



Proposed Development

At

Pointe Diable, Rodrigues

Procurement Reference No: - DIS/IAC/01/2019-2020

OPEN NATIONAL BIDDING

BIDDING DOCUMENT

(VOLUME 2 OF 3)

EMPLOYER

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Mechanical & Electrical Installations

Volume 2

Contents

Bills of Quantities – Bill No 3

Printed Pages

Electrical Installations 3

Public Health Installations 3

Summary of Bill No 3 3: S

Specifications

Electrical Installations 5

Plumbing Installations 4

BILL NO. 3

MECHANICAL AND ELECTRICAL INSTALLATIONS

Proposed Development at Pointe Diable

Lot 1: Electrical Installations at Pointe Diable

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT(Rs)
	<i>Supply, deliver to site, install, connect, test and commission the following all in accordance with specifications and drawings.</i>				
A.	EARTHING				
A.1	3 Nos. Solid Copper rods Ø16mm x 3mts for earthing of Main DB01 c/w coupler as required and clamp for connection of bare copper cable 4.0mm ² between the Rods and from the Rod to Main DB01. Earthing Rod and connection accessories to be high corrosion resistant (Sea Water). Earth resistance to be < 5.0 Ohm	Lot	1		
B.	ELECTRICAL DISTRIBUTION BOARDS				
	Distribution Boards c/w main isolator, contactors, digital meters, cabling accessories, distribution blocks, outgoing terminals, busbars and engraved labels. DB to include lock and Keys. DBs to be as per schematic drawings and specifications and include 30% spare capacity.				
B.1	<u>Distribution Board</u>				
B.1.1	DB Main 01	No.	1		
B.1.2	SDB Kitchen	No.	1		
B.2	Allow for cable glands, lugs, terminal blocks, engraved labels and other accessories for DB & SDB.	Lot	1		
C.	SLEEVES				
C.1	Pressure type PVC pipe buried underground: LV services (63 mm dia)	m	60		
D.	POWER CABLES				
	Power cables in trenches, ducts, sleeves or onto cable trays. Allow for proper cable fixation and protection. Include all necessary accessories such as cable glands, terminals, etc. Terminate and connect properly.				
	Note: All quantities indicated are subject to remeasurement.				
D.1.1	From CEB Meter to DB Main 01 3Cx4.0 mm ² Cu XLPE/SWA/PVC	m	15		
D.1.2	From DB Main 01 to SDB Kitchen 3Cx4.0 mm ² Cu XLPE/SWA/PVC	m	40		
	TO COLLECTION				

TOTAL COLLECTION

Electrical Installations

Total brought down from priced Bill of Quantities :-

Page 1	Rs	_____
Page 2	Rs	_____
Total	Rs	=====

Proposed Development at Pointe Diable

Lot 2: Public Health Installations at Pointe Diable

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT(Rs)
	<i>Supply, deliver to site, install, connect, test and commission the following all in accordance with specifications, drawings, conditions of contract, etc.</i>				
A.	WATER UNIT INLET PIPINGS & ACCESSORIES				
A.1	HDPE PN 16 pipe (Ø25/20mm) to be laid underground from existing water unit network to new water tank (on roof)	m	50		
A.2	uPVC PN16 surface pipe (Ø25/20mm) from HDPE UG piping to roof tank of toilet block	m	5		
A.3	Brass Quarter Turn Valve Ø25/20mm to BS 1010 (at inlet and at entry of water tank)	No.	1		
A.4	Non- return valve Ø25/20mm (BRASS)	No.	1		
A.5	Heavy duty ball cock at water tank, Ø25/20mm, Brass connection	No.	1		
A.6	Electrofusion fittings, elbows, tees for HDPE pipe	Lot	1		
A.7	uPVC pressure fittings, rated to PN16. Solvent welded. Reducers, Tees, Elbows, Unions, male adaptors, female adaptors, transition fittings, threaded sockets at all valves and flexible pipes,etc. (ALL DIMENSIONS FOR COMPLETE INSTALLATION)	Lot	1		
A.8	Saddles, hangers and all other holding accessories to pipes (COMPLETE INSTALLATION)	Lot	1		
B.	PE WATER TANKS & MAIN DISTRIBUTION PIPINGS				
B.1	Supply and fix of PE Water Tank Capacity 1000L	No.	1		
B.2	Vertical and horizontal distribution pipes in uPVC PN 16				
B.2.1	Dia 32/25mm	m	1		
B.2.2	Dia 25/20mm	m	10		
B.3	Stop Valve at outlet of roof water tank and main pipes.				
B.3.1	Dia 32/25mm	No.	1		
B.3.2	Dia 25/20mm	No.	2		
B.4	HDPE PN 16 pipe to be laid underground from distribution pipes to different water points c/w electrofusion fittings, Dia 25/20mm	m	6		
	TO COLLECTION				

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT(Rs)
B.5	Saddles, hangers and other holding accessories to pipes ALL DIMENSIONS FOR COMPLETE INSTALLATION	Lot	1		
C.	COLD WATER SUPPLY				
C.1	uPVC pressure pipe, rated to PN16. Diameter 20/15 mm	m	8		
C.2	Quarter Turn Valve in DR Brass on uPVC pipes diameter 25/20mm	No.	4		
C.3	uPVC pressure fittings, rated to PN16. Solvent welded. Reducers, Tees, Elbows, Unions, male adaptors, female adaptors, transition fittings, threaded sockets at all valves and flexible pipes,etc. (ALL DIMENSIONS FOR COMPLETE INSTALLATION)	Lot	1		
C.4	Saddles, hangers and all other holding accessories to pipes (COMPLETE INSTALLATION)	Lot	1		
C.5	Miniball valve ½" connection (High Quality) for WHB	No.	2		
C.6	Flexible pipes (200mm long) ½" connection (High Quality) for WHB	No.	2		
D.	WASTE				
D.1	uPVC pipe, solvent welded, diameter				
D.1.1	63mm PN6	m	3		
D.1.2	63mm PN10 (cast in floor/wall)	m	4		
D.1.3	75mm PN 6	m	8		
D.2	uPVC fittings, rated to PN6 and PN10. Solvent welded. Reducers, Tees, Elbows, Y-Tees, Rodding Eyes, etc. (ALL DIMENSIONS FOR COMPLETE INSTALLATION)	Lot	1		
D.3	Supports, saddles, screws, rawl bolts and all sundries for COMPLETE INSTALLATION of sewer and waste pipes	Lot	1		
D.4	Bottle traps (vertical inlet, horizontal outlet), 40 mm at WHBs	No.	2		
D.5	Floor/Shower Trap 150 x 150 uPVC Body with S/S cover, 50mm water seal, high quality	No.	6		
E.	INSTALLATION OF SANITARY APPLIANCES				
E.1	Take delivery from Main Contractor on site and fix the following sanitary fittings, complete with all sanitary wares & accessories :-				
E.1.1	WC	No.	2		
E.1.2	WHB	No.	2		
E.1.3	Shower (incl connections from shower mixer to shower head)	No.	4		
	TO COLLECTION				

**Proposed Development
at
Pointe Diable, Rodrigues**

<i>BILL NO</i>	<i>DESCRIPTION</i>	<i>PAGE NO</i>	<i>AMOUNT (MUR EXCL. VAT)</i>
3	MECHANICAL & ELECTRICAL INSTALLATIONS		
	ELECTRICAL INSTALLATIONS	3
	PUBLIC HEALTH INSTALLATIONS	3
TOTAL CARRIED FORWARD TO MAIN SUMMARY MUR			

SPECIFICATIONS

Electrical Specifications For Proposed Development at Pointe Diabie

1. INTRODUCTION
2. STANDARDS
3. EXTENT OF PRESENT SPECIFICATIONS
4. DRAWINGS
5. DETAILED ELECTRICAL SPECIFICATIONS
 - 5.1 DISTRIBUTION BOARDS
 - 5.2 SWITCHGEARS
 - 5.3 POWER CABLES
 - 5.4 WIRING CABLES
 - 5.5 CONDUITS
 - 5.6 WIRING ACCESSORIES
 - 5.7 PVC TRUNKING
 - 5.8 LUMINAIRES
 - 5.9 EARTHING & BONDING
6. SCHEDULE OF LUMINAIRES

1. INTRODUCTION

This section shall relate to the description of the installations and the specifications of materials and equipment to be used on the project. It should be noted that all installation and materials proposed should

2. STANDARDS

All parts of the installation shall conform in all respects to the Requirements for Electrical Installations BS 7671:2008, IEE Wiring Regulations Seventeenth Edition. This document shall serve as a reference throughout to determine acceptability of materials, techniques and workmanship.

Where the installation of a particular material or equipment is described by the manufacturer, the Contractor shall submit these information to the M&E Engineer before the start of the works. The Contractor shall also ascertain that the procedures laid down are properly followed.

Where an item or subject within the contract has not been covered either under the BS 7671:2008, or in the specifications contained within the section, the relevant British Standards Codes of Practice shall be referred to.

3. EXTENT OF PRESENT SPECIFICATIONS

The following items shall be covered within the present specifications.

1. Distribution Boards
2. Switchgears
3. Power Cables
4. Wiring cables
5. Conduits
6. Electrical & Wiring Accessories
7. PVC trunking
8. Luminaires
9. Earthing and Bonding

4. DRAWINGS

Drawings, as listed in the relevant section, are supplied for tender purposes only.

The M&E Engineer shall submit new drawings, incorporating the latest requirements of the Client, if any, to the successful Tenderer. The latter will be required to prepare necessary working drawings for approval by the M&E Engineer before implementation.

5. DETAILED ELECTRICAL SPECIFICATIONS

5.1 DISTRIBUTION BOARDS

These units shall be designed and constructed electrically as per the respective one-line diagrams. They shall be wall mounted, of polyester finish complete with din rail and earth terminals.

The distribution board shall be modular, of standard dimensions and be made by reputable manufacturers. It shall be supplied complete with incoming switchgears, outgoing MCBs, mounting rails, terminal blocks, perforated / plain plates, engraved labels and other accessories. The distribution board proposed shall have lock and keys.

Detailed drawings of the boards shall be approved by the M&E Engineer before order. All DBs shall be supplied with a minimum of 20% spare capacity.

5.2 SWITCHGEARS

All switchgears shall also be from reputable manufacturers and be strictly to BS norms. They shall be designed for fixed installation. Switchgear used must be such that neutral lines are always interrupted at the same time as phase lines.

The Contractor must ensure that the breaking capacity of each switchgear is appropriate for the purpose it will be used. This shall be calculated and indicated on all working drawings.

5.3 POWER CABLES

All power cables (unless otherwise specified) shall be PVC insulated, PVC sheathed with copper conductors. They shall be steel wire armoured, rated at 600/1000V and manufactured to the appropriate MS or BS standards.

Conductors shall be stranded copper of high conductivity.

Core identification shall be:

Brown, Black, Grey and Blue for 4-core cables.

Where single core power cables are specified, the colour shall be according to the phase to which it shall be connected, ie. brown, black or grey for the phases, blue for neutral and green or yellow/green for earth.

The earth continuity conductor shall always be green or yellow/green.

Cables not meeting the above core identifications will not be accepted under any circumstances.

All power cables shall be terminated suitably using proper glands, lugs and terminals.

The Contractor shall allow for all draw boxes as required.

Underground power cables including those for external lighting shall be laid in yellow/orange PVC pipes of appropriate diameter at a minimum of 800mm below ground level.

On top of this layer, yellow/orange plastic warning tape 200mm wide at least 0.5mm thick marked "DANGER ELECTRICITY" at no more than 300mm interval shall be laid along all run.

The Contractor shall allow for supply and laying of all PVC pipes, plastic warning tape complete with proprietary accessories, etc.

5.4 WIRING CABLES

All wiring within polyethylene conduits shall generally be PVC insulated single core copper conductor cables. Minimum size of cable shall be 1.5 mm² for lighting circuits and 2.5 mm² for socket circuits.

Cables sizes for other circuits shall be as specified on the one-line diagram of the relevant distribution or sub-distribution boards.

Colour coding shall be strictly implemented all over the building as follows:

Brown for phase

Blue for neutral

Green or yellow/green for earth

All wiring cables to be used must be manufactured to the relevant MS or BS standards.

5.5 CONDUITS

Conduits to be embedded into concrete or chased into blockwalls shall be plastic, flexible and be specially manufactured for this purpose. Suitable accessories shall be used for the implementation of the conduit network.

Where conduits are surface mounted or laid within dry wall partitions, etc. only non-fire propagating ones shall be used. Locally manufactured conduits not meeting EN norms shall not be accepted on this project.

During implementation of the project the Contractor shall ensure that all necessary precautions are taken for the protection of the conduits from breakage or blockage. The appropriate accessories shall consequently be used.

Unless otherwise stated, conduit sizes shall be as follows:-

- For lighting circuits - 20mm or equivalent
- For socket circuits - 25mm or equivalent

For all other circuits, conduits shall be laid as specified on the respective layout drawings.

5.6 WIRING ACCESSORIES

They shall be flush mounted using appropriate mounting accessories.

Final point user accessories shall be equivalent to Model Plexo from Legrand or model Sollysta from Hager. They shall conform to the appropriate BS standards.

The Contractor shall provide for appropriate proprietary back boxes or clip-on support frames and associated accessories for mounting of these either flush to walls or in partitions or in PVC trunking.

Minimum ampere rating for light switches shall be 10A. For BS sockets minimum rating shall be 13A.

Samples of all fittings and accessories shall be submitted to the M&E Engineer for approval prior to order.

Unless otherwise stated on the drawings, all switches are to be 1200 mm above finished floor level and all switch sockets shall be fixed at a height of 300 mm above finished floor level.

5.7 PVC TRUNKING

All PVC trunking shall be supplied and installed complete with proprietary covers, cover joints, clip-on partitions, inner and outer 90° bends, flat angles, tees, end caps, adaptors etc. Appropriate clip-on staples for retaining cables shall also be provided.

5.8 LUMINAIRES

Luminaires shall be as listed in the Bill of Quantities and described in the schedule given at the end of this section. They shall be of LED type with energy efficient performance.

Bidders may propose luminaires equivalent to the specified ones for consideration by the M&E Engineer/Architect.

Catalogues and full technical specifications of all luminaires must be submitted with the bid.

Samples of each luminaire shall be submitted for final approval by the M&E Engineer and Architect before order.

5.9 EARTHING & BONDING

New earthing stations must be provided and executed as specified in the bill of quantities. Earth electrodes shall be at least 600mm long and buried not less than one metre below the ground level. Bare copper conductor of appropriate size as indicated in the bill of quantities shall link the earth electrodes to the earth terminals of the distribution boards.

The earth rod and connection accessories proposed should be high corrosion resistant (Sea Water).

The earthing resistances to be achieved shall be 5.0 ohm.

The Contractor shall allow in his price for all additional works or materials including non-soluble earth enhancing compounds required to achieve the desired earth resistances. Earth tests must be carried out to the satisfaction of the M&E Engineer prior to backfilling and / or concreting.

All electrical distribution boards shall be connected to the earth bar using suitable insulated earth conductors of appropriate cross-section.

The Contractor shall provide necessary identification plates on all earth terminals and also provide for bonding of the solar panels and structures to a main earth bar in the electrical room.

6. SCHEDULE OF LUMINAIRES

TYPE	DESCRIPTION	EQUIVALENT OR SIMILAR TO:
LM1	Wall Mounted Light, Polycarbonate White finish, Sea side suitable, IP65, LED Luminaires, 3000K, 7.2W, 820Lm.	FORLIGHT ARA
LM2	Surface Mounted Light, Polycarbonate White finish, Sea side suitable, IP65, LED Luminaires, 4000K, 18W, 1750Lm	FORLIGHT PROPPER
LM3	Surface Mounted Light, Polycarbonate White finish, Sea side suitable, IP65, LED Luminaires, 4000K, 39W, 3550Lm	FORLIGHT PROPPER
EM1	Surface mounted Light, IP20, LED Luminaires, 3500K, 3W, 300Lm, Non maintained 3hrs battery with Legend Kit to ISO7010.	COOPER VISTRAL

Plumbing Specifications For Proposed Development at Pointe Diable

1. Plumbing & Sewer Installations
 - 1.1 PIPINGS
 - 1.1.1 COLD WATER PIPINGS
 - 1.1.2 WASTE PIPES
 - 1.1.3 SUPPORTS, HANGERS, ETC
 - 1.2 PAINTING

1. PLUMBING & SEWER INSTALLATIONS

1.1 PIPINGS

1.1.1 COLD WATER PIPINGS

1.1.1.1 *Internal*

Water supply pipings shall be in uPVC pressure type, rated to withstand a pressure of 16 bars minimum. uPVC pipes shall conform to relevant International Standards (ISO R 161), BS 4514. These shall be generally used at ceiling soffits.

Joints on uPVC pressure pipes shall be solvent welded by use of appropriate PVC solvent glue. Parts to be joined shall be cleaned first to remove all traces of grease and dirt before being glued together.

Solvent welded screwed fittings shall be used wherever required, at stop valve, flexible pipes etc.

At all user ends, chrome plated ringed flexible pipes of appropriate lengths shall be used.

At each branch out from the mains underground pipe, a Quarter turn valve with stainless steel handle shall be provided in a valve chamber. All valves shall be of high quality to BS1010.

Mini ball valve shall be fixed at each supply to WHB's and sinks. The valves shall be full bore valves with finger handles and shall be brass and nickel plated.

Chrome plated angle valves to the highest quality shall be provided at WC cistern supplies and jet washers.

Water pipings shall be pressure tested to 8 bars at completion of installation works. A certificate to that effect is to be submitted.

1.1.1.2 *External*

The external underground cold water pipings shall be in High Density Polyethylene pipe (HDPE), rated to PN16.

The cold water pipes shall be properly and neatly laid underground. Trenching shall be by others. Compacting and laying of pipes shall be the Plumbing Contractor's responsibility.

HIGH DENSITY POLYETHYLENE PIPES (HDPE)

High density polyethylene pipes (HDPE) shall have a normal pressure rating of 16 bars at +20°C.

The pipes shall have **electrofusion** joints.

POLYETHYLENE FITTINGS

Polyethylene fittings to be supplied shall be of the electrofusion types and shall be as described below.

TRANSITION FITTINGS - POLYETHYLENE / OTHER PIPE CONNECTIONS

The polyethylene side shall have integral heating coil or provided with long end with electrofusion couplers. Electrofusion safety voltage specifications shall apply the metal-side shall be manufactured as per specifications of relevant pipe connector.

The transition fittings shall be a monolithic product guaranteed to axial bursting and internal pressure rightness.

HDPE TAPPINGS TEES SADDLES

The saddles shall be supplied in two anti-corrosion bolts and nuts for right clamping on the HDPE pipes.

The saddles shall be fitted with integral heating coil to enable electrofusion jointing. Electrofusion safety voltage specifications shall apply.

The saddles shall be supplied complete with tapping device, appropriate key including all fittings / couplers for connection with 20mm HDPE service pipes or otherwise as directed by the Engineer. These fittings / couplers for connection shall also be fitted with heating coil to enable electrofusion jointing.

The tapping shall be internally threaded to the nominal diameter given for the ferrule as specified.

Spigot surfaces can be scrapped off again to permit the insertion and more freely as far as the marker line of the insertion depth.

1.1.2 WASTE PIPES

All internal waste pipes, waste water and sewer, shall be in uPVC, PN6 type of the appropriate dimensions.

Underground sewer pipes shall be in uPVC, SN8, rubber ring push fit type (Brown or Pink colour) to MS6 Standards.

Joints shall be solvent welded on the uPVC internal pipes by use of appropriate solvent glue. Parts to be joined shall be cleaned thoroughly to remove all traces of grease and dirt prior to joining.

All joints are to be tested for leaks. A certificate to that effect is to be submitted.

PVC bottle traps, with vertical inlets and horizontal outlets, are to be connected at discharges from wash hand basins, sinks. These shall be of renowned make and quality.

Floor traps shall be provided at toilets (wherever possible) for draining of overflow or cleaning water. They shall have low height and have horizontal discharge,

The floor traps shall be of renowned make and quality.

Individual waste pipe and sewer pipe shall run in the duct risers. The waste pipes shall be connected to the sewer pipes at soffit of ground floor through a “U” or “P” Trap so as to prevent foul odour rising in the pipes.

1.1.3 SUPPORTS, HANGERS, ETC

All pipes are to be properly and solidly supported at reasonable distances along their whole lengths, and along walls.

A rail type supporting system shall be used. The rail frame shall be fixed to the wall of the risers and ceilings and individual tackles and studs with saddles at their ends shall be used to support the pipes. The fixation items shall be of renowned make. (SIKLA / MUPRO)
The supports, hangers etc shall permit frequent expansion and contraction of the pipes.

1.2 PAINTING

All exposed pipes (uPVC) and fittings shall be painted with white UV paint.