Final Billing payment. Submission of the project as-built layout is likewise a requirement for project that has stopped implementation due to arbitration or court litigation or the contract for the project has been terminated.

2.7 The contractor's site engineer shall prepare and submit a daily report reflecting the following information with concurrence of this Office Project In-Charge:

- Weather condition
- Activities for the day reflecting all the detail of the actual works performed. (It shall show the plan vs. actual)
- Breakdown of utilized equipment
- Breakdown of manpower
- Materials utilized and delivered on site
- Any other details relevant to the executed activities.

2.8 In cases where the delay reaches 5% of the planned activities, the contractor shall submit a CATCH UP PLAN the following day reckoned from the date of the delay incurred. The "catch-up plan" shall cover the left-behind activities of the preceding week and the remaining works.

2.9 All pipe materials and appurtenances to be used for this contract shall be inspected by the ZCWD Engineering & Construction Department prior acceptance by the ZCWD project engineer. Manufacturers and Material Testing Certificate from government accredited testing laboratory shall be submitted to this effect. Failure to comply with this provision, the implementing unit-Mainline Expansion & Rehabilitation Division (MERD) shall have the right to order "REMOVE AND REPLACE" the said materials at the expense of the contractor while the period to complete the project shall continue to run and without time extension. For restoration materials to be tested in Zamboanga City: It must be witnessed by the ZCWD Engineer together with the Contractor or the Contractor's representative during sampling and actual testing.

2.10 In relation to section 2.9 of this Technical Specifications, the winning bidder/contractor shall provide Materials Engineer, who shall be present during the inspection of pipe materials and appurtenances and testing of restoration materials.

2.11 The contractor cannot proceed with the next work item unless they can present that the materials indeed passed the requirements/specifications, in which case, the project engineer has the right to demand from the contractor, otherwise, the project engineer may order the stoppage of the work portion where the construction materials did not pass the specifications while the period to complete the project shall continue to run.

2.12 Material Testing for Structural Concrete, Reinforcements and Structural Steel, Pavement Restoration items is required as per testing standard of DPWH (Department of Public Works & Highways).

2.13 All *Items of Works* for this project shall include all the necessary equipment, manpower and materials to implement and to complete it; and this shall be considered and anticipated by the Contractor in their financial bid offer. Hence, any additional equipment, manpower and/or materials which have been used in the completion of any *Item of Work* shall be at no extra cost to ZCWD.

2.14 Prior the implementation, the contractor shall form a team who is readily available to address the concerns or complaints of the public in line with project implementation activities at the expense of the Contractor. Likewise, the contractor shall provide the public a communication channel through providing a contact detail. Hence, the contractor shall post the signage or tarpaulin on project route prior to the start of the excavation works until the completion of restoration activities. The signage shall contain at least 3-inch letter/font height with the following message:

PROJECT: MAINLINE REPLACEMENT PROGRAM (LGU FUNDED) PHASE II
PROJECT OWNER: ZAMBOANGA CITY WATER DISTRICT
CONTRACTOR: _____
CONTRACTOR'S REPRESENTATIVE: _____
CONTACT NUMBERS: _____

NOTICE TO THE PUBLIC,

FOR YOUR CONCERN OR COMPLAINT IN RELATION TO THE PROJECT IMPLEMENTATION KINDLY CONTACT THE NUMBER PROVIDED ABOVE.

THANK YOU FOR YOUR COOPERATION.

2.15 The Contractor shall respond to the public's complaints immediately and they shall log all the complaints that they have received from the public or even from the ZCWD. They shall indicate the date when the complaint/issue was received, name of complainant, the nature of complaint, the location, the complainant's contact details, the contractor's action taken, date when the action was taken and the

resources utilized in addressing the same. Further, the contractor shall submit this in a form of report to ZCWD every month.

2.16 The contractor shall also prepare a Contractor's Environmental Management Plan (CEMP) that shall detail the specifications for dust control, erosion and sediment control, avoidance of casual standing water, management of solid wastes, workers' camp sanitation, pollution from oil, grease, fuel spills, and other materials due to the operation of construction machineries, safety and traffic management, avoidance of inconveniences to the public, air and noise pollution control. It shall also include guidance on the proper design of the construction zone, careful management of stockpiles, vegetation, topsoil, and vehicles and machinery. The contractor shall also designate its Construction Pollution Control Officer who shall monitor compliance with the conditions of the project's Environmental Compliance Certificate (ECC) during the construction phase and submit a Self-Monitoring Report of its compliance to the CEMP to ZCWD every month.

2.17 The project implementation shall be in accordance with the Zamboanga City Ordinance No. 309 "*An Ordinance Regulating the Excavation and Repavement of Excavated Portions of Roads/Streets in the City of Zamboanga and Prescribing Fees and Penalty Therefore*". For working scheduling, see Section V of this Technical Specifications. The conditions of the said Ordinance shall be observed such as, but not limited to, no landfill construction materials will be deposited in the street; all holes or excavation shall be duly covered by Steel Plate with not less than 3/4 inches thickness (capable to carry AASHTO HS-20 Traffic Load) during the day to make it passable to the riding public; and repavement of the portion affected shall be completed within 30 days after the completion of the excavation provided, that the excavation, shall not completely obstruct traffic flow in the area.

2.18 Water service interruption schedule for interconnection works shall be coordinated and approved by the ZCWD management. Interruption notice shall strictly follow the LWUA Memorandum Circular No. 005-18, a Circular requiring the Local Water Districts to announce the scheduled water service interruptions at least three (3) days before the scheduled interruption through any means as stated in the said Circular. Hence, the Contractor shall be prepared with the necessary manpower, equipment and materials prior the request for water service interruption and shall consider giving ample time for the interruption request to be assessed, evaluated and approved by ZCWD prior the minimum three (3) days posting of notice.

2.19 The Bill of Quantities (BOQ) prevails in all issues relating to pay items of work. The contractor shall supply the needed materials, equipment & manpower to complete the quantity stated in the BOQ with specifications as stated herein. For deficiency in the contractor's detailed estimate, the contractor shall bear the expenses for the deficiency made in the detailed estimates (materials, manpower or equipment) to complete the quantity stated in the BOQ.

**3.1 FEES AND PERMITS** shall include obtaining all permits and the *Environmental Compliance Certificate (ECC).*

3.1.1 All necessary permits, clearances and performance bond with the DPWH, City office, DENR, local and national government clearances and other documents necessary for the implementation of the project including incidental expenses shall be borne and processed by the contractor in coordination with the implementing unit of ZCWD except for the ECC which shall be processed by the ZCWD and to be paid by the contractor. The expense for the permits and ECC shall be included & chargeable to in the OCM, hence shall not be a separate pay item.

3.1.2 The affected barangays and stakeholders must all be well-informed and documented through writing as to the definite date of TAKE-OFF.

3.1.3 Continuous coordination meetings with the traffic management unit may be realized during the implementation of the project up to its completion if necessary.

3.1.4 Obstructions concerning electrical light post, drainage, telecommunication underground wirings, pavement, water and sewer pipeline, etc. shall be coordinated by the contractor with the concerned agencies in coordination with the Technical Services Group of ZCWD.

**3.2 MOBILIZATION/DEMOBILIZATION**

This shall include the necessary arrangement to mobilize initial activities on site such as; preparation of the working area at site, mobilization of manpower & equipment

3.2.1 Upon demobilization, all restored area shall be cleared from debris, tools, equipment, barricades, excavated materials and all other supplies that were used during project implementation and dismantling all temporary storage facilities (if any) and all other temporary office facilities; and

**3.3 TEMPORARY FACILITIES**

Temporary facilities include the construction of site facilities and other necessary components to complete the job. The detail for temporary facilities are reflected in the detailed engineering plan. However, the contractor may construct larger temporary facilities than what is reflected in the plan should deemed necessary without additional cost to the ZCWD.

**3.4 CONSTRUCTION SAFETY AND HEALTH**

The contractor shall process and seek the approval from the Department of Labor and Employment (DOLE) for the **Construction Safety and Health Program** for this project. This item shall include the provision of the **Safety Officers**, the provision of warning devices, safety and warning signage, barricades, first aid kit and personal protective equipment (PPE) for the workers.

3.4.1 The contractor shall provide customized barricades (made of wood) at least 30 units – 1-m pole w/ concrete base and at least 30 units – A-frame barricade with 1-m height and 1-m width to ensure enclosure and safety in all working areas and this shall be included in this item of work.

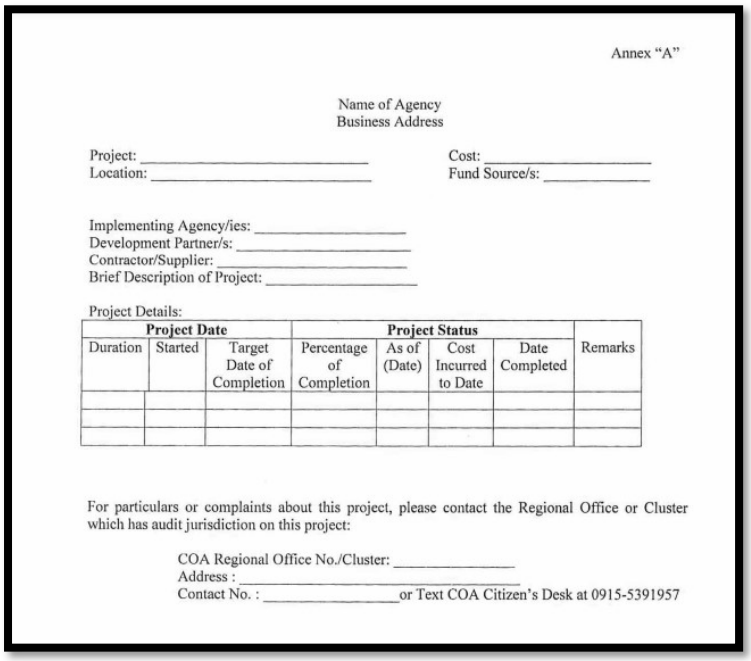
3.4.2 Regardless of project suspension and any impediments, the contractor shall maintain the safety measures and cleanliness at any of the working areas of the project.

3.4.3 The contractor shall implement the Construction Safety and Health Program in compliance with DOLE D.O. No. 13, Series of 1998 and the DPWH DO 136 Series of 2022 the "Revised Construction Safety Guidelines for the Implementation of Infrastructure Projects during the Covid-19 Public Health Crisis or the latest DPWH issuance or Department Order with regards to the Implementation of Infrastructure Projects during the Public Health Crisis or emergency.

## 3.5 CONSTRUCTION OF PROJECT BILLBOARD/SIGNAGES

This item of work includes the construction of at least six (6) sets project signages & billboards by the contractor, placed on-site in accordance with the guidelines as specified in COA Circular No. 2013-044 dated Jan. 30, 2013. The frame for bill boards may be made from coco lumber or any lumber as long as the same shall stand for the entire duration of project implementation. The exact location for the installation of six (6) billboards/signages shall be determined by ZCWD engineer project in-charge. Also, this item includes the installation of signages bearing the contractor's contact details for public complaints in relation to the project as specified in **item 2.14** of this Technical Specifications.

For infrastructure projects, a tarpaulin project signboard must be suitably framed for outdoor display at the project location, and shall be posted as soon as the award has been made. The design and format of the project signboard tarpaulin, as shown in Annex "A" of the said COA Circular shall have the following specifications:



Annex "A"

Name of Agency
Business Address

Project: _____ Cost: _____
Location: _____ Fund Source/s: _____

Implementing Agency/ies: _____
Development Partner/s: _____
Contractor/Supplier: _____
Brief Description of Project: _____

Project Details:

| Project Date | | | Project Status | | | | Remarks |
|---|---|---|---|---|---|---|---|
| Duration | Started | Target Date of Completion | Percentage of Completion | As of (Date) | Cost Incurred to Date | Date Completed | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

For particulars or complaints about this project, please contact the Regional Office or Cluster which has audit jurisdiction on this project:

COA Regional Office No./Cluster: _____
Address : _____
Contact No. : _____or Text COA Citizen's Desk at 0915-5391957

Tarpaulin, white, 8ft x 8ft;
Resolution: 70dpi
Font: Helvetica;
Font Size: Main Information – 3"
Sub-Information- 1"
Font Color: Black

## 3.6 AS-STAKED SURVEY, PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING, LAYOUTING AND LINE AND GRADE/POTHOLING

3.6.1 This item includes the actual site survey, preparation of As-staked Plan or Construction Plan, layouting, line and grade, potholing not more than 50-meter interval distance and preparation of *As-staked plan.* However, the contractor may opt to do the potholing in a short interval for more accurate results without additional expense to ZCWD.

3.6.2 The submission of the as-staked plan shall be mandatory prior to execution of asphalt/concrete cutting & demolition works.

3.6.3 As-staked plan/ Construction Drawing shall be a new set of plan depicting the actual field condition and requirements derived from the "As-Staked" survey conducted by the Contractor.

3.6.4 The "As-Staked" plan shall be prepared by the Contractor based on the pre-construction survey jointly conducted by the Contractor and ZCWD - Engineering & Construction Department (ECD). Upon issuance of the Notice to Proceed (NTP) for a contract, the ZCWD shall provide the Contractor with an editable CAD file (electronic/soft copy) of the approved original plan of the project to facilitate the preparation of "As-Staked" plan. The plan shall be reviewed and evaluated by the Technical Services Group of ZCWD and shall be approved by the ZCWD management.

3.6.5 PROGRAM OF WORK based on the newly approved as-staked plan or construction drawing shall also be submitted by the Contractor which includes but not limited to the order in which it intends to carry out the work; Number and names of personnel to be assigned for each stage of work per site (for simultaneous implementation); list of equipment required on site for each stage of work per site; and other relevant activities to be performed based on the actual site conditions.

3.6.6 The cost for the survey and preparation of construction drawing shall be borne by the Contractor as part of this pay item.

3.6.7 ZCWD has considered all the possible obstructions in the detailed engineering that may be encountered in the project implementation, however, if there are still unforeseen obstructions that may came across during implementation concerning the electrical light post, drainage system, telecommunication underground wirings, pavement, water and sewer pipeline, etc., and it shall be the duty of the contractor to coordinate with the concerned agencies in coordination with the Technical Services Group of ZCWD and additional works may be implemented to address the matter through variation orders pursuant to the revised IRR of RA 9184.

## 3.7 CONCRETE AND/OR ASPHALT CUTTING AND REMOVAL OF EXISTING CONCRETE AND /OR ASPHALT PAVEMENT

This item of works shall include the manpower, equipment & tools and consumable materials in cutting on both side of the proposed trench, breaking and removal of concrete and/or asphalt pavement as per given dimension in the plan.

3.7.1 The item of work for **Asphalt Cutting** includes the cutting of asphalt pavement with thickness ranging from 50mm to 200mm. The cutting of the asphalt pavement shall not be cut thorough concrete. There must be a 50mm distance from the edge of the concrete pavement. A straight one-time cutting of asphalt & concrete pavements shall only be considered as accomplishment for item Asphalt Cutting only.

3.7.2 The item of work for **Removal of Existing Asphalt Pavement** includes the breaking of asphalt pavement with thickness ranging from 50mm to 200mm by means of jackhammer.

3.7.3 The item of work for **Concrete Cutting** includes the cutting of concrete pavement with thickness ranging from 200mm to 280mm. The cutting of the concrete pavement shall be off-set by 2" (50mm) from the asphalt pavement cut.

3.7.4 The item of work for **Removal of Existing Concrete Pavement** includes the breaking of concrete pavement with thickness ranging from 200mm to 280mm by means of jackhammer.

3.7.5 Cutting and breaking works shall be started only if all barricades, steel plates are available on site for safety of the public.

3.7.6 Cutting shall come first prior the demolition works to comply with the DPWH standard. All the terms and conditions on the excavation permit shall be observed by the contractor.

## 3.8 PIPELINE EXCAVATION

This shall include the removal of materials of whatever nature encountered including all obstructions of any nature that would interfere with the proper execution and completion of the pipe laying. The removal of the said materials shall conform to the lines and grades shown in the plan.

3.8.1 No excavation shall be allowed when the pipes, fittings and appurtenances intended for the segment is not yet delivered.

3.8.2 For longitudinal excavations, the maximum length for open continuous excavation per street shall not exceed **150 meters**. This shall be fully backfilled and made passable to traffic and continuously maintained in good condition before another strip of the same maximum length shall be excavated. For long projects extending to kilometers along a road, 150-meter excavated strips may be made at each end or at 300 meters distances. or the length necessary to accommodate the amount of pipe installed in a single day, whichever is greater.

3.8.3 Excess excavated materials shall be removed and disposed immediately at the ZCWD lot located at Lupong Road, Cabatangan. The hauling work is incorporated in this item of work, hence, without additional cost to ZCWD. Moreover, ZCWD shall see to it that the dumping site (at Cabatangan) is accessible to the contractor's hauling truck and free from obstruction. During project implementation, a sketch will be provided to the contractor to serve as reference in dumping of the excess excavated material.

3.8.4 Trench shall be backfilled at the end of day's activity. There shall be no open excavation left before leaving the site otherwise open trenches shall be covered with steel plate.

3.8.5 The excavated areas shall be passable every end of the day.

## 3.9 PIPELINES, FITTINGS, BENDS AND APPURTENANCES

This shall include installation of the pipes and fittings into the lined and graded trench with the application of temporary backfilling through the utilization of the native materials up to the pavement level intended for hydrotesting activities. In addition, the cost of installation of thrust blocks, the **3-inch-wide detectable underground warning tapes with markings "Caution: Buried Pipeline Below"** are included in this item as reflected in the detailed engineering plans.

PVC Pipes and D.I. Pipes and its fittings are all specified with push-on joints. Valves and fittings are joined using adaptors and short pipes as reflected in the plans provided.

3.9.1 Pipes shall be laid on a dry trench. In cases where excavated trench is filled with water, the trench shall be dried up using equipment such as water pump before installing the pipe. Both ends of the pipes shall be covered with metal sheets or equivalent every after installation in the trench to avoid intrusion of the contaminants.

3.9.2 Water pumps and other equipment shall be included in the interconnection works and pipe fitting works item of work, hence, the same shall be subject to deductive variation order in case the actual site conditions will not require the use of such equipment.

3.9.3 Ductile Iron (D.I.) Pipes shall be embedded with polyethylene encasement to protect the pipes from corrosion due to aggressive soils. The polyethylene encasement shall be either ISO 8180, ANSI/AWWA C105, ASTA A674, BS 6076 or equivalent renowned standards.

3.9.4 During the pipelaying activity, Item 104 (a selected materials derived from the native materials) shall be backfilled as pipe envelope on the newly laid pipeline as well as the Item 200 Sub-base Course and Item 201 Base Course shall also be backfilled right after the pipe envelope and to be compacted pursuant to the DPWH standard Item 200 and Item 201. Nonetheless, the Contractor may opt to backfill the newly laid pipeline with native materials temporarily instead of Item 200 & Item 201, however, the Contractor shall not be entitled to re-excavation as additional pay item as the result of the removal of native materials to install the item 200 & item 201.

## 3.10 VALVES/FITTINGS/INTER-CONNECTION WORKS

This item of work includes the manpower, equipment & necessary materials needed to do the interconnection works as reflected in the detailed engineering plan. The interconnection works shall include the **decommissioning works** of the existing old pipeline in situ which has been replaced. The decommissioning works involves the permanent shutdown of the existing old pipeline by means of isolating it from the existing system.

3.10.1 All cut–ins and connections shall be done with proper tools and equipment. Whenever tapping or cutting of pipe is required, it shall be done with a tapping or cutting machine designed for the specific purpose. Before proceeding to making the cut-in or connections, all tools, equipment and materials necessary shall be ready on hand and cut-ins or/and connections done with the least inconvenience with the consumers.

3.10.2 All materials needed for this item shall be inspected and evaluated by the Engineering & Construction Department, and laid-out by the contractor before this activity will be undertaken. This is to give time for replacement and arrangement of materials before deploying on site.

3.10.3 Only manpower with experience relative to this activity will be deployed on site. The names with their corresponding experiences that will perform this activity shall be submitted a week prior the scheduled date of interconnection for proper evaluation.

3.10.4 All materials/fittings retrieved on site shall be turned-over and hauled to the ZCWD premises located at barangay Pasonanca & Lupong Road, Cabatangan without additional expense to ZCWD, hence, hauling works shall be included in this item.

3.10.5 Should there be a discrepancy between the existing pipe, fitting sizes as reflected in the plan against the actual size, the size for the interconnection shall be done in accordance with the actual size and be subject to variation order.

3.10.6 The contractor shall see to it that the fittings & valves to be used in the interconnection works will be compatible in terms of connection, hence, requiring additional fittings in the interconnection works due to non-compatible connections may be allowed and approved by ZCWD however the additional cost shall be borne by the Contractor.

3.10.7 Decommissioning component (including manpower, equipment & materials) of the existing pipelines those reflected in the map which is to be provided to the contractor, is necessary for this project for an effective Non-Revenue Water reduction and is also part of this item of works. Only schematic diagram is available of the existing pipeline and there was no as-built plan provided when the system was taken over by ZCWD. Hence, the contractor shall conduct due diligence, anticipate and consider that the existing pipeline have been in existence for a long time and its depth may have been increased due to the development of roads, its orientation may have been altered as compared to the map due to road expansion, and most of the pipeline may have been under

a private property/facility already. Excavation of trench for decommissioning works to a depth of more than 1.5m may be entitled to additional payment through variation order consistent with Annex E of RA 9184.

### 3.11 DRAINAGE CROSSING WITH CONCERETE ENCASEMENT

This shall include the cost of the installation of pipes encased with reinforced concrete crossing the path of existing drainages as per detailed drawings and specifications provided in plans. Concrete encasement shall be of Class A concrete mix as per DPWH specifications for Structural Concrete (Item 405) with at least Grade 33, deformed bars reinforcements.

### 3.12 BRIDGE CROSSINGS

This shall include the complete assembly of the pipelines crossing parallel to the existing bridges in accordance with the plans and specifications provided.

### 3.13 BLOW-OFFS AND AIR RELEASES

The cost shall include the provision of the complete assembly of blow-offs and air release valves along pipelines where locations are specified in the plans provided. The blow-off is being used in allowing the escape of fluid thus removing sediments from a pipe and it shall be constructed in locations specified in the plan where its pipe outlet shall fall into a natural drain such as creek, drainage system among others. The air release valve assemblies shall have the capacity to admit air during shut down of system and the release of air during operations and shall be constructed as per detailed engineering plan.

### 3.14 HYDRO-TESTING, DISINFECTION AND FLUSHING WORKS

The includes the manpower, equipment and materials (including water) to complete this item. This item of work shall include the filling of required volume of water to attain the full carrying capacity of the pipe, application of the required testing pressure, and disinfection in works by application of the required concentration of chlorine solution up to the flushing activity.

3.14.1 All pipelines shall be thoroughly flushed out with water prior to pressure and leakage tests. The pipeline shall be tested in sections after the trench is temporarily backfilled, but with joints exposed for examination except in heavily traveled roadways and prior to permanent resurfacing.

3.14.2 The pipeline shall not be filled with water until the following minimum curing periods have lapsed.

| Concrete Thrust Blocks | |
|---|---|
| a. Standard Cement | 7 days |
| b. High Early Strength Cement | 36 hours |

3.14.3 The pipeline shall be prepared for testing by closing valves when available, or placing temporary bulkheads or end cap in the pipe and filling the line slowly with water. During the filling of pipe and before the application of the specified test pressure, all air shall be expelled from the pipeline. To accomplish this, taps shall be made, if necessary, at points of highest elevation and after completion of the test the taps shall be tightly plugged unless otherwise specified. After the line or section thereof has been completely filled, it shall be allowed to stand under a slight pressure for a minimum of forty-eight (48

hours) to allow the escape of air from any air pockets and to allow the pipe to absorb as much water as possible.

3.14.4 During the testing period, all exposed pipes, fittings, valves, hydrants, joints and couplings shall be examined for leaks. If found to be cracked or defective, it shall be removed and replaced with sound material at their own expense. The pipeline shall then be refilled and all bulkheads, joints and connections shall be examined for leaks. If any are found, this shall be stopped.

3.14.5 The test shall consist of holding the test pressure on each section of the line for a period of two (2) hours. The test pressure at lowest point shall be 150psi the water necessary to maintain the pressure shall be measured through a water meter. The leakage shall be considered the amount of water entering the pipeline during the two-hour period test.

3.14.6 The allowable leakage for uPVC Pipes and ductile iron pipe shall not exceed 1.85 Liter/millimeter of the diameter of pipe per kilometer per day. Should any test of a section of pipeline disclose joint leakage greater than that permitted, the defective pipe, fitting, joint, coupling or other appurtenance shall be located and repaired. The test shall then be repeated until the leakage is within the permitted allowance.

3.14.7 All new water mains or extensions to existing systems or valve section of such extension or any replacement in the existing water system shall be disinfected with chlorine in accordance with AWWA Standard C601 "Standard for Disinfecting Water Mains".

3.14.8 The amount and concentration of chlorine solution applied shall be such as to provide a dosage of not less than fifty (50) mg per litter and shall be introduced into lines as directed by the ZCWD Site Engineer. After a contact period of twenty-four (24) hours, the chlorine residual at the end of pipelines shall not be less than twenty-five (25) mg per liter. The system shall then be **FLUSHED** with clean (potable) potable water until the residual chlorine is not greater than 0.75 mg per liter but not less than 0.20 mg per liter. All valves and appurtenances in the pipelines being disinfected shall be operated several times during the chlorine periods.

3.14.9 The preferred point of application of the chlorine agent is at the beginning of the pipeline, extension or any valved section and through a corporation stop inserted on the top of the laid pipe.

3.14.10 Should the initial treatment/ disinfection fail to result in the conditions stipulated above, the chlorination procedure shall be repeated until satisfactory results are obtained.

## 3.15 INSTALLATION OF FIRE HYDRANTS WITH CONCRETE BARRICADE

This covers the items reflected in the plan including the tapping from the distribution line and the painting works. Excavation and interconnection to the water main (Tee Fittings to Fire Hydrant) and construction of fire hydrant assemblies are included in this item of work.

## 3.16 CONSTRUCTION OF CLUSTERED CONNECTIONS

This item of work covers all costs to complete the provision and assembly of clustered meters with safety cage and concrete stands as reflected in the plans provided. Likewise, this applies to the transfer of existing clustered meters to the newly replaced distribution lines. Decommissioning and closure of old tapping lines are also covered in this item of work.

## 3.17 TRANSFER OF INDIVIDUAL SERVICE LINE CONNECTIONS

This item of work covers all costs to complete the provision and assembly of individual meters with concrete stands as reflected in the plans provided. Likewise, this applies to the transfer of existing individual meters to the newly replaced distribution lines. Decommissioning and closure of old tapping lines are also covered in this item of work.

3.17.1 The ZCWD Engineer under the supervision of MERD, shall coordinate with the Commercial Services Department (CSD) for the quantity, location and account details of the water meters to be transferred. Prior the transfer site of tapping, a survey to be conducted by the contractor & ZCWD Engineer for accounting of the actual number of existing service lines covered by the project. Suspected illegal service connections found shall be reported to the Legal Department for further verification and investigation.

3.17.2 All materials/fittings retrieved on site shall be turned-over and hauled to the ZCWD premises located at barangay Pasonanca & Lupong Road, Cabatangan without additional expense to ZCWD, hence, hauling works shall be included in this item. ZCWD shall provide the space to be determined by its Administration Group, for the storage of the retrieved materials such as fittings and pipes.

## 3.18 ITEM 200- AGGREGATE SUB-BASE AND ITEM 201 - BASE COURSE

As part of the major item of restoration works, this item of work includes the provision of sub-base (Item 200) and base course (Item 201) preparation with 15% shrinkage factor and proper tamping and settling. This also covers the removal of temporarily backfilled trench area leaving the Item 104 on fill for official utilization.

3.18.1 Prior to backfilling, materials test and field density results shall pass the standard as stipulated in the DPWH Standards.

3.18.2 **Detectable Underground Warning Tape** shall be provided as indicated in the plan for pipeline/utility identification, it shall be fully detectable from above grade utility locators and be able to provide a depth reference point to top of pipe. It shall be 3" wide, installed between Item 200 and Item 201 at 0.31 MBGL. The material of the tape shall be aluminum backing to make it easy to find underground. Detectable Underground Warning Tape shall be continuous from valve box to valve box for complete pipeline detection and location.

3.18.3 The warning words shall be legible, correctly spelled and fully printed which reads "CAUTION BURIED PIPELINE BELOW" in black lettering on a yellow background.

3.18.4 After pipelaying and backfilling of pipe envelope using Item 104 (a selected material from native materials), Item 200 and Item 201 shall be backfilled and compacted pursuant to DPWH Item 200 & Item 201 standard.

## 3.19 BACKFILLING OF NATIVE MATERIALS

This item of work includes the backfilling of Item 104 (derived from the **native materials** or excavated materials) as pipe envelope pursuant to detailed engineering plan. Manpower and equipment to be used shall be included in this item of work. Materials to be used as pipe envelope shall not be included in the estimates since this will be coming from the native materials/excavated materials on site.

## 3.20 ITEM 311 - PCC PAVEMENT

This item of work includes the provision of concrete pavement restoration affected by the pipe laying including the provision of dowels on national roads. The use of fast setting concrete is hereby required to achieve the desired concrete strength in less than (7) seven days or less.

3.20.1 Restoration works shall be executed only after passing the required Field Density Test and other test requirement. Submission of approved "*Order*" to proceed restoration works from the concerned agency is also required.

3.20.2 Trenches must be free from debris and caved-in walls before backfilling and restoration works.

3.20.3 All restoration activities must be witnessed DPWH technical representatives.

3.20.4 After the segment shall have passed hydrotesting works, restoration thereof should immediately be done.

## 3.21 INSTALLATION OF DOWEL BAR FOR ITEM 311 RESTORATION

All concrete pavement (Item 311) restoration works along identified National Road (under DPWH jurisdiction) shall be installed with 16mm deformed steel bar dowel as indicated in the detailed engineering plan. The dowel shall be installed by drilling onto the existing pavement and inserting with concrete epoxy and allow to harden sufficiently before concrete restoration commence. Installation detail is shown in the detailed estimate. Manpower, equipment & tools, materials shall be included in this item of works.

## 3.22 ITEM 302 - BITUMINUOS TACK COAT AND ITEM 310 - BITUMINOUS CONCRETE SURFACE COURSE

This shall cover the preparation of the asphalt base and asphalt pavement in accordance with the required DPWH standards on asphalt pavements. The materials specifications shall be in accordance with the DPWH blue book latest edition.

## 3.23 REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS

Includes the restoration of all reflectorized thermoplastic markings affected by the project and the restoration works shall be in accordance with the material specifications, application methodology and quality control of DPWH standards.

# IV. MATERIALS SPECIFICATION

All materials specified herein shall be supported with manufacturer's materials testing certificate for quality control purposes and this shall be approved by the ZCWD prior any utilization in any items of work. All materials for asphalt & concrete pavement restoration including Items 200 & 201 shall be tested pursuant to DPWH standards prior restoration works.

ZCWD shall provide a widely known and accepted Specification commonly used in the water industry should some of the materials' specifications has not been specified in this section. Also, during the project implementation, should there be an inconsistency between the specifications herein and in the provided detailed engineering plan, the ZCWD shall determine which specification shall be adopted and implemented.

## 4.1 POLYVINYL CHLORIDE (PVC) PIPES SPECIFICATIONS

### 4.1.1 UNPLASTECIZED POLYVINYL CHLORIDE (uPVC) PIPES

uPVC pipes & fittings shall conform to either of the standards adopted by the contractor such as PNS 65, ASTM D1784 or ISO 4439. The uPVC pipes shall be Bell & Spigot with Rubber Ring or fixed seal or its equivalent and shall contain the following customized markings:

- Manufacturing year
- Serial no.
- Nominal diameter
- Standard
- Pressure Rating

The nominal pressure rating of uPVC pipes shall be **Series 8 (Class 150)**

### 4.1.2 ORIENTED POLYVINYL CHLORIDE (PVC-O)

PVC-O pipes shall conform to ISO 16422 PN 16 Standard. The PVC-O pipes shall be Bell & Spigot with Rubber Ring or fixed seal or its equivalent and shall contain the following customized markings:

- Manufacturing year
- Serial no.
- Nominal diameter
- Standard
- Pressure Rating

The nominal pressure rating of uPVC pipes shall be **PN 16 (16bars or 232psi)**

## 4.2 DUCTILE IRON PIPES

This specification is applicable to Ductile Iron Pipes for water supply systems and shall conform to either ISO 2531, BS EN 545:2010 and AWWA C151 Standards. The choice of any one of the standards governs to all information on the product dimension, flange detail and other requirements pertaining to the supply of pipes only. The pipes shall obtain the following customized markings in however way it is visible:

- Manufacturing year
- Serial no.
- Nominal diameter
- Standard
- Pressure Rating

Pressure rating on the specified ductile iron pipes shall withstand the rated working pressure of not less than **232 psi or 16 Bars.**

## 4.3 EDIBLE LUBRICANTS

Lubricants to be used in pipe fitting are specified to be of food-grade base only. It shall conform to the water potability standards of *Philippine National Standards of Drinking Water (PNSWD) 2017* for safety purposes and to further avoid damaging the rubber seal for that matter.

## 4.4 ALUMINUM DETECTABLE WARNING TAPE

Total Width - 3 inches
Thickness - ≤ 5 Mil
Material - Aluminum *(Made Detectable for its maximum life span)*
Customized Label - **CAUTION BURIED PIPELINE BELOW** (*Black print)*

## 4.5 VALVES AND FITTINGS

***4.4.1 Commercial Fire Hydrant*** –this fire hydrant shall have 63mmØ diameter hose connector and 1-100mm hose pumper outlet and a dry type transfer of tapping. All other accessories to the complete assembly of the fire hydrant are indicated and specified in the provided detailed plan.

***4.4.2 75mmØ Fire Hydrant*** – the fire hydrant shall be made up of 75mmØ brass head and Galvanized Iron vertical pipe and 63mm Ø hose connector. All other accessories to the complete assembly of the fire hydrant are indicated and specified in the provided detailed plan.

***4.4.3 Gate Valves*** – Gate valve body shall be made up of Ductile Iron (D.I.) body in accordance with a pressure rating of 16 Bar. This section applies to gate 50 mm (2in.) through 300 mm (12in.) in sizes. The valve shall be non-rising stem with a minimum of two ”0” ring seal as (at least one above the stem collar), or rising stem when shown on the drawings. The valves shall have a 50 mm (2in.) square operating nut with a cast arrow showing direction in which the nut is to be turned to open the valve. Valves shall be constructed to permit the replacement of the "O" rings above the stem collar under full working water pressure with the valves in the fully open position. The valves shall be painted in blue.

***4.4.5 Blow Off Valves*** –the assembly shall be of iron body gate valve with 16bar pressure rating. Sizes, complete assembly detail and locations are reflected in the provided plans

***4.4.6 Air Release Valves*** –shall be a combination air release valve body and made up of iron and a pressure rating of 16 Bar. Sizes, complete assembly detail and locations are reflected in the provided plans. Air release valves sizes from 50mm and above in diameter shall have flange connections while 25mm may have threaded connections, except where otherwise shown on the drawings, and shallow be designed for a water working pressure of 1.0 MPa (150 psi). The valve shall be designed to automatically permit the escape of accumulated air under pressure while the pipe is in operation and capable to admit air during draining of pipes.

***4.4.7 Flexible Coupling*** –Sleeve type coupling body shall be made up of cast iron body and a pressure rating of 16 Bar. These couplings must be capable of jointing both DI, uPVC pipes and existing pipeline as per interconnection details. The minimum center sleeve length of flexible coupling shall not be less than seven (7") inches for sizes 50mm to 300mm and not less than (12") for sizes 350mm and above.

*Other Fittings* – Adaptors, flanges, tees, cross tees, and other bends indicated in the plans are specified to have a cast iron body in accordance with the ASTM-A53 global standards and a pressure rating of 16 bars.

## 4.6 WATER METER

*Full specification is indicated in the following figure (on the next page):*

## TECHNICAL SPECIFICATIONS FOR ONE HALF INCH SINGLE-JET WATER METERS (DN -13mm)

| SPECIFICATIONS | |
|---|---|
| Designed for the measurement of cold potable water | |
| 1. Standard | ISO 4064:*1993 or latest* |
| 2. Nominal Diameter | 13mm - 15mm |
| 3. Meter Type | Single Jet |
| 4. Metrological Class | "B" or its equivalent to latest edition |
| 5. Meter Body | Copper alloy containing not less than 75% copper<br><br>or a copper alloy containing not less than 65% copper but with anti-corrosion treatment.<br><br>- Testing result of the copper content from any government accredited material testing laboratory like DOST, MIRDC or any accredited government agency or from any DOST-accredited laboratory shall be submitted to ZCWD during Project Implementation |
| 6. Register | Hermetically vacuum sealed or Hermetically sealed |
| | With magnetic ring/shield |
| | Glass lens with abrasion resistant |
| | Meter Register in Cubic Meters |
| | Marked with "ZCWD" at top plate of register using Arial Text with font size of 9 - 12, printed in Bold and all written in Capital Letters. |
| | Cubic Meters in registration – minimum of 4 digit |
| | Straight Reading |
| 7. Working Condition | Maximum Working Pressure: 10 bars or 1.0Mpa |
| | Maximum Working/Liquid Temperature: 30°C or Higher |
| 8. Metrological Characteristics (Permissible Error) | Maximum flowrate (Qmax/Q4) = 2.0m3/hr. or higher; Allowance error in accuracy ± 2% |
| | Nominal flowrate (Qn/Q3) = 1.0m3/hr. or higher; Allowance error in accuracy ± 2% |
| | Transitional flowrate (Qt/Q2) = 120 l/hr. or lower ; Allowance error in accuracy ± 2% |
| | Minimum flowrate(Qmin/Q1) = 30 l/hr. or lower ; Allowance error in accuracy ± 5% |
| 9. Meter and corresponding Tailpiece length ranges | <table><tr><th>Water Meter Length</th><th>Length per Tail Piece</th></tr><tr><td>115mm</td><td>100mm</td></tr><tr><td>165mm</td><td>75mm</td></tr><tr><td>190mm</td><td>63mm</td></tr></table> |
| 10. Meter Seal | Meter body should be properly sealed |
| 11. Strainer | With plastic strainer installed |
| 12. Serial Numbering | Meter numbers should be in series, clearly and permanently engraved |
| 13. Painting | All water meters shall be painted by the supplier with acrylic Tahiti blue (or closer shade acceptable to the end user) automotive paint with properly primed surface of compatible paint primer. |
| 14. Meter Body Markings | Meter Size - (embossed) |
| | Flow Direction (arrow) - (embossed) |
| 15. Warranty | All meters shall be guaranteed against factory defects in workmanship and materials for a period of one (1) year from the date of acceptance. Defective meters or parts discovered within this period shall be replaced without charge upon the return to the supplier. |
| 16. Packaging | All water meters shall have plastic end cap installed on both meter body thread ends |
| | Each water meter shall be packed individually in a small box and must contain 2 tailpieces and rubber gaskets |
| | The water meters shall be packed by 10's or 20's per batch and shall indicate the meter serial numbers on the box. |
| 17. Other requirements | All water meters will be tested at the ZCWD meter testing bench. Only those that will pass meter testing will be deployed onsite. Those that will not pass will be replaced by the contractor at their own expense. The replacements shall again be subjected to bench test at the account of the contractor until it shall pass testing. ZCWD will charge meter testing fee of P50.00 per water meter. |

Submitted by:

**Atty. Vincent F. Fernandez**
*Officer In-charge*
General Services Department

Recommending approval:

**Louella A. Aguilera**
*Assistant General Manager*
Administration Group

Approved by:

**Reynaldo R. Cabilin**
*Acting General Manager*

### 4.6.1 INDIVIDUAL SERVICE CONNECTIONS

*Brass fittings* – brass fittings such as ball valves, corporation cocks, double adaptor and safety key valve shall be made up of lead-free yellow brass metal that is a requirement for potable use with at least 55% copper content supported with test result of copper content of the meter body from any DOST-accredited laboratory during project implementation.

*Reinforced concrete stand* – shall be made up of reinforced concrete in accordance with the plans and specifications provided.

*Saddle clamps* – shall be made up of Cast Iron (C.I.) or Ductile Iron (D.I.) and can be installed and withstand at least 150psi pressure.

*GI Pipes, Bends and fittings* – All GI pipes, bends and fittings shall be of Hot Dipped galvanized, PNS 26 Heavy Gauge Standard or ASTM A-53 Schedule 40.

*19mmØ (Inside Diameter) PE Tubing* – are specified to be ISO standard, SDR 11.

All other materials necessary to complete the individual service line connection shall be based on the provided plans.

### 4.6.2 CLUSTER CONNECTIONS

All metal works utilized in the provision of protective cage enclosure with pad lock are in accordance with specifications indicated in the plan provided.

Telescopic Cover - shall be made up of cast iron metal, casted in accordance with ZCWD customized design.

All other materials necessary to complete the clustered service line connection shall be based on the provided plans and specifications.

## 4.7 ITEM 200 - AGGREGATE SUB-BASE COURSE

This serves as the first phase of restoration works. It shall be with strict compliance with all the provisions, material testing, preparation and methodology as per DPWH Standard Specifications for Highways Bridges and Airport, 2013 Ed. Under item 201

The Contractor shall provide new materials for sub-base course and not from the native materials acquired during excavation.

## 4.8 ITEM 201 - AGGREGATE BASE COURSE

This serves as the second phase of restoration works. It shall be with strict compliance with all the provisions, material testing, preparation and methodology as per DPWH Standard Specifications for Highways Bridges and Airport, 2013 Ed. Under item 200

The Contractor shall provide new materials for base course and not from the native materials acquired during excavation.

## 4.9 CONCRETE PAVEMENT

This Item shall consist of pavement of Portland Cement Concrete, with or without reinforcement, constructed on the prepared base in accordance with this Specification and in conformity with lines, grades, thickness and typical cross section shown on the Plans.

In preparation for the concrete pouring along National Roads, provision of 16mmØ deformed bar dowel shall be drilled in place 750mm apart unto existing concrete using Concrete Adhesive at 400mm extrusion and 800mm total length. It is required to use a powered Concrete Dowel Drill that will be turned over to ZCWD office upon completion of the project. Class Mix, provisions, material testing, material quality and methodology are all based on DPWH Standard Specifications for Highways Bridges and Airport, (latest edition) under Item 311.

## 4.10 BITUMINOUS EMULSIFIED ASPHALT (TACK COAT)

This Item shall consist of preparing and treating an existing bituminous or cement concrete surface with bituminous material in accordance with the Plans and Specifications, preparatory to the construction of a bituminous surface course

This commences the asphalt laying stage of pavement restoration works. It shall conform to the standards as per DPWH Standard Specifications for Highways Bridges and Airport, (latest edition) under Item 302 (a).

## 4.11 REFLECTORIZED THERMOPLASTIC MARKINGS

All reflectorized thermoplastic markings affected by the pipelaying (white or yellow marks) must be in accordance with the material specifications, application methodology and quality control of DPWH standards.

## V. SCHEDULING

5.1 The schedule for implementation is planned based on the traffic flow program generated by the city government of Zamboanga. Any proposed traffic alteration scheme borne by the contractor must be presented to ZCWD for further approval by the city government's traffic management unit for smooth implementation.

5.2 On roads which are affected by pipeline replacement on both sides of facility, pipe laying activity must take place one after the other to avoid traffic congestion.

5.3 All road/ project sites located within 4–km radius from the city proper shall adopt a night shift schedule of work *(8:00PM – 4:00AM).* The rest of the areas can be implemented pursuant to Zamboanga City Ordinance 309 such as project implementation within 4-km to 7-km radius from 6:00pm to 6:00am.

5.4 As per mandate of the city government's traffic management unit, all pipelaying works located in the city proper are scheduled one road location after the other.

## VI. BILL OF QUANTITIES

The following is the Bill of Quantities (BOQ) for this project arranged according to route or road segment. The unit cost in the BOQ shall be consistent with the unit cost of the detailed estimate, in case of discrepancies between unit cost in the detailed estimate and unit cost in the bill of quantities, the latter shall prevail as per section 32.2.3 of the IRR of RA 9184.

| *WORK ITEM/DESCRIPTION* | | *ESTIMATED QUANTITY* | *UNIT* | *Unit Cost* | *Total Amount* |
|---|---|---|---|---|---|
| SPL - 1 | MOBILIZATION/DEMOBILIZATION (**up to 1% of Estimated Direct Cost only**) | 1.00 | LOT | | |
| SPL - 2 | TEMPORARY FACILITIES | 2.00 | EACH | | |
| SPL - 3 | CONSTRUCTION SAFETY & HEALTH PROGRAM | 1.00 | LOT | | |
| SPL - 4 | CONSTRUCTION PROJECT BILLBOARDS/ SIGNAGES | 1.00 | LOT | | |
| **Gonzales Drive** | | | | | |
| SPL - 5a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 5b | CONCRETE CUTTING | 378.52 | LN.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 189.26 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 93.15 | CU.M. | | |
| SPL - 5c | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 189.26 | LN.M. | | |
| SPL - 5d | FITTING OF BENDS (150mmØ x 45° PVC BEND) W/ CONCRETE THRUST BLOCK | 2.00 | PCS. | | |
| SPL - 5e | DRAINAGE CROSSING WITH CONCRETE ENCASEMENT (150mmØ CLASS 150 PVC PIPELINE) | 1.80 | LN.M. | | |
| SPL - 5f | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 189.26 | LN.M. | | |

| | | | | | |
|---|---|---|---|---|---|
| SPL - 5g | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 189.26 | LN.M. | | |
| SPL - 5h | VALVES/FITTINGS/INTER-CONNECTION WORKS | 1.00 | ASSY. | | |
| SPL - 5i | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 4.00 | UNITS | | |
| SPL - 5j | CONSTRUCTION OF CLUSTER CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 1.00 | UNITS | | |
| SPL - 5k | BACKFILLING OF NATIVE MATERIALS | 41.68 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 26.99 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 26.12 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 189.26 | SQ.M. | | |
| **Rizal St.** | | | | | |
| SPL - 6a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 6b | ASPHALT CUTTING | 248.32 | LN.M. | | |
| SPL - 6c | CONCRETE CUTTING | 496.64 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 248.32 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 248.32 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 122.22 | CU.M. | | |
| SPL - 6d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 248.32 | LN.M. | | |
| SPL - 6e | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 248.32 | LN.M. | | |

| | | | | | |
|---|---|---|---|---|---|
| SPL - 6f | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 248.32 | LN.M. | | |
| SPL - 6g | VALVES/FITTINGS/INTER-CONNECTION WORKS | 1.00 | ASSY. | | |
| SPL - 6h | INSTALLATION OF 150mm Ø FIRE HYDRANT W/ 63mmØ HOSE PUMPER OUTLET TRANSFER OF TAPPING (DRY TYPE) WITH CONCRETE BARRICADE (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 1.00 | UNIT | | |
| SPL - 6i | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 4.00 | UNITS | | |
| SPL - 6j | BACKFILLING OF NATIVE MATERIALS | 54.69 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 35.41 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 34.27 | CU.M. | | |
| SPL - 6k | INSTALLATION OF DOWEL BAR FOR ITEM 311 RESTORATION | 418.24 | KG. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 280MM THICK | 248.32 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.17 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 248.32 | SQ.M. | | |
| 612 (1) | REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS (WHITE) | 18.62 | SQ.M. | | |
| **Orendain St.** | | | | | |
| SPL - 7a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 7b | ASPHALT CUTTING | 381.86 | LN.M. | | |
| SPL - 7c | CONCRETE CUTTING | 381.86 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 190.93 | SQ.M. | | |

| | | | | | |
|---|---|---|---|---|---|
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 190.93 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 93.98 | CU.M. | | |
| SPL - 7d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 190.93 | LN.M. | | |
| SPL - 7e | DRAINAGE CROSSING WITH CONCRETE ENCASEMENT (150mmØ CLASS 150 PVC PIPELINE) | 14.82 | LN.M. | | |
| SPL - 7f | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 190.93 | LN.M. | | |
| SPL - 7g | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 190.93 | LN.M. | | |
| SPL - 7h | VALVES/FITTINGS/INTER-CONNECTION WORKS | 2.00 | ASSY. | | |
| SPL - 7i | INSTALLATION OF 150mm Ø FIRE HYDRANT W/ 63mmØ HOSE PUMPER OUTLET TRANSFER OF TAPPING (DRY TYPE) WITH CONCRETE BARRICADE (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 1.00 | UNIT | | |
| SPL - 7j | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 5.00 | UNITS | | |
| SPL - 7k | BACKFILLING OF NATIVE MATERIALS | 42.05 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 27.23 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 26.35 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 190.93 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.13 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 190.93 | SQ.M. | | |
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**Pura Brillantes St.**

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| SPL - 8a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 8b | ASPHALT CUTTING | 291.04 | LN.M. | | |
| SPL - 8c | CONCRETE CUTTING | 291.04 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 139.12 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 139.12 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 67.69 | CU.M. | | |
| SPL - 8d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 137.52 | LN.M. | | |
| SPL - 8e | DRAINAGE CROSSING WITH CONCRETE ENCASEMENT (150mmØ CLASS 150 PVC PIPELINE) | 4.30 | LN.M. | | |
| SPL - 8f | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 137.52 | LN.M. | | |
| SPL - 8g | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 137.52 | LN.M. | | |
| SPL - 8h | VALVES/FITTINGS/INTER-CONNECTION WORKS | 5.00 | ASSY. | | |
| SPL - 8i | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 6.00 | UNITS | | |
| SPL - 8j | BACKFILLING OF NATIVE MATERIALS | 30.29 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 19.61 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 18.98 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 139.12 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.10 | M.T. | | |

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| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 139.12 | SQ.M. | | |
| **Corcuerra St.** | | | | | |
| SPL - 9a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 9b | ASPHALT CUTTING | 508.46 | LN.M. | | |
| SPL - 9c | CONCRETE CUTTING | 508.46 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 254.23 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 254.23 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 125.13 | CU.M. | | |
| SPL - 9d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 254.23 | LN.M. | | |
| SPL - 9e | DRAINAGE CROSSING WITH CONCRETE ENCASEMENT (150mmØ CLASS 150 PVC PIPELINE) | 9.70 | LN.M. | | |
| SPL - 9f | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 254.23 | LN.M. | | |
| SPL - 9g | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 254.23 | LN.M. | | |
| SPL - 9h | VALVES/FITTINGS/INTER-CONNECTION WORKS | 3.00 | ASSY. | | |
| SPL - 9i | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 12.00 | UNITS | | |
| SPL - 9j | CONSTRUCTION OF CLUSTER CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 1.00 | UNITS | | |
| SPL - 9k | BACKFILLING OF NATIVE MATERIALS | 55.99 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 36.25 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 35.08 | CU.M. | | |

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| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 254.23 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.18 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 254.23 | SQ.M. | | |
| **Zaragosa St.** | | | | | |
| SPL - 10a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 10b | ASPHALT CUTTING | 691.96 | LN.M. | | |
| SPL - 10c | CONCRETE CUTTING | 691.96 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 336.89 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 336.89 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 164.70 | CU.M. | | |
| SPL - 10d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 334.62 | LN.M. | | |
| SPL - 10e | FITTING OF BENDS (150mmØ x 45° PVC BEND) W/ CONCRETE THRUST BLOCK | 4.00 | PCS. | | |
| SPL - 10f | DRAINAGE CROSSING WITH CONCRETE ENCASEMENT (150mmØ CLASS 150 PVC PIPELINE) | 6.77 | LN.M. | | |
| SPL - 10g | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 334.62 | LN.M. | | |
| SPL - 10h | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 334.62 | LN.M. | | |
| SPL - 10i | VALVES/FITTINGS/INTER-CONNECTION WORKS | 6.00 | ASSY. | | |
| SPL - 10j | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 6.00 | UNITS | | |

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| SPL - 10k | BACKFILLING OF NATIVE MATERIALS | 73.69 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 47.72 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 46.18 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 336.89 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.24 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 336.89 | SQ.M. | | |
| **Rodriquez St.** | | | | | |
| SPL - 11a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 11b | ASPHALT CUTTING | 590.08 | LN.M. | | |
| SPL - 11c | CONCRETE CUTTING | 590.08 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 295.04 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 295.04 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 145.22 | CU.M. | | |
| SPL - 11d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 295.04 | LN.M. | | |
| SPL - 11e | FITTING OF BENDS (150mmØ x 11.25° PVC BEND) W/ CONCRETE THRUST BLOCK | 1.00 | PCS. | | |
| SPL - 11f | DRAINAGE CROSSING WITH CONCRETE ENCASEMENT (150mmØ CLASS 150 PVC PIPELINE) | 2.50 | LN.M. | | |
| SPL - 11g | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 295.04 | LN.M. | | |
| SPL - 11h | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 295.04 | LN.M. | | |

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| SPL - 11i | VALVES/FITTINGS/INTER-CONNECTION WORKS | 1.00 | ASSY. | | |
| SPL - 11j | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 4.00 | UNITS | | |
| SPL - 11k | BACKFILLING OF NATIVE MATERIALS | 64.98 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 42.07 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 40.72 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 295.04 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.21 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 295.04 | SQ.M. | | |
| **Sevilla St.** | | | | | |
| SPL - 12a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 12b | ASPHALT CUTTING | 745.70 | LN.M. | | |
| SPL - 12c | CONCRETE CUTTING | 745.70 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 345.49 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 345.49 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 166.68 | CU.M. | | |
| SPL - 12d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 338.65 | LN.M. | | |
| SPL - 12e | DRAINAGE CROSSING WITH CONCRETE ENCASEMENT (150mmØ CLASS 150 PVC PIPELINE) | 14.30 | LN.M. | | |
| SPL - 12f | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 338.65 | LN.M. | | |

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| SPL - 12g | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 338.65 | LN.M. | | |
| SPL - 12h | VALVES/FITTINGS/INTER-CONNECTION WORKS | 7.00 | ASSY. | | |
| SPL - 12i | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 14.00 | UNITS | | |
| SPL - 12j | BACKFILLING OF NATIVE MATERIALS | 74.58 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 48.29 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 46.73 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 345.49 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.24 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 345.49 | SQ.M. | | |
| **P. Reyes St.** | | | | | |
| SPL - 13a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 13b | ASPHALT CUTTING | 327.26 | LN.M. | | |
| SPL - 13c | CONCRETE CUTTING | 327.26 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 142.43 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 142.43 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 67.50 | CU.M. | | |
| SPL - 13d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 137.13 | LN.M. | | |
| SPL - 13e | DRAINAGE CROSSING WITH CONCRETE ENCASEMENT (150mmØ CLASS 150 PVC PIPELINE) | 12.60 | LN.M. | | |

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| SPL - 13f | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 137.13 | LN.M. | | |
| SPL - 13g | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 137.13 | LN.M. | | |
| SPL - 13h | VALVES/FITTINGS/INTER-CONNECTION WORKS | 2.00 | ASSY. | | |
| SPL - 13i | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 5.00 | UNITS | | |
| SPL - 13j | BACKFILLING OF NATIVE MATERIALS | 30.20 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 19.55 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 18.92 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 142.43 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.10 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 142.43 | SQ.M. | | |
| **Campaner St.** | | | | | |
| SPL - 14a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 14b | ASPHALT CUTTING | 939.92 | LN.M. | | |
| SPL - 14c | CONCRETE CUTTING | 939.92 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 419.40 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 419.40 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 200.21 | CU.M. | | |
| SPL - 14d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 406.76 | LN.M. | | |

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| SPL - 14e | FITTING OF BENDS (150mmØ x 45° PVC BEND) W/ CONCRETE THRUST BLOCK | 2.00 | PCS. | | |
| SPL - 14f | FITTING OF BENDS (150mmØ x 22.5° PVC BEND) W/ CONCRETE THRUST BLOCK | 2.00 | PCS. | | |
| SPL - 14g | DRAINAGE CROSSING WITH CONCRETE ENCASEMENT (150mmØ CLASS 150 PVC PIPELINE) | 7.54 | LN.M. | | |
| SPL - 14h | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 406.76 | LN.M. | | |
| SPL - 14i | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 406.76 | LN.M. | | |
| SPL - 14j | VALVES/FITTINGS/INTER-CONNECTION WORKS | 2.00 | ASSY. | | |
| SPL - 14k | INSTALLATION OF 150mm Ø FIRE HYDRANT W/ 63mmØ HOSE PUMPER OUTLET TRANSFER OF TAPPING (DRY TYPE) WITH CONCRETE BARRICADE (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 1.00 | UNIT | | |
| SPL - 14l | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 18.00 | UNITS | | |
| SPL - 14m | CONSTRUCTION OF CLUSTER CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 3.00 | UNITS | | |
| SPL - 14n | BACKFILLING OF NATIVE MATERIALS | 89.58 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 58.00 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 56.13 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 419.40 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.29 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 419.40 | SQ.M. | | |
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| **Villalobos St.** | | | | | |
| SPL - 15a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 15b | ASPHALT CUTTING | 534.24 | LN.M. | | |
| SPL - 15c | CONCRETE CUTTING | 534.24 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 267.12 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 267.12 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 131.48 | CU.M. | | |
| SPL - 15d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 267.12 | LN.M. | | |
| SPL - 15e | FITTING OF BENDS (150mmØ x 45° PVC BEND) W/ CONCRETE THRUST BLOCK | 2.00 | PCS. | | |
| SPL - 15f | DRAINAGE CROSSING WITH CONCRETE ENCASEMENT (150mmØ CLASS 150 PVC PIPELINE) | 9.60 | LN.M. | | |
| SPL - 15g | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 267.12 | LN.M. | | |
| SPL - 15h | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 267.12 | LN.M. | | |
| SPL - 15i | VALVES/FITTINGS/INTER-CONNECTION WORKS | 5.00 | ASSY. | | |
| SPL - 15j | INSTALLATION OF 150mm Ø FIRE HYDRANT W/ 63mmØ HOSE PUMPER OUTLET TRANSFER OF TAPPING (DRY TYPE) WITH CONCRETE BARRICADE (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 1.00 | UNIT | | |
| SPL - 15k | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 22.00 | UNITS | | |
| SPL - 15l | BACKFILLING OF NATIVE MATERIALS | 58.83 | CU.M. | | |

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| 201 | AGGREGATE BASE COURSE | 38.09 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 36.86 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 267.12 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.19 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 267.12 | SQ.M. | | |
| **Buenavista St.** | | | | | |
| SPL - 16a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 16b | ASPHALT CUTTING | 1,322.08 | LN.M. | | |
| SPL - 16c | CONCRETE CUTTING | 1,322.08 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 661.04 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 661.04 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 393.90 | CU.M. | | |
| SPL - 16d | PIPELINES & APPURTENANCES (200mmØ CLASS 150 PVC PIPELINE) | 661.04 | LN.M. | | |
| SPL - 16e | PIPELINE FLUSHING (200mmØ CLASS 150 PVC PIPELINE) | 661.04 | LN.M. | | |
| SPL - 16f | HYDRO-TESTING & DISINFECTION WORKS (200mmØ CLASS 150 PVC PIPELINE) | 661.04 | LN.M. | | |
| SPL - 16g | VALVES/FITTINGS/INTER-CONNECTION WORKS | 6.00 | ASSY. | | |
| SPL - 16h | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 200mmØ CLASS 150 PVC PIPELINE) | 41.00 | UNITS | | |

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| SPL - 16i | CONSTRUCTION OF CLUSTER CONNECTION (Tap on 200mmØ CLASS 150 PVC PIPELINE) | 3.00 | UNITS | | |
| SPL - 16j | BACKFILLING OF NATIVE MATERIALS | 179.32 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 107.58 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 104.11 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 661.04 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.46 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (100 mm. Thick.) | 661.04 | SQ.M. | | |
| **La Purisima St.** | | | | | |
| SPL - 17a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 17b | ASPHALT CUTTING | 1,837.18 | LN.M. | | |
| SPL - 17c | CONCRETE CUTTING | 1,837.18 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 918.59 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 918.59 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 452.13 | CU.M. | | |
| SPL - 17d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 918.59 | LN.M. | | |
| SPL - 17e | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 918.59 | LN.M. | | |
| SPL - 17f | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 918.59 | LN.M. | | |
| SPL - 17g | VALVES/FITTINGS/INTER-CONNECTION WORKS | 5.00 | ASSY. | | |

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| SPL - 17h | INSTALLATION OF 150mm Ø FIRE HYDRANT W/ 63mmØ HOSE PUMPER OUTLET TRANSFER OF TAPPING (DRY TYPE) WITH CONCRETE BARRICADE (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 1.00 | UNIT | | |
| SPL - 17i | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 15.00 | UNITS | | |
| SPL - 17j | BACKFILLING OF NATIVE MATERIALS | 202.30 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 130.99 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 126.77 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 918.59 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.64 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 918.59 | SQ.M. | | |
| **Gen. Vicente Alvarez St.** | | | | | |
| SPL - 18a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 18b | ASPHALT CUTTING | 493.67 | LN.M. | | |
| SPL - 18c | CONCRETE CUTTING | 907.34 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 421.67 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 421.67 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 203.61 | CU.M. | | |
| SPL - 18d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 413.67 | LN.M. | | |
| SPL - 18e | FITTING OF BENDS (150mmØ x 22.5° PVC BEND) W/ CONCRETE THRUST BLOCK | 1.00 | PCS. | | |

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| SPL - 18f | DRAINAGE CROSSING WITH CONCRETE ENCASEMENT (150mmØ CLASS 150 PVC PIPELINE) | 2.40 | LN.M. | | |
| SPL - 18g | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 413.67 | LN.M. | | |
| SPL - 18h | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 413.67 | LN.M. | | |
| SPL - 18i | VALVES/FITTINGS/INTER-CONNECTION WORKS | 7.00 | ASSY. | | |
| SPL - 18j | INSTALLATION OF 150mm Ø FIRE HYDRANT W/ 63mmØ HOSE PUMPER OUTLET TRANSFER OF TAPPING (DRY TYPE) WITH CONCRETE BARRICADE (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 1.00 | UNIT | | |
| SPL - 18k | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 15.00 | UNITS | | |
| SPL - 18l | CONSTRUCTION OF CLUSTER CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 1.00 | UNITS | | |
| SPL - 18m | BACKFILLING OF NATIVE MATERIALS | 91.10 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 58.99 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 57.09 | CU.M. | | |
| SPL - 18n | INSTALLATION OF DOWEL BAR FOR ITEM 311 RESTORATION | 696.73 | KG. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 300MM THICK | 421.67 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.30 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (100 mm. Thick.) | 421.67 | SQ.M. | | |
| 612 (1) | REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS (WHITE) | 31.03 | SQ.M. | | |
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| **Veterans Ave.** | | | | | |
| SPL - 19a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 19b | ASPHALT CUTTING | 344.58 | LN.M. | | |
| SPL - 19c | CONCRETE CUTTING | 689.16 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 344.58 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 344.58 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 169.60 | CU.M. | | |
| SPL - 19d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 344.58 | LN.M. | | |
| SPL - 19e | FITTING OF BENDS (150mmØ x 45° PVC BEND) W/ CONCRETE THRUST BLOCK | 2.00 | PCS. | | |
| SPL - 19f | FITTING OF BENDS (150mmØ x 11.25° PVC BEND) W/ CONCRETE THRUST BLOCK | 1.00 | PCS. | | |
| SPL - 19g | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 344.58 | LN.M. | | |
| SPL - 19h | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 344.58 | LN.M. | | |
| SPL - 19i | VALVES/FITTINGS/INTER-CONNECTION WORKS | 3.00 | ASSY. | | |
| SPL - 19k | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 34.00 | UNITS | | |
| SPL - 19l | CONSTRUCTION OF CLUSTER CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 3.00 | UNITS | | |
| SPL - 19m | BACKFILLING OF NATIVE MATERIALS | 75.89 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 49.14 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 47.55 | CU.M. | | |

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| SPL - 19n | INSTALLATION OF DOWEL BAR FOR ITEM 311 RESTORATION | 580.36 | KG. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 280MM THICK | 344.58 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.24 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (150 mm. Thick.) | 344.58 | SQ.M. | | |
| 612 (1) | REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS (WHITE) | 25.84 | SQ.M. | | |
| **Sta. Catalina** | | | | | |
| SPL - 20a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 20b | ASPHALT CUTTING | 2,055.84 | LN.M. | | |
| SPL - 20c | CONCRETE CUTTING | 4,624.48 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 1,027.92 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 2,312.24 | SQ.M. | | |
| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 1,358.67 | CU.M. | | |
| SPL - 20d | PIPELINES & APPURTENANCES (200mmØ D.I. PIPELINE) | 2,312.24 | LN.M. | | |
| SPL - 20e | FITTING OF BENDS (200mmØ x 11.25° D.I. BEND) W/ CONCRETE THRUST BLOCK | 3.00 | PCS. | | |
| SPL - 20f | DRAINAGE CROSSING WITH CONCRETE ENCASEMENT (200mmØ CLASS 150 PVC PIPELINE) | 5.37 | LN.M. | | |
| SPL - 20g | PIPELINE FLUSHING (200mmØ D.I. PIPELINE) | 2,312.24 | LN.M. | | |
| SPL - 20h | HYDRO-TESTING & DISINFECTION WORKS (200mmØ D.I. PIPELINE) | 2,312.24 | LN.M. | | |

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| SPL - 20i | VALVES/FITTINGS/INTER-CONNECTION WORKS | 2.00 | ASSY. | | |
| SPL - 20j | INSTALLATION OF 150mm Ø FIRE HYDRANT W/ 63mmØ HOSE PUMPER OUTLET TRANSFER OF TAPPING (DRY TYPE) WITH CONCRETE BARRICADE (Tap on 200mmø D.I. Pipeline) | 3.00 | UNIT | | |
| SPL - 20k | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 200mmø D.I. Pipeline) | 49.00 | UNITS | | |
| SPL - 20l | CONSTRUCTION OF CLUSTER CONNECTION (Tap on 200mmØ D.I. PIPELINE) | 20.00 | UNITS | | |
| SPL - 20m | BACKFILLING OF NATIVE MATERIALS | 617.99 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 372.73 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 360.71 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 2,312.24 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.72 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 1,027.92 | SQ.M. | | |
| **Gov. Alvarez St.** | | | | | |
| SPL - 21a | AS-STAKED SURVEY/ PREPARATION OF AS-STAKED PLAN/ CONSTRUCTION DRAWING/ LAYOUTING/ LINE AND GRADE/POTHOLING | 1.00 | LOT | | |
| SPL - 21b | ASPHALT CUTTING | 1,932.50 | LN.M. | | |
| SPL - 21c | CONCRETE CUTTING | 1,932.50 | LN.M. | | |
| 101(4)b | REMOVAL OF EXISTING ASPHALT PAVEMENT | 966.25 | SQ.M. | | |
| 101(4)a | REMOVAL OF EXISTING CONCRETE PAVEMENT | 966.25 | SQ.M. | | |

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| 103(1)a | STRUCTURE EXCAVATION (COMMON SOIL) | 475.59 | CU.M. | | |
| SPL - 21d | PIPELINES & APPURTENANCES (150mmØ CLASS 150 PVC PIPELINE) | 966.25 | LN.M. | | |
| SPL - 21e | PIPELINES & APPUTENANCES (150mmØ G.I. Pipeline Bridge Crossing) | 28.19 | LN.M. | | |
| SPL - 21f | PAINTING WORKS (150mmØ G.I. Pipeline Bridge Crossing) | 13.92 | SQ.M. | | |
| SPL - 21g | PIPELINE FLUSHING (150mmØ CLASS 150 PVC PIPELINE) | 994.44 | LN.M. | | |
| SPL - 21h | HYDRO-TESTING & DISINFECTION WORKS (150mmØ CLASS 150 PVC PIPELINE) | 994.44 | LN.M. | | |
| SPL - 21i | VALVES/FITTINGS/INTER-CONNECTION WORKS | 6.00 | ASSY. | | |
| SPL - 21j | INSTALLATION OF 100mmØ BLOW-OFF ASSEMBLY (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 2.00 | UNIT | | |
| SPL - 21k | INSTALLATION OF 50mm Ø AIR RELEASE ASSEMBLY (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 2.00 | UNITS | | |
| SPL - 21l | TRANSFER OF INDIVIDUAL SERVICELINE CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 97.00 | UNITS | | |
| SPL - 21m | CONSTRUCTION OF CLUSTER CONNECTION (Tap on 150mmØ CLASS 150 PVC PIPELINE) | 5.00 | UNITS | | |
| SPL - 21n | BACKFILLING OF NATIVE MATERIALS | 212.80 | CU.M. | | |
| 201 | AGGREGATE BASE COURSE | 137.79 | CU.M. | | |
| 200 | AGGREGATE SUBBASE COURSE | 133.34 | CU.M. | | |
| 311(1)a | PCC PAVEMENT(PLAIN) - CONVENTIONAL METHOD, 230MM THICK | 966.25 | SQ.M. | | |
| 302a | BITUMINOUS TACK COAT (Emulsified Asphalt) | 0.68 | M.T. | | |
| 310b | BITUMINOUS CONCRETE SURFACE COURSE (50 mm. Thick.) | 966.25 | SQ.M. | | |

Total Project Cost _____

Prepared & submitted by:

_____

Bidder's Authorized Representatives

## VII. PREPARATION OF ESTIMATES/ FINANCIAL BID

In the preparation of the detailed estimates or financial bid, the DPWH Department Order No. 197, Series of 2016 shall be followed:

### 7.1 DIRECT COST

The **Estimated DIRECT COST** shall consist of the following:

**7.1.1** **Cost of materials** to be used in doing the work item called for, which shall include, inter alia, the following:

- Cost at source, including processing, crushing, stockpiling, loading, royalties, local taxes, construction and/or maintenance of haul roads, etc.
- Expenses for hauling to project site.
- Handling expenses.
- Storage expenses.
- Allowance for waste and/or losses, not to exceed 5% of materials requirement.

**7.1.2** **Cost of Labor** this shall include the following:

- Salaries and wages, as authorized by the Department of Labor and Employment.
- Fringe benefits, such as vacation and sick leaves, benefits under the Workmen's Compensation Act, GSIS and/or SSS contributions, allowances, 13th month pay, bonuses, etc.

**7.1.3** **Equipment Expenses**

Rental rates of equipment shall be based on the prevailing "Association of Carriers and Equipment Lessors, (ACEL) Inc." approved for use by the DPWH (Presently it is the 2014 ACEL Rates). Rental rates of equipment not indicated in the ACEL booklet shall be taken from the rental rates prepared by the Bureau of Equipment. For simplicity in computation, the operated rental rates are preferred over the bare rental rates as the former includes operator's wages, fringe benefits, fuel, oil, lubricants and equipment maintenance. The make, model and capacity of the equipment should be indicated in the detailed unit cost analysis.

Mobilization and Demobilization shall be treated as a separate pay item. It shall be computed based on the equipment requirements of the project stipulated in the proposal and contract booklet. Mobilization and demobilization shall not exceed 1% of the Estimated Direct Cost (ECD) of the civil works items.

## 7.2 INDIRECT COST

The Indirect Cost shall consist of the following

**7.2.1 Overhead Expenses** which include the following:

- Engineering and Administrative Supervision.
- Transportation allowances.
- Office Expenses, e.g., for office equipment and supplies, power and water consumption, communication and maintenance.
- Premium on Contractor's All Risk Insurance (CARI).
- Financing Cost such as Premium on Bid Security, Premium on Performance Security, Premium on Surety for Advance Payment, Premium on Warranty Bond (one year).
- Fees, Permits and clearances.
- Provision of service vehicle.

**7.2.2 Contingencies** includes the following:

- Expenses for meetings, coordination with other stakeholders, billboards (excluding Project Billboard which is a pay item under the General Requirements), stages during ground breaking & inauguration ceremonies, and other unforeseen events.

**7.2.3 Miscellaneous Expenses** - These include laboratory tests for quality control and plan preparation.

**7.2.4 Contractor's Profit Margin**

The margin of contractor's profit shall be in accordance with the table below. The profit is computed as the profit mark-up multiply by the Estimated Direct Cost.

**7.2.5 Value Added Tax (VAT) Component**

Which shall be the five (5) percent of the summation of Estimated Direct Cost, Overhead, Contingencies & Miscellaneous (OCM) and Contractor's Profit.

**7.2.6 OCM and Profit Mark-Up**

**7.2.6.1** The following items shall not be subjected to OCM and Profit mark-up:

- Mobilization and Demobilization

**7.2.6.2** The following non-civil works items shall not be subjected to OCM mark-up:

- Field/Laboratory Office & Living Quarters (Rental Basis)
- Furnishing of Furniture, Laboratory Equipment, Survey Equipment and Consumables
- Assistance to the Engineers
- Photographs
- Health and Safety
- Environmental Certificate
- Traffic Management
- Communication Equipment, etc.

**7.2.6.3** The detailed estimates for this project shall not exceed with the following mark-ups:

| Estimated Direct Cost | OCM | Profit | Value Added Tax (VAT) |
|---|---|---|---|
| Above 5 Million up to P50 Million | 12% | 8% | 5% |
| Above 50 Million up to P150 Million | 10% | 8% | 5% |

Per: DPWH D.O. No. 197, Series of 2016

## VIII. SIGNATORIES

Prepared by:

**BUNNY L. DAMPIOS, CE**
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Design Division

**VERLIN ANN L. LORIA, ME**
Senior Engineer A
Design Division

Checked by:

**REX D. SALE JR.**
Supervising Engineer A
Design Division

Submitted by:

**EDITO M. BAUTISTA JR.**
Officer-In-Charge
*Design Division*

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Recommending Approval for Implementation:

**MARLI P. ACOSTA – DE FIESTA**
*Assistant General Manager*
*Technical Services Group*

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Approved for Implementation:

**REYNALDO R. CABILIN**
*Acting General Manager, ZCWD*