PART 1 - GENERAL

1.1 DESCRIPTION

.1 Include all items to locate and extend an existing ocean outfall line with new as indicated on the drawing.

1.2 MEASUREMENT FOR PAYMENT

.1 Ocean Outfall Line Extension: The supply and installation of new pipe for the purpose of extending the existing ocean outfall line with new shall be included in the lump sum price arrangement as per the following:

.1 Include all costs to locate existing pipe, temporarily remove or realign sections to facilitate new work, temporary support sections to remain and prepare existing pipe for new connection.

.2 Supply and install new pipe material, concrete ballast blocks, bends, and all required fittings as specified and as necessary to route and install pipe to new approximate location indicated on the drawings and/or as directed in the field. All new pipe and fittings to be supplied and installed in accordance with all current Canadian standards, codes and regulations governing this type of work and requirements from the manufacturer. Include all testing, excavation, fittings, butt fusion, neoprene padding, galvanized bolts, fastenings, diving services and all other requirements.

1.3 MATERIAL CERTIFICATION

.1 At least four (4) weeks prior to commencing work, submit manufacturer's test data and certification that pipe materials and fittings meet the requirements of this section. Include manufacturer's drawings, information and shop drawings where pertinent.

1.4 SCHEDULING OF WORK

.1 Schedule work to minimize interruptions to existing services with coordination with the Fish Plant.

.2 Submit schedule of expected interruptions for approval by Departmental Representative and adhere to interruption schedule as approved by Departmental Representative.

.3 Notify Departmental Representative minimum of 24 hours in advance of any interruption in service.

PART 2 - PRODUCTS

2.1 PIPE, JOINTS AND FITTINGS

.1 New HDPE Outfall Line Extension:

.1 250mm Ø - DR 17 HDPE pipe, Sclairpipe or approved equal. Contractor shall confirm existing outfall pipe size prior to ordering of materials.

.2 The pipe shall be made from polyethylene resin compound with a minimum cell classification of PE 345464C for PE 3408 materials in accordance with ASTM D3350. This material shall have a Long Term Hydrostatic Strength of 1600 psi when tested and analyzed by ASTM D2837, and shall be a Plastic Pipe Institute (PPI) TR4 listed compound.

.3 The raw material shall contain a minimum of 2%, well dispersed, carbon black. Additives, which can be conclusively proven not to be detrimental to the pipe may also be used, provided that the pipe produced meets the requirements of this standard.

.4 The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification and from the same raw material supplier.

.5 Compliance with the requirements of this paragraph shall be certified in writing by the pipe supplier, upon request.

.6 Manufacture's Quality System shall be certified by an appropriate independent body to meet the requirements of the ISO 9001:2000 Quality Management Program.

.7 The following shall be continuously indent printed on the pipe or spaced at intervals not exceeding 5 feet: Name and/or trademark of the pipe manufacturer. Nominal pipe size. Dimension ratio.The letters PE followed by the polyethylene grade per ASTM D3350, followed by the Hydrostatic Design basis in 100's of psi e.g. PE 3408. Manufacturing Standard Reference e.g. ASTM F 714 A production code from which the date and place of manufacture can be determined.

.8 Pipe design:

.1 The pipe shall be designed in accordance with the relationships of the ISO-modified formula (see ASTM F714).

$$P = \frac{2S}{(D°/t) - 1}$$

where, S = Hydrostatic Design Stress (psi)
P = Design Pressure Rating (psi)
D° = OD_{avg} for IPS Pipe
OD_{min} for ISO Pipe
t = Minimum Wall Thickness
D°/t = Dimension Ratio

.2 The design pressure rating P shall be derived using the formula above, expressed in pounds per square inch.

.3 The Hydrostatic Design Basis for PE 3408 materials is 1600 psi.

.4 The pipe dimensions shall be as specified in manufacturer's literature.

PART 2 - PRODUCTS (CONT'D)

2.1 PIPE, JOINTS AND FITTINGS (CONT'D)

.2 New HDPE Fittings:

.1 Fabricated HDPE fittings for use in pressure service are to be manufactured in the same diameters as the HDPE pipe specified, but with a heavier wall thickness than that used in the piping system. This results in a fitting with a pressure rating which is greater than or equal to the pipe itself. Unless specifically stated otherwise, the additional wall thickness is on the inside diameter. The butt weld ends of the fittings are counter bored to meet the wall thickness of the mating pipe. Fittings are to be ordered by EDR (Equivalent Dimensional Ratio), in accordance with the manufacturer's recommendations. The pressure rating of the EDR fittings is to be the same as that associated with the DR of the matching pipe.

.2 The manufacturer of the HDPE pipe shall supply all HDPE fittings and accessories as well as any adapters and/or specials required to complete the work as shown on the drawings.

.3 Connection to existing outfall pipe:

.1 Victaulic Coupling – Style 905 – Galvanized, or approved equal.

.1 Bolts/nuts/washers: Galvanized

.2 Gasket as per manufacturer's recommendations.

.3 Concrete ballast blocks:

.1 Concrete as per Section 03 30 00 – Cast-In-Place Concrete.

.2 Sized as detailed on the drawings.

.4 Galvanized bolts: as indicated on the drawings.

2.2 PIPE BEDDING AND SURROUND MATERIAL

.1 In accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Clean pipes, fittings, valves, and appurtenances of accumulated debris and water before installation. Carefully inspect materials for defects. Remove defective materials from site.

PART 3 - EXECUTION (CONT'D)

3.2 PIPE INSTALLATION

.1 Install pipes and concrete ballast blocks as per manufacturer's standard instructions and specifications, including sinking operations. Refer to Sclairpipe Marine Pipeline Installation Guidelines.

.2 Join pipes as per manufacturer's recommendations.

.3 Handle pipe by methods approved by Departmental Representative and recommended by pipe manufacturer. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends.

.4 Lay pipes true to line and grade. Take up and replace defective pipe. Correct pipe which is not in true alignment or grade or pipe which shows undue settlement after installation. Sweep pipe to the location shown on the drawings within the acceptable bend radius recommended by the manufacturer. New outfall line shall be installed without any high points. Prepare ocean floor as necessary.

.5 Do not exceed permissible deflection at joints as recommended by pipe manufacturer.

.6 Keep jointing materials and installed pipe free of dirt and water and other foreign materials. Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.

.7 Position and join pipes with equipment and methods approved by Departmental Representative.

.8 Make required cuts to pipes in an approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

.9 Align pipes carefully before jointing.

.10 Install gaskets to manufacturer's recommendations. Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.

.11 Complete each joint before laying next length of pipe.

PART 3 - EXECUTION (CONT'D)

3.2 PIPE INSTALLATION (CONT'D)

.12 Minimize deflection after joint has been made.

.13 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.

.14 HDPE pipe to be joined by the method of thermal butt fusion as outlined in ASTM D2657, Heat Joining Polyolefin Pipe and Fittings. Butt fusion joining of pipe and fittings shall be performed in accordance with the procedures recommended by the manufacturer. The temperature of the heater plate should be between 400°F and 450°F. Follow the recommendations of ASTM D2657 regarding interfacial pressures for pipe wall thickness less than or equal to 1.5". Follow the manufacturer's recommendations regarding interfacial pressures for pipe walls thicker than 1.5". Pipe or fittings may be joined by butt fusion only by technicians who have been trained and qualified in the use of the equipment.

.15 Connect existing and new outfall line with galvanized coupling as per manufacturer's recommendations.