

WORK UNITS & PLANT UNITS
FOR
THE TELECOMMUNICATIONS EXTENSION
FOR
OPTICAL FIBER
TRANSMISSION PROJECT

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3.1 COMMON EXCAVATION ITEMS

3.1.1 The Plant Unit Items in this group shall be used as applicable with conduit system installations, pole route installations and cable installation.

3.1.2 The following PU items are listed under this series:

1000 **BREAKING AND REINSTATEMENT OF PAVED ROAD AND FOOTWAY SURFACES**

These PU items are extra cost items, that can be applied to excavation PU items where justified.

The following types of road construction are recognized:

- Class "A", which is the highest standard, which is applied only to International roads and major dual-carriageway trunk roads.
- Class "B", which is applicable to Primary and Secondary type highways and other main roads which may include dual-carriageways.
- Class "C", which is applied to all local roads, other paved roads, roads with sidewalks in residential areas and asphalted road shoulders. Included in this classification, are two types of paved footway, being:

Concrete tiles, laid over a prepared sand or concrete base.

Plain asphalt or concrete, laid over compacted soil.

- Reinforced concrete roads, with concrete grade 350 compressive strength 275kg/sq.m.
- Reinforced concrete surfaces which are applicable to difficult concrete surfaces such as staircase, water channel sides, etc...

The plant unit shall be measured per sq.m. Or cu.m and the work unit shall be inclusive of:

The cutting and breaking of the surface of whatever thickness, using an asphalt/concrete saw when appropriate, removal of broken asphalt, concrete and other materials not suitable for use as backfill. Supply and testing of all necessary materials. Reinstatement of sub-base, compaction tests as required by the relevant specification. Where the excavated sub-base material is of the same or better specification of new sub-base material, the contractor shall, while excavating, separate the sub-base material and provide necessary weather protection. If the existing sub-base material is declared unsuitable for back-filling, new sub-base material shall be provided by PU 8022, subject to prior

approval of the Engineer. Unless otherwise specified, reinstatement shall be to that of the standard width specified for the associated class of roadway. In the case of tiled footway, reinstatement shall be not less than the dimensions specified and shall additionally be to a whole number of tile widths nearest applicable to the standard width for reinstatement.

Reinstatement of extra width of asphalt/concrete and cutting extra thickness of asphalt/concrete is deemed to be included within the price.

The following shall be measured in sq.m:

1001 CLASS "A" ROAD SURFACE, BREAKING AND REINSTATEMENT.

1002 CLASS "B" ROAD SURFACE, BREAKING AND REINSTATEMENT.

1003 CLASS "C" ROAD SURFACE, BREAKING AND REINSTATEMENT.

The following shall be measured in cu.m:

1009 BREAKING AND REINSTATEMENT OF REINFORCED CONCRETE ROADS.

1010 BREAKING AND REINSTATEMENT OF REINFORCED CONCRETE.

Note: In cases of other uncovered surfaces i.e. where installations take place through plantation areas, non asphalted/non concreted surfaces or bare earth, none of the items above shall be used. Payment shall be made for the duct formation under plant unit series 1200 and items 8021 and 8022 in cases where imported backfill and subbase are used.

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3.2 CONDUIT SYSTEM INSTALLATIONS

- 3.2.1 The Plant Unit items in this group are for conduit system installation and for other associated or similar works.
- 3.2.2 The plant unit shall be measured per m. and the work units for all these items shall be inclusive of:
- 3.2.3 Excavating in any type of soil. Surveys to ascertain the location and depth of any other services, preferably using electronic plant location equipment but including test pits as required, marking and setting out works. Provision of traffic barriers, warning signs, traffic controls, night hazard warning lights and service accesses.
- 3.2.3 The following PU items are listed under this series:

1200 CONDUIT SYSTEM INSTALLED IN CONCRETE.

The plant unit shall be measured per m. and the work unit shall be inclusive of:

Surveys to ascertain the location and depth of any other services, preferably using electronic plant location equipment but including test pits if required, marking and setting out works. Provision of traffic barriers, warning signs, traffic controls, night hazard warning lights and service accesses. Excavating in any type of soil as required to give a depth of cover over the top of the ducts of 800mm, together with any shoring, support, dewatering etc. as required. It shall also include any extra depth or width required. Supply and installation of couplings and sufficient PVC preformed pipe bends as to achieve the curve required in the duct route or up to the surface level at risers. Also, where necessary, the conduit route shall be set round a curve to a minimum radius 12m without the use of preformed bends or couplings. Supply and placing of formwork and concrete protection slab if required. Supply and placing of PVC ducts 100mm OD, or 50mm OD, ducts spacers and concrete as specified. Joining ducts to manholes, cabinets, risers etc. Cleaning and mandrel testing ducts, supply and installation of nylon draw cord in each duct. Supply and installation of duct plugs at both ends of each duct in the formation. Removal of shoring, support, formwork etc. Backfilling in layers as specified, including the supply and placement of warning tape/s up to the sub-base level, when the excavated material is unsuitable to be used as backfill, the supply of new material as provided by PU item 8021, where so approved by the Engineer. The disposal of the unusable excavated material is covered by this PU. Clearing site of all excess material, debris, equipment etc.

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These items do not include paved surface breaking and reinstatement. Refer to PU. Items 1001 - 1007.

The linear measurement shall be from the outside wall of one manhole to the outside wall of the next manhole, cabinet base, riser, etc.

The width of the trench shall be as indicated in the construction standards. Any excavation outside of these dimensions shall be the Contractor's responsibility.

1201 1 WAY PVC DUCT, 100mm OD IN CONCRETE.

1201.A 1 WAY PVC DUCT, 50mm OD IN CONCRETE.

1202 2 WAY PVC DUCT, 100mm OD IN CONCRETE.

1202.A 2 WAY PVC DUCT, 50mm OD IN CONCRETE.

1204 4 WAY PVC DUCT, 100mm OD IN CONCRETE.

1206 6 WAY PVC DUCT, 100mm OD IN CONCRETE.

1270 **SUPPLY AND INSTALL ADDITIONAL DUCTS.**

The plant unit shall be measured per m. and the work unit shall be inclusive of:

1272 SUPPLY AND INSTALL 1 WAY PVC 100MM IN CONCRETE/OPEN TRENCH- m.

1274 SUPPLY AND INSTALL 1 WAY PVC 50MM IN CONCRETE/OPEN TRENCH- m.

1274.A SUPPLY AND INSTALL 2 WAY PVC 50MM IN CONCRETE/OPEN TRENCH- m.

1291 **STEEL PIPE IN CONCRETE.**

In certain circumstances, it may be required to install steel pipe in standard duct formations as an alternative to standard PVC pipe.

The plant unit shall be measured per m and the work unit shall include:



The supply and installation, (instead of PVC pipe), of 100mm inside diameter steel pipe, together with all couplings, including couplings to PVC pipes as required.

Measurement shall be for the steel pipe only.

The item cost shall be as an increase over that of the standard item. (PU ITEMS 1201 - 1224 as applicable) for the re-placing of one PVC pipe.

1292 STEEL PIPE ROAD CROSSING (PVC 100 mm INSIDE)

1292 .A STEEL PIPE ROAD CROSSING (PVC 50 mm INSIDE)

In certain circumstances, it may be required to install PVC pipe inside a galvanized steel pipe in standard duct formation

The plant unit shall be measured per m and the work units of items 1292 and 1292.A shall include the supply and installation of steel pipes and PVC pipe inside the steel pipes in standard duct formation. Items 1292 and 1292.A are an increase over that of the standard items. (PU ITEMS 1201 - 1224 as applicable).

1400 SUPPLY AND INSTALLATION OF PRECAST MANHOLES & HANDHOLES.

The plant unit shall be measured per unit and the work unit shall be inclusive of:

Surveys to ascertain the location and depth of any other services, preferably using electronic plant location equipment but including test pits, marking and setting out works. Provision of traffic barriers, warning signs, traffic controls, night hazard warning lights and service accesses. Excavating in any type of soil as necessary to give required depth of cover, together with any shoring, support, dewatering etc. as required. Provision of graded aggregate filter bed if required by site conditions. Supply and placing nominated precast manhole/handhole. Supply and placing of entrance frame and cover to surface level. Supply and installation of poke-outs of 1m length to complete duct formations at manhole entry to the maximum specified number of ducts per manhole type. Any work necessary to complete duct entries and make flush. Supply and installation of manhole furniture as specified, including manhole identity label. Removal of shoring, support, formwork etc. Backfilling in layers as specified and, when the excavated material is unsuitable to be used as backfill, the supply of new material. Clearing site of all excess material including unusable excavated material, debris, equipment etc. These items do not include any paved surface breaking or reinstatement, which measurement shall not include the area of the entrance cover frame.

The works shall be undertaken in compliance with Design Drawings, Specifications and Installation Standards and, where applicable, the permits and specifications of the Local Municipality, or other competent roads Authority. Also the regulations and permits of the Traffic Control Authority.

The standard area of excavation shall be as indicated. Any excavation (unless otherwise specified) outside of these dimensions shall be the Contractor's responsibility.

1401 SUPPLY AND INSTALLATION OF MANHOLE TYPE "A"

Standard excavation area = 3700 x 2200 mm.

1412.A SUPPLY AND INSTALLATION OF HH1C

Standard excavation area = 1600 x 1100 mm

1413.A SUPPLY AND INSTALLATION OF HH2C

Standard excavation area = 2000 x 1300 mm

1414.A SUPPLY AND INSTALLATION OF HH3C

Standard excavation area = 3000 x 1400 mm

1415 SUPPLY AND INSTALLATION OF BLDG ENTRANCE HHAF TYPE

Standard excavation area = 700 x 700 mm

1415.A EXTRA OVER FOR CHECKER PLATE COVER FOR HHAF PULL-BOX
4 mm THICK INCLUDING FRAME AND PAINTING

Extra over item to replace the concrete cover of pull-box HHAF by steel cover where applicable

1416 SUPPLY AND INSTALLATION OF BLDG ENTRANCE HHBF TYPE

Standard excavation area = 100 x 760 mm

1416.A EXTRA OVER FOR CHECKER PLATE COVER FOR HHBF PULL-BOX
4 mm THICK INCLUDING FRAME AND PAINTING

Extra over item to replace the concrete cover of pull-box HHBF by steel cover where applicable

1420 CONSTRUCTION OF IN-SITU BUILT MANHOLES/HANDHOLES.



Construction of in-situ built manholes/handholes will only be permitted where site conditions preclude the installations of precast units.

The plant unit shall be measured per unit and the work unit shall be inclusive of:

The costs of any approved design modifications required to avoid any other services or other obstructions. Surveys to ascertain the location and depth of any other services, preferably using electronic plant location equipment but including test pits, marking and setting out works. Provision of traffic barriers, warning signs, traffic controls, night hazard warning lights and service accesses. Excavating in any type of soil as necessary to give required depth of cover, together with any shoring, support, dewatering etc. as required. Support and protection of any other services as necessary. Breaking and repairing ducts as necessary to install manhole/handhole surfaces and make proper duct entry including protection of existing cable. Pouring of a "blinding" layer of concrete over excavation base. Construction of manhole/handhole of nominated type including all necessary preparation, form work, strutting, concrete reinforcement, curing, protection and waterproofing of outer surfaces. Supply and placing of entrance frame and cover to surface level. Supply and installation of poke-outs of 1m length to complete duct formations at manhole entry to the maximum specified number of ducts per manhole type. Any work necessary to complete duct entries and make flush. Supply and installation of manhole/handhole furniture as specified, including manhole/handhole identity label. Removal of shoring, support, formwork etc. Backfilling in layers as specified and, when the excavated material is unsuitable to be used as backfill, the supply of new material. Clearing site of all excess material including formwork and strutting material, unusable excavated material, debris, equipment etc.

These items do not include any paved surface breaking or reinstatement, which measurement shall not include the area of the entrance cover frame.

The standard area of excavation shall be as indicated below. Any excavation outside of these dimensions shall be the contractor's responsibility.

1421 CONSTRUCTION OF IN-SITU BUILT MANHOLE TYPE "A"

Standard excavation area = 4200x2900 mm.

1427 CONSTRUCTION OF IN_SITU BUILT HANDHOLE TYPE HH1C

1428 CONSTRUCTION OF IN_SITU BUILT HANDHOLE TYPE HH2C

1429 CONSTRUCTION OF IN_SITU BUILT HANDHOLE TYPE HH3C

**1450 CONSTRUCTION OF IN-SITU BUILT REPLACEMENT
MANHOLES/HANDHOLES.**

These PU items shall be used where there is a requirement to demolish an existing manhole/handhole and to replace it on the same site with a new in-situ constructed manhole/handhole.

The plant unit shall be measured per unit and the work unit shall include:

The protection and support of all joints and cable in and adjacent to the existing manhole at all stages of the work. Recovery for re-use of manhole furniture and entrance frame and cover if possible, otherwise supply.

Demolition of the existing manhole/handhole and of intruding ducts so far as is necessary. Construction of in-situ built manhole/handhole as described above, including the re-termination and making good of the existing and any additional ducts. Re-racking of cables and joints, (except where jointing operations are required).

The dimension of excavation will differ from site to site depending on the situation of each case. The minimum surface breaking area and the minimum depth shall be subject to approval of the Engineer.

1451 IN-SITU CONSTRUCTION OF REPLACEMENT MANHOLE TYPE "A"

1455 IN-SITU CONSTRUCTION OF REPLACEMENT HANDHOLE HH1C

1456 IN-SITU CONSTRUCTION OF REPLACEMENT HANDHOLE HH2C

1457 IN-SITU CONSTRUCTION OF REPLACEMENT HANDHOLE HH3C

1467 MANHOLE CLEANING.

This plant unit series shall be measured per unit, and it shall not be used for new manholes/handholes, nor may when the previously described install, or install and supply PU are applied.

The work shall include removal of sand, mud, dirt, sewage, and stones including the cleaning of existing cables sheath with care to the existing network.

The works shall not be undertaken without the approval of the Engineer.

1467.A MANHOLE CLEANING (FROM 0 TO 0.75 cu.m) - each

1467.B MANHOLE CLEANING (FROM 0 TO 1.5 cu.m) - each

Note: Item 1467.B shall be used instead of 1467.A when the volume to be removed is more than 0.75 cu.m.

1500 BRIDGE CROSSINGS.

These PU items shall only be used for crossings of bridges when permission to use the bridge structure can be obtained which, usually, is only where there is no reasonable alternative. If not suspended under the bridge, crossings shall be preferably attached to the North (shaded) side of the bridge. If the crossing is not installed on the North side of the bridge then it shall be provided with a metal sun shade.

The plant unit shall be measured per m and the work unit shall be inclusive of:

The design of all necessary brackets, and other special details for fixings, supports, etc. Obtaining all necessary permits and agreeing the location with the relevant Authorities, including the Bridge Authority and the Engineer. The supply and installation of all necessary components to satisfy the requirements, including appropriate pipe couplings. Steel pipes shall be a minimum of 100mm inside diameter. All pipes shall be cleaned and mandrel tested. Clearing site of all excess materials, debris, equipment, etc.

1512 2 WAY STEEL PIPE BRIDGE CROSSING.

1512.A 2 WAY STEEL PIPE BRIDGE CROSSING (PVC 100 MM INSIDE)

1512.B 2 WAY STEEL PIPE IN THE RIVER (PVC 100 MM INSIDE).

1514 4 WAY STEEL PIPE BRIDGE CROSSING.

1514.A 4 WAY STEEL PIPE BRIDGE CROSSING (PVC 100 MM INSIDE)

1532 2 WAY PVC BRIDGE CROSSING STANDARD PIPES.

1532.A 2 WAY PVC BRIDGE CROSSING STANDARD PIPES IN THE RIVER.

1534 4 WAY PVC BRIDGE CROSSING STANDARD PIPES.



3.3 ODF STRUCTURES

3.3.1 Plant Unit items in this group apply mainly to additional works in Exchange Cable Vaults and to ODF extensions, but some of the items may be used in other parts of an exchange or, when applicable, in any other building.

3.3.3 For additional and extension works, the new materials shall be compatible with, and so far as is reasonably possible, shall match the existing materials.

3.3.4 Stringent precautions shall be taken to prevent the spread of dust and other contaminants outside the working area. Debris shall not be permitted to accumulate.

3.3.5 The following PU items are listed under this series:

1700 ODF - GENERAL

The plant unit shall be measured per unit and the work unit shall be inclusive of: Survey to determine requirements to comply with plans and specifications and to match existing materials. Supply and installation of materials as required. Removal of surplus materials, debris, equipment, etc. on a daily basis. Clean up of site on completion of works.

1701 SUPPLY AND INSTALL OF OPTICAL FIBER DISTRIBUTION FRAME (EACH).

1705 SUPPLY AND INSTALL GALVANISED STEEL OR PAINTED CABLE TRAYS (0.55-0.80m)

The plant unit shall be measured per m and the work unit shall include:

All necessary bends, elbows, tees, couplings, hangers, bracket supports and other necessary accessories required for safety and protection of cable installation in cable vault/MDF.

1706 SUPPLY AND INSTALL CABLE RACKS

The plant unit shall be measured per sq.m and the work unit shall include:

All necessary couplings, bracket supports and other necessary accessories required for safety and protection of cable installation in cable vault/MDF.

1711 FLOOR/WALL FIXED OUTDOOR CABLE SUPPORT LADDERS (m)

Width shall be in half (0.5) m increments

1721 HORIZONTAL/VERTICAL INDOOR CABLE RACK OR TRAY.

The plant unit shall be measured per m and the work unit shall include:

Fixing as required to other racks, walls, ceiling, etc. The width shall be measured in increments of 0.5m.

1725 STANDARD CABLE BRACKETS AND BEARERS.

These items are normally installed in manholes but may be required to be installed in cable vaults, cable tunnels or elsewhere.

The plant unit shall be measured for each and the work unit shall include:

Supply and installation of cable brackets and bearers as specified, complete with all fixing devices.

- 1730 STANDARD WALL FIXED CABLE BRACKET - 500mm - (unit).
- 1731 STANDARD WALL FIXED CABLE BRACKET - 1000mm - (unit).
- 1732 STANDARD WALL FIXED CABLE BRACKET - 1500mm - (unit).
- 1733 STANDARD WALL FIXED CABLE BRACKET - 1800mm - (unit).
- 1734 STANDARD WALL FIXED CABLE BRACKET - 2300mm - (unit).
- 1735 SUPPLY AND INSTALL CABLE SUPPORT BRACKET- 300MM - (unit).
- 1741 STANDARD CABLE BEARER - 250mm - (unit).
- 1742 STANDARD CABLE BEARER - 350mm - (unit).
- 1743 STANDARD CABLE BEARER - 500mm - (unit).

NOTE: Items 1730 to 1743 could also be used for existing MH structures.

1750 STANDARD MDF EXTENSION.

The plant unit shall be measured per unit and the work unit shall include:

The supply and installation of one vertical MDF section comprising the specified number of horizontal and vertical components and all other fittings, but not the supply of terminal blocks.

1761 CABLE ACCESS HOLE TO MDF.

The plant unit shall be measured per unit and the work unit shall include:

Core drilling a hole of the required diameter through reinforced concrete floor, lining the hole as necessary with PVC or other pipe and otherwise making good. Supply and installation of duct plugs at both ends and packing with fire blocking material.

1762 CUTTING ACCESS HOLE THROUGH BLOCK WALL.

The plant unit shall be measured per 100 sq.cm and the work unit shall include:

Cutting hole of required size, lining hole and otherwise making good, supply and installation of fireproof facing plates on both sides and packing with fire blocking material.

1763 CUTTING CABLE ACCESS HOLE THROUGH CONCRETE WALL.

The plant unit shall be measured per unit and the work unit shall include:

Supply and installation of fireproof facing plates on both sides and packing with fireproof material.

1771 MAKING NEW DUCT ENTRIES TO CABLE VAULT, 1 - 2 WAYS.

The plant unit shall be measured per duct and the work unit shall include:

For each duct, core drilling a hole of the required diameter through a reinforced concrete wall, supply and install standard 100mm PVC duct, with a minimum of 1 m extending beyond the outer wall face, grouting to waterproof entry and making good wall facings, supply and installation of duct plugs at both ends.

1790 MAKING NEW DUCT ENTRIES TO MANHOLES/HANDHOLES

The plant unit shall be measured per unit and the work unit shall include :

Coordinating with the Engineer to determine form of work. Cutting a hole of minimum size necessary in reinforced concrete wall. Supply and install the required number of standard 100/50mm outside diameter PVC ducts staggered such as to allow subsequent staggered jointing of ducts, with vertical and horizontal spacing as specified. Grouting in ducts to give a waterproof construction. Making good both wall faces and supply and installation of duct plugs at both ends of each duct.

1791/1 INSTALL ADDITIONAL 1 WAY DUCT ENTRY 100mm. - (unit).

1791/1.A INSTALL ADDITIONAL 1 WAY DUCT ENTRY 50 mm. - (unit).

1791/2 INSTALL ADDITIONAL 2 WAY DUCT ENTRY 100mm. - (unit).

1791/2.A INSTALL ADDITIONAL 2 WAY DUCT ENTRY 50 mm. - (unit).

3.5 CABLE INSTALLATION

- 3.5.1 Plant Unit items in this group are concerned with the requirements to install all types of outside plant cable in trench, by mole-plough, in underground duct or indoors and other associated works.
- 3.5.2 The plant unit shall be measured per m and the work units shall be inclusive of:
- 3.5.3 Excavating in any type of soil. Surveys to ascertain the location and depth of any other services, preferably using electronic plant location equipment but including test pits if required, marking and setting out works. Provision of traffic barriers, warning signs, traffic controls, night hazard warning lights and service accesses.

2370 INSTAL OPTICAL FIBER CABLE IN SUB-DUCT.

The plant unit shall be measured per m and the work unit shall include: Dewatering of manholes/handholes with normal water pump/tanker. Working with care so as not to damage any existing cables/joints and, if necessary, setting cables to gain access to the allocated sub-duct. Recovering existing duct plugs, if any, or carefully removing other duct seal and, rodding sub-duct or performing any other approved operation to install draw rope. Any work necessary to make good sub-duct entries and make flush in existing manhole. Cleaning sub-duct and testing with an approved mandrel or suitable alternative. Installations of cable draw rope, setting up of drum and winch. Drawing cable into sub-duct at speed and tension specified. At "pulled through" manholes/handholes, pulling slack cable and setting onto bearers. Cutting and sealing cable. Replacing any moved existing cables/joints onto bearers. Setting cable ends in manholes/handholes to avoid obstructing any other subsequent operations. Sealing ducts with an approved method supply and install cable identification labels at each manhole/handhole and manhole/handhole identification plate for existing structures. Clearing site of all excess materials, debris, equipment, etc. Measurements shall be taken from the cable length marker at the beginning and the end of installation.

- 2371 INSTALL OPTICAL FIBER CABLE IN EMPTY SUB-DUCT. (m)
- 2380 SUPPLY AND INSTALL SUB-DUCT IN STANDARD MAIN DUCT.(m)

These items are included in this section, rather than in conduit system installation, as they are more closely associated with the cable pulling operations and shall include all the essential operations as described in PU Item 2370 above, except those specifically concerning cable. Unless otherwise specified, they shall not include "pulling through" at manholes. The sub-ducts shall normally be terminated at each manhole as specified.

The work unit shall include:

Supply of sub-duct. Drawing in the required number of sub-ducts into a main duct in a single operation and, after a sufficient period of resting to ensure full contraction to normal condition, cutting sub-ducts 10 cm. Clear of duct face and anchoring the sub-ducts within the main duct by an approved method. Cleaning and mandrelling testing sub-duct as specified. If not included in the manufacture, installing a nylon draw cord in each sub-duct. Anchoring draw cord and closing sub-duct ends with an approved seal.

- 2381 SUPPLY AND INSTALL 1 SUB-DUCT IN EMPTY DUCT. (m)
- 2382 SUPPLY AND INSTALL 3 SUB-DUCT IN EMPTY DUCT. (m)
- 2383 SUPPLY AND INSTALL 1 SUB-DUCT IN OCCUPIED DUCT. (m)
- 2440 INSTALL VF, OPTICAL FIBER CABLE ON WALL.

The work unit shall include:

Supply and installing of all necessary fittings. Collecting cable from stores. Running out and setting up cable on wall. Supply and install inscribed labels where required. Make good any damage to wall. Return surplus cable to stores. Clearing site of all excess materials, debris. Equipment etc...

- 2469 INSTALL OPTICAL FIBER ON WALL. (m)

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3.6 CABLE JOINTING (SUPPLY AND INSTALL).

3.6.1 The PU items in this group are normally concerned to Supply of complete Optical Fiber Jointing Closure including the necessary components to close one Joint according to MoT standard and specifications.

3.6.2 The following PU items are listed under this series:

7720 SUPPLY OF OPTICAL FIBER JOINTING CLOSURE.

Supply of complete Optical Fiber Jointing Closure including the necessary components to close one Joint according to MoT standard and specifications.

7722 Jointing Closure for 6 cables, max outer diameter 28 mm. 6, 12, 24, 48, 72, 96, 144 & 256 Fibres (Each).

7800 SUPPLY OF OPTICAL FIBER CABLE CLOSURE KIT .

Supply of complete closure kit (Small, Medium or Large size) including the necessary component to close one joint according to MoT standards and specifications.

7801A JOINTING CLOSURE FOR OPTICAL FIBER CABLE SIZE 1 (EACH).

7801B JOINTING CLOSURE FOR OPTICAL FIBER CABLE SIZE 2 (EACH).

7801C JOINTING CLOSURE FOR OPTICAL FIBER CABLE SIZE 4 (EACH).

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3.7 TERMINATIONS.

3.7.1 The PU items in this group are normally concerned with the installation of terminations on exchange ODFs, but may be used elsewhere for similar works.

3.7.2 The following PU items are listed under this series:

3510 **INSTALLING LINE SIDE ODF TERMINAL BLOCKS.**

The plant unit shall be measured per unit and the work unit shall include:

The installation of the specified terminal block in compatibility with the existing installation, including the supply of any adapters, fixing bolts, etc.

3520 **TERMINATING CABLES ON ODF.**

The plant unit shall be measured per pair and the work unit shall be inclusive of: Supply of cable ties or other fixing materials. Packing and re-packing access hole with fireproof material. Preparing cable end and terminating wires on the allocated terminal block. Testing as required. Marking the terminal block with the appropriate specified designation information. Removal of surplus and scrap materials.

3985 **RISERS AND GUARDS**

The plant unit shall be measured per meter and shall be inclusive of:

Supplying and fitting a galvanized steel U-guard/pipe together with a duct connector and associated hardware.

3985/1 **SUPPLY AND INSTALL U-GUARD PROTECTION (m)**

3985/2 **SUPPLY AND INSTALL GALVANISED STEEL PIPE CABLE PROTECTION (m)**

The steel pipe is meant to replace the U-Guard when the U-Guard protection is inadequate on rustic stone facades. The steel pipe dimensions are as approved by the Engineer.

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3.8 SPECIALESED TESTS ON OPTICAL FIBER CABLES.

3.8.1 The PU items in this group are normally concerned with the specialised test on optical fiber cables.

3.8.2 The following PU items are listed under this series:

The work units in this group shall be inclusive of marking available as necessary, of test sets of approved performance and the skilled labour to operate them.

5471 OPTICAL TIME DOMAIN REFLECTOMETER (OTDR) TESTS.

The work unit shall include Set up, perform and record OTDR. Tests on one optical fiber from an existing termination to any other point as specified. Test may be used as a fault location.

5472 ADDITIONAL OPTICAL TIME DOMAIN REFLECTOMETER (OTDR) TESTS.

From the same Set up as PU # 5471 perform tests on additional fibers as required

5473 OPTICAL ATTENUATION TESTS.

The work unit shall include Set up, perform and record optical attenuation measurement on one fiber from an existing termination to any other point as specified.

5474 ADDITIONAL OPTICAL ATTENUATION TESTS.

From the same Set up as PU # 5473 perform tests on additional fibers as required.

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3.8A REHABILITATION

3.8A.1 The PU items in this group are normally concerned with the rehabilitation of outside plant.

3.8A.2 The following PU items are listed under this series:

5000 REHABILITATION WORKS

The purpose of this section is to provide Plant Unit items for rehabilitation Works that is, repair, reconditioning, relocation and recovery of outside plant.

When applicable, the previously described install, or supply and install PU items shall be used, however, where no such item is available, the PU items in this group shall be used. The PU items in this group shall not normally be used for new works.

The works shall be undertaken in compliance with MoT. Plan, Specifications and Installation standards and practices and, where applicable, the permits and specifications of the Local Municipality, or other competent roads Authority.

Also the regulations and permits of the traffic control authority. It shall be the sole responsibility of the Contractors to acquaint themselves with these specifications, standards and regulations.

The work units shall, as applicable, be inclusive of: - Excavating in any type of soil. Locating existing services, including test pits if required marking and setting out works.

Provision of traffic barriers, warning signs, controls, service accesses and night hazard lamps. Removal of surplus and scrap materials and debris.

5120 REHABILITATION MANHOLE/HANDHOLE ENTRANCE COVER

The works shall include additionally to 5000 series description, surface breaking as required, supply and install cast-in situ reinforced concrete collar or cutting collar and making good. Supply and install reinforced concrete extension to walls of manhole/handhole or cutting manhole/handhole walls and making good. Relocating manhole/handhole frame and covers. Backfilling and reinstating as necessary including supply of necessary approved materials.

The works shall not be undertaken without the approval of the Engineer's supervisor with whom the quantity shall be agreed.

5121 RAISE/LOWER MANHOLE ENTRANCE COVER W/O SUPPLY OF THE FRAME AND COVER FROM 0 TO 60cm - EACH

5124 REPLACING MANHOLE/HANDHOLE/PULL BOX ENTRANCE COVER

The plant unit shall be measured per unit and the work shall include:

Supply and installation of new cover or frame to replace damaged or missing cover or frame at site. Transporting damaged to MoT stores for repairs against receipt from nominated store keeper.

The works shall not be undertaken without the approval of the Engineer's supervisor with whom the quantity shall be agreed

5125 REPLACE MH COVER AND FRAME - EACH

5126 REPLACE MH COVER - EACH

5127 REPLACE MH FRAME - EACH

5127/1.A REPLACE HH1C COVER AND FRAME - EACH

5127/1.B REPLACE HH1C COVER - EACH

5127/1.C REPLACE HH1C FRAME - EACH

5127/2.A REPLACE HH2C COVER AND FRAME - EACH

5127/2.B REPLACE HH2C COVER - EACH

5127/2.C REPLACE HH2C FRAME - EACH

5127/3.A REPLACE HH3C COVER AND FRAME - EACH

5127/3.B REPLACE HH2C COVER - EACH

5127/3.C REPLACE HH2C FRAME - EACH

5128 REPLACE BUILDING ENTRANCE COVER 40X40 - EACH

5129 REPLACE BUILDING ENTRANCE COVER 60X60 - EACH

5201-5202 TESTING DUCTS

Items 5201, 5201 A, 5202 and 5202 A cannot be used without prior approval of the Engineer nor w/o full justification

Items 5201, 5201 A, 5202 and 5202 A cannot be used where a new cable will be installed inside the duct.

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Items 5201, 5201 .A, 5202 and 5202 .A cannot be used at the same time with items of repair of ducts.

5201 TESTING EXISTING EMPTY DUCT - m

The plant unit shall be measured per m and the work unit shall include:

Safety testing before entering any MH. Dewatering of manholes with normal water pump/tanker. Working with care as not to damage any existing cable/joint and if necessary setting cables to gain access to the duct.

The work unit shall additionally include: removing duct plugs from ends, cleaning and mandrel testing using an approved cylinder. Installing draw cord, surface marking of obstruction(s) (if any). Replacement of duct plugs.

5201 .A TESTING EXISTING EMPTY OF SUB DUCT - m
All the work described in PU 5201.

5202 TESTING EXISTING OCCUPIED DUCT - m

All the work described in PU 5201, except using the cylinder, and plus the extra care needed for not to damage the existing cables.

5203 TESTING EXISTING EMPTY DUCT AND CLEARING BLOCKAGE BY WATER PRESSURE - m

The plant unit shall be measured per m.

5203 .A TESTING EXISTING EMPTY OF SUB DUCT AND CLEARING BLOCKAGE BY WATER PRESSURE - m

The plant unit shall be measured per m.

5204 TESTING EXISTING OCCUPIED DUCT AND CLEARING BLOCKAGE BY WATER PRESSURE - m

The plant unit shall be measured per m.

5210 REPAIRING EXISTING DUCTS

5210,5210.A,5211,5211.A units do not include surface breaking and reinstatement. These items cannot be used where the duct can be cleared by the mean of pressure or water washing or any other operation that does not require excavation/replacement of duct.

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These units include tracing the blockage and testing the pipe with approved cylinder after repair

In this series, each represents up to 6 m length section.

5210 REPAIR OF EXISTING EMPTY DUCT ENCASED IN CONCRETE - EACH

This work unit shall include:

Excavation as required to expose damaged duct/s. Breaking concrete as necessary to permit repair of first empty duct. Supply of all necessary materials (incl. PVC pipe) and repairing one duct using an approved method.

Supply and make good concrete. Backfilling of excavation with approved material.

The works shall not be undertaken without the approval of the Engineer's supervisor with whom the quantity shall be agreed

5210.A REPAIR OF EXISTING OCCUPIED DUCT ENCASED IN CONCRETE - EACH

This work unit shall include:

Excavation as required to expose damaged duct/s. breaking concrete as necessary to permit repair of first occupied duct. Supply of all necessary materials (incl. PVC pipe) and repairing one duct using an approved method.

Supply and make good concrete. Backfilling of excavation with approved material.

The works shall not be undertaken without the approval of the Engineer's supervisor with whom the quantity shall be agreed

5211 REPAIR OF EXISTING EMPTY DUCT ENCASED IN CONCRETE (ADDITIONAL AFTER FIRST ONE) - EACH

This work unit shall include:

Breaking concrete as necessary to permit repair of each additional empty damaged duct after the first one. Supply of all necessary materials (incl. PVC pipe) and repair of each additional duct. Supply and make good concrete.

The works shall not be undertaken without the approval of the Engineer's supervisor with whom the quantity shall be agreed

5211.A REPAIR OF EXISTING OCCUPIED DUCT ENCASED IN CONCRETE (ADDITIONAL AFTER 1ST ONE) - EACH







This work unit shall include:

Breaking concrete as necessary to permit repair of each additional occupied damaged duct after the first one. Supply of all necessary materials (incl. PVC pipe) and repair of each additional duct. Supply and make good concrete.

The works shall not be undertaken without the approval of the Engineer's supervisor with whom the quantity shall be agreed



3.9 CABLE SUPPLY

- 3.9.1 The Plant Unit numbering system for CABLE SUPPLY is an adaptation of the main numbering system, in which the 4 digit code is used to identify the type of cable, while a 4 digit decimal suffix is used to identify the sizes of each cable type. This enables all standard cable types and sizes to be given a unique and comparatively easily identified PU item number, while giving facilities to provide PU item numbers for special cables as required.
- 3.9.2 This result is achieved by the use of the convention illustrated in the Table on the next page.
- 3.9.3 Arbitrarily, PU item numbers 6000.0001 to 6000.0004 have been allocated to Subscribers Service Wires and to Jumper Wires. Special Cables can be given a unique PU item number by using the series 6000-nnnn, when the numbers "nnnn" can be arbitrarily allocated to specify up to 9963 other types and sizes of cables, that are not specifically served by the convention.
- 3.9.4 Should one or other type of cable fall into disuse for installation and O & M purposes, then the table should be revised to accommodate new standard cable types.
- 3.9.5 The letter codes trailing the cable descriptions are referring to the Specifications.
- 3.9.6 Cables shall be manufactured, tested, packed and shipped in accordance with the prevailing MoT specifications. Refer to relevant MAT. SPEC.
- 3.9.7 If not otherwise specified, it shall be the manufacturers and/or suppliers responsibility to correlate specifications to the applicable PU item numbers.
- 3.9.8 While this section is for "supply", it shall be understood that items under the Project OFT are intended for "supply/installation", as noted in Section 2 of this Volume.
- 3.9.8 The following table shall be used as reference to PU item numbers to be applied:

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TABLE TO DETERMINE CABLE SUPPLY PLANT UNIT ITEM NUMBERS

6	x	y	z	nnnn	= PU item number for each particular cable
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where:

nnnn represents the cable pair for pair/quad cables.

z represents the wire gauge, as applicable, where:

- 0 = Special cable core type - see specific description
- 1 = Standard coaxial cable - type 1.2/4.4
- 2 = Standard coaxial cable - type 2.6/9.5
- 3 = Open for future allocation
- 4 = 0.4mm solid metallic conductor
- 5 = 0.5mm solid metallic conductor
- 6 = 0.65mm solid metallic conductor
- 7 = Standard optical fibre - type 10/125 - single mode
- 8 = Standard optical fibre - type 50/125 - multi-mode
- 9 = 0.9mm solid metallic conductor

y represents the cable sheath type, where:

- 0 = Special sheath - see specific description
- 1 = Single PE sheath over moisture barrier
- 2 = Double PE sheath over moisture barrier
- 3 = Double PE sheath over moisture barrier and incorporating steel tape armour
- 4 = Double PE sheath over moisture barrier and incorporating steel wire armour
- 5 = Single PE sheath over moisture barrier and incorporating aerial suspension
- 6 = Single PE sheath, without moisture barrier
- 7 = Single halogen free sheath, without moisture barrier
- 8 = Halogen free sheath, as an outer cover to a composite sheath
- 9 = Single PVC sheath without moisture barrier

strand

x represents the cable core type, where:

- 0 = Special type - see specific description
- 1 = Air spaced, paper or pulp insulated
- 2 = Air spaced, solid PE, insulated
- 3 = Air spaced, cellular PE, insulated
- 4 = Air spaced, solid PVC, insulated
- 5 = FILLED, paper or pulp insulated
- 6 = FILLED, solid PE, insulated
- 7 = FILLED, cellular PE, insulated
- 8 = Standard 1.2/4.4 or 2.6/9.5mm Coaxial cable
- 9 = Standard Optical Fibre cable

6 represents the PU System group number

3.9.9 The following PU items are listed under this series:

6910 SUPPLY STANDARD OPTICAL FIBER CABLE. (DIAMETER 8 – 24 mm)

It shall be specified or tenderers shall quote, as applicable, the number And type, if any, of the interstices wires/ pairs included in each size of optical fiber cable.

As and when other counts are identified as standard cables for use in Lebanon, new item decimal suffix number shall be allocated to the appropriate groups.

6910 SUPPLY OPTICAL FIBER CABLE (km).

6910.06	6 OPTICAL FIBER CABLE
6910.012	12 OPTICAL FIBER CABLE
6910.024	24 OPTICAL FIBER CABLE
6910.048	48 OPTICAL FIBER CABLE
6910.072	72 OPTICAL FIBER CABLE
6910.096	96 OPTICAL FIBER CABLE
6910.144	144 OPTICAL FIBER CABLE
6910.256	256 OPTICAL FIBER CABLE

6910 A SUPPLY STANDARD OPTICAL FIBER CABLE. (DIAMETER 8 -18 mm)

It shall be specified or tenderers shall quote, as applicable, the number And type, if any, of the interstices wires/ pairs included in each size of optical fiber cable.

As and when other counts are identified as standard cables for use in Lebanon, new item decimal suffix number shall be allocated to the appropriate groups.

6910A SUPPLY OPTICAL FIBER CABLE (km).

6910.06A	6 OPTICAL FIBER CABLE
6910.012A	12 OPTICAL FIBER CABLE
6910.024A	24 OPTICAL FIBER CABLE
6910.048A	48 OPTICAL FIBER CABLE
6910.072A	72 OPTICAL FIBER CABLE
6910.096A	96 OPTICAL FIBER CABLE
6910.144A	144 OPTICAL FIBER CABLE
6910.256A	256 OPTICAL FIBER CABLE

3.10 OPTICAL PATCH PANEL (SUPPLY AND INSTALL).

3.10.1 The PU items in this group are normally concerned to Supply of complete Optical Patch Panel including all the necessary components according to MoT standard and specifications.

3.10.2 The following PU items are listed under this series:

9100 SUPPLY AND INSTALL OF CONNECTORS WITH THEIR SPLICERS (EACH).

9104 SUPPLY AND INSTALL OF 4 CONNECTORS WITH THEIR SPLICERS (EACH).

9108 SUPPLY AND INSTALL OF 8 CONNECTORS WITH THEIR SPLICERS (EACH).

9112 SUPPLY AND INSTALL OF 12 CONNECTORS WITH THEIR SPLICERS (EACH).



3.11 MISCELLANEOUS MATERIALS & WORKS

3.11.1 The purpose of this group of Plant Unit items is to provide items for supplies and work to cover foreseeable possible needs, not included in the preceding Section.

3.10.2 These items shall not be used where other suitable PU items are available, and shall only be allowable with strict written instructions by the Engineer.

3.11.3 The following PU items are listed under this series:

8000 SUPPLY OF MISCELLANEOUS MATERIALS

The use of these PU items shall be limited to those situations where the supply of the material is not included and none of the previously described PU items can be applied. Records of such materials shall be submitted on daily basis by the Contractor for the Engineer's approval.

The plant unit shall be measured in the work unit indicated in the Bills of Quantities.

The work unit shall be inclusive of:

Supply of material as specified and transport to the required site.

8021 TRENCH BACKFILL MATERIAL - GENERAL - cu.m.

This P.U. shall be used with PU's in the 1000 series for the importation of general backfill when the excavated material has been declared unsuitable by the Engineer. This P.U. will not be applied along with 1000 series in cases where backfill from trenching machine output is used.

8022 TRENCH BACKFILL - HIGHWAY SUB-BASE - cu.m.

This P.U. shall be used with PU's in the 1000 series for the importation of subbase backfill when the excavated material has been declared unsuitable by the Engineer.

8100 MISCELLANEOUS WORKS.

These PU items are provided in case of need.

The plant unit shall be measured in the work unit indicated in the Bills of Quantities.

The work unit shall be inclusive of:

The supply of all necessary materials and work as specified.

8110

EXCAVATION

These PU items are provided to give a basis for the costing of any excavations for outside plant works which are unforeseen and not included in any other PU item.

The basis of this costing shall be for the following grades of soil as defined below:

COMMON EXCAVATION - All materials encountered (except rock as specified) to include, but not be restricted to, sand, loam, silt, gravel, granular material, hard soil, packed stone, broken rock, soft rock, clay, loose stone and other similar materials. Shall include the provision of shoring to prevent sliding in and collapse of unexcavated ground and to restrict area of excavation.

HARD ROCK - Any unaltered and unweathered firm and rigid igneous, metamorphic and sedimentary rock that essentially requires the use of heavy rock breaking machines to fragment the material before it can be excavated.

The plant unit shall be measured per cu. m.

The work unit shall be inclusive of:

The labour and machinery to perform the excavation. Provision of safety equipment including, warning signs, barriers, traffic controls, night hazard warning lights, etc. Provision of shoring and other support as required. When the excavated material is unsuitable to be used as backfill, the supply of new material as provided by P.U. 8021, where so approved by the Engineer. Backfilling and/or removal of surplus excavated materials. Clearing site of all surplus materials, debris, equipment, etc.

The volume to be excavated shall be pre-agreed with the Engineer. Any excavation outside of these limits shall be the Contractor's responsibility.

When it is necessary to excavate in different types of soil, the different volumes shall be agreed with the Engineer before the commencement of backfilling, while the different strata can be identified.

8131

EXCAVATION OF HARD ROCK TO A DEPTH OF 1.5m (cu.m)

8132

EXCAVATION OF HARD ROCK TO A DEPTH > 1.5m TO 3m (cu.m)

Note: Common excavation items may not be used for any excavation outside the specified dimensions which is included in the standard previously described plant unit items.

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