
PART C3: SCOPE OF WORK

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Status

Should any requirement or provision in the parts of the Scope of Work conflict with any requirement of any Standardised Specification, or any drawings, the order of precedence, unless otherwise specified, is:

Drawings
Scope of Work (Parts C3.1, C3.4, C3.5 and C3.6)
Model Preambles for Trades 2017

Part C3.1: Description of the Works

CITY OF CAPE TOWN

WATER AND SANITATION

CONTRACT NO. 256Q/2019/20

SIR LOWRY'S PASS RIVER - 2.7 KM RIVER UPGRADE FROM THE N2 TO FALSE BAY, GORDON'S BAY

C3.1 Description of the Works

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3.1.1 EMPLOYER'S OBJECTIVES

The existing Sir Lowry's Pass river channel has a limited flow capacity of between 15 and 25m³/s, and is susceptible to flooding on an annual basis leading to inundation of properties on both the east and the west flood plains, and potentially uncontrolled flow through Gordon's Bay.

The upgrade of the Sir Lowry's Pass River is required to secure the safe conveyance of up to the 1 in 100 year return period flood event peak through the Firlands agricultural area and 1:50 year return period in the existing development in Gordon's Bay to reduce the risk of flooding and to free land for development.

3.1.2 OVERVIEW OF THE WORKS

The main part of the work to be carried out includes:

- a) the construction of berms
- b) flattening of the grade
- c) fixing the alignment of the Sir Lowry's river between the N2 in the north and ocean in the south.

This will be achieved by constructing 4 weirs that will act as drop structures as well as the associated earthworks to adjust the vertical and horizontal alignment. It also includes importing and placing large quantities of riprap around the drop structures and along the full length of the rivers.

Miscellaneous work will include the construction of bridges, the construction of erosion protection such as riprap, gabions, berms and minor concrete structures, the construction of NMT pathways, dealing with services, landscaping, and demolition of various walls and structures.

3.1.3 EXTENT OF THE WORKS

The Works to be carried out by the contractor under this contract comprises the following:

- a) The establishment on site of the Contractor's campsite, including facilities for the Engineer's personnel on site.
- b) Demolition
 - Demolish existing houses and structures
 - Demolish existing services. (manholes, pipelines, culverts, etc.)
 - Demolish electrical infrastructure
 - Removal of fencing
 - Removal of trees
 - Clear and grub
 - Clearing of alien vegetation
- c) Accommodation of traffic.
- d) Bulk earthworks.
 - Cut to spoil from river channel.
 - Construction of berms and banks with selected material from cut.
 - Importing & placing of RipRap
 - Filling and shaping of existing ponds and channels
 - Cut and subsequent shaping of hard material

- e) Concrete work.
 - Construction of Drop Structures (Rolling bucket weirs).
 - Construction of bridges
 - Construction of diversion weir.
 - Construction of lined channels.
 - Construction of apron slabs
 - Construction of and alterations to retaining walls.
- f) Drainage.
 - Construction of in situ culverts.
 - Construction of pre cast pipe and box culverts.
 - Construction of overflows and inlets for side drainage.
 - Construction of chutes.
 - Alteration to existing stormwater structures.
- g) Erosion protection.
 - RipRap at weirs.
 - RipRap to berms
 - RipRap to natural channel.
 - Gabions at outlet/overflow structures.
 - Reno mattresses at outlet/overflow structures.
- h) Construction of NMT paths.
- i) Roads
 - Construction of temporary and permanent roadways.
- j) Construct or relocate services.
 - ESKOM cables & overhead power to be relocated by others. Coordination required.
 - City of Cape Town 132kV overhead power to be relocated by others. Coordination required.
 - TELKOM.
 - Water – Bulk water 1675mm diam. Scour valve to be modified and Air valve to be relocated.
 - Sewer – Sewer to be redirected and existing sewer to be demolished.
- k) Construct or relocate fences.
- l) Landscaping and planting of trees, shrubs and smaller plants.
- m) Finishing off.

This description of the Works is not necessarily complete and shall not limit the work to be carried out by the Contractor under this contract

Approximate quantities of each type of work are given in the Bill of Quantities.

3.1.4 LOCATION OF THE WORKS

The location of the works is situated in the vicinity of Gordon's Bay and follows the Sir Lowry's River from 100m above the N2 to the ocean. A locality map is included in the drawings.

3.1.5 TEMPORARY WORKS

The Contractor shall be responsible for designing and providing any temporary works required. Such temporary works shall be removed upon completion of the works.

Temporary works will include the diversion of the Sir Lowry's Pass river during construction in line with the environmental management plan.

A) ACCESS ROADS

Existing gravel roads provide access to certain points along the works, however, the Contractor will be required to adequately clear and level areas to allow access for deliveries and construction vehicles to all points along the routes. It must be noted that access must be maintained to all affected property.

Allowance has been made for two temporary access ways on either side of the Permanent canal, consists of an 85m servitude to the West of the main canal and 15m on the East of the main canal, and shall be leased from the various homeowners according to arrangements made by the City of Town.

B) RIVER CROSSINGS

If so required by the Contractor's work method, temporary bridges may be required to provide access across rivers. These bridges shall be designed and installed by the Contractor and removed after completion of the Works and shall be in accordance with the provisions in the Client's Water Use Licence for this project.

C) TEMPORARY PIPEWORK

The Contractor will be required to construct temporary pipework, end caps and restraints for pressure testing.

D) DIVERSION OF SEWAGE FLOWS

The Contractor will be required to design, install, operate, maintain and remove any temporary diversions, pumps and pipework required to divert sewage flow when tying into existing sumps and manholes.

E) RIVER DIVERSIONS AND DEWATERING

The Contractor will be required to design, construct and remove temporary river diversions and cofferdams to enable the construction of river crossings of pipelines.

The Contractor will also be required design, install, operate, maintain and remove dewatering facilities for deep excavations required for pump station sumps.

F) SHORING OF EXCAVATIONS

The Contractor will be required to design and install adequate shoring for excavations. This will require special attention at the foundations of the drop structures, but will also apply to pipe trenches and other excavations. The pricing of shoring is to be included under the relevant items for earthworks.

G) EXISTING SERVICES

The Contractor will be required to protect, and maintain existing services crossed, or where work takes place adjacent to existing services. Special precaution to be taken where existing services cross or are adjacent to deep trench conditions.

H) FORMWORK FOR CONCRETE WORK

The Contractor will be required provide formwork for the concrete work. The pricing is to be included under the relevant items in the Schedule of Quantities.

3.1.6 CONSTRUCTION PROGRAMME

As soon as practicable after the acceptance of the Contractors Tender, prior to commencement of construction work but in any event within a period of fourteen (14) days Commencement Date, the Contractor shall submit his programme, as required in terms of Clause 5.6 of the GCC 2015, to the Employer's Agent for approval.

The programme shall further be explained clearly and in detail by method statements and any other necessary information.

If the programme is to be revised by reason of the Contractor falling behind his programme, he shall produce a revised programme showing the modifications to the original programme necessary to ensure completion of the works or any part thereof within the time for completion as defined or any extended time granted.

Any proposal to increase the tempo of work must be accompanied by positive steps to increase production by providing more labour and plant to site, or by using the available labour and plant in a more efficient manner.

The approval of any programme by the Employer's Agent shall have no contractual significance other than that the Employer's Agent would be satisfied if the work is carried out according to such programme and that the Contractor undertakes to carry out the work in accordance with the programme. It shall limit the right of the Employer's Agent to instruct the Contractor to vary the programme if circumstances make this necessary.

3.1.7 METHOD STATEMENT

A method statement clearly stating how the work will be executed including the resources to be employed shall be submitted together with the programme of Works.

The construction methods to be followed shall be environmentally sensitive as far as possible. No construction methods that will result in long term or permanent damage to the surrounding natural environment shall be allowed.

The contractor must comply with the requirements of the Environmental Management Plan and the Water Use Licence.

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C3.2 Engineering / Design

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- 3.2.1 DESIGN SERVICES AND ACTIVITY MATRIX
- 3.2.2 EMPLOYER'S DESIGN
- 3.2.3 DESIGN BRIEF
- 3.2.4 DRAWINGS

3.2.1 DESIGN SERVICES AND ACTIVITY MATRIX

The employer is responsible for the design of the permanent Works as reflected in the Contract Documents unless otherwise stated.

The Contractor is responsible for the design of the temporary Works and their compatibility with the permanent works.

The Contractor shall supply all details necessary to assist the Engineer in the compilation of the as-built drawings.

3.2.2 EMPLOYER'S DESIGN

The Employers design is as per the drawings and the specifications.

3.2.3 DESIGN BRIEF (CONTRACTOR'S DESIGN)

Where the Contractor is to supply the design of designated parts of the permanent Works or temporary works he shall supply full working drawings supported by a professional engineer's design certificate.

The Contractor shall be responsible for the production of all shop details for structural steelwork, in accordance with clause 5.1 of SANS 1200 H and/or SANS 1200 HA.

3.2.4 DRAWINGS

The Contractor shall use only the dimensions stated in figures on the Drawings in setting out the Works, and dimensions shall not be scaled from the Drawings, unless required by the Engineer. The Engineer will, on the request of the Contractor in accordance with the provisions of the Conditions of Contract, provide such dimensions as may have been omitted from the Drawings.

The Contractor shall ensure that accurate as-built records are kept of all infrastructure installed or relocated during the Contract. The position of pipe bends, junction boxes, duct ends and all other underground infrastructure shall be given by either co-ordinates, or stake value and offset. Where necessary, levels shall also be given. A marked-up set of drawings shall also be kept and updated by the Contractor. This information shall be supplied to the Engineer's Representative on a regular basis.

All information in possession of the Contractor, required by the Engineer and/or the Engineer's Representative to complete the as-built/record drawings, must be submitted to the Engineer's Representative before a Certificate of Completion will be issued.

The cost of supplying the engineer with all necessary as-built/record drawings and the information shall be included in the contractor's rate for Preliminary and General Charges

The Drawings prepared by the Employer for the permanent Works are issued separately in Vol. 1 FOR TENDER PURPOSES ONLY. The Employer reserves the right to issue amended and/or additional drawings during the Contract.

The Works are detailed on the following drawings:

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Contract

Part C3: Scope of Work

Contract No. Error! Unknown document property name;

C3.2

Engineering

DRAWING NO	DESCRIPTION
4974-0000-IDX-0001	DRAWING INDEX AND LOCALITY PLAN
4974-0000-DGA-C011	SITE GENERAL ARRANGEMENT
4974-0000-DGA-C012	SCHEMATIC - ROADWAYS AND NMT ROUTES
4974-0030-DRD-C001	N2 EARTH BERM - LAYOUT DETAILS - SHEET 1 OF 3
4974-0030-DRD-C002	N2 EARTH BERM - CROSS-SECTIONS - SHEET 2 OF 3
4974-0030-DRD-C003	N2 EARTH BERM - TYPICAL DETAILS - SHEET 3 OF 3
4974-0015-DGA-C001	ALLUVIAL CANAL - KM 0.15 TO KM 0.80 - GENERAL ARRANGEMENT
4974-0080-DGA-C002	ALLUVIAL CANAL - KM 0.80 TO KM 1.40 - GENERAL ARRANGEMENT
4974-0140-DGA-C003	ALLUVIAL CANAL - KM 1.40 TO KM 2.00 - GENERAL ARRANGEMENT
4974-0200-DGA-C004	ALLUVIAL CANAL - KM 2.00 TO KM 2.60 - GENERAL ARRANGEMENT
4974-0260-DGA-C005	ALLUVIAL/DIVERSION CANAL - KM 2.60 TO KM 3.30 - GENERAL ARRANGEMENT
4974-0330-DGA-C006	DIVERSION CANAL - KM 3.30 TO KM 3.95 - GENERAL ARRANGEMENT
4974-0395-DGA-C007	DIVERSION CANAL - KM 3.95 TO KM 4.55 - GENERAL ARRANGEMENT
4974-0455-DGA-C008	DIVERSION CANAL - KM 4.55 TO KM 5.29 - GENERAL ARRANGEMENT
4974-A050-DGA-C009	NATURAL CHANNEL - KM 0.50 TO KM 1.10 - GENERAL ARRANGEMENT
4974-A110-DGA-C010	NATURAL CHANNEL - KM 1.10 TO KM 1.70 - GENERAL ARRANGEMENT
4974-A170-DGA-C011	NATURAL CHANNEL - KM 1.70 TO KM 2.12 - GENERAL ARRANGEMENT
4974-0010-DLS-C001	ALLUVIAL CANAL - KM 0.10 TO KM 1.40 - LONGITUDINAL SECTIONS
4974-0140-DLS-C002	ALLUVIAL CANAL - KM 1.40 TO KM 2.60 - LONGITUDINAL SECTIONS
4974-0260-DLS-C003	DIVERSION CANAL - KM 2.60 TO KM 3.95 - LONGITUDINAL SECTIONS
4974-0031-DSE-C001	ALLUVIAL CANAL - DETAIL CROSS-SECTIONS - KM 0.31 TO KM 0.54
4974-0056-DSE-C002	ALLUVIAL CANAL - DETAIL CROSS-SECTIONS - KM 0.56 TO KM 0.82
4974-0084-DSE-C003	ALLUVIAL CANAL - DETAIL CROSS-SECTIONS - KM 0.84 TO KM 1.10
4974-0112-DSE-C004	ALLUVIAL CANAL - DETAIL CROSS-SECTIONS - KM 1.12 TO KM 1.38
4974-0140-DSE-C005	ALLUVIAL CANAL - DETAIL CROSS-SECTIONS - KM 1.40 TO KM 1.68
4974-0170-DSE-C006	ALLUVIAL CANAL - DETAIL CROSS-SECTIONS - KM 1.70 TO KM 1.96
4974-0198-DSE-C007	ALLUVIAL CANAL - DETAIL CROSS-SECTIONS - KM 1.98 TO KM 2.24
4974-0226-DSE-C008	ALLUVIAL CANAL - DETAIL CROSS-SECTIONS - KM 2.26 TO KM 2.52
4974-0254-DSE-C009	ALLUVIAL CANAL - DETAIL CROSS-SECTIONS - KM 2.54 TO KM 2.80
4974-0282-DSE-C010	ALLUVIAL CANAL - DETAIL CROSS-SECTIONS - KM 2.82 TO KM 3.00
4974-0304-DSE-C011	DIVERSION CANAL - DETAIL CROSS-SECTIONS - KM 3.04 TO KM 3.28
4974-0330-DSE-C012	DIVERSION CANAL - DETAIL CROSS-SECTIONS - KM 3.30 TO KM 3.60
4974-0362-DSE-C013	DIVERSION CANAL - DETAIL CROSS-SECTIONS - KM 3.62 TO KM 3.88
4974-0390-DSE-C014	DIVERSION CANAL - DETAIL CROSS-SECTIONS - KM 3.90 TO KM 4.20
4974-0422-DSE-C015	DIVERSION CANAL - DETAIL CROSS-SECTIONS - KM 4.22 TO KM 4.52
4974-0454-DSE-C016	DIVERSION CANAL - DETAIL CROSS-SECTIONS - KM 4.54 TO KM 4.84
4974-0486-DSE-C017	DIVERSION CANAL - DETAIL CROSS-SECTIONS - KM 4.86 TO KM 5.18
4974-A046-DSE-C001	NATURAL CHANNEL - DETAIL CROSS-SECTIONS - KM 0.46 TO KM 0.78
4974-A080-DSE-C002	NATURAL CHANNEL - DETAIL CROSS-SECTIONS - KM 0.80 TO KM 1.10
4974-A112-DSE-C003	NATURAL CHANNEL - DETAIL CROSS-SECTIONS - KM 1.12 TO KM 1.48
4974-A150-DSE-C004	NATURAL CHANNEL - DETAIL CROSS-SECTIONS - KM 1.50 TO KM 1.80
4974-A182-DSE-C005	NATURAL CHANNEL - DETAIL CROSS-SECTIONS - KM 1.82 TO KM 2.12
4974-0000-DRD-C001	ALLUVIAL CANAL - TYPICAL CROSS-SECTIONS
4974-0000-DRD-C002	DIVERSION CANAL - TYPICAL CROSS-SECTIONS - SHEET 1 OF 2
4974-0000-DRD-C003	DIVERSION CANAL - TYPICAL CROSS-SECTIONS - SHEET 2 OF 2
4974-0000-DRD-C005	ALLUVIAL CANAL - RIPRAP DETAILS
4974-0000-DRD-C301	ALLUVIAL CANAL - SIDE INLETS
4974-0000-DRD-C302	NATURAL CHANNEL - TYPICAL DETAILS
4974-0000-DRD-C303	NATURAL CHANNEL - SCOUR PROTECTION AT INLET AND RIPRAP CASCADE
4974-0000-DRD-C304	ALLUVIAL CANAL - CULVERT AND SIDE INLET MANHOLE
4974-0305-DGA-C301	WESTERN CANAL - GENERAL ARRANGEMENT - SHEET 1 OF 3
4974-0305-DGA-C302	WESTERN CANAL - GENERAL ARRANGEMENT - SHEET 2 OF 3
4974-0305-DGA-C303	WESTERN CANAL - GENERAL ARRANGEMENT - SHEET 3 OF 3
4974-0305-DGA-C304	ST ANDREW'S ROAD - GRAVEL ACCESS - GENERAL ARRANGEMENT

4974-0305-DRD-C301	ST ANDREW'S ROAD - GRAVEL ACCESS - SECURITY FENCE & GATE DETAILS
4974-0305-DGA-C305	SUNSET DRIVE - GRAVEL ACCESS - GENERAL ARRANGEMENT
4974-0305-DGA-C306	NEPTUNE'S WAY - GRAVEL ACCESS - GENERAL ARRANGEMENT
4974-0315-DGA-C401	GORDON'S BAY WWTW - SITE LAYOUT
4974-0315-DGA-C402	GORDON'S BAY WWTW - SERVICES LAYOUT
4974-0315-DGA-C403	GORDON'S BAY WWTW - MATURATION POND LAYOUT
4974-0315-DRD-C410	GORDON'S BAY WWTW - CHAMBER DETAILS - SHEET 1 OF 4
4974-0315-DRD-C411	GORDON'S BAY WWTW - CHAMBER DETAILS - SHEET 2 OF 4
4974-0315-DRD-C412	GORDON'S BAY WWTW - CHAMBER DETAILS - SHEET 3 OF 4
4974-0315-DRD-C413	GORDON'S BAY WWTW - CHAMBER DETAILS - SHEET 4 OF 4
4974-0315-DRD-C414	GORDON'S BAY WWTW - MATURATION POND DETAILS
4974-0315-DRD-C415	GORDON'S BAY WWTW - FENCELINE AND MOLE BARRIER DETAILS
4974-0311-DGA-C301	EASTERN CANAL GENERAL ARRANGEMENT - SHEET 1 OF 2
4974-0311-DGA-C302	EASTERN CANAL GENERAL ARRANGEMENT - SHEET 2 OF 2
4974-0258-DRD-C002	DAM WALL - REM. ERF 5109 - MODIFICATION DETAILS
4974-0030-DRD-C401	FOUL SEWER AT N2 BRIDGE - LAYOUT, LONGSECTION & TYPICAL DETAILS
4974-0000-DRD-C220	PRECAST CONCRETE PORTAL CULVERTS: INLET AND OUTLET DETAILS
4974-0000-DRD-C221	PRECAST CONCRETE PORTAL CULVERTS: REINFORCEMENT AND DETAILS
4974-0178-DRD-C301	BULK WATER - SCOUR VALVE DETAILS
4974-0178-DRD-C302	BULK WATER - AIR VALVE LAYOUT AND DETAILS AT CH 1711
4974-0178-DRD-C303	BULK WATER - LONG SECTION INDICATING AIR VALVE LOCATION
4974-A037-DLS-C310	NATURAL CHANNEL - INLET CULVERT LONGSECTION
4974-A037-DGA-S001	NATURAL CHANNEL - INLET CULVERT GENERAL ARRANGEMENT
4974-A173-DRD-C200	LANCASTER ROAD KM A1.73 - MODIFICATION AND DETAILS
4974-0065-DRD-C201	ALLUVIAL CANAL - ROADS - MAINTENANCE ACCESSES KM 0.65 & KM 1.05
4974-0142-DRD-C202	ALLUVIAL CANAL - ROADS - NMT & VEHICLE CROSSING KM 1.42
4974-0145-DRD-C203	ALLUVIAL CANAL - MAINTENANCE ACCESS ROAD - KM 1.45
4974-0250-DRD-C204	ALLUVIAL CANAL - ROADS - PRIVATE ACCESS (REM. ERF 5109) KM 2.5
4974-0128-DRD-C503	ESKOM 400KV MAST - PROTECTION DETAILS
4974-0042-DGA-S001	DROP STRUCTURE A SV 420 - GENERAL ARRANGMENT
4974-0042-DFN-S001	DROP STRUCTURE A SV420 - FOUNDATION LAYOUT AND DETAILS
4974-0083-DGA-S001	AUXILIARY SPILLWAY B SV 825 - GENERAL ARRANGMENT
4974-0088-DGA-S001	DROP STRUCTURE B SV879 - GENERAL ARRANGMENT
4974-0088-DFN-S001	DROP STRUCTURE B SV 879 - FOUNDATION LAYOUT AND DETAILS
4974-0088-DGA-S100	DROP STRUCTURE B SV 879 - PEDESTRIAN BRIDGE - GENERAL ARRANGEMENT
4974-0135-DGA-S001	AUXILIARY SPILLWAY C SV 1350 - GENERAL ARRANGMENT
4974-0142-DGA-S001	DROP STRUCTURE C SV 1420 - GENERAL ARRANGMENT
4974-0142-DFN-S001	DROP STRUCTURE C SV 1420 - FOUNDATION LAYOUT AND DETAILS
4974-0142-DGA-S100	DROP STRUCTURE C SV 1420 - VEHICLE BRIDGE - GENERAL ARRANGEMENT
4974-0195-DGA-S001	AUXILIARY SPILLWAY D SV 1950 - GENERAL ARRANGMENT
4974-0202-DGA-S001	DROP STRUCTURE D SV 2016 - GENERAL ARRANGMENT
4974-0202-DFN-S001	DROP STRUCTURE D SV 2016 - FOUNDATION LAYOUT AND DETAILS
4974-0202-DGA-S100	DROP STRUCTURE D SV 2016 - PEDESTRIAN BRIDGE - GENERAL ARRANGEMENT
4974-0304-DGA-S001	TRANSITION STRUCTURE 1 - SV 3036 - GENERAL ARRANGEMENT
4974-0304-DSE-S001	TRANSITION STRUCTURE 1 - SECTIONS
4974-0304-DRD-S001	TRANSITION STRUCTURE 1 - CONCRETE DETAILS
4974-0310-DRD-S001	DIVERSION CANAL SV 3100 - 3800 - CONCRETE LAYOUT AND DETAIL
4974-0380-DGA-S001	TRANSITION 2 SV 3800 - CONCRETE LAYOUT AND DETAILS

4974-0325-DGA-S100	GOLF COURSE FOOTBRIDGE SV 3250 - GENERAL ARRANGEMENT - SHEET 1 OF 2
4974-0325-DGA-S101	GOLF COURSE FOOTBRIDGE SV 3250 - GENERAL ARRANGEMENT - SHEET 2 OF 2
4974-0339-DGA-S100	NMT FOOTBRIDGE SV 3390 - GENERAL ARRANGEMENT - SHEET 1 OF 2
4974-0339-DGA-S101	NMT FOOTBRIDGE SV 3390 - GENERAL ARRANGEMENT - SHEET 2 OF 2
4974-0386-DGA-S001	ST ANDREW'S BRIDGE SV 3860 - GENERAL ARRANGEMENT
4974-0400-DGA-S001	DENNEHOF BRIDGE SV 4000 - GENERAL ARRANGEMENT
4974-0449-DGA-S001	HIBISCUS BRIDGE SV 4490 - GENERAL ARRANGEMENT
4974-A118-DGA-S100	FOOTBRIDGE A1 SV A1182 - CLIPPER CRESCENT BRIDGE - G.A.
4974-A158-DGA-S100	FOOTBRIDGE A2 SV A1580 - GARDEN CRESCENT BRIDGE - G.A.
4974-A181-DGA-S100	FOOTBRIDGE A3 SV A1811 - BAY CRESCENT BRIDGE - G.A.
4974-0311-DGA-S001	EASTERN LINK - SV 3110 GENERAL ARRANGEMENT
4974-0311-DLS-S001	EASTERN LINK - SV 3110 LONG SECTION 1 - SHEET 1 OF 3
4974-0311-DLS-S002	EASTERN LINK - SV 3110 LONG SECTION 2 - SHEET 2 OF 3
4974-0311-DLS-S003	EASTERN LINK - SV 3110 LONG SECTION 3 - SHEET 3 OF 3
4974-0311-DRD-S001	EASTERN LINK - SV 3110 CONCRETE DETAILS
4974-0311-DSE-S001	EASTERN LINK - SV 3110 SECTIONS
4974-0337-DGA-S001	WESTERN CHANNEL LINK - SV 3370 GENERAL ARRANGEMENT
4974-0165-DGA-S001	BLOCK BOUNDARY WALL - ERF 5094 SV 1650 - GENERAL ARRANGEMENT
4974-0340-DGA-S001	GABION WALL EXTENSION - SV 3400 TO 3625 - GENERAL ARRANGEMENT

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C3.3 Procurement

CONTENTS

- 3.3.1 PREFERENTIAL PROCUREMENT
- 3.3.2 SUB-CONTRACTING PROCEDURES

3.3.1. PREFERENTIAL PROCUREMENT

The Works shall be executed in accordance with the conditions associated with the granting of preferences detailed in the **Preference Schedule** where preferences are granted in respect of B-BBEE contribution.

Financial penalties, as described in the **Preference Schedule**, shall be applied in the event that the Contractor is found to have breached any of the conditions contained in the **Preference Schedule** (unless proven to be beyond the control of the Contractor).

Notwithstanding the application of penalties, the Contractor's attention is drawn to other sanctions that may be applied by the Employer (listed in the **Preference Schedule**) with due consideration to the circumstances.

3.3.2. SUB-CONTRACTING PROCEDURES

3.3.2.1 General

The selection of all subcontractors shall be subject to the approval of the Employer's Agent.

Subcontractors shall have a CIDB grading appropriate to the class and value of the work to be undertaken by them.

3.3.2.2 Monitoring the use of sub-contractors

Notwithstanding the restriction on sub-contracting as described on the **Preference Schedule**, it is recognised that sub-contracting is an integral part of construction, which the conditions of contract make provision for.

In order, however, to comply with the requirements of the **Preference Schedule**, the Contractor shall submit to the Employer's Agent, on a monthly basis, a **B-BBEE Sub-contract Expenditure Report**. The format of this report is provided in Annex 2 attached.

The Contractor shall submit to the Employer's Agent documentary evidence in accordance with the applicable codes of good practise, of the B-BBEE status level of every sub-contractor employed by the Contractor. Until such time as documentary evidence as described above has been submitted to the Employer's Agent, a sub-contractor shall be deemed to be a non-compliant contributor.

The Contractor shall furthermore, on the written request of the Employer's Agent, provide documentary evidence showing the value of work sub-contracted to any or all of the sub-contractors employed by the Contractor.

3.3.2.2 Procedure for the selection of sub-contractors/suppliers

Where monetary allowances for provisional sums or prime costs items have been provided in the Bills of Quantities, and where the work or items to which the allowances relate are to be executed/supplied by sub-contractors/suppliers, then the following selection process shall be followed in respect of the required sub-contractors/suppliers:

Where the monetary allowance is less than or equal to R200 000, the Contractor shall invite three quotations from suitably qualified sub-contractors/suppliers for the required work or items. The selection of the three sub-contractors/suppliers shall be in consultation with, and to the approval of the Employer's Agent. The evaluation of the quotations received must include a preference points system as described in F.3.11 of the Tender Data.

Where the monetary allowance is in excess of R200 000, an open competitive tender process shall be followed in respect of the selection of a sub-contractor/supplier for the required work or items. In such circumstances, tender documentation will be prepared by the Employer's Agent in consultation with and to the approval of the Contractor; invitations to tender will be advertised in the media by the Employer's Agent on behalf of the Contractor, and a sub-contractor/supplier will be selected from the responses received, by the Contractor and Employer's Agent in consultation. The evaluation of the offers received must include a preference points system as described in F.3.11 of the Tender Data. The Contractor must satisfy itself that the selected sub-contractor/supplier can meet the requirements of the sub-contract /supply agreement and may, on reasonable grounds, elect not to employ a particular sub-contractor/supplier.

In both instances above (less than or equal to R200 000 or in excess of R200 000), the contractual relationship between the Contractor and sub-contractor/supplier shall be as described in the conditions of contract.

CITY OF CAPE TOWN

WATER AND SANITATION

CONTRACT NO. 256Q/2019/20

SIR LOWRY'S PASS RIVER - 2.7 KM RIVER UPGRADE FROM THE N2 TO FALSE BAY, GORDON'S BAY

C3.4 Construction

CONTENTS

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- 3.4.4 LOCAL PRODUCTION AND CONTENT
- 3.4.5 EMPLOYMENT OF SECURITY PERSONNEL
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3.4.1. APPLICABLE STANDARDISED SPECIFICATIONS

Where reference is made to the standard specifications in this contract, it shall mean the COLTO Standard Specifications for Road and Bridge Works for State Road Authorities 1998, prepared by the Committee of Land Transport Officials complete with any corrections and amendments applicable at the time of tendering.

The tenderer shall obtain / purchase it from the South African Institution of Civil Engineering (SAICE), Private Bag X200, Halfway House 1685, Tel: (011) 805 5947, Fax: (011) 805 5971, e-mail: civilinfo@saice.org.za. This document may also be inspected, by appointment, at the offices of the employer and the consulting engineers during normal office hours. The COLTO Standard Specifications for Road and Bridge Works for State Road Authorities that are applicable are listed in C3.7.1.

This shall be supplemented by The SANS Standardised Specifications for Civil Engineering Construction prepared by Standards South Africa. These publications are available and tenderers must obtain copies at their own cost from Standards South Africa, Private Bag X191, PRETORIA, 0001.

3.4.2 PARTICULAR / PROJECT SPECIFIC SPECIFICATIONS

The Particular Specifications for work not covered by the COLTO Standard Specifications for Road and Bridge Works for State Road Authorities 1998 are listed in C3.4.2.1.

Variations and additions to the COLTO Standard Specifications for Road and Bridge Works for State Road Authorities 1998 are listed in C3.4.2.1 and included in C3.4.2.2.

C3.4.2.1 PART A: LIST OF APPLICABLE SPECIFICATIONS

Applicable Standard Specifications

The following COLTO Standard Specifications for Road and Bridge Works for State Road Authorities 1998 are applicable:

SECTION 1100	:	Definitions and terms
SECTION 1200	:	General requirements and provisions
SECTION 1300	:	Contractor's establishment on site and general obligations
SECTION 1400	:	Housing, offices and laboratories for the engineer's site personnel
SECTION 1500	:	Accommodation of traffic
SECTION 1600	:	Overhaul
SECTION 1700	:	Clearing and grubbing
SECTION 2100	:	Drains
SECTION 2200	:	Prefabricated culverts
SECTION 2300	:	Concrete kerbing, concrete channelling, chutes and downpipes, and
		linings for open drains
SECTION 3100	:	Borrow materials

SECTION 3200	:	Selection, stockpiling and breaking-down the material from borrow pits and cuttings, and existing pavement layers, and placing and compacting the gravel layers and existing pavement layers.
SECTION 3300	:	Mass earthworks
SECTION 3400	:	Pavement layers of gravel material
SECTION 3500	:	Stabilization
SECTION 3600	:	Crushed-stone-base
SECTION 3700	:	Plant-mixed paver-laid pavement layers
SECTION 3800	:	Breaking Up existing pavement layers
SECTION 4100	:	Prime coat
SECTION 4200	:	Asphalt base and surfacing
SECTION 4300	:	Materials and general requirements
SECTION 4700	:	Surfacing of bridge decks
SECTION 5100	:	Pitching, stonework and protection against erosion
SECTION 5200	:	Gabions
SECTION 5300	:	Guideblocks
SECTION 5400	:	Guardrails
SECTION 5500	:	Fencing
SECTION 5600	:	Road signs
SECTION 5700	:	Road markings
SECTION 5800	:	Landscaping and planting plants
SECTION 5900	:	Finishing the road and road reserve and treating old roads
SECTION 6200	:	False, work formwork and concrete finish
SECTION 6300	:	Steel reinforcement for structures
SECTION 6400	:	Concrete for structures
SECTION 6600	:	No-fines concrete, joints, bearings, bolt groups for electrification and parapets and drainage for structures
SECTION 6700	:	Structural steelwork
SECTION 6800	:	Construction tolerances for structures
SECTION 7100	:	Concrete pavements
SECTION 7300	:	Concrete block paving for roads
SECTION 8100	:	Testing material and workmanship
SECTION 8200	:	Quality Control (Scheme 1)

Variations and additions to the Standard Specifications

The following variations and additions to the **COLTO Standard Specifications for Road and Bridge Works for State Road Authorities 1998** apply to this Contract:

SECTION B1100	:	Definitions and terms
SECTION B1200	:	General requirements and provisions
SECTION B1300	:	Contractor's establishment on site and general obligations
SECTION B1500	:	Accommodation of traffic
SECTION B1600	:	Overhaul
SECTION B1700	:	Clearing and grubbing
SECTION B3300	:	Mass earthworks
SECTION B4700	:	Surfacing of bridge decks
SECTION B5100	:	Pitching, stonework and protection against erosion
SECTION B5500	:	Fencing
SECTION B6100	:	Foundations for structures
SECTION B6200	:	Falsework, formwork and concrete finish
SECTION B6400	:	Concrete for structures
SECTION B6500	:	Prestressing
SECTION B6600	:	No-fines concrete, joints, bearings, bolt groups for electrification and parapets and drainage for structures

Particular Specifications

The following Particular Specifications for work not covered by the **COLTO Standard Specifications for Road and Bridge Works for State Road Authorities 1998** are also included hereunder:

SECTION B1800 : Daywork

SPECIFICATION PA: Maintaining Continuity of Flow in Waste Water Treatment Works

SPECIFICATION PC: Method for Surveying Submerged Sludge

SPECIFICATION LX: Alterations to Existing Steenbras Raw Water Main

SPECIFICATION H: Health and Safety Specification (contained in Section C3.5 of this document)

SPECIFICATION E: Environmental Management Specification (contained in Section C3.5 of this document)

The following SANS 1200 Standardised Specifications for Civil Engineering Construction prepared by the South African Bureau of Standards are applicable:

SANS 1200 C:	Site Clearance
SANS 1200 D:	Earthworks
SANS 1200 DB:	Earthworks (Pipe Trenches)
SANS 1200 DK:	Gabions and Pitching
SANS 1200 DM:	Earthworks (Roads, subgrade)
SANS 1200 G:	Concrete
SANS 1200 H:	Structural Steelwork
SANS 1200 HA:	Structural Steelwork (Sundry Items)
SANS 1200 HB:	Cladding and Sheeting
SANS 1200 HC:	Corrosion Protection of Structural Steelwork
SANS 1200 L:	Medium-Pressure Pipelines
SANS 1200 LB:	Bedding (Pipes)
SANS 1200 LC:	Cable Ducts
SANS 1200 LD:	Sewers
SANS 1200 LE:	Stormwater Drainage
SANS 1200 ME:	Subbase
SANS 1200 MF:	Base
SANS 1200 MH:	Asphalt base and surfacing
SANS 1200 MJ:	Segmented Paving
SANS 1200 MK:	Kerbing and Channelling
SANS 1200 MM:	Ancillary Roadworks

These standardised specifications are obtainable from the South African Bureau of Standards. The Contractor shall obtain copies of these documents at his own costs.

Interpretations of and variations to the Standardised SANS Specifications are set out below.

The term "Engineer" appearing in any of the SANS 1200 Standardised Specifications must be replaced with the terms "Employer's Agent".

C3.4.2.2 PART B: VARIATIONS AND ADDITIONS TO THE STANDARD SPECIFICATIONS

Amendments to the standard specifications are included in this section.

(i) The project specifications form an integral part of the contract documents and supplement the standard specifications.

(ii) In the event of any discrepancy between the project specifications and a part of the standard specifications, the bill of quantities, or the drawings with regard to the scope or quality of the works, the project specifications shall take precedence.

(iii) The standard specifications, which form part of this contract, have been written to cover all phases of work normally required for road contracts, and they may therefore cover items not applicable to this particular contract.

In certain clauses the standard specifications allow a choice to be specified in the project specifications between alternative materials or methods of construction and for additional requirements to be specified to suit a particular contract. Details of such alternatives or additional requirements applicable to this contract are contained in this part of the project specifications.

The number of each clause and each payment item in this part of the project specifications consists of the prefix B followed by a number corresponding to the number of the relevant clause or payment item in the standard specifications. The number of a new clause or a payment item which does not form part of a clause or a payment item in the standard specifications and which is included here, is also prefixed by B followed by a new number. The new numbers follow on the last clause or item number used in the relevant section of the standard specifications.

SECTION 1100: DEFINITIONS AND TERMS

B1115 GENERAL CONDITIONS OF CONTRACT

Replace clause 1115 with the following:

"The General Conditions of Contract for Construction Works (3rd Edition) 2015 (GCC 2015) published by the South African Institute of Civil Engineering, together with the special conditions of contract forming part of the contract.

All general conditions of contract references in the COLTO Standard Specifications for Road and Bridge Works are to the COLTO General Conditions of Contract for Road and Bridge Works for State Road Authorities. Consequently, all references in the COLTO Standard Specifications have to be amended accordingly to reflect the appropriate general conditions of contract relevant for the contract. The COLTO Standard Specifications have been scrutinized and the clauses, which refer to the COLTO General Conditions of Contract, identified. Each COLTO clause reference is tabulated in table 1115/1 below (context of reference is also given) together with the relevant equivalent clause in the SAICE General Conditions of Contract for Construction Works applicable for this contract.

Whereas every effort has been made to include all of the affected clauses in the table, there may be some omissions. In every case, however, the SAICE General Conditions of Contract for Construction Works, as amended by the special conditions of contract in the contract data, shall apply and the contractor shall be responsible for interpretation of the equivalent clause.

• Table 1115/1

REFERENCES IN COLTO STANDARD SPECIFICATIONS TO THE COLTO GENERAL CONDITIONS OF CONTRACT AND RELEVANT SAICE GENERAL CONDITIONS OF CONTRACT FOR CONSTRUCTION WORKS 2015					
COLTO Standard Specification		COLTO General Conditions of Contract 1998 (GCC)		SAICE General Conditions of Contract for Construction Works: 3rd Edition 2015	
Clause No	Page No	Clause No	Description or Reference	Clause No	Description or Reference
1115	1100-2		Definition of GCC		Definition of SAICE
1202	1200-2	15	Construction programme	5.6	Programme
1115	1100-2		Definition of GCC		Definition of SAICE
1202	1200-2	15	Construction programme	5.6	Programme
1206	1200-3	14	Setting out of works and beacons		Omitted
1209(e)	1200-5	52(2)	Valuation of material brought onto site	6.10.2	Valuation of material brought onto site
1210	1200-5	54	Certificate of practical completion	5.14	Completion
1212(l)	1200-7	49(2)	CPA on alternative designs	6.8.2	CPA on alternative designs
1215	1200-9	45	Extension of time for completion due to abnormal rainfall.	5.12	Extension of time for completion due to abnormal rainfall.
1217	1200-10	35	Care of the works	8.2	Care of the works
1303(iii)	1300-1	49	Price adjustment Item 13.01 (a)	6.8	Price adjustment Item 13.01 (a)
1303(iii)	1300-2	49	Price adjustment Item 13.01 (b)	6.8	Price adjustment Item 13.01 (b)
1303(iii)	1300-1	53	Variations exceeding 20%	6.11	Variations exceeding 15%
1303(iii)	1300-2	53	Variations exceeding 20%	6.11	Variations exceeding 15%
1303	1300-2	12	Payment Item 13.01 (c)	5.2	Commencement of the Works
1303	1300-2	45	Payment Item 13.01 (c)	5.12	Payment Item 13.01 (c)
1403(c)(ii)	1400-4	40(1)	Variation for rented accommodation	6.4	Variation for rented accommodation
1505	1500-3	40(1)	Variation for temporary drainage	6.4	Variation for temporary drainage
Item 15.08	1500-8	48	Payment of Provisional Sum	6.6	Payment of Provisional Sum
Item 15.09	1500/8	48	Payment of Provisional Sum	6.6	Payment of Provisional Sum

REFERENCES IN COLTO STANDARD SPECIFICATIONS TO THE COLTO GENERAL CONDITIONS OF CONTRACT AND RELEVANT SAICE GENERAL CONDITIONS OF CONTRACT FOR CONSTRUCTION WORKS 2015					
COLTO Standard Specification		COLTO General Conditions of Contract 1998 (GCC)		SAICE General Conditions of Contract for Construction Works: 3rd Edition 2015	
Clause No	Page No	Clause No	Description or Reference	Clause No	Description or Reference
Item 15.11	1500-8	48	Payment of Provisional Sum	6.6	Payment of Provisional Sum
Note (2)	3100-4	40	Payment for prospecting for materials	6.5.2	Payment for prospecting for materials
3204(b)(iii)	3200-2	40	Payment for oversize material	6.5.2	Payment for oversize material
3303(b)	3300-2	2	Employer's Agent's decisions, with reference to materials classification	3.2	Employer's Agent's decisions, with reference to materials classification
5803(c)	5800-3	40	Variation, for landscaping	6.4	Variation, for landscaping
5805(d)	5800-4	40	Variation, for grassing	6.4	Variation, for grassing
Item 58.10	5800-10	48	Payment for Extra Work	6.4	Payment for Extra Work
8103(c)	8100-1	40	Variation, for testing material	6.4	Variation, for testing material
Item 81.03	8100-26	22	Clearance of site on completion, with reference to core drilling	5.15	Clearance of site on completion, with reference to core drilling

Add the following new clause:

"B1156 OTHER DEFINITIONS

The COLTO Standard Specification for Roads and Bridges has been written for all contractors, Employers and Employer's Agents. Similarly, the works and the site are not defined and the general nature of the entities and elements that collectively constitute construction under a contract are characterized by the use of lower case letters throughout.

These project specifications continue to use lowercase spellings in order to avoid the appearance of the upper case and lower case words to describe or prescribe the same elements of work required on this project. However, for the purposes of this contract the following definitions shall apply:

(a) **Contractor:** The Contractor and the contractor is the same persona defined under clause 1.1.1.9 of the general conditions of contract, but who will only be formally identified by the completed form of Acceptance C1.1.2 in this document and which will be bound into the final contract document.

(b) **Employer:** The Employer and employer is the same persona, and is defined in C1.2.3 Contract Specific Data, and clause 1.1.1.15 of the general conditions of contract.

(c) **Employer's Agent:** The Employer's Agent and engineer is the same persona, and is defined in the C1.2.3 Contract Specific Data, and clause 1.1.1.16 of the general conditions of contract.

(d) **Schedule of quantities:** The terms "Schedule of Quantities", (used throughout the standard specifications) and "Bill of Quantities", (used in all other documents forming part of this contract), are synonymous.

(e) **Specifications:** All specifications forming part of the contract whether they appear in the standard specifications, the project specifications or on the drawings, or any other specifications referred to in the said specifications, or be they written instructions given to the contractor.

(f) **Standard specifications:** The standard specifications for road and bridge works prescribed by the employer and forming part of the contract.

(g) **Project specifications:** Any specifications appearing under this heading and forming part of the contract, and containing any amendments to, omissions from or additions to the standard specifications that may be required in connection with a specific project."

B1157 PROCESS CONTROL

Process controls is the responsibility of the contractor and refers to all testing requirements to be executed during the Works to ensure that the completed permanent works comply with the specifications and drawings prior to proceeding with the following task or activity.

B1158 ACCEPTANCE CONTROL

Acceptance control is the responsibility of the Employer's Agent and refers to all testing requirements to be executed during the Works to determine the acceptability or otherwise of the materials and workmanship of the Works as executed by the Contractor.

It is the responsibility of the contractor to ensure that completed work is presented in writing to the Employer's Agent timeously for acceptance in order to ensure that necessary sampling and testing can be performed as required.

B1159 AGGREGATE SIZE

Where reference is made in this specification or the standard specifications to aggregate size, nominal aggregate size or maximum aggregate size, the aggregate size as listed shall be replaced with the new corresponding aggregate size as indicated in the following table:

Aggregate size	New aggregate size
26,5	28
19	20
13,2	14
9,5	10
6,7	7
4,75	5
2,36	2
1,18	1

B1160 COMPACTION

The standard for compaction efforts shall change from Modified AASHTO Density as per TMH1 Test Method to Maximum Dry Density (MDD) as per SANS 3001. Where reference is made to compaction or of Modified AASHTO Density in the tender documentation or the standard specifications or wherever there is conflict between the tender documentation and the standard specifications, the SANS 3001 specification and terminology shall govern.

B1161 SANS BITUMEN SPECIFICATIONS

Where reference is made in this specification or the standard specifications to the SABS / SANS bitumen specifications, the following new SANS specification shall apply:

- SANS 4001-BT1:2014 - Penetration Grade Bitumen's
- SANS 4001-BT2:2012 - Cutback Bitumen
- SANS 4001-BT3:2014 - Anionic Bitumen Road Emulsion
- SANS 4001-BT4:2014 - Cationic Bitumen Road Emulsion
- SANS 4001-BT5:2014 - Inverted Bitumen Emulsion

On this contract where a SANS specification exists, all products shall conform to the specification and shall bear the inspection seal or brand mark of the SABS (South African Bureau of Standards)."

SECTION 1200: GENERAL REQUIREMENTS AND PROVISIONS

B1202 SERVICES

Add the following after the first paragraph of clause 1202 of the specifications:

"Various types of services, both overhead and underground, exist within the boundaries of the site. It is envisaged that it will be necessary for the contractor to arrange for the removal, relocation, reinstatement or protection of existing services. Should any work become necessary due to unforeseen circumstances then all work shall be done strictly in accordance with the requirements of the relevant service owner and in accordance with the requirements of these project specifications and the standard specifications where applicable."

Add the following after the sixth paragraph of clause 1202 of the Specifications:

"The contractor's attention is drawn to the relevant clauses of the general and special conditions of contract regarding liability for damage to the works, or property, or injury to persons arising from the construction of the works. His attention is also drawn to clause 8.6 (GCC 2015) of the general conditions of contract regarding insurance to be effected by the contractor. Special attention is drawn to the exclusions in this insurance policy and particularly to the exclusions regarding consequential damage."

Add the following:

"EXISTING SERVICES

Prior to commencing work, the contractor shall confer with all authorities and departments concerned and obtain the necessary way leaves for both overhead and underground services affected by the works and shall satisfy himself that he has obtained all the relevant information required to complete the contract. The contractor shall carry out the works with the minimum interference to existing services. He shall co-operate with all authorities and departments concerned and he shall be solely responsible for carrying out the following operations and checks:

(i) He shall inform all authorities and departments in good time before the correct stage of the construction is reached for the laying and/or relaying of any particular services.

(ii) He shall set out the lines and levels of kerbs, pipes, culverts and any other necessary features of the contract in order that authorities and departments are able to lay and/or relay services correctly.

It shall be clearly understood that obtaining the necessary way leaves and any extra work, such as the removal of any portion of the works already executed either by the contractor or other authority or department and its subsequent re-execution, which is caused by the contractor's failure to observe and carry out his responsibilities as specified, will be at his own cost.

If the contractor considers that the progress of the works is being retarded by the failure of any authority or department to lay, remove or divert pipes, ducts, services, cables or poles within a reasonable time, he shall immediately notify the engineer in writing, stating clearly the number of days of delay claimed. The engineer will then decide whether such a claim is justifiable, and in the event of the claim being accepted he will hand to the contractor a certificate stating clearly the number of days of delay sanctioned.

The cost of repairing any damage to services, due to miscalculations or negligence on the part of the contractor or his failure to carry out the duties set out in this clause, shall be borne by the contractor.

(a) Protection of overhead and underground services

Although every care has been exercised in the presentation of the available data, the employer cannot and does not vouch for the accuracy or completeness of the information shown. Whenever the contractor deems it necessary to determine the exact location of an existing service or obstruction, he shall, at his own expense, make any examination that he may consider desirable in advance of the work, and the employer does not accept any liability for loss, damage or delay to the contractor as a result of the non-location or inaccurate location of services or obstructions.

Where no underground services are shown on the drawings or scheduled, but the possibility of their presence can be reasonably inferred, the contractor shall in collaboration with the engineer, search for such services to establish their positions well in advance of the work. A full report shall then be submitted in good time to the engineer, to enable the necessary arrangements for the protection, removal or diversion of the services before work is commenced in their vicinity.

In the event of damage to existing services, the contractor shall take such immediate action as is necessary to prevent further damage or danger to life or property and shall immediately notify the engineer who will issue instructions as to the necessary repairs or protective measures to be taken. The cost thereof shall be borne by the contractor irrespective

of whether the repairs or protective measures were carried out by him or by or on behalf of the service authority or department concerned.

As soon as an underground service not shown on the drawings is discovered, it shall be deemed to be a known service and the contractor will be held responsible for any subsequent damage to it. If such service is damaged during the course of its discovery, the contractor will be reimbursed for the cost of making good such damage, unless it is established by the engineer that the contractor did not exercise reasonable diligence and care and that the damage was avoidable.

(b) Existing services

Existing service shall include any service which has been temporarily taken out of service to allow for the execution of the works or which has been taken out of service as a result of an event which necessitated the execution of the works.

(c) Condition of existing services

The contractor acknowledges that he has inspected and examined all known existing services and all existing services subsequently discovered, as contemplated in (a) above and is satisfied that all such services were in an acceptable and serviceable state at the commencement of the works, alternatively, upon discovery thereof as contemplated in (a) above.

In the event of a dispute as to the acceptability and/or serviceability of an existing service at the commencement of the works or upon the discovery of such service, the contractor shall bear the onus of proving that the service in question was not in an acceptable and/or serviceable state at the commencement of the works.

(d) Maintenance, protection and relocation of existing services

During the course of the works, all existing services including traffic signals, watermains, sewers and stormwater reticulation, electricity transmission and telephone lines, cables, poles and conduits whether in service or not shall be protected, supported and maintained to the satisfaction of the service authority or department concerned and the engineer. The contractor shall bear all costs in this regard.

Where a bank of underground ducts, cables, etc. are crossed over a distance of less than 1.0m they shall be regarded as a single crossing. Hydrants under pressure, watermain valve covers and manholes shall be kept unobstructed and accessible at all times.

Where the existing stormwater system is affected by the roadworks, drainage pipes and structures will have to be upgraded, adapted or demolished and new drainage pipes and structures constructed.

Where water connections (from watermain to adjacent property) interfere with the construction of the road works, these shall be lowered to the required level where required and where possible. A provisional sum has been made available for these instances. In instances, where water connections cannot be lowered, these shall be protected at the Contractor's expense.

The covers and frames of service manholes and catchpits will have to be adjusted where they are affected by the roadworks.

(e) Work in close proximity to existing services

The contractor shall note that no mechanical excavators or vibratory type compactors may be used within three (3) metres of any telecommunications or electrical services. No pegs or stakes shall be driven into the ground in the vicinity of underground services unless their exact positions have been determined.

The contractor's attention is drawn to the following with regard to work done in the proximity of ESKOM and other electrical services:

MACHINERY AND OCCUPATIONAL SAFETY ACT (Act No 6 of 1983) WITH REGULATIONS

"D16 (7) Excavations

The builder or excavator shall ascertain as far as practicable the location and nature of underground services likely to be affected by the excavation and take such steps as may be necessary to prevent danger to persons."

THE ELECTRICITY ACT (Act No 40 of 1958)

"Section 51(3): Offences and Penalties

Any person who without legal right (the proof of which shall be upon him) cuts or damages or interferes with apparatus for generating, transmitting or distributing electricity, shall be guilty of an offence and liable on conviction to a fine not exceeding R1 000,00 or to imprisonment for a period not exceeding twelve months."

The contractor shall take the above into account in the drawing up of his construction programme and in the calculation of his tendered rates, and shall note that no additional payment or compensation will be allowed for any additional costs or delays incurred as a result of compliance with these regulations, except as measured and paid under the items listed in the bill of quantities.

The contractor shall allow all reasonable access to the representatives of any authority or department for the purpose of maintaining, laying and/or relaying any services, cables or mains during the period of the contract.

Permanent alterations to existing services ordered in writing by the engineer, and for which no separate provision has been made in the bill of quantities, will be paid for under dayworks if required.

B1204 PROGRAMME OF WORK

(a) General requirements

Delete the first paragraph and replace with the following:

"The contractor shall submit his programme to the Employer's Agent for approval within the time stated in the contract data. The programme shall be provided in MS Project 2007 (.mpp format) and PDF format and shall clearly show:

- (i) The proposed rate of progress in order to complete the works within the required period as tendered, showing the various activities, their durations and proposed resourcing levels (major plant and labour) for each element of the works. Sufficient detail shall be provided to enable the Employer's Agent to be able to gauge construction progress. All activities, including establishment on site, trimming and finishing and the completion of all minor ancillary works are to be included in the programme.
- (ii) A work breakdown structure that identifies all major work activities, scheduled start and end dates for each activity, the linkage of activities and any dependencies (time or resource related) between them.
- (iii) The sequence of activities clearly identifying floats and critical path activities.
- (iv) Key dates in respect of work to be carried out, information required or due delivery.
- (v) The anticipated value of work to be done during each month.
- (vi) The allowance for normal inclement weather, as indicated in table B1215 shall be clearly indicated and shown as a critical path activity.
- (vii) Other information specifically required by the Employer's Agent in order for him to ascertain the suitability of the proposed programme.

In the event that the contractor wishes to submit a programme in a format other than MS Project 2007, the contractor shall provide and maintain two licenced copies of the appropriate software to the Employer's Agent for the duration of the contract. The costs of complying with this requirement will be deemed to be covered under the rates for general obligations.

When drawing up his programme, the contractor shall, inter alia, take into consideration and make allowance for:

- All special non-working days, shut-down periods and breaks defined in the contract data.
- Expected weather conditions and their effects and restrictions.
- Additional constraints specified in clause C3.1.6 – Construction Constraints – of Section 3.1.
- Known physical conditions and artificial obstructions.
- The design, submission and review of temporary works.
- The preparation and approval of method statements.
- The time required for training.
- The accommodation and safeguarding of public traffic.
- Dealing with, altering and installing services.
- The importation of material from commercial sources.
- Inspection, testing and specialised testing of construction equipment.
- Temporary stockpiling and the re-use of excavated and milled materials.
- All other actions and restrictions required in terms of this contract.

The following details shall be submitted together with the programme:

- a) The number of working hours per day, working days per week, assumed holiday or shut down periods on which the programme is based.
- b) The overall labour and major plant resource levels on which the programme is based.
- c) The detailed traffic accommodation proposals on which the programme is based.

The contractor shall base his initial programme of work on the scope of the work as described in the project specification and the schedule of quantities. This programme shall be reviewed on a regular basis by the contractor in accordance with the contract data.

with changing circumstances, delays and amendments to the work ordered by the Employer's Agent as a result of further examinations made by him.

Should the contractor fall more than 21 calendar days behind schedule on an activity that is included on the critical path, or should the programmed sequence of major activities not accurately reflect the actual sequence of major activities, then the Employer's Agent shall, in terms of clause 5.7.1 of the general conditions of contract, instruct the contractor to submit a revised programme for approval within seven days. Whenever an extension of time is granted in terms of the provisions of this contract, the contractor shall submit a revised programme to the Employer's Agent for approval within seven days of receiving the Employer's Agent's ruling. Notwithstanding that various other minor revisions of the programme may be submitted by the contractor during the execution of the Works, only those revisions approved based on an instruction or ruling from the Employer's Agent shall be considered to be approved programme's in terms of clause 5.6.3 of the general conditions of contract.

It should be noted that it is in the contractor's best interest to provide a comprehensive programme giving as much information as possible about the times allowed for the various activities as well as resource or other limitations affecting the programme, since the approved programme may be used to evaluate any claims in terms of the general conditions of contract for extensions of time.

The contractor shall submit to the Employer's Agent, at least two working day before each monthly site meeting copies of the following:

- (i) A list of all delays to scheduled work activities over the reporting period, indicating the date and time that each delay commenced and ended and the activities directly affected by such delays;
- (ii) A list of the actual dates and times that all scheduled work activities either started or ended over the reporting period;
- (iii) A list of the actual progress on all scheduled work activities that neither started nor ended over the reporting period;
- (iv) Details of activities running late, indicating what steps have been or will be taken to ensure that the work is completed within the specified time.
- (v) A report on all labour, plant and materials on site.
- (vi) The Employer's Agent shall then use this information into the approved programme software to determine actual progress of the Works to date.

If an alternative contract period is shown, the contractor shall submit a separate programme with the alternative tender."

B1205 WORKMANSHIP AND QUALITY CONTROL

Add the following to the second paragraph:

"The contractor's attention is also drawn to the requirements in section 8100 for the submission to the Employer's Agent for prior approval of certain materials and mix designs accompanied by the relevant test results."

Replace the third paragraph with the following:

"The intensity of control and of tests to be conducted by the contractor in terms of these obligations shall meet but, not be limited to, that specified in clause B8209 and shall be adequate to ensure that proper control is being exercised."

- *Add the following at the end of this clause:*

"The Employer's Agent shall, for the purpose of acceptance of materials and workmanship, assess test results and measurements in accordance with the provisions of section 8200 of the standard specifications (Quality Control Scheme 1, Judgement Plan B). Where small quantities of work are involved, a lot shall mean a full day's production for a specific item of work subject to acceptance control testing."

B1206 THE SETTING-OUT OF THE WORK AND PROTECTION OF BEACONS

Replace the first paragraph with the following:

"It is a specific requirement of this contract that the contractor will have to establish his own reference and control beacons for the setting-out and control of the works. The position of the works shall generally be as indicated on the drawings but shall be confirmed on site by the Employer's Agent."

Add the following at the end of the fourth paragraph:

"Existing road markings, particularly road junction / intersection lines, the divergent/convergent lines of ramp at interchanges and no overtaking barriers are also elements of the road that require proper setting out. The contractor shall prove to the Employer's Agent that critical reference points have been satisfactorily recorded for later reinstatement before any work commences that will obliterate the existing markings."

Add the following at the end of the fifth paragraph:

"Property beacons and trigonometrical survey beacons that have been displaced or destroyed without the consent of the Employer's Agent, shall be replaced by a registered land surveyor, who shall certify such replacement, and the cost thereof shall be borne by the contractor."

B1207 NOTICES, SIGNS AND ADVERTISEMENTS

Replace the second paragraph with the following:

"At each end of the works at locations determined by the Employer's Agent, the contractor shall provide and erect contract signboards of sound, weatherproof construction, painted by an approved firm of sign writers in accordance with the details shown on the drawings."

Delete the final paragraph and replace with the following:

"All signboards erected in accordance with the drawings or as approved advertisements for the contractor's establishment, shall be removed at the same time as the contractor's disestablishment. The completion certificate shall not be issued and payment under subitem 13.01(a) for the final instalment of 15% of the tendered lump sum shall not be made unless all the contract signboards, advertisements, notices and temporary signs have been removed."

B1209 PAYMENT

(b) Rates to be inclusive

Add the following:

"No value added tax shall be included in the contractor's tendered rates or amounts. Payment of value added tax (VAT) shall be made under a separate item in the Summary of Schedule(s) in C2.2 Bill of Quantities in C2 Pricing Data."

(c) The meanings of certain phrases in payment clauses

(i) Procuring and furnishing (material)

Add the following:

"Payment for procuring and furnishing material from commercial sources shall include for all transport costs, irrespective of distance hauled."

Add the following new subclauses:

"(g) Work in confined areas

Except where provided for in the specifications and the bill of quantities in the pricing data no extra payment shall be made nor shall any claim for additional payment be considered for construction in confined areas. The omission of standard pay items from the bill of quantities shall be taken to be deliberate and any additional costs incurred shall be included in the bulk rate.

(h) Rates to remain unchanged when scope of work changes

Dependent on the rates and prices offered in the bill of quantities in the pricing data, the Employer intends to increase or reduce the scope of work to match the budget allowed for this project. To this end the contractor has been provided the opportunity to price separately for unit rates of work and the establishment of major plant. The value of such increase or reduction in the scope of works shall not give cause for the contractor to vary the offered rates and prices, which shall remain final and binding for the duration of the contract, provided that:

(i) Notification of the change to the scope of work is given in writing within 28 days of the tender closing date.

(ii) The value of the increase or reduction in the scope of work does not alter the tendered sum by more than

(I) Trade names

Where materials are specified under trade names, these materials are deemed to include the phrase "or equivalent".

B1214 CONTRACTOR'S ACTIVITIES IN RESPECT OF PROPERTY OUTSIDE THE CHANNEL RESERVE AND OF SERVICES MOVED, DAMAGED OR ALTERED

Under subclause (e) replace the opening paragraph with:

"Should the contractor use land not provided by the employer for the purpose of his own establishment, Employer's Agent's offices and laboratory, or storing of equipment or materials required for construction or disposal, it shall be subject to the following:"

and add the following sub-subclauses:

"(vi) That lease agreements are concluded with the owner or owners of such land for the full period that such areas are required. The leases shall provide for possible extensions to match the duration of the contract. The lease agreements shall also provide for the contract being terminated by contractor's default or liquidation and the resulting possibility for them to be taken over by a succeeding contractor.

(vii) That copies of lease agreements shall be submitted to the Employer's Agent prior to signature by the signing parties, and copies lodged with the Employer's Agent after signing. Notwithstanding the Employer's Agent's approval of the conditions of a lease the contractor shall be solely responsible for adhesion to the terms of the agreements.

(viii) Adherence to the principles of the environmental management plan and legal obligations."

B1215 EXTENSION OF TIME RESULTING FROM ABNORMAL RAINFALL

Change the existing heading of clause 1215 to read as follows: "EXTENSION OF TIME RESULTING FROM INCLEMENT WEATHER" and replace this clause with the following:

"Delays caused by inclement weather events may be considered as extension to the time for completion only if the engineer agrees that the event (and not the consequence of the event) occurred during the working hours of a working day (based on a twenty three (23) day working month) within the contract period and caused all progress on an item or items of work on the critical path of the contractor's approved programme (including revisions thereof) brought to a halt. Each day, or portion of a day so agreed will accrue as 'n' days of delay over the duration of the contract. The summary of accrued agreed 'n' delays shall be recorded at each site meeting.

In the case of the inclement weather event being rainfall, no limitation is placed on the quantity, severity or duration of the event as being the cause of delay except, if it is an exceptional climatic condition then it shall not be measured as a delay event under this clause, but shall be considered for delay under the general conditions of contract clause 5.12. Expressly excluded from the measurement of 'n' days are consequential delays, which are taken to mean delays to critical path activities attributable to the weather event but occurring after (i.e. outside of and distinctly separate from) the duration of the weather event itself.

The contractor shall make provision in his approved programme (including revisions thereof) of work for expected N working days caused by inclement weather. This provision shall be shown as a terminal float on the approved programmes. Any extension to the time for completion caused by inclement weather delays will only apply once the agreed cumulative 'n' delays exceed $N = \sum n$ days.. N will be adjusted in accordance with the actual commencement date.

Table B1215/1 below is provided for demonstration purposes only. It shows the average number of days on which rainfall events of > 5.0 mm has occurred at Gordon's Bay weather station. This station has been chosen because its records span 117 years and is considered sufficiently close to the site to be representative of what the contractor could expect during the contract. The full weather station record is included in Part C4: Site Information. The contractor may apply this record to any claim for weather delays that fall outside the prescripts of this clause and within the terms of the general conditions of contract.

Table B1215/1 also records the average 'other' inclement weather event days that the contractor could expect to encounter and cause delay. These have been derived from previous experience of wind and temperature influence on similar construction in the area of the site. 'Other' events could be extreme cold or heat, snow, wind or ice but are not limited to these.

From Table B1215/1 it will be noted that the sum of average rain and other delays measured over the contract duration is 33 days yet the contractor is instructed to allow $N = 21$ days in his approved programme (including revisions to

The reduction indicates the extent of the Employer's share of the overall risk attaching to delays caused by inclement weather.

Table B1215/1: Average delays due to inclement weather

Month	Jan*	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec*	Total
Average rain days	1 (0)	1	1	2	3	4	4	4	3	2	1	1 (1)	27(26)
Average other days				1	1	1	1	1	1				6

* The figures shown in brackets are the average days of rain expected in December/January but reduced to take account of the standard construction break over the Christmas/New Year period.

If approved extensions of time extend the completion date beyond the start of the Christmas shut-down as defined in the Appendix to Tender, the holiday period shall not be considered as working days. Any remaining extension of time shall be calculated from the first working day in January the following year."

B1217 PROTECTION OF THE WORKS AND REQUIREMENTS TO BE MET BEFORE CONSTRUCTION OF NEW WORK ON TOP OF COMPLETED WORK IS COMMENCED

Renumber the existing paragraph (g) to become paragraph (h) and insert the following new paragraph (g):

"(g) Concrete elements adjoining a surface which is to receive a sprayed bituminous application or slurry application shall be covered with protective material prior to such operations to prevent the concrete from being stained with bituminous binder."

B1219 WATER

Add the following:

"The contractor shall make the necessary arrangements and connections for the provision of water required by him for the execution of the works. Water for use on site other than municipal, shall be subject to the required permit from Department of Water and Sanitation (DWS). This shall include such extraction points as rivers, dams, streams, and boreholes.

Use Table B1219 below to determine the suitability of water for construction purposes.

TABLE B1219: WATER CLASSIFICATION FOR CONSTRUCTION: TESTING

Property	Unit	Water Quality Classification Code						Method
		H0 Pure water (AR)	H1 Clean water (Rain)	H2 Treated water (Municipal)	H3 Silty (muddy) water with low salt content	H4 Highly mineralised chloride sulphate water (brackish)	H5 Waste brack, sewage, marsh, sea, etc. water	
PH*	-	7.0	5.7 – 7.9	4.5 – 6.5	4.5 – 8.5	9.0	-	SABS M113 SM 11 - 1990
Dissolved solids*	ppm	0	1000	1500	3000	-	-	SABS 213 SM213 - 1990
Total hardness*	-	None	None	Temporary	Temporary	Permanent	-	SABS 215 SM 215 - 1971
Suspended matter	ppm	0	2000	2000	5000	-	-	SABS 1049 SM 1049 - 1990
Electrical conductivity	mS/m	0	200	200	500	-	-	SABS 1057 SM 1057 - 1982
Sulphates (SO4)	ppm	0	200	300	500	1000	-	SABS 212 SM 212 - 1971
Chlorides (Cl)	ppm	0	500	1000	3000	5000	-	SABS 202 SM 202 - 1983
Alkali Carbonates (CO3) & Bicarbonates (HCO3)	ppm	0	500	1000	1000	2000	-	SABS 241 - 1999
Sugar	-	Negative	Negative	Negative	Negative	Negative	-	SABS 833
Quality of water required		Untreated layer works	✓	✓	✓	✓	Investigate the effect on	

						the quality of the material
	Chemically treated layer works	✓	✓	✓	Investigate the effect on the quality of the material	
	Concrete mass	✓	✓	✓	Investigate the effect on the quality of the material	
	Concrete prestressed	✓	✓			
	Slurry & emulsion	✓	✓			
	Soil/gravel tests	✓	✓			
	Chemical or control tests	✓	✓			

References:
1. Concrete Technology – Dr S Fulion (1989)
2. Materials Manual (PAWC)

- A primary property. The quality of the water is that quality where all three of the primary properties are within the limits.
- The tabulated single values are maximum value except in the case of the pH value for pure water, which must be 7.0

B1224 THE HANDING-OVER OF THE CHANNEL RESERVE

Amend the heading to read: "THE HANDING-OVER AND OCCUPATION OF THE SITE"

Add the following:

"The site of the works shall consist of the entire channel reserve inclusive of road junctions and farm accesses required for construction of the works as defined by the limits of construction shown on the drawings. It shall also include any additional lengths of road required for the placement of advanced warning road signs and/or traffic accommodation measures beyond the limits of construction as shown on the drawings. Where consistent with the context, the site shall also include areas outside of the channel reserve required for construction camps, borrow areas, spoil areas and stockpile areas. The exact extent of the site and its boundaries will be verified once the site is handed over to the contractor.

Upon being given access to the site the contractor shall immediately assume responsibility for the entire site as defined in the specifications and verified. Personnel and plant shall not enter property beyond the boundary of the site irrespective of whether or not the boundary is fenced.

Prior to the commencement of work the contractor and the Employer's Agent shall together carry out a joint inspection of the site. During such an inspection, notes shall be made of all damaged fences, guardrails, signs and any other notable problems or features that exist at the time of gaining access or hand-over. The following matters should be agreed at the time of handing-over:

- The limits, lengths, widths and areas of construction.
- The location of stockpile areas and the responsibilities of the contractor with regard to the channel reserve area and the stockpile sites (fencing, re-establishment, height of stockpile, etc.)
- The method of accommodation of public traffic with regard to safety, sight distances, interference with existing road signs and road markings both within the work area and providing advance warning before the work area.
- The method of construction and supervisory control measures
- The protection of existing features."

B1229 SABS CEMENT SPECIFICATIONS

Add the following:

"All cement used during construction shall comply with SANS 50197-1 for common cements and SANS 50413-1:2004 for masonry cement. Any reference to SABS 471 in the standard specifications shall be replaced with the new specification SANS 50197-1: Cement compositions, specifications and conformity criteria: Part 1: Common cements.

Where the old SABS 471 product nomenclature has been used in the standard specifications, the contractor shall supply and use the relevant new product, in compliance with SANS 50197-1."

Add the following new clauses:

"B1230 MATERIALS

(a) General

The contractor, when using materials that are required to comply with any standard specification, shall, if so ordered, furnish the Employer's Agent with certificates showing that the materials do so comply. Where so specified, materials shall bear the official mark of the appropriate authority. Samples ordered or specified shall be delivered to the Employer's Agent's office on the site free of charge.

Where proprietary products have been specified, similar products may be used subject to the prior written approval of the Employer's Agent.

Unless otherwise specified in the prior written approval of the Employer's Agent, all proprietary materials shall be used and placed in strict accordance with the relevant manufacturer's current published instructions.

Unless anything to the contrary is specified, all manufactured articles or materials supplied by the contractor for the permanent works shall be unused.

Earth, stone, gravel, sand, and all other materials excavated or present on the site or in borrow areas provided by the employer shall not become the property of the contractor, but will be at his disposal only in so far as they are approved for use on the contract.

Existing structures on the site shall remain the property of the employer and except as and to the extent required elsewhere in the contract, shall not be interfered with by the contractor in any way.

No materials to be included in the works shall be damaged in any way and, should they be damaged on delivery or by the contractor during handling, transportation, storage, installation or testing they shall be replaced by the contractor at his own expense.

All places where materials are being manufactured or obtained for use in the works, and all the processes in their entirety connected therewith shall be open to inspection by the Employer's Agent (or other persons authorised by the Employer's Agent) at all reasonable times, and the Employer's Agent shall be at liberty to suspend any portion of work which is not being executed in conformity with these specifications.

The contractor shall satisfy himself that any quarry selected for use provides the necessary mined material in accordance with the specification.

(b) Ordering of materials

Immediately upon his tender being accepted, the contractor shall order materials which are in short supply or for which the delivery period may be long.

The quantities set out in the bill of quantities have been determined from calculations based on data available at the time and should therefore be considered to be only approximate quantities. The contractor shall therefore, before ordering materials of any kind, check with the Employer's Agent the quantities required. No liability or responsibility whatsoever shall attach to the employer for materials ordered by the contractor except if they have been ordered in accordance with written confirmation issued by the Employer's Agent.

B1231 SAFETY

The contractor shall at all times observe adequate safety precautions on site to ensure the safety of his own staff as well as that of the public and other persons engaged in or about the works. In this respect, he shall comply with the provisions of the health and safety specifications (Appendix A) and observe all laws, ordinances and regulations pertaining to his work.

In terms of clause 4.5 of the general conditions of contract, the contractor shall enter into an agreement (refer to C1.5 of Volume 3) to complete the work required for the construction of the works in accordance with the provisions of all pertinent legislation and in particular with the provisions of the Occupational Health and Safety Act, (Act 85 of 1993) and the regulations promulgated thereunder.

Where adequate safety precautions are not being observed, the Employer's Agent may order the contractor to comply with minimum safety requirements at the latter's expense. Compliance with such an order will not absolve the contractor from any of his responsibilities and obligations under the contract."

B1232 MIX DESIGNS

Before commencing with certain construction activities, the contractor shall, except where specified otherwise in the relevant construction sections in the Scope of Works, apply the following procedures with regards to mix designs:

- Taking and submitting samples of the relevant materials.
- Undertake the required mix design(s) or allow the engineer to undertake them.
- Produce, where required, laboratory, production/plant and/or trial mix(es).
- Undertake the required adjustments to the mix design(s) and reproduce required laboratory, production/plant and/or trial mix(es).
- Complete trial section(s) where required.
- Await the engineer's approval of the mix design(s) and trial section(s).

B1233 SITE SECURITY

The contractor shall carefully assess the security measures of whatever nature that may be required at the location of the site offices and the site of the works. No direct payment for security measures shall be made and the contractor shall make adequate provision in his tendered rates for all measures, including insurances, deemed necessary by him to safeguard his staff and that of the Employer's Agent, his plant, materials and equipment, the offices of the Employer's Agent complete with furniture, equipment and personal belongings, and to prevent disruption of the works by criminals. No claims in this regard will be entertained.

B1234 MEASUREMENT AND PAYMENT

Item	Unit
B12.01 Protection, removal, relocation and reinstatement of existing services	
(a) Provisional sum for the protection, removal, relocation and reinstatement of existing services	PC Sum
(b) Handling cost and profit in respect of subitem B12.01 (a)	Percentage (%)

The provisional sum is to cover the cost of work completed by service owners or approved selected subcontractors for the relocation or protection of existing service.

The tendered percentage is the percentage of the amount actually spent under subitem B12.01 (a) and shall include full compensation for dealing with the service owner, procurement of the service owner or a specialist subcontractor's services, all handling costs of the contractor, profit and any other costs related to the managing of the relocation or protection of existing services.

SECTION 1300: CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS

B1302 GENERAL REQUIREMENTS

(c) Legal and contractual requirements and responsibilities to the public

Add the following as a second paragraph

"There has been recent legislation promulgated by Government that imposes mutual obligations on the employer and contractor in the performance of their duties to society and to the built and natural environment. To assist the contractor in understanding and assessing his obligations, and thus to make allowances for the cost of compliance with this legislation, the following additional specifications are included in the project specifications:

(i) Appendix A contains the specification that regulates the contractor's construction methods so far as to ensure health and safety of his employees and of the public. Separate new pay item(s) are included in these provisions to allow the contractor to make separate provision for the cost of health and safety measures during the construction process.

ii) Appendix B contains the environmental management plan for this project. Its provisions regulate the contractor's construction methods to ensure responsible conduct and treatment of the environment relevant to the project. Separate payment items are included in these provisions. However, non-compliance with these provisions may lead to the imposition of penalties.

B1303 MEASUREMENT AND PAYMENT

Item	Unit
B13.01 The contractor's general obligations:	
<i>Add the following pay subitems:</i>	
"(d) Health and safety obligation	month
(e) Environmental obligation	month"

In the 17th paragraph (the fourth last paragraph), replace the second sentence with the following:

"The tendered rate will be paid monthly, pro rata for parts of a month from the commencement date of the contract in terms of clause 5.2 of the general conditions of contract, until the due completion date as defined in clause 1.1.1.14 of the general conditions of contract, or the date of certification of due completion, whichever is the earliest, provided that

Add the following paragraphs:

"Payment of the rate per month for subitems B13.01(d), and (e) shall include full compensation for all the contractor's obligations relevant to health and safety legislation and environmental compliance. The tendered rates for subitems 13.01(d), and (e) shall apply in the same manner as pay subitem B13.01(c).

Payment for time related costs arising from extensions of time granted by the employer, where the contractor is fairly entitled to such compensation in terms of subclause 5.12 of the general conditions of contract, will be calculated by taking account only pay items for which the unit of measurement is "month". All pay items for which the unit of measurement is "month" are deemed to be based on 30.5 calendar days per month."

Add the following payment items:

Item	Unit
B13.02 Contract Sign boards	number(No.)

The unit of measurement shall be the number of contract signboards provided in accordance with the drawings and erected at the locations as instructed by the Employer's Agent.

The tendered rate shall include full compensation for procuring and furnishing all materials, and for the manufacture of the contract signboards complete as specified on the drawings. It shall also include for the delivery and erection

the signs complete as specified at the locations instructed by the Employer's Agent, and for their removal on completion of the contract."

SECTION 1500: ACCOMMODATION OF TRAFFIC

B1501 SCOPE

Add the following new paragraphs:

"It also covers the accommodation of traffic required for the relocation, protection and modification of existing services and the installation of new services, including where half-and partial-width construction will be necessary.

It is a condition of this contract that traffic is accommodated taking into account the provisions of the latest edition of the South African Road Traffic Signs Manual (SARTSM). The latest version for use in the accommodation of traffic is volume 2, chapter 13 of the June 1999 edition. Copies of this publication are available from Government Printers – Tel: (012) 334 4507/8/9 or (012) 334 4510 Fax: (012) 323 9574.

This section also covers the provision of additional information signs for motorists and the release of any notices to the media and public."

B1502 GENERAL REQUIREMENTS

(f) Approval of temporary deviations

Add the following to subclause 1502 (f):

"Before starting any activity that could possibly obstruct the flow of traffic on the existing roads, the contractor shall submit his proposed plan for the accommodation of traffic to the engineer for his approval. This plan shall be in accordance with the requirements as set out in the latest edition of the South African Road Traffic Signs Manual, Volume 2 – Chapter 13 as well as the general details as shown on the drawings. The contractor shall submit this plan to the engineer for his approval at least fourteen days before the commencement of construction.

Should the contractor neglect to provide the necessary road signs or to take the necessary precautions regarding the safety and comfort of the public road user as set out in the latest edition of the South African Road Traffic Signs Manual, Volume 2 – Chapter 13 as well as shown on the drawings, an instruction can be issued to stop all the work under this contract until such time as the engineer is satisfied that all the prescribed measures are complied to."

(i) Traffic Safety Officer

Add the following to the end of the second paragraph:

"The contractor shall submit a CV of the candidate to the engineer for approval before the candidate is appointed as the traffic safety officer."

Insert the following as the opening phrase to sub-sub-clause (i):

"make himself available to discuss road safety and traffic accommodation matters whenever required by the engineer and shall be responsible..."

Delete sub-sub-clauses (ii) and (iii) and replace with the following:

"(ii) Record on neat and dimensioned sketches and submit to the engineer the position and sign reference number, where applicable, of each sign, barricade, delineator, cone, amber flicker light, guardrail and permanent or temporary painted road marking feature. The position of each shall be adequately referenced from the marker boards or other surveyed points on the site of the works.

These records shall also show the date and time at which the recorded traffic accommodation features are certified correct by the traffic safety officer, and shall be signed by the traffic safety officer before being submitted to the engineer.

The records shall similarly account for whatever changes are made in the field. Such changes shall record the position of flagmen and stop/go control men and their associated traffic accommodation equipment wherever they are used.

(iii) Personally inspect the position and condition of each traffic accommodation feature on the whole site of works twice per workshift, whether daytime or nightwork, and at least twice a day/night during non-working hours, to record all irregularities discovered and the remedial action taken, and to sign off as correct and submit to the engineer record sheets by middle of the next working shift. The above inspections must at least take place before commencement of peak traffic periods. The traffic safety officer shall keep a duplicate book for this specific purpose.

The traffic safety officer shall also submit with this report the daily labour returns of flagmen, stop/go, traffic signal control personnel employed and the traffic data recorded at each traffic control point."

Add the following subclauses:

"(j) Failure to comply with provisions for the accommodation of traffic

The failure of or refusal by the contractor to construct and/or maintain diversions, barricades, traffic signs or road markings at the proper time, or to take the necessary precautions for safety and convenience of public traffic as specified or instructed by the engineer, shall be sufficient cause to suspend the works on this contract until the required construction or maintenance has been completed to the satisfaction of the employer's agent. Further, the employer's agent will have the right to stop any operation where the traffic accommodation measures are not to specification or as ordered and the engineer considers that there is a risk to the public. Such stoppage of the work will not be acceptable as a reason for extension of time or additional compensation.

(k) Safety of the travelling public

The safety of the travelling public is of utmost importance and every effort shall be made to ensure that all warning signs, barricades, flagmen and speed controls are maintained and effective and that courtesy is extended to the public at all times.

(m) Overnight parking of plant

During non-working hours all obstructions to traffic shall be removed from the road and all signs no longer applicable to the situation shall be removed or effectively covered. (The use of hessian for this purpose will not be permitted).

The overnight parking of construction plant within the road reserve may be permitted in suitable areas alongside the carriageway where approved by the Engineer. The minimum clearance between the parked vehicle/plant and the edge of the existing surfaced edge shall be 5 metres and delineators shall be placed in advance of the obstruction to warn the travelling public."

B1503. TEMPORARY TRAFFIC-CONTROL FACILITIES

Insert "South African Road Traffic Signs Manual, Volume 2 – Chapter 13 as read in conjunction with" before "the South African Road Traffic Signs Manual" in the fifth line of the first paragraph.

Add the following after the second paragraph:

"No work may proceed in any section where accommodation of traffic is required until such time as the relevant requirements with regard to signposting are met. The contractor shall keep sufficient surplus signs, delineators and barricades on the site to allow for the replacement of damaged or missing items within a period of three hours of instructions having been given by the engineer."

Insert "South African Road Traffic Signs Manual, Volume 2 – Chapter 13 as read in conjunction with" before "the latest edition of the South African Road Traffic Signs Manual" in the fourth line of the third paragraph.

(a) Traffic-control devices

Add the following to sub-clause 1503(a) of the Specifications:

"All flagmen shall be equipped with reflective clothing and bright orange flags during the execution of their duties."

(e) Warning devices

Replace the first sentence of the first paragraph with:

"All construction equipment and plant used on the works shall be equipped with rotating amber flashing light. The amber lens shall be at least 200mm high."

Add the following subclauses:

"(g) Spare signs

The Contractor shall keep sufficient surplus barricades, signs and delineators on or around the site to allow for the immediate replacement of damaged or missing items.

(h) Construction vehicle sign

A sign reading "CONSTRUCTION VEHICLE" in red lettering at least 400 mm high on a white background shall be securely and prominently fixed to the rear of all construction vehicles and shall ideally extend over the full width of the vehicle. It shall be kept clean and visible at all times."

B1517 MEASUREMENT AND PAYMENT

Item

Unit

B15.01 Accommodating traffic and maintaining temporary deviations

In the first, second and third paragraphs replace the words "half-widths" or "half-width" with "partial-widths" or "partial-width" respectively.

Add the following sentence after the first sentence of the first paragraph:

"Irrespective of the number of work items / activities / operations conducted per kilometer of road, measurement will be made once only."

Add the following to the second paragraph:

"It shall also include full compensation for the provision and erection of the various traffic-control devices including the provision of flagmen to control the traffic. The tendered rate shall also include full compensation for the provision, erection and maintenance of all road signs and other traffic control devices, including lighting, STOP / GO operators and other measures required for night work, as well as the replacement of all items that became unserviceable. It shall also include full compensation for any additional cost items and associated work that may be required for the safe accommodation of traffic as specified.

It shall also include full compensation for accommodating traffic during the night time and on Sundays. No claims for additional payment in this regard will be considered."

Item

Unit

B15.03 Temporary traffic control facilities

(a) Flagmen

Replace the 1st paragraph of the payment description to the following:

"The unit of measurement shall be a full day and night worked by flagmen. A man-day shall be deemed to comprise of a number of shifts within a twenty-four-hour period. Shifts of 12 hours and less shall be measured as half of a man-day."

Item

Unit

B15.03 Temporary traffic-control facilities:

- (g) Road signs, STW-, DTG-, TGS- AND TG-series**
(excluding delineators and barricades)

square metre (m²)

Replace the description of this subitem with:

"Road signs, TGD-, TSC-, TGS- AND TIN-series (excluding delineators and barricades)"

(h) Delineators (DTG50J) (size indicated):

Replace the description of this subitem with:

"Delineators (TW401 and TW402)"

Item

B15.04 Relocation of traffic-control facilities

Lump Sum

Add the following:

"The tendered lump sum shall apply for the full duration of the contract period, irrespective of the number of work areas and times the relocation of traffic-control facilities are affected. The tendered lump sum shall also include payment for the final removal off site of all temporary traffic-control devices used by the contractor."

SECTION 1600 : OVERHAUL

B1602 DEFINITIONS

Replace the first paragraph of subclause 1601(a)

"No overhaul of any kind will be payable for materials hauled within the confines of the project.

Overhaul shall only apply to material when hauled in excess of the free-haul distance beyond the confines of the project area and shall include only the following materials:"

Delete the first, second, and last paragraphs of subclause 1602(b).

Replace the third paragraph of subclause 1602(b) with the following:

"Ordinary overhaul shall only apply"

Delete the balance of the sentence starting after "materials" in the second last line of subclause 1602(d).

B1603 MEASUREMENT AND PAYMENT

Item

Unit

Replace item 16.02 with the following:

"B16.02 Overhaul on material hauled in excess of a free-haul distance of 1,0 km (This item is only applicable to material spoiled off site on the instruction of the Engineer) (ordinary overhaul)

cubic metre-km (m³-km)

The unit of measurement shall be the cubic metre of overhaul material hauled in excess of a free-haul distance of 1,0 km beyond the confines of the project, multiplied by the overhaul distance."

SECTION 1700: CLEARING AND GRUBBING

B1704 MEASUREMENT AND PAYMENT

Add the following items :

Item	Unit
B17.07 Demolish existing buildings including service connections.	
(a) (Specify building)	square metre (m ²)

The unit of measurement shall be m2 of building demolished.

The tendered rate shall include full compensation for demolishing the buildings, including foundations and any other components that make up the buildings. The tendered rate shall also include for the loading of the material, the transportation, all haul, the disposal of the material, dealing with service connections and all other costs involved in demolishing, removal and disposal of the buildings."

Item	Unit
B17.08 Demolish Manholes and dispose of resulting material off site	Number (No)

The unit of measurement shall be the number of manholes demolished.

The tendered rate shall include full compensation for demolishing the manholes, including foundations and any other components that make up the manholes. The tendered rate shall also include for the loading of the material, the transportation, all haul, the disposal of the material, dealing with service connections and all other costs involved in demolishing, removal and disposal of the manholes."

Item	Unit
B17.09 Demolish sewer pipe line and dispose of resulting material off site	metre (m)

The unit of measurement shall be the metre of sewer pipeline demolished.

The tendered rate shall include full compensation for demolishing the sewer pipelines and any other components that make up the manholes. The tendered rate shall also include for the loading of the material, the transportation, all haul, the disposal of the material, dealing with service connections and all other costs involved in demolishing, removal and disposal of the manholes."

Item	Unit
B17.10 EO items B 17.07 and B17.09 for disposing of asbestos	

(a) EO items B 17.07 a to q for disposing of asbestos	cubic metre (m ³)
---	-------------------------------

The unit of measurement shall be the cubic metre of asbestos products found in buildings to be removed.

The tendered rate shall include full compensation for additional or more difficult work of any nature to demolish and remove asbestos from buildings demolished. The tendered rate shall also include for the loading of the material, the transportation, all haul, the disposal of the material at a accredited site and all other costs involved in demolishing, removal and disposal of the asbestos material."

(b) EO items B 17.9 for disposing of asbestos	metre (m)
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The unit of measurement shall be the metre of asbestos pipe to be removed.

The tendered rate shall include full compensation for additional or more difficult work of any nature to demolish and remove asbestos pipes demolished. The tendered rate shall also include for the loading of the material, the transportation, all haul, the disposal of the material at a accredited site and all other costs involved in demolishing, removal and disposal of the asbestos material."

Item	Unit
B17.11 Demolish Gabions and dispose of resulting material off site	cubic metre (m ³)

The unit of measurement shall be the cubic metre of gabion demolished.

The tendered rate shall include full compensation for demolishing gabions, including foundations and any other components that make up the gabion structures. The tendered rate shall also include for the loading of the material, the transportation, all haul, the disposal of the material and all other costs involved in demolishing, removal and disposal of the manholes."

"Item

Unit

B17.12 Demolish concrete drift including associated pipes and dispose of resulting material off site

cubic metre (m³)

The unit of measurement shall be the cubic metre of drift demolished.

The tendered rate shall include full compensation for demolishing concrete drifts, including foundations and any other components that make up the concrete drifts. The tendered rate shall also include for the loading of the material, the transportation, all haul, the disposal of the material and all other costs involved in demolishing, removal and disposal of the drifts."

"Item

Unit

B17.13 Demolish steel fulton gate including associated reinforced concrete and dispose of resulting material off site

number (No)

The unit of measurement shall be the fulton gate structure complete.

The tendered rate shall include full compensation for demolishing the reinforced concrete structure, including foundations and any other components that make up the structure, as well as demolition of the steel penstock portion of the structure. The tendered rate shall also include for the loading of the material, the transportation, all haul, the disposal of the material and all other costs involved in demolishing, removal and disposal of the fulton gate."

SECTION B1800 : DAYWORK

Add the following section to "Series 1000 : General" of the Standard Specifications.

"SECTION B1800 : DAYWORK

CONTENTS

- B1801 SCOPE
- B1802 GENERAL REQUIREMENTS
- B1803 MEASUREMENT AND PAYMENT

B1801 SCOPE

This section covers the method of measurement and payment for work carried out on a daywork basis.

B1802 GENERAL REQUIREMENTS

Work will be classified as daywork only if the Engineer considers no other rate in the Schedule of Quantities appropriate for payment purposes.

An instruction regarding all work to be carried out under daywork in terms of clause 40(3) of the General Conditions of Contract will be issued at the discretion of the Engineer. Some or all of the items priced under daywork in the Schedule of Quantities may possibly not be required for this contract.

Before ordering any material, the Contractor shall submit quotations to the Engineer for his approval, and shall submit such receipts or vouchers to the Engineer as may be necessary for proving the amount claimed.

B1803 MEASUREMENT AND PAYMENT

Item	Unit
B18.01 (a) Vehicles, plant and equipment	
(i) (specify equipment)	hour (hr)
(ii) etc for other equipment	hour (hr)
	<u>Subtotal</u>
(b) Percentage on-cost on subtotal for subitem B18.01 (a)	percentage (%)

The daywork rates submitted for vehicles, constructional plant and equipment, subitem (a), in the Schedule of Quantities shall be a hire charge for the use of the vehicle and driver or constructional plant/equipment and operator (VAT excluded) and shall apply only to vehicles, constructional plant and equipment approved in writing by the Engineer. The rate shall include for maintenance, operative costs, establishment, insurance and other contingency costs relating to the running of the vehicle, plant or equipment.

Where there is ambiguity between the power developed at the flywheel and mass of a machine, the power shall govern the measurement category.

The Contractor and the Engineer will agree on the method of recording the working hours prior to the commencement of the work. Any long period of idling at any one time which in the opinion of the Engineer or his representative is beyond that required for normal operating conditions will not be paid for as working time. Non-working hours for any reason shall not be measured for payment.

The tendered percentage for subitem (b) shall include full compensation for all administrative costs, supervision, overheads, liabilities and obligations related to the running of the vehicles, constructional plant and equipment. The tendered percentage shall also include for profit and shall be subject to the contract price adjustment factor as laid down in the General Conditions of Contract.

Item	Unit
B18.02 (a) Labour	
(i) Normal working hours (Specify skill)	h

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Contract

Part C3: Scope of Work

Contract No. Error! Unknown document property name.

Construct

(ii) Outside normal working hours (Specify skill) hour (hr)

Subtotal

(b) Percentage on-cost on subtotal for subitem B18.02 (a) percentage (%)

The day work rates for subitem (a) submitted for labour in the Schedule of Quantities shall be the cost of labour for each skill level and shall apply only to the number of workers approved in writing by the Engineer.

The rates shall distinguish between normal working hours and those outside these.

The tendered percentage for subitem (b) shall include full compensation for overhead charges, profit, liabilities, obligations, site supervision, the use of hand tools, appliances, equipment and for consumable stores. The tendered rates shall be subject to the contract price adjustment factor as laid down in the General Conditions of Contract.

Item	Unit
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B18.03 Materials

(a) Material costs	Provisional Sum
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(b) Percentage on net cost of materials	Percentage (%)
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The prices for materials (excluding VAT) shall be based on the documented proof submitted to the Engineer as specified in clause B1802 and expenditure shall be made in accordance with the General Conditions of Contract. The prices shall not be subject to the contract price adjustment factor.

The tendered percentage as an on-cost on the net cost price of materials shall include full compensation for handling, overheads, profit, liabilities, obligations, risks, incidents and other on-cost for the supply, delivery and distribution of materials for dayworks."

SECTION B2100 : DRAINS

Add the following item:

"Item

Unit

B21.20 Backfilling material in existing eroded open drains

cubic metre (m³)

The unit of measurement shall be the cubic metre of approved backfill material placed and compacted to 93% of modified AASHTO density, measured in place according to the authorized dimensions.

The tendered rate shall include full compensation for procuring, either from material removed during clearing and shaping of existing open drains or from cutting from elsewhere within the confines of the project area, furnishing, transporting, placing and compacting the approved material. It shall further include for trimming the open drains, disposing of resulting unsuitable material and all haul within the confines of the project area."

SECTION 3300: MASS EARTHWORKS

B3312 MEASUREMENT AND PAYMENT

Replace the description of Item 33.01 with the following

"B33.01 Cut and borrow to fill including sand fills, for all haul distances within confines of project"

Replace the third last paragraph of subclause 33.01

"The tendered rates shall include full compensation for procuring, furnishing and placing the material, including excavating as if in soft excavation, the cutting of benches, for transporting the material for all haul distances within the confines of the project; for preparing, processing, shaping, watering, mixing, and compacting the materials to the densities or in the manner specified herein and for removing and disposing of up to 5% oversize material from the road after processing."

Replace the description of Item 33.01 with the following

"Item

Unit

B33.01 Pavement layers constructed from gravel sourced from commercial sources,

- (1) Cut to spoil to an area outside the confines of the project, including free-haul up to 1,0 km. Material obtained from:

Replace the description of Item 33.04 with the following

"Item

Unit

B33.04 Cut to spoil,

- (1) Cut to spoil to an area outside the confines of the project, including free-haul up to 1,0 km. Material obtained from:
- (a) Soft excavation cubic metre (m3)
- (b) Intermediate excavation cubic metre (m3)
- (2) Cut to spoil, for all haul distances within confines of project. Material obtained from:
- (a) Soft excavation cubic metre (m3)
- (b) Intermediate excavation cubic metre (m3)
- (3) Cut to temporary stockpile material, for all haul distances within confines of project. Material obtained from excavation above rip rap layer:
- (a) Soft excavation cubic metre (m3)
- (b) Intermediate excavation cubic metre (m3)
- (c) hard excavation cubic metre (m3)
- (4) Cut from temporary stockpile and reinstate material above rip rap layer, for all haul distances within confines of project. Compacted to 90% of modified AASHTO density
- (a) Soft excavation cubic metre (m3)"

SECTION 4700: SURFACING ON BRIDGE DECK

B4702 MATERIALS

Add the following:

"The following shall be applicable to timber decking and structural timber members:

- (a) Decking planks shall be of Rhino Modified Wood or equivalent.
- (b) Decking planks shall be 20mm in thickness and 65mm in width.
- (c) Joists shall be 152x38mm C.C.A treated SA Pine Grade 5 timber suitable for outdoor use.
- (d) Structural timber is to be sealed using Armadek and Rystix Exterior wood sealer or equivalent. Timber is to be coated prior to installation.
- (e) Bolts connecting to structural steel are to be minimum M12 Grade 4.8 hot-dip galvanised complete with nuts and washers.
- (f) All other connections such as nails and plates are to be galvanised or appropriately protected against corrosion in external environments"

B4707 MEASUREMENT AND PAYMENT

Item		Unit
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B47.01	Surfacing on bridge deck:	
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Add the following pay subitems:

(i)	Timber decking inclusive of installation.....	square metre (m ²)
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The tendered rate shall allow for procuring materials as per the sub item description and as indicated on the drawings. The rate shall also include all labour and equipment required for the installation, as well as bolts, nuts, screws, etc. required for timber decking installation. All workmanship shall carry a minimum guarantee of 5 years after completion.

SECTION 5100: PITCHING, STONework AND PROTECTION AGAINST EROSION

B5102 MATERIALS

Replace the last paragraph of subclause 5102(a) (ii) with the following tables

Rip Rap Type A				
Riprap and filter grading - main channel bed downstream of weirs				
% passing (mass)	Riprap main channel bed (m)	Underlayer main channel (m)	Natural Filter layer (m)	Geofabric
dmin	0.16	0.011	0.0008	Bidim type A7 or equivalent
d15	0.33	0.023	0.0017	
d20	0.4	0.028	0.0020	
d50	0.8	0.055	0.0040	
d85	1.3	0.089	0.0065	
d100	1.6	0.110	0.0080	
Layer thickness (m)	2	0.25	0.15	
Rip Rap Type B				
Berms riprap and filter grading – Berm upstream of N2 bridge to weir B, and 100 m upstream to 100 m downstream of weirs A to B				
% passing (mass)	Riprap main channel bed (m)	Underlayer main channel (m)	Natural Filter layer (m)	Geofabric
dmin	0.08	0.006	0.0004	Bidim type A7 or equivalent
d15	0.16	0.011	0.0008	
d20	0.2	0.014	0.001	
d50	0.4	0.028	0.0020	
d85	0.65	0.045	0.0033	
d100	0.8	0.055	0.004	
Layer thickness (m)	0.8	0.25	0.15	
Rip Rap Type C				
Berms riprap and filter grading - weir B to Diversion weir (excluding 100 m US to 100m DS of weirs)				
% passing (mass)	Riprap main channel bed (m)	Underlayer main channel (m)	Natural Filter layer (m)	Geofabric
dmin	0.06	0.004	0.0003	Bidim type A7 or equivalent
d15	0.12	0.008	0.0006	
d20	0.15	0.010	0.0008	
d50	0.3	0.021	0.0015	
d85	0.49	0.034	0.0024	
d100	0.6	0.041	0.0030	
Layer thickness (m)	0.6	0.25	0.15	

Note: The rock should be angular with density of 2.65 t/m³; (the rock diameter should be adjusted if density differs).

B5105 STONE MASONRY WALLS

(c) Cement-mortared stone walls

Add the following:

"Sand stone cladding to RC walls shall include suitable wall ties at 1m centre to centre spacings in both directions, shot fixed to RC walls and built into the stone masonry cladding."

SECTION 5500: FENCING

B5502 MATERIALS

Add the following:

(k) Concrete blockwork

"Concrete blocks shall be 390x190x190 hollow block units of minimum 7 MPa strength. Blockwork shall include cement mortar, piers at specified spacing, cavity filling of piers, expansion joints at 30m intervals filled with 10mm Jointex or equivalent, crimped hoop iron wall tiers at expansion joints connecting adjacent panels and tying in to existing walls as required."

(l) Palisade fencing

"Palisade fencing shall comprise of 140mm wide x 225mm depth x 1850 high posts at 2m centres with 9no. off 100mm wide x 75mm deep x 1205mm high pales fixed to 150mm wide x 80mm deep rails fitted to posts and grouted in place using cement mortar. All fencing units are to be constructed using 30MPa/10mm concrete. Support posts are to be set into 500x500x550 deep foundations of 20MPa/20mm concrete. Bolted connections are to be made using M8 Grade 8.8 galvanised carriage bolts as indicated in the drawings."

B5503 TYPES OF FENCING

Add the following:

"(e) Concrete blockwork boundary wall"

"Concrete blocks shall be 390x190x190 hollow block units of minimum 7 MPa strength."

"(f) Palisade fencing"

B5514 MEASUREMENT AND PAYMENT

<u>Item</u>	<u>Unit</u>
B55.02 Supply and erect new fencing material for new fences and for supplementing material in existing fencing which are being repaired or removed	
Add the following pay subitem:	
"(j) New 2.25m high boundary wall constructed using 390x190x190 concrete blocks.....	kilometre (km)
"(k) Palisade fencing.....	metre (m)

Add the following:

"The tendered rate shall include full compensation for all labour, plant and equipment required to erect the blockwork, including tying into existing structures".

<u>Item</u>	<u>Unit</u>
B55.05 Dismantling existing fencing	

Add the following pay subitem:

"(v) Existing blockwork wall..... kilometre (km)"

Amend the paragraphs under this pay item as follows:

Replace all instances of the word "fences" with "fences or walls".

Add the following:

"The tendered rate for demolition of walls shall include full compensation for all labour, plant and equipment required to demolish the existing block / brick wall, and disposal of the product of the demolition to a borrow pit within a free-haul distance of 1km."

SECTION 6100: FOUNDATIONS FOR STRUCTURES

B6115 MEASUREMENT AND PAYMENT

<u>Item</u>	<u>Unit</u>
B61.05 Fill within a restricted area (extra over item 33.01).....	cubic metre (m ³)

Add the following:

The tendered rate shall allow for dynamic plate compaction of layers no thicker than 300mm in achieving the specified compaction.

Add the following pay items:

<u>Item</u>	<u>Unit</u>
B61.60 Establishment on the site for 300mm diaphragm wall.....	Lump Sum

The tendered lump sum shall allow for establishment of excavation equipment and materials required for the excavation methodology as proposed by the Contractor and approved by the Engineer. The tendered lump sum shall allow for the construction of access platforms for mass-excavating equipment (if required) and moving of any equipment or materials within the work area relative to that structure.

<u>Item</u>	<u>Unit</u>
B61.61 Excavation for 300mm diaphragm wall (i) 0m up to 4.0m depth.....	cubic metre (m ³)

The unit of measurement shall be the cubic metre of material to be removed in constructing the diaphragm wall over the successive depth range from the indicated top of concrete (TOC) level of diaphragm wall.

The tendered rate shall include full compensation for trench excavation from the indicated level to the specified depth, with trench stabilization by means of mineral or polymer slurry, shoring or other suitable means as the excavation proceeds. Should excavation by hand without shoring, or bulk excavation by mass-excavating equipment, be implemented, the rate shall include the additional excavation required in creating stable side slopes, as well as backfilling and compaction of over excavated material in layers no thicker than 300mm, to the required compaction as stipulated by the engineer, after construction of the diaphragm wall.

<u>Item</u>	<u>Unit</u>
B61.62 Extra over item 61.61, irrespective of depth, through obstructions consisting of: (a) Hard Rock.....	cubic metre (m ³)

The unit of measurement shall be the cubic metre of hard rock material to be removed in constructing the diaphragm wall.

The tendered rate shall include full compensation for the additional effort in removing hard rock material during the excavations irrespective of methodology. The methods in removing hard rock material are to be approved by the Engineer prior to implementation.

<u>Item</u>	<u>Unit</u>
B61.63 Steel reinforcement in cast in situ diaphragm wall: (a) Mild-steel bars..... (b) High-yield-stress-steel bars (Type indicated).....	

The unit of measurement for steel bars shall be the ton of reinforcing steel in accordance with the provisions stipulated in item 63.01.

<u>Item</u>	<u>Unit</u>
B61.64	Lateral support to excavations
(i) 0 to 5 m depth.....	lump sum (L/Sum)

The unit of measurement shall be the lump sum over the successive depth ranges, measured from the existing ground levels.

The tendered rate shall include full compensation for procuring and installing the lateral support system, as well as for removal, if required. It shall include for all materials, labour, plant, equipment and incidentals to provide support to the excavated faces and layerwork faces for the duration of construction.

The depth of excavation shall be measured over the successive depth ranges measured down from the existing road levels, or in the event of road fill to be retained, the height measured up from the existing road levels.

The work will be paid for by way of a lump sum, 50% of which shall become payable when all equipment and material is on site and the first element of the lateral support system has been installed. The second instalment of 40% of the lump sum shall become payable after the excavation platform has been completed, and the final 10% of the lump sum shall be paid after the system has been removed from the site.

The cost of excavating the material and layerworks shall not be included, but paid for under items 61.02 and 61.03(A)."

SECTION 6200 : FALSEWORK, FORMWORK AND CONCRETE FINISH

B6210 MEASUREMENT AND PAYMENT

<u>Item</u>	<u>Unit</u>
B62.04 Inclined formwork to provide F2 surface finish to:	
(i) Curved channel soffit.....	square metre (m ²)
(ii) Chamfered inlet below barrier walls.....	square metre (m ²)
(iii) Bridge Beam internal faces.....	square metre (m ²)
(iv) Rounded finish to Piers.....	square metre (m ²)

Add the following

"The tendered rate shall allow for full compensation in achieving the required finish to suspended, curved surfaces, chamfered, rounded or other surfaces that are inclined as indicated in the drawings."

Amend the note at the end of this pay item to read:

"Inclined, vertical and horizontal formwork shall be the formwork as described in the Schedule of Quantities."

<u>Item</u>	<u>Unit</u>
B62.05 Permanent formwork:	
(a) 30mm precast planks to form void.....	square metre (m ²)

Add the following

"The tendered rate shall allow for full compensation in manufacturing 30mm precast planks of 25MPa/13mm concrete, curing for 14 days, and placement as indicated on the drawings prior to fixing reinforcement for deck construction."

SECTION 6400 : CONCRETE FOR STRUCTURES

B6414 QUALITY OF MATERIALS AND WORKMANSHIP

(a) Criteria for compliance with the requirements

Add the following:

At the commencement of the project, the contractor shall make a batch of 9 No. 100mmx100mmx100mm test cubes for independent compression strength testing of 3 samples at 14 days, 21 days and 28 days respectively. The contractor shall submit the test results and mix design to the engineer, who must approve the mix design and test results, before concrete construction work can commence. Rejected test samples will require redesign of the concrete mix and/or additional testing. The initial and any subsequent batch and testing to achieve the required concrete specification shall be deemed to be included in the rates and shall not be an additional cost to the project.

B6416 MEASUREMENT AND PAYMENT

<u>Item</u>	<u>Unit</u>
B64.01	Cast in situ concrete:
	(a) Class 25MPa/19mm concrete
	(b) Class 30MPa/19mm concrete
	(c) Class 60MPa/13mm concrete

Add the following:

"The tendered rate shall allow for the Contractors preferred method of construction, subject to approval from the employer's agent, with particular reference to the concrete canal lining, i.e. should the Contractors preferred method of construction be slip form construction, the rate tendered shall account for the additional resources, machinery, etc. required to implement such a construction method. All surfaces shall be finished to either a Class U2 or Class F2 surface finish (where applicable) unless specified otherwise."

SECTION 6500 : PRESTRESSING

B6505 TECHNICAL DATA

h) Bursting reinforcement

Add the following paragraph:

"The contractor shall design the bursting reinforcement for his proposed prestressing system and submit drawings to the employer's agent for approval in accordance with clause 6507. The price for the steel and fixing shall be included in the rate tendered for stressing."

B6510 POST-TENSIONING

d) Concrete strength

Add the following after the first paragraph:

"Notwithstanding the concrete strength provisions above, permanent prestressing cables shall not be stressed within 7 days after completion of the last concrete pour unless the method and sequence of construction is based on a method of assessing the in situ concrete strength, such as match casting, which demonstrates that adequate strength has been attained. The proposed method shall be described in a method statement which shall be submitted to the employer's agent for approval at least 28 days before construction of that part of the Works commences. When determining concrete strengths at which stressing operations can safely commence, due regard shall be taken of the tensile strength in addition to compressive strength, to prevent undesirable cracking in tendon anchorage zones. In this shall be carried out to determine the rate of gain of both tensile and compressive strengths before the a statement is submitted to the employer's agent for approval".

B6512 MEASUREMENT AND PAYMENT

<u>Item</u>	<u>Unit</u>
B65.01 Prestressing tendons:	
(a) Longitudinal parabolic tendons	meganeuton-metre (MN-m)

Add the following to the paragraph describing the unit of measurement:

"The cross-sectional area of the tendon used in the calculations shall be the area of the minimum number of strands necessary to develop the jacking force."

SECTION 6600 : NO-FINES CONCRETE, JOINTS, AND DRAINAGE FOR STRUCTURES

B6608 MEASUREMENT AND PAYMENT

<u>Item</u>	<u>Unit</u>
B66.05 Expansion joints:	
(a) Claw joint or equivalent in deck over abutments (40mm movement capacity).....	metre (m)

Add the following to the measurement clause of subitem (b):

"The joint measured shall be the complete joint shown on the drawings including termination details and recesses at balustrades and cover plates and fixings."

Add the following to the end of the second paragraph:

"The tendered rate for subitem (a) shall also include water testing required to prove the joint. The water shall be ponded and maintained to a minimum depth of 150mm above the top of the joint for a period of one hour each. Each test shall cover the length of each joint installed.

<u>Item</u>	<u>Unit</u>
B66.06 Filled joints:	
a) Horizontal Dowel Joint "Type C" in in channel floor and side slopes	metre (m)
b) Horizontal Expansion Joint Type "D".....	metre (m)
c) Horizontal Isolation Joint at surface beds	metre (m)
(e) Inclined joints in curved channel Joint Type "E"	metre (m)
(f) Inclined joints in curved channel Joint Type "F".....	metre (m)
(g) Vertical joints in retaining walls Joint Type "G".....	metre (m)
h) Horizontal Dowel Joint "Type H" in surface bed.....	metre (m)
j) Vertical Expansion Joint "Type J" in walls.....	metre (m)

Delete the item description and replace with the following:

"All joints are to be measured per metre length, irrespective of depth, along the joint centre line".

The tendered rate shall allow for full compensation for all materials as indicated in the applicable drawings formwork in forming the joint, dowels at specified spacings, PVC sleeves with bituthene caps, bitumen paint, jointex, sealant as specified etc. Items as measured under Item 66.21 are excluded where applica

Item

- B66.07 Unfilled joints:**
- (a) Horizontal Toggle Joint "Type A" in channel floor and side slopes. metre (m)
 - (b) Vertical Toggle Joint "Type A" in walls..... metre (m)
 - (c) Inclined Dowel Joint "Type B" in channel..... metre (m)
 - (d) Saw-cut Joint in surface beds..... metre (m)

Delete the item description and replace with the following:

All joints are to be measured per metre length, irrespective of depth, along the joint centre line.

The tendered rate for the various sub items shall allow for full compensation for all materials as indicated in the applicable drawings which include formwork in forming the joint, dowels at specified spacings, PVC sleeves with bituthene caps, bitumen bond breaker paint, jointex as specified, etc. Items as measured under Item 66.21 are excluded where applicable.

Where joints of similar profile, such as Toggle Joint "A", are described by a single detail, the rate tendered shall account for the additional requirements as necessary in achieving the joint specification for that application (e.g. where a single detail is used to describe both vertical and horizontal joints, the rate tendered will consider the different methods of construction in achieving that profile for the particular application)."

<u>Item</u>	<u>Unit</u>
B66.19 Drainage pipes and weepholes:	
(a) Drainage pipes	
(i) Perforated drainage pipes - M65 Nylon drainage pipe or equivalent wrapped in grade 2 geotextile (as specified in COLTO 2104 (a)).....	metre (m)
(b) Weepholes:	
(i) 75mm dia. uPVC pipes with stone filter wrapped in grade 2 geotextile (as specified in COLTO 2104 (a)).....	Number (No.)
(ii) 100mm dia. ground water relief structure with stone filter wrapped in grade 2 geotextile (as specified in COLTO 2104 (a)).....	Number (No.)

Add the following

"The unit of measurement shall be the linear metre of perforated drainage pipes placed behind the earth faces as shown on the drawing.

The tendered rate for drainage pipes shall include the 300mm wide by 50mm thick mortar bed under the core.

The tendered rate for sub items (a) and (b) shall allow for full compensation for all materials as indicated in the drawings which include cast-in items such as non-return valves and piping, stone filter at specified dimensions, Bidim or equivalent around pipes and stone filters, etc; as well as installation, labour and equipment required."

<u>Item</u>	<u>Unit</u>
B66.28 Drainage strips	
(a) 200mm wide DN3 Flownet or equivalent drainage strips.....	metre (m)

The unit of measurement shall be the linear metre of drainage strips laced behind the earth faces as shown on the drawing.

The tendered rate shall include full compensation for all material, labour, and equipment and install the strips as shown.

PSA SANS 1200 A: GENERAL

PSA 2. INTERPRETATIONS

PSA 2.3. DEFINITIONS

Add the following definitions:

Commercial source: A source for the supply of materials or services chosen by the Contractor and for which he assumes full responsibility for the quality and supply thereof.

Construction Width: The strip of land along a pipeline route in which all construction activities are to be contained, as defined in PSA 5.8.

Landowner: The term Landowner shall be read to include any lessee of the land concerned.

PSA 2.8. ITEMS IN SCHEDULE OF QUANTITIES

PSA 2.8.1. Principle

In the fourth line of Sub-Clause 2.8.1 after the word "specification", add "or in the measurement and payment clause of the standard or particular specification or section or project specification".

PSA 3. MATERIALS

PSA 3.1. QUALITY

Where there is a standardisation mark programme for any material, all such material supplied shall bear the official standardisation mark.

Alternative materials or equipment proposed by the Contractor shall be tested. The test, as well as the materials or equipment, shall be approved by the Engineer prior to any such materials or equipment being built into the works, and all costs involved in testing shall be deemed to be included in the rates tendered.

PSA 4. PLANT

PSA 4.2. CONTRACTOR'S OFFICES, STORES AND SERVICES

The Contractor's site establishment shall also comply with the requirements of the Environmental Management Plan herein (Section C3.8).

PSA 5. CONSTRUCTION

PSA 5.1. SURVEY

PSA 5.1.1. Setting Out of the Works

The Contractor shall engage a registered engineering surveyor to establish sufficient control points for the subsequent setting out and checking of the new pipeline alignments.

Any control point disturbed by the Contractor in the course of construction shall be reinstated at the Contractor's own expense.

The setting out of the Works shall be carried out by the Contractor, according to the setting out coordinates given on the drawings and the control points referred to above. All dimensions, levels and data necessary for the complete setting out of the Works will be provided on the Drawings. The Contractor shall not scale dimensions from the Drawings, but shall request from the Engineer any information which is not clearly stated on the Drawings.

PSA 5.4. PROTECTION OF OVERHEAD AND UNDERGROUND SERVICES

Add the following to Sub-Clause 5.4:-

(i) Location and Protection

All available information relating to known existing services and structures has been included on Drawings. Although this information is reflected as accurately as possible, all positions and levels must be taken as approximate only. At the commencement of the contract the Contractor shall verify the information on the plans.

The Contractor shall liaise with the landowners to determine the location of any privately owned services.

At locations where there is a reasonable possibility of unknown underground services being present, the Contractor shall open trenches across such locations before commencing with excavations and, if services are found, these shall be plotted and thereafter be considered as 'known services'. Such work is to be carried out only on the instruction of and under the direct control of the Engineer.

All known services shall be adequately protected from damage during construction operations. The requirements of the relevant service departments relating to limits of heavy plant usage, departmental supervision etc., shall be ascertained and adhered to.

Any damage to known services shall be made good at the Contractor's expense.

No pegs or stakes are to be driven into the ground in the vicinity of the underground services, particularly Electricity or telecommunication services.

Any services or structures damaged during construction shall immediately be reported to the Engineer, and as soon as possible after such damage a written report stating the exact circumstances of the occurrence shall be submitted to the Engineer.

All practical measures shall be taken to effect immediate repairs, either by contacting the relevant authority, or where instructed by the Engineer, the Contractor shall perform temporary repairs himself.

(ii) Wayleaves

As soon as the Contract has been awarded, the Contractor shall apply for the applicable wayleaves or permits from Eskom, and the City of Cape Town for working in the vicinity of electrical cables.

The Contractor shall also apply to the City of Cape Town, Bulk Water Department for a wayleave to work in the vicinity of the existing 1 500 mm diameter raw water pipeline, and to Telkom, Neotel and any other services authorities in respect of any other services which may be present on site.

Furthermore, the Contractor shall apply for the applicable wayleaves from SANRAL for working in, or immediately adjacent to, SANRAL road reserves.

Copies of these wayleaves or permits shall be submitted to the Engineer prior to any excavations being carried out.

The Contractor shall provide any sureties or bank guarantees (over and above any other contractual monies) required by Eskom, the Municipality or any other Service Authority, which will be fully refundable provided that the funds are not required to repair cables damaged by the Contractor. The Contractor shall make provision for excavating by hand when working within 3 m of existing electrical cables (underground or overhead). The Contractor shall liaise closely with Eskom in this regard.

PSA 5.6

POLLUTION

Add the following to Sub-Clause 5.6:

The Contractor is required to take all necessary precautions, watering where appropriate, to prevent dust blowing from construction material and spoil heaps and/or ground stripped of vegetation cover. Unless a specific item is included in the Bill of Quantities, the costs shall be deemed to be included in the tendered rates.

This item shall receive special attention due to the presence of vineyards in the vicinity of the site.

PSA 5.7

SAFETY

The Contractor shall comply with all further provisions pertaining to safety, contained in the Health and Safety Specifications.

PSA 5.8

GROUND AND ACCESS TO THE WORKS

PSA 5.8.1

Construction Width

The Works are to be executed within public roads and land owned by the Municipality. Part of the site are currently leased out for agricultural use and are under vines. The Employer will arrange for the Contractor to have access to the site.

exercise a right of way over a strip of land 12 m wide, along the pipeline route. The Contractor shall restrict his activities, including the pipe trench, top soil and excavated material heaps, temporary stringing out of pipes and stacking of materials, access and operation of plant and all other work, to within this Construction Width, or such narrower width as may be indicated in certain areas.

PSA 5.8.2 Site Demarcation

Prior to starting work on any section of the pipelines, the Contractor shall erect and maintain site demarcation along both edges of the Construction Width. The demarcation shall only be removed after completion of the backfill.

Site demarcation shall comprise orange, UV stabilised, HDPE construction safety netting, 1.2 m high, adequately supported on timber stakes.

PSA 5.8.3 Work in Agricultural Property

Work is to be undertaken in private agricultural property and the Contractor shall respect all existing fence lines and gates, and ensure that no livestock is allowed to stray as a result of the construction activities.

PSA 5.8.5 Access Roads

Where there are no existing roads or tracks, the Contractor shall provide suitable access roads, for the purposes of construction and delivery of materials and for access by the Engineer to carry out inspections of the work

These shall be maintained in a satisfactory condition until they are no longer required, after which the areas affected shall be reinstated to their original condition.

Temporary gates shall be provided at points where access roads cross existing fences.

All existing access roads on the site, used by the Contractor for the works or affected by the works shall be maintained for the duration of the Contract and reinstated to their original condition after completion of the works.

The Contractor shall ensure that all existing access roads required by the general public, the Employer or the Landowners are kept open or that acceptable alternative routes are provided.

PSA 5.8.6 Fences

Before commencing work, the Contractor shall, consult the affected landowners to determine which fences, if any, can be temporarily removed.

Fences that cross the Construction Width shall be suitably propped, protected and maintained during construction.

Fences which run parallel to and within the Construction Width, shall be replaced with a temporary fence erected along the edge of the Construction Width, and restored to their original lines after completion of the Works.

Where so agreed to by the landowners, the fences may be dismantled, the materials set aside until completion of the work, after which they shall be reinstated. All fences affected by the Works shall be reinstated to their original condition.

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.3 FIXED-CHARGE ITEMS

PSA 8.3.7 Items Requiring Special Attention (Fixed Charge)

a) Wayleaves

The item shall cover all general costs associated with protection of services and compliance with wayleave requirements as detailed in PSA 5.4, including financing of any deposits required and/or costs of providing any sureties or guarantees required.

b) Survey

The item shall cover all costs of establishing control points and general costs associated with setting out the works, as described in PSA 5.1.1 above.

<u>Item</u>	<u>Unit</u>
a) Wayleaves.....	Sum
b) Survey.....	Sum

PSA 8.4 SCHEDULED TIME-RELATED ITEMS

Add the following:

*Adjusted Payment for Time-Related Costs.

The payment to the Contractor for time-related costs shall be adjusted in accordance with the following formula in the event of the Engineer granting an extension of time in terms of the provisions of the Contract:

$$\text{Sum of Tendered amount for Time-Related items} \times \frac{\text{Extended contract period as authorised by Engineer}}{\text{Tender contract period}}$$

The above mentioned adjustment of the payment for Time-Related Items shall be made in the Completion Payment Certificate and shall be the only payment for additional time-related costs irrespective of the actual period required to complete the Contract including its authorised extensions. Where completion occurs after the original due completion date but before the extended due completion date, the contractor shall only be entitled to claim time-related costs up to the actual date on which practical completion is certified.

PSA 8.5 SUMS STATED PROVISIONALLY BY THE ENGINEER

PSA 8.5.1 Testing of materials by Engineer

<u>Item</u>	<u>Unit</u>
a) Testing of materials ordered by the Engineer	PC Sum
b) Contractor's overheads, charges and profit on a) above	%

PSA 8.8 TEMPORARY WORKS

PSA 8.8.1 Site Demarcation

The sum tendered shall cover all costs associated with erecting, maintaining and removing Construction Width demarcation as specified in PSA 5.8.2.

e) Site Demarcation.....	Sum
--------------------------	-----

PSA 8.8.2 Access Roads

The sum tendered shall cover the costs associated with establishing and reinstating access specified in PSA 5.8.5.

25% of the sum tendered will be paid once the necessary access roads are substantially established and the balance will be paid after the all roads have been reinstated to the satisfaction of the Engineer.

	<u>Item</u>	<u>Unit</u>
	Access roads	Sum
PSA 8.8.3	<u>Traffic Accommodation</u>	
	Access through public roads, to residential and commercial properties shall be maintained at all times. Should temporary diversions become necessary, the Contractor shall give reasonable notice to the affected residents and take adequate measures to maintain the temporary deviation in good condition at all times.	
	This item shall cover all costs of complying with the above as well as all signage, labour, plant, material and all other costs involved with accommodating traffic in accordance with the latest edition of the South African Traffic Signs Manual.	

■

<u>Item</u>	<u>Unit</u>
Traffic accommodation	Sum

PSC SANS 1200 C: SITE CLEARANCE

PSC 2,3 DEFINITIONS

Designated Site / Area

Add the following:

The designated site for clearing and grubbing (as defined in SABS 1200C clause 5.3 & 5.4) shall be defined as that falling within the Site boundary shown on the drawings.

Notwithstanding the above, the Contractor shall prior to any clearing and grubbing agree with the Employer's Agent the areas to be cleared.

PSC 3 MATERIALS

PSC 3.1 DISPOSAL OF MATERIAL

Natural material comprising stones, gravel, soil and topsoil shall be stockpiled along the edge of the Construction Width and spread over the Construction width after completion of the backfill.

Unless otherwise indicated, material and rubble obtained from clearing and demolition, including pipeline cleaning, shall be disposed of off-site at a landfill site selected by the Contractor and approved by the Employer's Agent. Disposal certificates shall be provided for each load of material disposed.

Tree trunks, branches and any cleared vegetation constituting a fire hazard shall be removed from site.

Burning of material on site will not be permitted.

PSC 3.2 ASBESTOS

Existing sewer pipework which is to be removed could be asbestos cement and the Contractor shall comply with the relevant legislation and provisions of the Health and Safety Specification in this regard.

Any materials suspected of containing asbestos must be reported immediately by the Contractor to the Engineer. All work with asbestos to be done strictly in accordance with the Asbestos Regulations and by a registered contractor only (registered in the last 12 months with the Department of Labour). The Asbestos Inspection Authority (AIA) must be supplied with a plan of work for the project. Removal and disposal of asbestos must be strictly monitored, and the registered Contractor appointed must abide by Asbestos Regulations GNR 155 of 10 February 2002.

PSC 3.3 RECOVERY OF MATERIAL FROM DEMOLITION

Where indicated, reusable materials obtained from demolition work shall remain the property of the Employer. Such materials shall be carefully dismantled and neatly stored at a location on the WWTW to be designated by the Employer's Agent. The Contractor shall not dispose any material which could reasonably be construed to be re-usable without authority from the Employer's Agent.

Where so indicated, certain materials obtained from demolition or dismantling shall be reused in the works (or at other WWTW). Such materials shall be carefully dismantled, set aside and stored for later reuse. The Contractor shall take all necessary precautions to protect such materials from damage during demolition, transport and storage. Any such materials which are lost or damaged as a result of negligence on the part of the Contractor shall be replaced at the Contractor's own cost.

PSC 4 PLANT

PSC 4.2 DEWATERING PLANT (NEW CLAUSE)

The Contractor shall be responsible for designing, supplying, installing, operating and removing site all the temporary plant necessary for dewatering the sludge, including any pumps and equipment required to transfer the water extracted from the sludge to the specified discharge point.

PSC 5 CONSTRUCTION

PSC 5.1 AREAS TO BE CLEARED

The Contractor shall clear the Construction Width, to the extent necessary to allow access and the execution of the Works as specified.

Areas to be cleared for the various components of the Works on the Waste Water Treatment Works shall be shown on the Drawings or agreed with the Employer's Agent. These shall include the routes of pipelines and areas to be occupied by new structures.

No fences and trees shall be removed without prior approval from the Employer's Agent.

PSC 5.8 DEMOLITION OF STRUCTURES

PSC 5.8.1 Breaking out of concrete and brickwork

Breaking out of existing concrete and brickwork is required in a number of areas to effect alterations to existing structures or allow new pipework to pass through existing walls. The extent of the demolition work is indicated on the drawings, but may also be directed by the Employer's Agent on site.

Wherever a section of a plane surface such as a wall or slab is to be broken out, a saw cut of depth at least 50 mm shall be made on the perimeter of the area to be removed so as to present a clean edge to the broken out section. Where both faces of the panel are accessible, a saw cut shall be made on each face.

All edges exposed by demolition shall be made good as specified in section PSG.

PSC 5.8.2 Removal of corroded pipework

The existing pipework in the sludge drying beds (which are to be demolished) are to be removed and disposed of.

The Contractor shall take all necessary precautions to prevent damage to the surround structures that will be kept. Take care of pipework that is to be not removed.

The pipework shall be removed from site and disposed of by the Contractor.

PSC 5.8.3 Dismantling existing pumps and motors

Where so indicated, the existing pump and motor equipment shall be dismantled by the Contractor. Any re-usable materials shall, unless otherwise directed, remain the property of the City of Cape Town and shall be moved by the Contractor to a designated store on the WWTW, where the materials shall be stacked in an orderly manner.

If so instructed however, such materials shall be removed from site and disposed of by the Contractor.

PSC 5.8.4 Dismantling of Existing Mechanical Plant

Where so indicated, existing mechanical plant shall be dismantled by the Contractor. Any re-usable materials shall, unless otherwise directed, remain the property of the City of Cape Town and shall be moved by the Contractor to a designated store on the WWTW, where the materials shall be stacked in an orderly manner.

PSC 8 MEASUREMENT AND PAYMENT

PSC 8.1 PRINCIPLES

PSC 8.1.1 Demolition

Payment for demolition work shall only be made after all waste generated from the demolition work concerned has been cleared from site to the satisfaction of the Engineer.

For all bill items involving the disposal of demolition waste, the Contractor will be deemed to have made allowance in his rate for the salvage value, if any, of any re-usable materials.

Where indicated that materials recovered from demolition or dismantling of existing structures are to be handed over to the Employer, the rate shall include all costs of removing, transporting and stacking the material at the designated location. No additional payment will be made for transport.

material from any location along the pipe route to any location within 500 m of the Construction Width or to any location within the WWTW.

Where indicated that materials are to be reused in the Works, the rate shall cover all costs associated with dismantling, setting aside and storing the materials and protecting them from damage, until they are reused.

The Contractor will be deemed to have inspected the site and familiarised himself with all conditions affecting demolition work such as access, working space, nature of materials to be demolished and temporary support required for existing structures. The rates for demolition work shall be deemed to include all necessary scaffolding, access ramps and plant or other provisions for the removal of waste

PSC 8.2 SCHEDULED ITEMS

PSC 8.2.2 Remove and grub large trees and tree stumps

The tendered rates for PSC8.2.2 shall also include for the requirements of PSC 5.2.

<u>Item</u>	<u>Unit</u>
Remove and grub large trees and tree stumps	
(a) Over 1m up to 2m	No
(b) Over 2m up to 3m	No

PSC 8.2.5 Take down and reinstate existing fences

Add the following:

The fences taken down during the clearing operation shall be reinstated in the position directed by the Engineer on site. The fences shall be reinstated using the original materials recovered from the existing fences and the contractor shall, at his own cost, replace any materials that have been lost or damaged during the construction period.

Measurement shall be the length of fence taken down.

<u>Item</u>	<u>Unit</u>
Existing fenceline to be taken down and reinstated in new position.....	m

PSC 8.2.7 Dismantle and Remove Pipelines, Electricity Transmission Lines, Cables etc.

Where the removal of Asbestos Cement (AC) pipes is identified in the bill of quantities, the rate shall include all costs associated with complying with the relevant Health and Safety Specifications and asbestos legislation (see PSC 3.2 above), including costs of PPE, medicals, notifications, drafting and approval of work plans and risk assessments, monitoring, providing decontaminating areas, inspections, reporting, record keeping, as well as transport and disposal at Vissershok and obtaining an Asbestos disposal certificate.

The Contractor shall dismantle and remove any service only on the written instruction of the Engineer.

The tendered rate shall include all costs involved in dismantling, lifting, and suitably disposing of each pipeline, transmission line, and cable and the additional cost of precautions required during excavation in their vicinity, including excavation by hand in all materials to expose the services, as directed by the Engineer, but excluding the cost of bulk excavation and backfilling, which will be measured separately.

PSC 8.2.8 Demolish and remove structures/buildings and dismantle steelwork, etc.

The Contractor shall demolish and remove any structure/building only on the written instruction of the Engineer. Where the removal of Asbestos Cement parts form part of the structures to be removed, the rates shall include all costs associated with complying with the relevant Health and Safety Specifications and asbestos legislation (see PSC 3.2 above)

The tendered rate shall include all costs involved in demolishing the structures/buildings specified, including excavating, cutting, dismantling and breaking up, lifting, loading, transport, disposing of all rubble and waste at approved municipal disposal facility, including disposal. It shall also include for backfilling excavations, making good and levelling of

around the structure/building. The Contractor will be deemed to have made allowance in his rate for the salvage value, if any, of any re-usable materials.

The Contractor is to take all reasonable care to protect the adjacent structures (if any) from damage during the removal operation.

The item shall distinguish between the different types of structures to be demolished and removed and the unit measured shall be the appropriate number of each.

The existing sludge drying beds are 12m x 14m each in area and less than 1.2m deep. Each sludge drying bed is consist of soil media in the bed, steel pipes (feed pipe to the sludge beds) and perforated pipe located inside the beds. All these items are to be removed and disposed of. The bed walls are made of brickwork with concrete strip footings.

The Vibracrete wall in the maturation pond must be removed and disposed of. The wall is approximately 2m high.

PSC 8.2.10. Remove topsoil to nominal depth of 150mm and stockpile

Add the following:

The Employer's Agent and Contractor are to agree upon a stockpile site for any topsoil that is to be removed and stockpiled. The costs for transporting, preparing the stockpile site and stockpiling, as per clause 5.6, shall be deemed to be included in the rates.

PSC 8.2.11 Dealing with hazardous material (New clause)

The rates tendered shall include full compensation for taking all of the necessary precautions for dealing with hazardous materials during clearing activities. The rates shall include the removal and transport of the materials to a hazardous waste disposal facility and shall also include all fees for disposal. The requirements of the Health and Safety Specification are to be included in the rate for this item of work.

The item shall distinguish the different types of material to be handled and the unit measured shall be appropriate to the material in question. Payment for each scheduled item will only become payable once the Contractor has supplied the Employer's Agent with a certificate issued by the disposal site.

PSC 8.2.12 Break out concrete or brickwork and make good (New Clause)

Separate items will be scheduled for different materials and different areas with different working conditions.

The item shall cover all costs associated with breaking out concrete or brickwork in walls and slabs for the purpose of modifying the existing structures, forming new pipe penetrations or for laying pipes below walls or structures. The rate shall include removal from site and disposal of the waste material. It shall also cover for making good the broken edges with an approved epoxy mortar (Sika Monotop 620 or equivalent) with a steel float finish to the Employer's Agent's satisfaction or rebuilding the wall to a condition approved by the Employer's Agent.

This work may be required to be done during night and over weekends (e.g. Sunday night after 11pm) when the flows through the works are at the lowest. The tendered rates shall therefore allow for any additional costs associated with doing this work at these hours. It may also be required that the breaking through and the making good of the surfaces be done on separate nights and this shall also be allowed for in the tendered rates.

The times when this work is to be done shall be approved in writing by the Employer's Agent before the work commences.

The quantity measured shall be the net volume of concrete or brickwork required to be removed based on the actual average thickness of the sections to be broken out and the extent of the sections to be broken out shown on the drawings or directed by the Employer's Agent. No payment will be made for overbreak.

Item

**Break out concrete/brickwork, reinstate, make good edges
and dispose of waste**

PSC 8.2.16 Saw Cuts through existing surface (New Clause)

The rate shall cover the cost of forming saw-cuts in existing concrete or asphalt surfaces for excavation of trenches or at the edge of areas to be demolished. The quantity measured shall be the length of saw-cut required.

Separate items will be scheduled for different materials and depths of cut.

<u>Item</u>	<u>Unit</u>
Saw cut through existing surface (type of surface and depth specified)	m

PSC 8.2.17 Removal of existing kerbing, channelling and edging

The tendered rate shall be for all costs to remove existing precast kerbs, including backing and benching concrete, and dispose thereof at a licenced waste disposal facility. The rate tendered shall cover all commonly used kerbs including barrier, mountable, combination and edging and channel sections. The quantity shall be the length of kerb designated for removal.

<u>Item</u>	<u>Unit</u>
Removal of existing kerbing, channelling and edging:	
(a) Channelling	m

PSC 8.2.18 Removal of General Waste

If so instructed by the Engineer, the Contractor shall remove miscellaneous waste material which interferes with the works and dispose of it at an approved, licenced landfill site. The rate under this item shall cover all costs in this regard including handling, loading, haulage (irrespective of distance), unloading and all disposal charges which may be levied by the landfill site.

The quantity measured shall be the tonnage reflected on the weighbridge certificate issued by the landfill site. No payment will be made should the Contractor fail to produce a certificate from an approved landfill site.

Separate items will be billed for different types of waste.

Metal shall include pipework, pressure vessels, structural sections and other miscellaneous scrap. Where appropriate, metal waste shall be disposed of at recyclers or scrap merchants selected by the Contractor and approved by the Engineer. The Contractor's rate may include any credit for the resale of scrap metal, but the Contractor shall bear all risk of price fluctuations.

Building Rubble shall include bricks, loose pavers, kerbs, concrete rubble, sand free of organic material etc.

Other material shall be general waste such as plastic, wood, old hoses, tarpaulins, ropes, tyres, sand contaminated with organics material or general waste etc.

These items shall only apply to existing waste on site. The disposal of all waste arising from demolition or clearing or construction work required under this Contract shall be deemed to be included in the relevant items for the work concerned.

<u>Item</u>	<u>Unit</u>
General Waste Removal	
(a) Metal	tonne
(b) Building Rubble	tonne
(c) Other	tonne

PSC 8.2.19 Survey of Sludge Volume (New Clause)

Maturation Pond

The Contractor shall determine the volume of sludge in the Maturation Pond by surveying the surface of the sludge at once the water is drained (at a time approved by the Engineer), and the invert level of the structure after cleaning out the sludge (once the Engineer is satisfied the sludge has been removed).

The Contractor shall establish a control network of benchmarks for the purposes of these surveys. The location of benchmarks shall be agreed with the Engineer.

The Contractor shall give the Engineer's Representative 48 hours' notice before undertaking such survey work. The Engineer's Representative may, at his option, witness the survey or carry out his own checks.

Where the sludge is submerged, the survey of the sludge surface shall be done from a small boat according to the method described in Particular Specification PC. All the equipment required to carry out the survey in accordance with the method in Specification PC and PA shall be made available to the Engineer, should he wish to carry out independent checks.

If the sludge is at the surface of the pond, the survey shall involve surveying the level of the sludge along the sides of the pond and interpolating across the pond. In this case, survey points shall be at a minimum of 3m spacing.

The Contractor shall not start drawing down the water or removing the sludge until the survey of the initial sludge surface has been agreed in writing with the Engineer.

<u>Item</u>	<u>Unit</u>
-------------	-------------

(a) Establishment of plant and survey control	Sum
---	-----

The establishment of plant and survey control shall include establishing and disestablishing the boat or any other equipment required and all the necessary equipment to carry out the survey, setting out the control benchmarks and the grid markers, all as specified in Particular Specification PC.

(b) Survey of submerged sludge in Maturation Pond.....	Sum
--	-----

Measurement shall be a lump sum item. The approximate area of the ponds is provided as a guide to the extent of the survey and tendered rates will not be re-calculated on a pro-rata basis if the actual area to be surveyed is different. The rate shall cover carrying out the survey as described in Particular Specification PC, plotting out the points and interpolating cross-sections.

(c) Survey of empty Maturation Pond.....	Sum
--	-----

Measurement shall be by the plan surface area of the area surveyed. The rate shall cover carrying out a conventional survey of the pond, plotting out the points and interpolating cross-sections.

PSC 8.2.21 Drawing Down of Water in Maturation Pond (New Clause)

The Contractor shall draw down the level of clear water in the ponds to allow the sludge to be removed. The water shall be drained (even pumped) into the inlet of the Chlorine contact tank.

When the water level approaches the sludge blanket, the Contractor shall notify the Engineer's Representative who shall instruct the Contractor to stop the drawdown when, in his opinion, the quality of the water is unacceptable for discharging into the Chlorine Contact tank. The Contractor shall give the Engineer 48 hours' notice to undertake such an inspection.

The Contractor shall assess the volume of water to be removed, choose an appropriate method of drawing down the water and tender a sum per pond to be drained.

The rate tendered shall allow for any variation of volume of water present within each pond. The amount tendered shall cover all labour and supply, installation and operation of pumps, pipework and other equipment required to lead water to the discharge point.

<u>Item</u>	<u>Unit</u>
Drawdown surface water level in Maturation Pond	Sum

PSC 8.2.22 Cleaning out of Sludge from Maturation Pond (New Clause)

The sludge inside the pond shall be removed. The rate tendered under this item shall include labour, plant, handling, measurement and transport to the location where the sludge is dewatered (dewatering scheduled separately) or where it will be stockpiled for disposal. The percentage of dry solids of the sludge, in the ponds and lagoons, is unknown. The contractor shall

use a flat bladed bucket on the excavator/dredger (not a toothed bucket) so as to not damage the pond lining system.

The volume shall be measured wet in-situ (i.e. in the pond or lagoon), prior to removal, on the basis of cross-sections before and after cleaning, determined as specified in PSC 8.2.19 and Particular Specification PA.

The rate shall include for transporting the wet sludge to the drying beds or dewatering facility on site as directed by the Engineer.

<u>Item</u>	<u>Unit</u>
Remove sludge from Maturation Pond	m ³

PSC 8.2.23

Bypass existing structure

This item shall cover all costs associated with diverting existing flow past the specified structure using a temporary pump and pipework with sufficient capacity.

The Contractor shall, at the time of tender, determine the amount of time required to carry out the construction work concerned and the sum tendered shall be deemed to include full compensation for keeping the diversion operational for the full duration of the construction work.

The payment of this time will be on a pro-rata basis, based on the Engineers assessment of the progress at the time of the certificate.

<u>Item</u>	<u>Unit</u>
Accommodation of flow passed existing structure (specified)	Sum

PSC 8.2.24

Divert flow from clarifier to the Chlorine Contact Tank

This item shall cover all costs associated with diverting existing flow as described in Particular Specification PA.

The Contractor shall, at the time of tender, determine the amount of time required to carry out the construction work concerned, including draining the chamber and the sum tendered shall be deemed to include full compensation for keeping the diversion operational for the full duration of the construction work.

<u>Item</u>	<u>Unit</u>
Diverting Flow from the clarifier to the chlorine Contact tank (specified)	Sum



PSD SANS 1200 D: EARTHWORKS

PSD 3 MATERIALS

PSD 3.1 CLASSIFICATION FOR EXCAVATION PURPOSES

PSD 3.1.1 Method of Classifying

The Contractor may use any method he chooses to excavate any class of material but his chosen method of excavation shall not determine the classification of the excavation. The Engineer or his Representative will decide on the classification of the materials. In the first instance the classification will be based on inspection of the material to be excavated and on the criteria given in PSD 3.1.2 below. All material shall be considered to be soft material unless agreed and approved otherwise in writing with the Engineer prior to excavation taking place.

In the application of this classification, no differentiation shall be made between "bulk" or "restricted" excavations.

PSD 3.1.2 Classes of Excavation

All material encountered in any excavations for any purpose including restricted excavation will be classified as follows:

- a) **Hard rock excavation**
Hard rock excavation shall be excavation in material (including un-decomposed boulders exceeding 0,17 cubic metres in individual volume) that cannot be efficiently removed without blasting or without wedging and splitting.
- b) **Intermediate excavation**
Intermediate excavation shall be excavation in material containing more than 40% by volume of boulders of sizes ranging between 0,01 m³ and 0,17 m³.
- c) **Soft excavation**
Soft excavation shall be all material not falling into the categories of hard rock or intermediate excavation.

PSD 5 CONSTRUCTION

PSD 5.1 PRECAUTIONS

PSD 5.1.1 Safety

i) PSD 5.1.1.2 Safeguarding of Excavations

The Contractor shall be responsible for all lateral support and the safe-guarding of all excavations, and all costs involved with the proper safeguarding of the excavations shall be included in the tendered rates.

PSD 5.2 METHODS AND PROCEDURES

PSD 5.2.2 Excavation

ii) PSD 5.2.2.3 Disposal

Where excavated material is disposed of on site or at location designated by the Engineer, the top soil shall be stripped to a depth of 150 mm or as directed, stockpiled and reinstated to its original depth over the spoil. The spoil site shall be graded to smooth, free-draining contours.

PSD 5.2.3 Placing and Compaction

iii) PSD 5.2.3.2 Confined Backfilling and Compacting Around Structures

Backfill against structures, within 1,0 m of the structure, shall be approved clean non-cohesive material, either selected material from the excavations or imported material, and shall be compacted to a minimum of 93% Mod. AASHTO density (100% for sand). Payment for this item shall cover all costs involved in supplying, loading, transporting, placing, spreading and compacting the imported material. The volume of backfill will be calculated on a 1,0m wide area for workspace behind the structure walls, and the Contractor shall make provision in his rates for any additional required for wider excavations.

PSD 5.2.4. Finishing

iv) PSD 5.2.4.1 *Final Grading (Sub-Clause 5.2.4.1)*

Add the following to Sub-Clause 5.2.4.1:

After the excavation or filling has been completed final grading slopes shall consist of trimming the existing or previously shaped ground to an even surface and to tolerances given in Clause 6.1 (b)(4). Trimming shall be done with hand tools. Machine operations shall only be permitted upon written instruction by the Employer's Agent.

Trimmed surfaces shall be free of all stones exceeding 50mm in size and all excess material shall be removed. The surface shall be left slightly rough to facilitate a better blinding with topsoil.

v) PSD 5.2.4.3 *Grassing*

Grassing shall be carried out by hydro-seeding with an approved mix or grass plugs as directed by the Employer's Agent and specified in the Schedule of Quantities.

vi) PSD 5.2.4.6 *Concrete Retaining Block Facings (New Clause)*

Slopes with concrete retaining block facings shall be constructed to the lines and dimensions shown on the drawings or as directed by the Employer's Agent.

A concrete strip footing shall be cast at the base of the facing. The footing shall be given a wood floated finish and the top surface of the concrete shall be sloped back at the correct angle to provide the specified batter. Unless otherwise indicated, the concrete shall be grade 15 MPa/19 mm.

Each course of blocks shall be arranged along straight lines or smooth curves as indicated, with full interlock between blocks. Successive courses shall be staggered in stretcher bond and set back as indicated. Geotextile reinforcement shall be placed as indicated.

Backfill shall be replaced behind each row of blocks and firmly tamped before laying the next course. Each course of blocks shall be filled with top soil obtained from other excavations on the Site, before laying the next course. Filling of all the blocks after completion of the whole facing will not be permitted.

PSD 5.2.5 Transport for Earthworks

All haulage for materials obtained from commercial sources selected by the Contractor or disposed of off site by the Contractor shall be regarded as free-haul.

PSD 8 **MEASUREMENT AND PAYMENT**

PSD 8.1 **BASIC PRINCIPLES**

Add the following:

Excavations

The Contractor shall determine at tender stage the appropriate method of bulk and trench excavation (plant, labour etc) and tender rates accordingly.

Generally, the excavations will be measured in the categories set out hereunder, i.e.

- (i) Cut to Fill, where the unit rate tendered shall be inclusive of all work and costs required for the bulk excavation of all materials from platform and excavation areas, the transport and placement of the material in the required fill areas, and compaction in layers not exceeding 150 mm to 93% Modified AASHTO density.
- (ii) Cut to Stockpile where the unit rate tendered shall be inclusive of all works and costs required for the bulk or restricted excavation of materials which are suitable for placement in fill, the loading and transport to the designated stockpile site, and the maintenance of the stockpiles, as directed by the Employer's Agent.
- (iii) Cut to Spoil where the unit rate tendered shall be inclusive of all works and costs required for the bulk or restricted excavation of materials which are in excess or are not suitable for placement in fill, the loading and transport and disposal thereof in accordance with PSD

- (iv) **Hand Excavations.** Hand excavation rates will only be paid if ordered by the Employer's Agent in writing where the unit rate tendered shall be an extra-over rate for restricted excavation, which shall include for all additional costs involved in providing labour and hand tools required for excavations by hand.

Backfilling

Except for the cut to fill operations described above where measurement and payment of the filling and compaction is included under these items, all other fill construction works and backfilling requires fill material from borrow pits and stockpiles on site or from commercial sources, where the following additional items shall apply;

- (a) Construction of fill platform and embankments; where the unit rate tendered shall be inclusive of all works and costs required for the loading and transport of fill material from the stockpiles or borrow pits on site, the placement of the material in the required fill areas, and compaction in layers not exceeding 150 mm to 93% Modified AASHTO density, as directed by the Employer's Agent.
- (b) Restricted backfilling against structures; where the unit rate tendered shall be inclusive of all works and costs required for the selection, loading and transport of fill material from the stockpiles or borrow pits on site, the placement of the material in the 1,0m working space against structures, and compaction in layers not exceeding 150 mm to 93% Modified AASHTO density (100% for sand), as directed by the Employer's Agent.
- (c) An Extra-over item to item (a) above shall be measured for final shaping and trimming of embankment sides.
- (d) An Extra-over item to item (b) above shall be measured for imported material from commercial sources.

PSD 8.1.3

Dimensions of Excavations

Excavations to structures will be measured as follows:

- (a) **Foundations:** Nett plan dimensions of foundations except where the sides of foundations require formwork as ordered by the Employer's Agent, in writing, on site, where a further 1,0 m maximum working space will be added to the nett plan dimensions (measured from the outside of the vertical walls) and up to the bottom of blinding layer beneath the vertical walls. It is envisaged that generally all footings and bases will be cast against the earth faces of the excavations, in which case no working space will be measured or paid for.
- (b) **Structure above foundation level:** A maximum space of 1,0 m working space where required, will be allowed for measurement purposes. It shall be measured up to the bottom of the blinding layer beneath the vertical wall. Any excavation exceeding 1,0 m to the finished vertical faces of any structure shall be excavated, backfilled and compacted as specified, to the cost of the Contractor.

PSD 8.3

SCHEDULED ITEMS

PSD 8.3.2

Bulk Excavation

Unless an item has been specifically scheduled for dewatering, the cost of dewatering of excavations will be held to have been included in the tendered rates for excavation.

The Contractor shall provide adequate temporary drains in and around the excavations to control surface water. Such drains may be self draining or lead to sumps equipped with pumps.

Should the Contractor allow saturated conditions to develop he shall take such steps to rectify the conditions as the Engineer may order, entirely at his own cost, including dewatering.

The tendered price for excavation shall also include for trimming, levelling and compacting the floor of the excavation ready for the application of the blinding layer.

Where embankments are to be constructed with boulder material, embankments are to be laid and compacted in layers (specified by the Engineer in writing) and boulders of diameter greater than layer thickness are to be removed before compaction. The cost for this exercise is deemed included in the tendered rates.

PSD 8.3.3

Restricted Excavation

The provisions of PSD 8.3.2 shall apply. Rates tendered shall include for restricted backfilling around the structures.

Add the following items:

Extra over for:

<u>Item</u>	<u>Unit</u>
5) Final shaping, trimming and compacting of embankment sides	m ²
6) Importation of approved sand fill material from commercial sources.....	m ³
7) 5% cement stabilised sand	m ³
8) Restricted backfilling from stockpile.....	m ³

PSD 8.3.8

Existing Services

vii)

PSD 8.3.8.1 The use or hire of specialist equipment for detection

Where instructed by the Employer's Agent, the existing services are to be located with the use of radio detection methods. The use of special equipment to locate existing services shall be measured by the number of hours the equipment was used to locate any existing service.

The tendered rate shall include all plant and labour required to locate existing services by radio detection methods. The Contractor shall submit a written methodology to the Employer's Agent for approval prior to the hiring of any equipment to be associated with locating any existing service. Should the Contractor hire out any equipment and proceed with locating any service without the written instruction or approval from the Employer's Agent, the costs of such work done shall be borne by the Contractor.

Payment shall only be made for the time that the equipment was in use. Unless for reasons beyond the Contractor's control, no payment shall be made for "standing time" of the equipment or specialist (if required).

A lump sum item has been allowed for the administrative costs of hiring and establishing a service detection crew, if required, on site. A separate item has been allowed for the excavation and exposure of services.

<u>Item</u>	<u>Unit</u>
(a) Establish service detection crew.....	Sum
(b) Service detection	Hour

PSD 8.3.14

Shore deep excavations (New clause)

This item shall apply where shoring is required or ordered by the Employer's Agent to protect existing structures and/or excavations in collapsing or non-cohesive materials.

The area of shoring measured for payment will be the actual area of excavation side shored, calculated from the perimeter of structure plus adequate working space and the height of shoring actually used.

The rate shall cover the cost, of the design, supply, placing, maintenance and removal of the shoring system, complying with SANS 1200 D, Clause 5.1.1.2 and other support measures together with any cost that results from the inconvenience of working in the supported excavation and the cost of any risks inherent in the operation.

<u>Item</u>	<u>Unit</u>
Shoring to protect existing structures.....	m ²

PSD 8.3.15

Final Grading (New Clause)

Measurement and payment for final grading shall distinguish between machine grading which reasonably be done by bulldozer or motor grader, and hand trimming, including areas which be done by machine on account of confined space, steep slopes or difficult shapes.

Measurement shall be based on the area, in hectares or square metres, graded to the satisfaction of the Employer's Agent. The rates for hand trimming shall distinguish between areas flatter than 1:4 and areas with slopes steeper than 1:4.

The tendered rates shall include full compensation for grading and trimming the areas to the specified finishing requirements, including the moving of a small quantity of material which would be inherent in this process and the removal of surplus material and stones. The rate shall cover the cost for all plant, labour, materials and all other incidentals necessary to complete the work to the satisfaction of the Employer's Agent.

Where embankments are to be constructed with boulder material, embankments are to be laid and compacted in layers (specified by the Employer's Agent in writing) and boulders of diameter greater than the layer thickness are to be removed before compaction. The cost for this exercise is deemed to be included in the tendered rates.

<u>Item</u>	<u>Unit</u>
Final grading	
(a) Machine grading.....	m ²
(b) Hand Trimming	
(i) Flat areas with slopes less than 1:4.....	m ²
(ii) Areas with slopes steeper than or equal to 1:4.....	m ²

PSDB SANS 1200 DB: EARTHWORKS (PIPE TRENCHES)

PSDB 3 MATERIALS

PSDB 3.1 CLASSES OF EXCAVATION

The excavation of material will be classified as specified in Clause PSD 3.1. The method of excavation shall be determined at tender stage, and rates shall be tendered accordingly.

PSDB 5 CONSTRUCTION

PSDB 5.1 PRECAUTIONS

PSDB 5.1.2 Stormwater, Seepage and Dewatering of Excavations (Sub-Clause 5.1.2)

In addition to the Contractor's responsibilities for dealing with water, which are deemed to be included in the rates tendered for the relevant payment items, the Employer's Agent may order the Contractor to place a crushed stone bedding layer (minimum thickness 150 mm) on the trench bottom.

Should the trench bottom conditions remain unstable due to the nature of the soil and the degree of saturation, the Employer's Agent may order the Contractor to install a Geotextile on the trench bottom prior to the provision of the stone layer. After placing the stone bedding, the geotextile shall be folded over the stone with a minimum overlap of 300 mm to form an enclosed drain. The specified bedding material shall then be used to bed the pipe.

The Contractor shall only provide and lay the stone bedding layer and geotextile after receipt of the written order to do so from the Employer's Agent.

PSDB 5.1.5 Shoring of Pipe Trenches

All trenches deeper than 1,0m shall be shored.

The Contractor shall assume full responsibility for the safety of excavations, and shall carry out all measures necessary to make the work secure, by timbering and strutting or sheet piling the excavated face or by side sloping where it is not required to act as a mould to concrete work. All timbering and strutting must be of sufficient strength and be capable of being removed readily as the work proceeds. The rates for trench excavation shall be deemed to include for this.

All timbering and strutting or sheet piling shall be subject to the Employer's Agent's approval but such approval shall not relieve the Contractor of any responsibility with regard to the safety or suitability of the timbering / sheet piling used.

The Contractor shall further take all precautions to safeguard existing services and structures near or next to excavations carried out by him and shall provide and erect any shoring or underpinning that may be necessary.

All claims for compensation for damage or injury caused or aggravated by the Contractor not taking all precautions to safeguard persons or property shall be met entirely by the Contractor.

When excavating the Contractor shall exercise due caution to ensure that the excavations do not undermine any existing structures or services, including existing thrust blocks.

PSDB 5.2 MINIMUM BASE WIDTHS SPECIFIED

Replace the side allowance table in Clause 5.2 with the following:

External diameter of pipe barrel, mm		Side allowance on each side, mm
Over	Up to and including	
-	125	300 (refer to sub-clause (b))
125	710	300
710	1050	400

1050	2020	500
2020	-	600

PSDB 5.4 EXCAVATION

Trench Depths

All trenches are to be excavated to a depth sufficient to accommodate the pipes at the levels and cover as shown on the drawings. Unless otherwise stated, a minimum cover of 1000 mm will generally be required. Allowance must also be made for the required depth of pipe bedding.

PSDB 5.6.3 Disposal of Surplus Material

Surplus material shall be disposed of off site or spoiled on site, as directed, in accordance with the provision of PSD 5.2.2.3.

PSDB 5.7 COMPACTION OF TRENCH BACKFILL

Compaction of trench backfill above the bedding (fill blanket) shall be 90% Modified AASHTO density (100% for non-cohesive materials).

PSDB 8 MEASUREMENT AND PAYMENT

PSDB 8.3 SCHEDULED ITEMS

PSDB 8.3.1 Site Clearance and Removal of Topsoil

The rate tendered shall include all costs of complying with the relevant requirements of the Environmental Management Plan.

PSDB 8.3.2 Excavation

PSD 8.3.2 (a) Excavate in all materials for trenches, dewater, backfill, compact, and dispose of surplus or unsuitable material, including shoring

Add the following to Sub-Clause 8.3.2 (a):

"The rates shall also cover the cost of shoring of excavations and dewatering and shall include for providing the necessary plant and materials, erecting, operating and maintaining all pumps; well points, sheeting, close timbering and other equipment throughout the entire period during which, in the opinion of the Engineer, the facilities are required.

The tendered rate shall include for working in restricted areas and no additional payment will be made in this respect."

viii) PSDB 8.3.2 (b) Extra-over item (a) above for:

Add the following to Sub-Clause 8.3.2 (b):

"Hard rock excavation will only be paid when written permission is obtained from the Engineer prior to the excavation operation actually commencing."

PSDB 8.3.4 Particular Items

Add the following to Sub-Clause 8.3.4:

ix) PSDB 8.3.4 (c) Excavate by hand in all materials to verify existing services, or as directed by the Engineer, and backfill

This item shall apply where the excavation is only required to confirm the position of an existing service and the removal of the service is not intended. Excavations by hand will only be paid upon written order by the Engineer to perform excavations by hand.

Measurement shall be the cubic metres actually excavated by hand to expose the services excavations as directed by the Engineer.

The rate shall cover the additional cost of care in excavation necessitated by the presence of service.

	<u>Item</u>	<u>Unit</u>
	Excavation by hand in all materials to verify existing services and backfill.....	m³
PSDB 8.3.4 (d)	<u>Excavate by hand in all materials to expose existing services for removal</u> (New Clause) Measurement shall be the cubic metres actually excavated by hand to expose the services sufficient for its removal and subsequent backfilling. The rate shall cover the additional cost of care in excavation necessitated by the presence of the service. No additional excavation and backfilling shall be paid for when a new pipe is to be placed in the same location as the existing pipe. The cost for removing the pipe is to be paid for elsewhere.	
	<u>Excavation by hand in all materials to expose pipe for removal and backfill.....</u>	m³
x)	<u>PSDB 8.3.4 (e) Temporary works to control sewerage flow between existing manholes MH1 EX and MH4 EX</u> The sums of the provision and removal of equipment shall cover the costs of providing the necessary plant and materials, fully erected and operative on the Site, and of removing such goods and restoring the Site to its original condition on completion of that part of the project for which the temporary works were erected. The rate for operation and maintenance shall cover the cost of fully complying with the requirements of the Health and Safety Specifications, operating and maintaining the pumps, well point, sheeting, close timbering and all other equipment and incidentals for 24 hrs a day, 7 days a week throughout the period during which it is deemed necessary by the Engineer, and for moving the setup as many times as required for completing the works. The average peak flow rate in the pipeline is estimated at 150 litres/second. Removal of equipment will only be allowed on the written instruction of the Engineer.	
	<u>Item</u>	<u>Unit</u>
	1) Provide equipment	Sum
	2) Operate and maintain	Days
	3) Remove equipment	Sum
PSDB 8.3.5	<u>Existing Services that Intersect or Adjoin a Pipe Trench</u> The rate for an item scheduled in terms of (a) and (b) shall in addition to items i) to iv) cover any additional costs in adhering to the requirements stipulated in the wayleave conditions, including excavation by hand if required.	
PSDB 8.3.6	<u>Finishing (Sub-Clause 8.3.6)</u>	
xi)	<u>PSDB 8.3.6.1 Reinstate road surfaces complete with all courses (Sub-Clause 8.3.6.1)</u> Add the following: The rates tendered shall cover all costs associated with carefully removing, storing and reinstating the respective items to the satisfaction of the Employer's Agent. Should any material be damaged or stolen, the costs of replacing the respective material shall be borne by the Contractor. The reinstatement of any material shall comply with the applicable specifications, as laid down in both SABS 1200 and the project specifications, and shall be deemed to be included in the rates. Any material that has been reinstated or reconstructed and does not comply with the applicable specification shall be reworked at the Contractor's expense. The rate shall cover the cost of the reinstatement of the following items:	
	<u>Item</u>	

- (a) Asphalt of thickness 40mm in roadway m²
- (b) Basecourse material stabilised with 5% cement and compacted to 98% mod AASHTO density (2 layers of 150mm thick) m²
- (c) Subbase material compacted to 95% mod AASHTO density (150mm thick) m²
- (d) Concrete interlocking block paving of thickness 80mm to roadway m²
- (e) Precast kerbing m
- (f) Class 30MPa/19mm concrete 150mm thick with mesh reinforcement Ref 193 m²

PSDB 8.3.8

Additional shoring (New clause)

The quantity measured shall be the area of additional shoring installed over and above the shoring deemed to be included in excavation for trenches deeper than 1 m.

The rate shall cover the full cost of additional shoring of pipe trenches *where instructed to do so by the Employer's Agent*. No payment shall be made without the written approval of the Employer's Agent prior to the installation of the shoring.

Item

Unit

Additional shoring of pipe trenches m²

PSG	CONCRETE (SANS 1200 G)
PSG 1	SCOPE
	All concrete works are to be carried out in accordance with the requirements of SANS 1200 G. This includes the construction of all reinforced and plain concrete structures, foundations, chambers, thrust blocks, haunching and encasement to pipes.
PSG 2	INTERPRETATIONS
PSG 2.4	EXPLANATION OF TERMS
PSG 2.4.1	<u>Exposure Conditions</u>
	All concrete in the works is deemed to be subject to severe exposure conditions and shall have a minimum cement content of 290 kg/m ³ .
PSG 3	MATERIALS
PSG 3.2	CEMENT
PSG 3.2.1	<u>Applicable Specifications</u>
	The cement for structural and water-retaining elements shall be common cement of strength class 42,5N or higher that complies with SANS 50197-1,
	All cement shall be to the Employer's Agent's approval and have a guaranteed equivalent Na ₂ O content of less than 0,5%.
	For each cement consignment the Contractor shall furnish a certificate stating that the cement has been tested and analysed by the manufacturer and complies with the above requirements.
	A similar procedure should be followed when use is made of Ready Mixed concrete.
	Extenders shall comply with the relevant part of SANS 1491.
PSG 3.2.3	<u>Storage of Cement</u>
	Cement shall be stored in such a way that the oldest cement is used first. Cement shall not be kept in storage for longer than 8 weeks.
PSG 3.5	ADMIXTURES
PSG 3.5.1	<u>Approval of Admixtures</u>
	Admixtures shall comply with the requirements of ASTM C 494.
PSG 3.5.3	<u>Curing Agents (New Clause)</u>
	Curing agents shall be tested in accordance with ASTM C 156 and shall comply with the requirements of ASTM C 309, except that the loss of water within 72 h shall not exceed 0,40 kg/m ² .
PSG 3.5.2	<u>Air-Entraining Agents</u>
	The use of air entraining agents will not be permitted.
PSG 3.9	JOINTS
PSG 3.9.1	<u>General</u>
	The jointing materials shall be approved and as shown on the drawings or as scheduled.
	All jointing materials shall be carefully stored and protected to avoid damage, distortion or contamination by other materials prior to use. They shall be applied by trained applicators in accordance with the manufacturer's instructions and as approved.
PSG 3.9.2	<u>Primer</u>
	An approved primer fully compatible with and/or manufactured for use with the specified sealing compound shall be applied to the appropriate joint surfaces where so required.

PSG 3.9.3 Elastomeric Sealant

Elastomeric sealants shall be polyethylene cured polyurethane "pouring grade" for horizontal joints and "gun grade" for vertical joints, conforming to the physical test requirements of SANS 110.

PSG 3.9.4 Joint Fillers

Joint fillers shall be closed-cell expanded polyethylene having a density not less than 35 kg/m³, a tensile strength not less than 215 kPa and a minimum tensile elongation at break of 92%.

Fillers shall have a tear out strip for forming the specified recess for sealant where appropriate.

PSG 3.9.5 Swellable Joint Sealing Profiles

Swellable joint sealing profiles shall be 'SikaSwell-P', 'Kuniseal C-31' or equivalent hydrophilic sealing profiles which swell on contact with water. Unless the profile is self-adhesive, it shall be fixed to the substrate with a compatible adhesive, as recommended by the supplier.

Swellable joint sealing products shall be kept dry during storage.

PSG 3.9.6 Waterstops

Waterstops shall be of approved manufacture and of the pattern and the widths scheduled and shown on the drawings. They shall have the appropriate physical properties as set out below:

	PVC at 25°C	Rubber at 20°C
Tensile strength	13,9 MN/m ²	21,09 MN/m ²
Elongation at break	250% (min)	400% (min)
Hardness BS degrees	40-50	60-70
Elongation	65% (min)	75% (min)
Tensile strength	65% (min)	75% (min)

Joints in PVC shall be heated, and pressure applied with a former. Those in rubber shall be factory made unless otherwise approved.

Dimensional tolerances of all types of waterstops shall be:

for width: ± 1,3 mm

for web thickness: +1,5 mm or -1 mm

Minor surface defects shall not exceed 10 mm in length or 2 mm in depth.

PSG 3.10 GRANOLITHIC SCREED (NEW CLAUSE)

Granolithic concrete shall consist of:

Cement:	1 part by pass
Sand:	1,25 parts by mass
Coarse aggregate:	2 parts by mass

The coarse aggregate shall consist of granite or other approved chips which shall pass a 10 mm sieve and be retained on a 5 mm sieve.

In all other respects the granolithic concrete shall comply with SABS 1200 G.

PSG 3.11 CONCRETE REPAIR PRODUCTS (NEW CLAUSE)

Concrete repair products shall be as specified or shown on the drawings. They shall be applied by trained and approved applicators, strictly in accordance with the manufacturer's instructions and as approved.

Where different products are to be used in conjunction, only mutually compatible products used and, if so instructed, the Contractor shall furnish a written assurance from the supplier that the combination of products is acceptable.

- PSG 3.12 CRYSTALLINE WATERPROOFING ADDITIVE (NEW CLAUSE)**
- Where specified, concrete shall have the crystalline waterproofing additive Xypex Admix C-500NF or equivalent. The dosage rate of the additive shall be 1.0 – 1.5% by weight of total cementitious material (including extenders). The W/C ratio shall be below 0.55 for any concrete containing the Xypex Admix C-500NF.
- The Contractor shall ensure that the transport, storage and handling of the additive is in line with the recommendations of the manufacturer and shall be included in his costs.
- Should the Contractor wish to use an alternative crystalline waterproofing additive, the Contractor shall submit an alternative to the Employer's Agent for approval. This shall include the dosage rate of the alternative additive and the mixing and construction methodology of the concrete. Any additional costs associated with the use of this alternative additive shall be borne by the Contractor.
- PSG 3.13 CONSTRUCTION JOINT SEALANT FOR XYPEX (OR EQUIVALENT) CONCRETE STRUCTURES (NEW CLAUSE)**
- Construction joints, as per the construction joint details for Xypex (or equivalent) concrete structures, are required, Xypex Concentrate slurry coat (or equivalent) shall be used. The sealing strip of the joint shall be Xypex Concentrate in Dry-Pac form (or equivalent).
- Should the Contractor wish to use an alternative material for the construction joint, he shall submit an alternative, with supporting documentation, indicating that the performance of the alternative is of equal or better performance to that specified.
- PSG 3.14 CRYSTALLINE WATERPROOFING COATING (NEW CLAUSE)**
- Existing concrete surfaces that require waterproofing treatment shall be treated with Xypex Concentrate or equivalent.
- PSG 3.15 CALCIUM ALUMINATE CORROSION RESISTANT COATING (NEW CLAUSE)**
- Existing concrete surfaces that require corrosion resistant coating treatment shall be treated with an approved calcium aluminate mortar, applied strictly in accordance with the manufacturer's specifications.
- PSG 4 PLANT**
- PSG 4.4 FORMWORK**
- PSG 4.4.3 Ties**
- Formwork ties used in water retaining concrete shall be of an approved design which does not create a path for the passage of water.
- PSG 5 CONSTRUCTION**
- PSG 5.1 REINFORCEMENT**
- PSG 5.1.2 Fixing**
- Welding of reinforcement as a means of securing it against displacement will not be permitted.
- PSG 5.1.6 Cutting**
- Cutting of reinforcement shall be done cold. The use of cutting torches will not be permitted.
- PSG 5.2 FORMWORK**
- PSG 5.2.6 Formwork to Foundations**
- The Employer's Agent may at his discretion, and depending on the nature of the soil, determine on site that the vertical earth excavation sides may form the vertical formwork to footings, bases, etc. In this situation the Contractor shall not be paid for formwork, and the measurement of the depth of the concrete construction shall be determined by the Employer's Agent on site.

PSG 5.5 CONCRETE

PSG 5.5.1 Quality

xii) PSG 5.5.1.7 Strength Concrete

All concrete to the structures shall be strength concrete to the specified strengths. Concrete in blinding layers and benching shall be strength concrete grade 10 MPa/19 mm, unless indicated otherwise.

All exposed concrete shall be of a uniform colour. No change in materials or processes shall be made without the Contractor first satisfying the Employer's Agent that no change in colour will result.

NOTE: Due to the high exposure condition, all concrete specified to strength mix 35 MPa/ 19 mm shall incorporate Ordinary Portland Cement. The rates tendered in the Schedule of Quantities shall allow for all additional costs necessary for the incorporation of "Low Alkali" cement.

PSG 5.5.7 Construction Joints

The position and details of all joints is shown on the drawings.

Should additional joints be required by the Contractor to suit his method of work, these shall be subject to the Employer's Agent's approval. No payment will be made for such additional joints.

All joints between slabs and bases of walls shall be formed with a kicker which shall be integrally cast with the slab.

xiii) PSG 5.5.7.3 Forming of Joints

Unless specifically indicated on drawings or directed by the Employer's Agent, no treatment of the surface with mortar, cement slurry, wet-to-dry adhesive etc. will be permitted.

The joint surface shall be thoroughly scabbled to a rough exposed aggregate finish by wire brushing within 24 hours of casting, in the case of new concrete, or chipping, in the case of existing concrete.

Concrete older than 3 days shall be thoroughly saturated with water by keeping the surface continuously wet for a period of at least 24 hours prior to casting the new concrete.

xiv) PSG 5.5.7.1 Primers

The concrete to which the primer is to be applied shall be dry and shall be cleaned of all dust and foreign matter by compressed air or other suitable means. The primer shall be applied in accordance with the manufacturer's instructions.

xv) PSG 5.5.7.2 Joint Filler

The filler strips shall be attached to the completed side of the straight or grooved concrete joint by means of an epoxy glue or by other approved means.

xvi) PSG 5.5.7.3 Swellable Joint Sealing Profiles

Where a swellable joint sealing profile is specified, the profile shall be fixed to the concrete face with the relevant adhesive, strictly in accordance with the manufacturer's instructions. The adhesive shall be applied to form a solid and continuous bed with full contact between the profile and the substrate.

The above shall not apply to self-adhesive profiles.

As far as practical the sealing profile shall be placed centrally within the section, but under no circumstances shall the cover between the edge of the profile and the face of the concrete be less than 75 mm.

Where concrete is to be saturated in terms of the method for joint preparation, the sealing profile shall only be affixed after the concrete has been saturated. The substrate shall be surface dry, before the sealing profile is applied.

xvii) PSG 5.5.7.4 Waterstops

The greatest care shall be taken to ensure that waterstops are fully bedded in the surface of the concrete and that they are maintained in the correct position and alignment while concrete is being cast.

placed. Waterstops that are displaced during concrete operations shall be cut out and reset to the satisfaction of the Employer's Agent.

Joints in waterstops, that may be straight for continuity or mitred for corners, shall be formed in accordance with the manufacturer's instructions to approval and shall have a tensile strength not less than 75% of that of the original material. Splices and joints shall be made such that all ribs in the original cross-section are maintained continuously and the joint made dense, homogeneous and free of all porosity. The Contractor shall test under the direction of the Employer's Agent joints made in waterstops of each type of material used.

Prior to use, all waterstops shall be carefully stored and handled to avoid damage or contamination by oil, grease, etc. Rubber and plastic waterstops shall be stored in a cool, well-ventilated place, away from the sunlight.

All waterstops shall be supplied in lengths as long as practicable in order to reduce site splicing to a minimum. Nails shall not be driven into waterstops.

xviii) *PSG 5.5.7.5 Reinforcing Bars Drilled into Concrete*

Where specified, reinforcing bars shall be fixed into existing concrete to form joints between old and new concrete. The bars shall be fixed with an approved epoxy adhesive into holes shall be drilled to the depth and diameter specified by the adhesive supplier.

The correct quantity of adhesive shall be injected into the hole using a suitable nozzle so that the adhesive is injected from the base of the hole.

The bars shall be inserted with a rotary motion to ensure that they are uniformly coated with adhesive. After being placed, the bars shall not be moved or loaded for the duration of the adhesive hardening time.

The Contractor shall comply with all other installation instructions of the adhesive manufacturer.

xix) *PSG 5.5.10 Concrete surfaces*

xx) *PSG 5.5.10.1 Finish to Unformed Surfaces*

All the weirs, tops of walls and chamfers shall receive a steel float finish, and unless specifically stated in the Drawings or in the Bills of Quantities, all other unformed surfaces shall be finished with a wood float.

xxi) *PSG 5.5.10.4 Wood Float Finish*

Where a wood float finish is specified or scheduled, the surface shall first be given a finish as specified and, after the concrete has hardened sufficiently, it shall be floated to a uniform surface free of trowel marks.

Measurement will be by the area so finished. The tendered rate shall cover the cost of producing the specified finish.

xxii) *PSG 5.5.10.5 Steel Float Finish*

Steel trowelling of surfaces shall be carried out when the moisture film has disappeared and the concrete has set sufficiently to prevent laitance from being worked to the surface. The concrete shall be steel trowelled and free of trowel marks. Further trowelling shall be carried out at intervals of two and four hours or such other intervals as the Employer's Agent may direct.

Measurement will be by the area so finished. The tendered rate shall cover the cost of producing the specified finish.

xxiii) *PSG 5.5.10.6 Screeds*

Where a screed is specified to the floor of a tank, sump or chamber, it shall be laid to the falls indicated on the drawings. The thickness of the screed shall nowhere be less than 25 mm. Feathered

The screed shall be formed from granolithic concrete as specified.

PSG 5.6 CONCRETE REPAIRS

Concrete repairs shall be carried out where specified to reinstate sections of degraded concrete or to finish off rough edge exposed by demolition

PSG 5.6.1 Surface Preparation

The surface to which repair mortar is to be applied shall be thoroughly cleaned by approved mechanical means, high pressure clean water jetting or by wire brushing and oil free clean compressed air. The surfaces shall be sound, clean and free of loose material, dust, laitance, dirt, grease, oil, paint, corrosion deposits, organic growth, etc.

In addition, the surface preparation shall comply with any additional requirements of the manufacturer of repair mortar to be used.

The surface shall be inspected for active hydrostatic leaks. Such leaks shall be brought to the Client's attention and recorded on a suitable evaluation diary. All such leaks shall be sealed with a suitable approved rapid setting cementitious blend (e.g. 'durarep 60 or 180' (or equivalent)).

Reinforcement

All exposed reinforcement shall be cleaned of corrosion products by wet grit blasting or other approved means to achieve a surface finish to comply with a standard of steel cleanliness such as SA 2½ (BS7079: Part A1 / ISO8501) or as directed by the Client's Representative. Special care shall be taken to clean out properly any pitting which may have occurred in the steel bar.

When the corrosion products have been removed and if directed by the Client's Representative, the diameter of the reinforcing bar(s) shall be measured. If considered necessary by the Client's Representative the existing reinforcement shall be cut out and replaced and/or additional bars added in accordance with instructions. Any deep pitting of the reinforcing bars shall be brought to the attention of the Client's Representative.

Reinforcement damaged during the removal of concrete or the preparation process shall be brought to the attention of the Client's Representative and if required, shall be repaired or replaced.

Where the presence of chloride is determined, it is essential that the cleaning process is completed by pressure washing with clean water the total exposed areas of reinforcing steel to ensure the removal of all residual contamination from the pitted surface of steel.

Immediately following preparation and cleaning, the reinforcing steel shall be primed with an approved epoxy primer complying with the relevant parts of BS4652 Specification, For Metallic Zinc Rich Priming Paint Type 2. The primer shall be brush applied to the cleaned reinforcement ensuring that all exposed steel is fully coated and comply with any additional requirements of the manufacturer of the primer.

PSG 5.6.2 Mixing and Application

The bonding agent, primer and repair mortar shall be mixed and applied strictly in accordance with the manufacturer's instructions by trained applicators and as shown on the detailed drawings.

PSG 5.7 CONCRETE CONTAINING XYPEX ADMIX C500NF OR EQUIVALENT (NEW CLAUSE)

Notwithstanding PSG 5.7.1 and PSG 5.7.2, the mixing, placing and curing of concrete shall comply with the standard concrete working practices, as per SABS 2001 – CC1:2007.

PSG 5.7.1 Mixing and placing

Unless a batch plant is commissioned on site, no mixing of concrete containing the Xypex (or equivalent) admix shall be permitted on site. The Contractor shall submit his methodology, as recommended by the manufacturer, to the Employer's Agent for approval prior to the concrete being mixed and cast. The mixing, placing and curing of the concrete shall comply with the manufacturer's instructions unless directed otherwise by the Employer's Agent.

It is required that a representative of the manufacturer is present on site when the concrete is placed to ensure that construction of the concrete structure is to the manufacturer's specifications. Any incurred for acquiring the representative shall be included in the Contractor's rates.

If there are any concrete defects (honeycombing, static cracks beyond 0.4mm, failed construction joints) these are to be repaired as per Xypex (or equivalent) Repair Methodology and the costs shall be borne by the Contractor.

PSG 5.7.2 Construction joints

Construction joints shall be Level 3 construction joints as per the construction joint details for Xypex (or equivalent) concrete structures. The Contractor's attention is drawn to clause PSG 3.13 for materials required when constructing Level 3 construction joints.

The rate of application for the Xypex Concentrate in slurry form shall be 1.08kg/m². The rate of application for equivalent products shall be to the manufacturer's specifications.

The Contractor shall adhere to the requirements laid down by the manufacturer's method statements for both constructing the joints and for the application of the Xypex Concentrate in Dry-Pac form (or equivalent) for sealing construction joints.

PSG 6 **TOLERANCES**

The permitted tolerances in concrete work shall be as specified in Sub-clause 6.2 except as follows:

Tolerance

- | | |
|--|---------|
| a) Setting out distances between major units of work | ± 25 mm |
| b) Concrete structures Overall dimensions: | ± 15 mm |

PSG 7 **TESTS**

PSG 7.1 **FREQUENCY OF SAMPLING**

Add: "One sample shall comprise three test cubes of concrete".

The cost of taking and crushing the concrete cubes shall be to the Contractor's account, including where check tests undertaken by the Employer's Agent have failed.

Payment for the cost of taking and crushing concrete cubes shall be deemed to be included in the Contractor's rates for concrete.

PSG 7.4 **WATERTIGHTNESS AND TESTING OF WATER-RETAINING STRUCTURES**

On completion of the construction of the structures and before mechanical installation they shall be tested for watertightness, in accordance with the following procedure:

The structure to be tested shall be filled with water, and shall remain full for a period of seven days, sufficient water being added daily to maintain the level in the tank.

The water level shall then be recorded and the structure allowed to stand for a further seven days without the addition of water. At the end of this period the level shall again be recorded. If the difference in level less the drop in level due to evaporation is less than 50mm during the second period of seven days, then the structure shall be considered watertight.

In uncovered structures, the evaporation shall be measured by recording the mean drop in level due to evaporation of water in three flat dishes floating in the water.

In the event of appreciable leakage being evident at any stage of the filling for testing or in the event of the Employer's Agent considering the final degree of watertightness to be unsatisfactory, the Contractor shall discontinue when ordered by the Employer's Agent such filling or testing and shall at his own expense take steps immediately to rectify the leakage and to make the work thoroughly sound to the complete satisfaction of the Employer's Agent. All such work of rectification shall be continued assiduously until a satisfactory test is obtained, which shall prove to the Employer's Agent that a sufficient degree of watertightness has been obtained.

Water-retaining structures will be finally accepted only when proved to be watertight by carrying out the above test.

No specific payment will be made for carrying out watertightness tests, and the cost of this work as well as the supply of water for the testing, and retesting if necessary, including the necessary

of the openings left for pipes, in the initial tests, will be deemed to be covered by the rates for the scheduled items.

PSG 8 MEASUREMENT AND PAYMENT

PSG 8.7 GROUTING

PSG 8.7 (c) Casting in of existing pipes into new concrete wall

Certain existing pipes are required to be cast into new concrete walls and the tendered rate for this item shall thus include costs involved in placing the reinforcement and formworks around the existing structure, securing the existing pipe in the correct position during the pouring and curing of the concrete and any associated additional costs.

The rate shall also include the application of a swellable joint sealing profile (Kuniseal C31 DS or equivalent) around the pipe.

Separate items will be scheduled for different ranges of pipe diameter.

The quantity measured shall be number of existing pipes embedded in the concrete,

<u>Item</u>	<u>Unit</u>
Casting in of existing pipes into new concrete wall	No

PSG 8.7 (d) Casting in of new pipes into concrete wall

Where new pipes are to be cast into new walls the Contractor shall form a box out hole of adequate size and grout the pipe in afterwards.

The surface of the box-out shall be roughened and saturated as described in PSG 5.5.7.3, before grouting the pipe in. The pipe shall be secured in its final position and grouted into the wall with Sika 'Sikacrete 214' or an equivalent free-flow repair concrete.

The tendered rate shall cover the costs for formwork around the pipe (including venting hole), casting the pipe into the wall, and making good the exposed surfaces with grout to form a neat finish to the satisfaction of the Employer's Agent.

The Contractor may elect to cast the concrete around the pipe without a box out in which case the rate shall be deemed to cover all costs of cutting and fitting the formwork around the pipe and no payment will be made for the corresponding box-out formwork item.

PSG 8.10 Extra-Over Item 8.4.1 for the Addition of Xypex Admix C500NF or Equivalent Admix (New Clause)

The extra-over shall be to cover the additional costs of adding the admixture Xypex Admix C500NF, or equivalent, to the concrete structures specified.

Measurement shall be the cubic metre of concrete that is to contain the admixture.

The tendered rates shall include for the cost of the admixture and the mixing of the admixture into the concrete, at the dosage as specified in PSG 3.12, at the batching plant.

It is required that a representative of the chemical product is present on site when the concrete is poured to ensure that construction of the concrete structure is to the manufacturers specifications and this shall be deemed to be included in the rates.

The Contractor's attention is drawn to clause PSG 3.12 and PSG 5.7 regarding the material and methodology to be adopted for this item and shall be included in the tendered rates.

The concrete shall be to the manufacturer's representative and Employer's Agent's approval. Any structural defects, pointed out by either the representative or the Employer's Agent, shall be repaired as per the manufacturer's method statement. Any additional costs for repairs to the concrete structure shall be borne by the Contractor.

Separate items shall be scheduled various thicknesses of concrete.

<u>Item</u>	<u>U</u>
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Extra-over item 8.4.1 for the addition of Xypex Admix C500NF or equivalent admix m³

PSG 8.11

Construction Joints for Concrete Containing Xypex Admix C500NF or Equivalent Admix (New Clause)

Construction joints for concrete structures containing Xypex Admix C500NF, or an equivalent admixture, shall be measured by the length of the joint constructed.

The tendered rates shall include the costs of constructing a construction joint as per the drawings.

The Contractor's attention is drawn to clauses PSG 3.13 and PSG 5.7.2 regarding the construction joint detail and the material types. Should the Contractor propose an alternative type of construction joint, subject to the approval of the Employer's Agent, the Contractor shall bear any additional costs for this alternative.

It is required that a representative of the chemical product used in the concrete is present on site when the first construction joint is constructed to ensure that the joint meets the specifications as set out by the manufacturer. This shall be included in the tendered rates.

The construction joint shall be to the manufacturer's representative and Employer's Agent's approval. Any defects, pointed out by either the representative or the Employer's Agent, shall be repaired as per the manufacturer's applicable method statement. Any additional costs for repairs to the joint, including repairs to the concrete structure, shall be borne by the Contractor.

Separate items shall be scheduled for various concrete thicknesses and joint types.

Item

Unit

Construction joints for concrete containing Xypex Admix C500NF or equivalent admix m

PSG 8.12

Application of Xypex Concentrate, or EQUIVALENT Coating System, on Concrete Structures (New Clause)

Where existing or new concrete structures are to have a slurry concrete protection coat, the unit of measurement shall be the area to of the concrete surface that is to be coated.

The tendered rates shall include the costs of acquiring the Xypex Concentrate or equivalent, mixing the slurry coat and applying the slurry at the rate as recommended by the manufacturer.

Should the Contractor propose an alternative type of material, subject to the approval of the Employer's Agent, the Contractor shall bear any additional costs for this alternative.

The Contractor shall mix and apply the slurry coat as per the manufacturer's methodology and shall be deemed to be included in the rates.

It is required that the manufacturer's representative is present on site upon the first application of the slurry coat to ensure that the material and construction methods meet the specifications as set out by the manufacturer. This shall be included in the tendered rates.

The Contractor shall inform the Employer's Agent prior to the mixing of the slurry and shall not mix or apply the slurry coat without the approval from the Employer's Agent. Should the slurry coat be applied to the concrete without prior approval from the Employer's Agent, the Employer's Agent reserves the right to reject the work and the Contractor remove the coating, remix and reapply the slurry coat at his own cost.

Separate items shall distinguish between various structures where the slurry coat is to be applied.

Item

Unit

Application of Xypex Concentrate, or equivalent coating system, on concrete structures

Concrete Refurbishment and Repairs

The Concrete Refurbishment and Repairs is required at existing concrete structures that receive raw sewage inflow. These structures include MH2, MH3 and the A-Inlet Works and may also be ordered by the Employer's Agent elsewhere, if required. In addition to the following general procedure, concrete refurbishment and repairs shall be carried out strictly in accordance with the supplier's instructions and shall only be done by specialist applicators.

Prior to starting any concrete refurbishment and repair work, the Contractor shall arrange for the surface to be repaired to be inspected jointly by the Contractor, the Employer's Agent and a specialist representative of the refurbishment and repair product supplier to agree the extent of the area to be treated.

The surface preparation, mixing and application of the refurbishment and repair product shall be carried out in accordance with the clauses PSG 3.11 and PSG 5.6 above and in accordance with the Contract drawings.

The refurbishment and repair work shall be measured per square meter of concrete surface area. The rate shall cover all costs of surface preparation, supplying of refurbishment and repair products, mixing and application including the required mechanical equipment, hand tools, etc. The dealing with existing raw sewage inflow shall be measured under Section PA 8.1 of Particular Specification PA. No payment will be made for wastage which, in the opinion of the Employer's Agent, could be reasonably prevented by the Contractor.

ItemUnit

Refurbishment and Repair to existing concrete (state structure)..... m²

PSH STRUCTURAL STEELWORK (SANS 1200 H)

PSH 1 SCOPE

SANS 1200 H, as amended below, shall apply to the following works:

All structural steel works, metal works, gratings, floor gratings, handrailing, special metal items, stainless steel items, fencing and safety protection works.

PSH 3 MATERIALS

PSH 3.1 STRUCTURAL STEEL

All structural steel shall comply with the requirements of SABS 1431 grade 350W and shall be legibly marked with the maker's name or trade mark and identification marks.

PSH 3.8 STAINLESS STEEL

The AISI grade of stainless steel to be used will normally be specified on the Drawings. Unless otherwise specified, rolled material shall be supplied with a matt, annealed and pickled or otherwise descaled surface finish. For wrought steels the equivalent BS 970 grade may in each case be used. The common applications are as follows:

APPLICATION	AISI	BS 970
Low corrosion interior:		
Welded	304L	304S12
not welded	304	304S15
Exterior and corrosive interior:		
Welded	316L	316S12
not welded	316	316S16

A manufacturer's test certificate shall be provided for each batch of stainless steel giving details of the material analysis and any mechanical tests carried out on the material. Each stainless steel item supplied shall be clearly and permanently marked with the grade of stainless steel and cross referenced to the applicable test certificate.

Where grades 316 and 304 are mentioned in the Contract Documents, these shall be taken synonymously with grades 316 L and grade 304 L, respectively.

PSH 3.9 3CR12 STEEL

This is the titanium stabilised, 12% chrome steel as produced by Columbus Stainless, South Africa.

3CR12 shall always be supplied with an annealed and pickled finish. 3CR12, in cases where it is to be coated, shall be suitably abrasive blasted to ensure adherence of the prime coat.

PSH 3.6 GRP

Where specified, handstops and their guides shall be manufactured from "Formo" or approved equivalent GRP products.

Flat panels used for manufacturing handstops shall be of a laminated structure conforming to the following requirements:

Compression modulus:	50 MPa
Compressive strength:	2 MPa
Mass per unit area :	less than 3.5 kg/m ²

The thickness of the handstop shall be designed in order to limit deflection of the handstop to less than 3mm under 1000mm water head when the handstop is secured on only two sides (i.e. when lifted out of the lower frame). If required, GRP angles shall be welded to the panel to improve the stiffness to meet the specification

Angle irons and other GRP sections are to conform to the following material properties:

Properties	Units	Longitudinal	Transverse
Tensile Strength	MN/m ²	300	55

Tensile Modulus	GN/m ²	17	7
Compressive Strength	MN/m ²	200	100
Compressive Modulus	GN/m ²	17	7
Shear Strength	MN/m ²	60	60
Shear Modulus	GN/m ²	3	3
Flexural Strength	MN/m ²	300	100
Flexural Modulus	GN/m ²	12	5

GRP walkway gratings are to be supplied with GRP angles. The GRP angles are to conform with the above table. The GRP walkway gratings shall be "Formo" or equivalent moulded GRP gratings with anti-slip finish and shall be able to carry a concentrated load of 180kg with less than 1% deflection.

PSH 3.11 QUALITY OF MATERIALS

All materials shall be new, unused and shall be the best of their respective kinds. The Contractor shall ensure that the materials are selected in accordance with the best engineering practice to suit the working conditions and the extremely corrosive environment.

PSH 5 CONSTRUCTION

PSH 5.1 DRAWINGS AND SHOP DETAILS

PSH 5.1.1 Design Drawings

The Employer's Agent's design drawings shall be issued to the Contractor on the Commencement Date.

PSH 5.1.2 Contractor Provides Shop Details

All shop details shall be prepared by the Contractor.

The Contractor shall provide the Employer's Agent with shop drawings of all structural steelwork including stairs, handrails, louvre intakes and roller shutter doors.

PSH 5.3 ASSEMBLY

PSH 5.3.2 Alignment of Holes

Reaming out of bolt holes shall not be permitted, without the prior approval of the Employer's Agent.

PSH 5.6 GROUTING OF SUPPORTS

PSH 5.6.1 Responsibility

All grouting and bedding shall be undertaken by the Contractor.

PSH 5.1 GENERAL

(a) STANDARDS: Steelwork shall be constructed, fabricated and erected in accordance with SABS Standard Building Regulations, Chapter 6, "Structural Steelwork", and with SANS 1200 H where applicable.

(b) STAINLESS STEELS: Fabrication of stainless steels and 30CR12 shall follow the recommendations in "The Stainless Steel User Manual" and "The 30CR12 Fabrication Guide" issued by Columbus Stainless. Only fabricators experienced with stainless steel will be considered acceptable. Such fabricators shall use dedicated storage and fabrication areas and use machines, tools and handling equipment suited and dedicated to this type of material. Surfaces which become contaminated with steel or otherwise stained or otherwise marked so as to be of uneven colour, shall be cleaned by pickling or electrocleaning, or coated if approved by the Employer's Agent. Grinding of grinding shall be avoided.

(c) DRAWINGS: General and detailed fabrication drawings shall be submitted by the Contractor for approval by the Employer's Agent. Full details of the welding procedures and standards which he proposes to use shall be shown on these drawings.

PSH 5.2 FABRICATION AND ASSEMBLY

PSH 5.2.4 Welding

xxiv) PSH 5.2.4.1 General Welding Requirements

(a) STANDARDS : Standards complying with good modern practice, and acceptable to the Employer's Agent, shall be adopted. These include the following:

- BS 5135 - Arc welding carbon and carbon manganese steelwork.
- BS 4677 - Arc welding austenitic stainless steel pipework.
- BS 2633 - Class 1 Arc welding of steel pipework.
- BS 2971 - Class II Arc welding of steel pipework.
- BS 806 - Design and construction of ferrous piping in connection with land boilers (Used for arc welding specification of all pipe flanges)

Welders shall be experienced competent artisans approved in accordance with BS 4872.

(b) WELDING TO BE CONTINUOUS: All welding shall be continuous on all sides of any joint unless otherwise approved in writing by the Employer's Agent. No crevices will be permitted and where stitch welding has been approved by the Employer's Agent, the crevices so left shall be sealed with an approved filling compound after priming but before further painting.

(c) WELD APPEARANCE: Welding shall be free of blowholes and all welding flux removed. All weld spatter and other sharp imperfections shall be removed prior to abrasive blasting. Prior to painting, weld beads with a surface irregularity exceeding 3 mm or with sharp crests having a radius under 2 mm shall be ground. Weld grinding must not be performed on 304L or 316L stainless steel, however.

(d) SITE WELDING: Site welding shall be kept to a minimum and shall only be undertaken with the approval of the Employer's Agent.

xxv) PSH 5.2.4.2 Welding of Stainless Steel and 3CR12

(a) WELDING STAINLESS STEEL: Stainless steels shall be welded strictly as recommended in "The Stainless Steel User Manual" issued by Columbus Stainless.

(b) WELDING 3CR12: 3CR12 shall be welded strictly as recommended in "The 3CR12 Fabrication Guide" issued by Columbus Stainless.

(c) TYPE OF STAINLESS STEEL: Austenitic stainless steels to be welded shall be of the low carbon grade type. (i.e. 304L, 316L, etc.)

(d) WELDING RODS : The welding rods used must be the most suitable for the metal and purpose. Type 309 stainless steel welding rods shall be used for welding 3CR12 unless otherwise approved in writing.

(e) WELDERS : Only welders experienced with welding stainless materials shall be used.

(f) GENERAL : All possible steps shall be taken to ensure maximum corrosion resistance and strength of the welds and welded material. Special care shall be taken to avoid prolonged heating. Welds shall be passivated. Discolouration and steel contamination must be removed by pickling or electrocleaning as approved by the Employer's Agent but should rather be avoided by taking the appropriate measures.

PSH 5.1 DRAWINGS AND SHOP DETAILS

(a) Steel Specials

Flooring gratings, steel safety railings, manhole covers and specified specials are to be constructed of hot dipped galvanised mild steel unless otherwise specified. All the items shall be painted in workshops after manufacture and before delivery to site.

(b) Aluminium hand stops

Aluminium handstops shall be provided at various locations in the works in accordance details shown on the drawings.

Aluminium handstops shall be manufactured to the dimensions shown on the drawings using grade M575 aluminium, and reinforced with aluminium angle sections as applicable. The frame and plate to be constructed from 5 mm thickness plates.

(c) GRP handstops

GRP handstops are specified at certain locations in the works.

GRP handstops shall be manufactured to the dimensions shown on the drawings and reinforced with GRP angle sections if required in order to limit deflection to less than 3mm at a depth of 1m water head.

PSH 5.2 ASSEMBLY

PSH 5.2.5 Bolting

xxvi) PSH 5.2.5.1 Fasteners

(a) STANDARDS: Bolts and nuts shall be hexagon head type complying with SABS 1700 with threads of the coarse pitch series. Allen head screws of any type shall not be used without the Employer's Agent's written consent.

(b) FASTENERS M12 AND SMALLER: All fasteners M12 and smaller shall be manufactured of AISI Grade 316 stainless steel.

(c) FASTENERS LARGER THAN M12 - IN CORROSIVE AREAS: All fasteners in corrosive areas shall be manufactured of 316 stainless steel. Corrosive areas shall be taken to include any moist or wet area such as in and above settling tanks, in or in the vicinity of open channels, where a continuous spray can be expected and all internal and external areas in the vicinity of the inlet works of a waste water treatment works. All fasteners embedded in brick, concrete or soil shall also be of 316 stainless steel.

(d) FASTENERS LARGER THAN M12 - NON CORROSIVE AREAS: Fasteners larger than M12 which are in non-corrosive areas shall, except when specified otherwise, be hot dip galvanised.

(e) HIGH TENSILE BOLTS: Where high tensile bolts are necessary, they shall be hot dip galvanised and coated. The bolt holes and crevices shall be filled and sealed, all to the approval of the Employer's Agent.

(f) MATERIAL COMPATIBILITY: Fastener material shall always be of equal or better corrosion resistance than the items being fastened, e.g. 316 stainless steel bolts must be used to fasten together 316 stainless steel fabrications or flanges.

(g) WASHERS: Washers of similar material to the bolts shall be provided under each nut and setscrew head. Multiple washers or shims shall not be used. Spring washers or other approved locking arrangement shall be used on all fasteners subject to vibration.

(h) ANTI-SEIZE COMPOUND: Before assembly, threads shall be treated with a nickel-based, anti-seize/corrosion protection compound; Chesterton 725; Nickel Anti Seize Compound, or equivalent. The thread shall be treated in the area under the final position of the nut. Compound on the exposed thread shall be cleaned off after installation. If it is found during inspection that compound has not been applied, the Contractor shall disassemble all fasteners and comply with this requirement.

(i) THREAD PROJECTION: Bolt threads shall project between 1 and 6 mm from the head of the nuts when fixed. Longer projections will only be allowed if the Contractor can show that bolts of a more suitable length are not manufactured.

(j) CORROSION PROTECTION: After installation the exposed surfaces of bolts not made of 316 stainless steel shall be coated as for the items being fastened. If the use of Allen head or similar fasteners has been approved by the Employer's Agent, the recessed heads shall be filled with a suitable non hardening sealing compound.

xxvii) PSH 5.2.5.2 Anchor Bolts

(a) HOOK BOLTS: Grade 316 stainless steel hook bolts shall be supplied and grouted by the Contractor into pockets which will be provided in the concrete structure in accordance with information to be supplied by the Contractor. The grouting products shall be used in accordance with the manufacturer's instructions.

(b) **ALTERNATIVE ANCHOR BOLTS:** The use of 316 stainless steel "Hilti Kwik Bolt" stud bolts or equivalent may be used as an alternative where approved by the Employer's Agent. If steel reinforcing bars are encountered while the holes are being drilled, the Contractor shall knock a hole in the concrete around the steel and grout in a stainless steel hook bolt as described above.

(c) **THROUGH BOLT ANCHORS:** Where machinery is anchored by studs or bolts which extend through the supporting structure and is therefore fastened down with the use of nuts from both sides, these, together with associated washers and brackets, shall also be of type 316 stainless steel.

(d) **ANTI-SEIZE COMPOUND:** All threads shall be coated with an approved nickel based anti-seize/corrosion protection compound before assembly.

PSH 5.2.10 Protective treatment

Except where otherwise specified, all steelwork shall be cleaned free of all rust, burr and millscale, and painted with an approved self-etching primer, followed by three coats of an approved epoxy tar, the first coat brown and the second coat black in colour. Before the application of the final coat the surface shall be cleaned, lightly abraded and solvent washed using coal tar epoxy thinners and a clean rag. Corrosion protection of steel shall be in accordance with SANS 1200 HC. Finishing coats shall be painted in colours according to NOSA Specifications.

Where hot-dipped galvanising is specified, the steelwork shall be hot-dipped galvanised in accordance with SANS 121/ISO 1461. No drilling or welding of steelwork is to take place after galvanising. All galvanising is to be double hot-dipped to a G650 spelter.

PSH 5.2.11 **HANDRAIL STANCHIONS AND HANDRAILINGS**

a) All guard railings shall be of hot dip galvanised mild steel "WECROLOK" or other approved equivalent and approved and shall comprise hand and knee rails not less than 31.75 mm diameter and stanchions spaced at not more than 1,8m except where specifically directed otherwise in writing by the Employer's Agent.

b) As far as it does not conflict with this Specification, guard railing shall comply with SANS 10104: Code of Practice for Hand and Guard Rails (Safety Aspects) which inter alia calls for: On platforms, walkways, landings or around dangerous areas the vertical height, measured from the top of the hand rails to the floor or surface, shall be at least 1,0m.

c) On stairways and fixed ladders the hand rail shall be parallel to the stringers and the vertical height, measured from the top of the hand rail to the nosing of the tread, shall be at least 0,9m. For applications covered by this Specification the hand rail and stanchion shall withstand, without permanent deflection, a proof force of 890N and 1780N respectively, applied at any point and in any direction. The Tenderers shall provide proof that their handrailing has been tested and withstands the loads.

d) Rails shall be smoothly finished and free from sharp cornered edges and projections that may injure persons or damage clothing.

e) Railings shall be joined using the slip jointing method with separate and neatly fitting tubular inserts fitted into the railing bore. If used, pins shall have their ends peened over and smoothed, or if taper pins are used, shall be filed off flush with the rail. The joint shall be watertight or the rails shall be made self-draining on all external hand rails.

f) Railings shall generally, particularly at the bottom of stairways, be ended off with positively fixed (pinned) closure bends. At corners, short radius bends with stanchions on both ends or stanchions specifically designed for such a position shall be employed. No sharp endings shall be permitted.

g) Stanchions shall generally be base mounted to suit the arrangement requirements and shall be of solid or welded construction. Welding shall be compatible and shall not impair the strength or corrosion resistance of the material, shall be continuous and shall be smoothly finished and then passivated.

h) Stanchions shall be self-draining to suit the mounting arrangement.

i) Holes for the rails to go through the stanchions shall have a diametrical clearance not exceeding 1mm but preferably 0,5mm. On stairways with stanchions vertically mounted the hole shall be to suit and shall accurately fit the angled rail with the above-mentioned clearances.

j) Stanchions shall be smoothly finished and free from sharp corners, edges or projections that may cause injury or damage. Bases shall have the corners rounded or sheared off.

k) Stanchions shall be fixed using 316 stainless steel fasteners. A nickel based anti-seize compound shall be applied to all threads before fastening.

l) All components for the guard rail system shall be manufactured of type 316L stainless steel but may be of type 316 stainless steel if no welding is involved in its manufacture. For the insert used in the internal slip joint, a non-corrosive material using steel reinforcing will be accepted provided the steel is completely enclosed. A manufacturer's test certificate shall be provided for each batch of stainless steel giving the chemical analysis of the material.

PSH 8 MEASUREMENT AND PAYMENT

PSH 8.3 SCHEDULED ITEMS

Add the following new items:

PSHA 8.3.7 Stainless Steel Penstock Special (New clause)

Handstops shall be measured by the number and the tendered rate shall include the cost of manufacture of the plate and frame according to the drawings, supply to site, casting the frame into concrete or fixing to existing concrete as applicable, and completing the installation to the satisfaction of the Employer's Agent.

<u>Item</u>	<u>Unit</u>
Supply and install stainless steel penstock and frames.....	No

PSH 8.3.8 Steel Specials

Floor gratings, handrails, manhole covers and frames manufactured of 316 stainless steel unless otherwise specified, shall be measured by the number.

The rates tendered shall include for the cost of manufacture and painting of the particular item, supply to site, supply and installation of frames/supports (angle iron bolted to or cast into concrete), casting or building into structure as applicable, touch up paint work, grouting, etc, all to provide a complete installation to the satisfaction of the Employer's Agent.

<u>Item</u>	<u>Unit</u>
Stainless Steel Specials	
Manhole covers and frames (size and position in works stated)	No

xxviii) PSH 8.3.9.2 GRP walkway gratings

Walkway gratings shall be measured by the number and the tendered rate shall include the cost of manufacture, supply to site, supply and installation of frames/supports (angle iron bolted to or cast into concrete), casting or building into structure as applicable, touch up paint work, grouting, etc, all to provide a complete installation to the satisfaction of the Employer's Agent.

<u>Item</u>	<u>Unit</u>
a) GRP walkway gratings (size and position in works stated)	No

PSH 8.3.16 Fencing

The rate for fencing shall cover the cost of the supply and installation of the fence complete as specified, including IPE posts or taper locking posts or equivalent, Mesh panels and all fixings and additional items required. It shall include all works on site and execution activities as described above as well as on the drawings. The rate shall include all ground preparation and excavation required and concrete for posts.

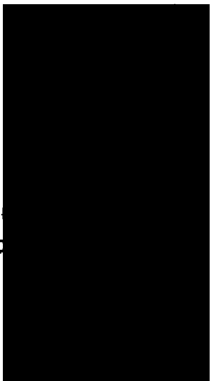
The item shall be measured by length of fence installed. Razor wire topping, gates and anti-protection are measured separately.

The rate for razor wire shall cover the cost of the supply and installation of the razor wire topping complete as specified.

The rate for gates shall cover the cost of the supply and installation of the gates complete as indicated including all work and materials required. This rate shall include all ground preparation excavation and concrete works.

The rate for anti-burrow protection shall cover the cost of the supply and installation of the 300mm x 400mm deep concrete plinth for anti-burrow protection, including all additional shuttering and wooden trowel finishing.

<u>Item</u>	<u>Unit</u>
Fencing	
Hot-dip galvanised mesh (12.7mm) Fencing of nominal height 2100mm.....	m
Razor wire (type specified)	m
Concrete plinth anti-burrow protection	m
Supply and install gates complete (type specified).....	No



PSL MEDIUM PRESSURE PIPELINES

PSL 1 SCOPE (CLAUSE 1)

The pipework required under this contract comprises GRP pressure pipes joined with rubber ring sockets for pond bypasses and sundry pipework as shown on the drawings.

PSL 2 INTERPRETATIONS (CLAUSE 2)

PSL 2.3 DEFINITIONS

Allowable Operating Pressure: Internal pressure, excluding water hammer, that a component can safely and continuously withstand under permanent hydraulic service.

Maximum Operating Pressure: Maximum internal pressure, including water hammer, that a component can safely withstand during service.

Allowable Test Pressure: Maximum hydrostatic pressure that can be applied on site to a newly installed component

PSL 2.4 ABBREVIATIONS

DI : Ductile Iron
DN : Nominal Diameter
GRP : Glass Fibre Reinforced Plastic
HDPE : High Density Polyethylene
SS : Stainless Steel

PSL 3 MATERIALS (CLAUSE 3)

PSL 3.1 GENERAL (SUB-CLAUSE 3.1)

Unless otherwise scheduled or shown on the drawings, the pipes to be used on the contract are as follows:

- (i) Pipes of 50mm diameter or less shall be High Density Polyethylene (HDPE);
- (ii) Pipes of 63mm diameter or larger shall be Unplasticised Polyvinyl Chloride (uPVC) or Ductile Iron, as applicable

Add to Sub-Clause 3.1

The Contractor shall provide adequate storage facilities for pipes, couplings and specials to conform with the following:

(a) Couplings and specials

Until required for use the rubber rings shall be stored in a cool dark place, away from grease, oil or harmful chemicals. If rubber rings have been tied they shall be separated a few days before they are required for use in order to eliminate minor impressions, which the ties may have caused.

Couplings, into which rubber rings have been fitted, ready for use, shall be stored under cover. All couplings and specials shall be stacked off the ground to ensure that the protective coatings are not damaged.

(b) Stacking of pipes.

Pipes may be placed off the ground alongside the pipe route. When stacking is necessary the Contractor shall make necessary arrangements for stacking areas and shall stack as recommended by the manufacturer.

(c) Valves.

Valves shall be stored under cover and shall be stacked off the ground in a manner which will prevent the ingress of dirt and ensure that the valve faces, spindles and coatings are not damaged.

- PSL 3.4 STEEL PIPES, FITTING AND SPECIALS
- PSL 3.4.1 General
- Welding and visual examination of carbon steel pipework shall be carried out in accordance with BS 4871 Part 1 and BS 2633 or BS 2971 or an equivalent, except where otherwise indicated. Dye penetration examination to BS 6443 shall be undertaken on not less than 10% of all weld connections.
- Plain ends of pipes and fittings shall be covered and protected against damage whilst being transported and stored.
- PSL 3.4.2 Pipes of Nominal Bore up to 150 mm
- Pipework, other than screwed and socketed of sizes up to and including 150 mm nominal bore, shall comply with the requirements of SANS 62 or ASTM A106 or API5L Grade A for seamless steel pipes. These pipes shall be heavy duty and with a minimum wall thickness of 5 mm.
- PSL 3.4.3 Pipes of Nominal Bore over 150 mm
- Carbon steel pipes and fittings, other than steam tubing and screwed and socketed pipes for general application, larger than 150 mm diameter, shall be electric resistance welded complying with the requirements of SANS 719 Grade A or ASTM A106 or API5L Grade A and shall have walls of thickness not less than 6 mm for pipe sizes up to 300 mm diameter inclusive and 8 mm for pipe sizes of 350 mm to 500 mm. Helical seam welded pipe will not be permitted unless specifically approved by the Employer's Agent.
- PSL 3.4.5 Screwed and Socketed Pipes
- All screwed and socketed pipes and fittings shall comply with the requirements of SABS 62 Heavy class and shall be 'hot dip' galvanised. Unless otherwise specified, screwed and socketed pipes shall not be used for the conveyance of steam gas and compressed air, or liquids containing it.
- PSL 3.4.6 Stainless and Steel Alloy Pipework and Fittings
- Stainless steel pipes shall be Grade TP304 L or TP316 L, as indicated, complying with the requirements of ASTM A312 for seamless pipe.
- Stainless steel butt weld fittings shall comply with the requirements of ASTM A403 class WPS and be of the same material as the pipes with which they connect. Dimensions shall comply with ANSI B.16.9 and B.16.28.
- Flanged fittings for stainless steel and alloy pipes shall be manufactured from butt weld fittings as specified above provided with short straight pipe extensions suitable for insertion in slip on or socket weld flanges.
- Unless otherwise indicated the material thickness for all stainless steel pipes and fittings shall be equivalent to Schedule 40 for Pipes up to and including 150 mm diameter and Schedule 20 for pipes exceeding 150 mm diameter.
- Welding and visual examination of stainless steel pipework shall be carried out in accordance with BS 4871 Part 1 and BS 2633 except where stated in the Detailed Specification. Dye penetration examination to BS 6443 shall be undertaken on not less than 10% of all weld connections.
- PSL 3.7 OTHER TYPES OF PIPES (SUB-CLAUSE 3.7)
- PSL 3.7.1 uPVC Pipes
- The uPVC pipes shall be Class 12 spigot and socket complying with SABS 966.
- Welded joints of uPVC pipes will only be allowed where pipes are built into structures. Only the welding cement supplied and recommended by the manufacturer of the pipes used on site shall be permitted. All other long pipe routes shall be spigot and socket joints with rubber ring seals.
- PSL 3.7.2 Polyethylene Pipes (Sub-Clause 3.7.2)
- High Density Polyethylene (HDPE) pipes shall comply with SANS ISO 4427 using comp fittings and joints. The class of material shall be PE 100. The pressure class shall be as specified in the drawings or in the Bill of Quantities.

The fittings shall be injection moulded from recognised high quality polypropylene (PP) and must conform to relevant internationally accepted performance requirements.

The bodies shall have moulded-in manufacturer identification, material and series information and shown the dimensions of the pipe outside diameter and, if necessary, of the threads. Samples of the fittings shall be issued to the Employer's Agent for approval prior to use.

Unless otherwise indicated, all bends shall be long radius bends and all branches shall be 45 degree branches.

PSL 3.7.3 GRP Pipes

GRP pipe, fitting and specials shall comply with the relevant requirements of SANS 1748-1.

PSL 3.8 JOINTING MATERIALS (SUB-CLAUSE 3.8)

PSL 3.8.3 Flanges and Accessories (Sub-Clause 3.8.3)

Where new pipework is to be joined onto existing pipework, the Contractor shall measure the existing flanges and report the dimensions to the Employer's Agent. The drilling of new flanges shall match the existing flanges.

In new installations, where pipes are not coupled onto existing pipework, the flanges shall be in accordance with SANS 1123.

Flanges shall be machined flat and without a raised joint face.

Flanges for low-pressure applications (less than 10 bar) shall be of the slip on type. Flanges for high-pressure applications (greater than 10 bar) shall be of the socket weld type, unless otherwise agreed with the Employer's Agent.

Flanges shall be manufactured from materials equal to or better than the pipes to which they are connected.

Where pipes pass through and will be built into walls they will be provided with puddle flanges, which shall have the same diameter and thickness as the standard flanges but be undrilled.

PSL 3.8.6 Spigot and socket Pipes (Sub-Clause 3.8.6)

Add the following:

The shortest length of pipe which may be used in the pipeline is 0,5m, thus the shortening of an adjacent pipe may be necessary so as to ensure compliance with the position of specials. When pipes of 1m or less in length are used or where specials are laid within 1m of each other, they shall be jointed by means of V.J. type coupling, or equivalent.

PSL 3.8.8 Jointing Gaskets (New Clause)

Jointing gaskets for flanged joints shall comply with the requirements of BS 4865 and be cut to the full width of the flange. The materials shall be suitable for and compatible with the required pressure and temperature duties, and characteristics of the material conveyed.

PSL 3.8.9 Fasteners (New Clause)

Bolts and nuts shall be hexagon head type complying with SANS 1700 with threads of the coarse pitch series.

Washers of the same material to the bolts shall be provided under each nut and bolt head. Multiple washers or shims shall not be used. Spring washers or other approved locking arrangement shall be used, together with flat washers on all fasteners subject to vibration.

All fasteners M12 and smaller shall be manufactured of grade 316 stainless steel.

All fasteners in corrosive areas shall be manufactured of grade 316 stainless steel. Corrosive areas shall be taken to include any moist or wet area such as in and above settling tanks, in or in the vicinity of open channels; where a continuous spray can be expected and all internal and external the vicinity of the inlet works of a wastewater treatment works. All fasteners embedded in concrete or soil shall also be of grade 316 stainless steel.

Fasteners larger than M12 which are in non corrosive areas shall, except when specified otherwise, be hot dip galvanized. Electro-plating and electro-galvanising will not be acceptable.

Fastener material shall always be of equal or better corrosion resistance than the items being fastened, e.g. 316 stainless steel bolts must be used to fasten together 316 stainless steel fabrications or flanges.

PSL 3.8.10 Anti-seize Compound (New Clause)

Before assembly, threads shall be treated with a nickel based, anti seize/corrosion protection compound such as Chesterton 725; Nickel Anti Seize Compound, or equivalent and approved.

Copper based compounds are not acceptable and, if used, shall be cleaned off before the correct compound is applied.

If it is found during inspection that compound has not been applied, the Contractor shall disassemble all fasteners and comply with this requirement.

A small amount of compound shall be applied along the full length of the thread before the nut is applied. Excessive compound visible on the thread after the nut has been applied shall be cleaned off.

PSL 3.8.11 Pipe Supports (New Clause)

Pipe support brackets/holderbats for mounting pipes against walls shall be stainless steel of an approved design and adequate strength to suit the pipe to be supported.

Holderbats shall be fixed to wall by means of stainless steel chemical anchors.

PSL 3.8.12 Repair Couplings (New Clause)

Unless otherwise shown, all couplings shall be Viking Johnson (V.J.) type or equivalent couplings capable of connecting uPVC and AC/FC pipes.

PSL 3.9 CORROSION PROTECTION (SUB-CLAUSE 3.9)

PSL 3.9.6 Corrosive Soil (Sub-Clause 3.9.6)

Saddles, cast iron detachable and flanged joints together with their bolts, shall be protected by means of either an approved protective petrolatum based primer, then wrapped with three layers of an approved petrolatum impregnated tape, or other means of inhibiting corrosion approved by the Employer's Agent. This protection shall also be applied to the bolts and flanges used by the manufacturer in the construction of valves and hydrants.

PSL 5 CONSTRUCTION (CLAUSE 5)

PSL 5.1 LAYING (SUB-CLAUSE 5.1)

Add the following :

Separation of Pipes

Where the proposed pipelines cross existing services in the form of watermain, sewer pipes or stormwater pipes the distance separating the two shall wherever possible not be less than 150 mm. Where circumstances make this impossible and where the gap is less than 75 mm a layer of a bitumen impregnated compressible filler material (to be approved by the Employer's Agent) shall be inserted between the two pipes. The minimum thickness of such a layer shall be 25 mm.

The layer shall consist of 12 mm thick sheets of the required material glued together to make up the required thickness.

Accommodation of Thermal Movement

In laying of pipelines with welded joints, provision shall be made for the thermal expansion and contraction of the pipe.

All measure for accommodation of thermal movement shall be subject to the approval of the Employer's Agent.

- PSL 5.1.3 Keeping Pipelines Clean (Sub-Clause 5.1.3)
All pipes and specials strung out above ground along the line of the trench shall have both ends closed by means of an adequately fixed plastic cap or other approved material, supplied by the Contractor, in order to prevent the ingress of foreign material.
- PSL 5.1.5 Pipes laid in common trench (New Sub-Clause)
Where two pipes are laid side by side in the same trench, the clear distance between the pipes shall not be less than 300 mm.
- PSL 5.1.6 Changes in Direction (New Sub-Clause)
Vertical and horizontal direction changes less than 11½° shall be achieved by deflecting the pipes at the joints. The deflection at each joint shall not exceed the value recommended by the pipe manufacturer and if necessary, the specified change in direction shall be achieved over a number of pipe lengths.
- PSL 5.2 JOINTING METHODS (SUB-CLAUSE 5.2)
- PSL 5.2.1 Detachable Couplings (AC and uPVC Pipelines) (Sub-Clause 5.2.1)
Add the following to Sub-Clause 5.2.1 :

Unless otherwise specifically detailed on the drawings, uPVC water pipes, specials and fittings shall be coupled with spigot and socket joints fitted with rubber sealing rings. In the following cases, V.J. couplings (or equivalent) shall be used:
- (a) on one end of each valve and hydrant;
 - (b) where pipes have to be cut to fit specials in designated positions, refer to PSL 3.8.6.
- PSL 5.2.5 Welding HDPE Pipelines (New Clause)
Unless otherwise indicated, field joints in HDPE pipes shall be formed by heated tool butt-welding.

Welding of HDPE pipes shall be in accordance with SANS 10268, and shall only be carried out by thermoplastic welders who are certified by the Plastics Federation of South Africa (PFSA).
- PSL 5.2.6 Joints between HDPE and Other Materials (New Clause)
Joints between HDPE and pipes, valves or fittings of other materials shall be flanged. Flanges shall be loose steel flanges in accordance with SANS 1123.
- PSL 5.11 FLEXIBLE JOINTS AT STRUCTURES (New Clause)
All pipelines connected to structures shall be connected with a flexible joint comprising a 1m length of pipe and two rubber ring jointed couplings to match the type of pipe.
- PSL 5.12 CONNECT TO EXISTING MAINS (NEW CLAUSE)
Where connections have to be made to the existing water mains, the following procedure has to be followed:
- (a) Liaise with the Local Authority to arrange a suitable time period for the proposed connection.
 - (b) Ensure all tools and fittings of the correct size and type are on site prior to requesting the shutdown of the mains.
 - (c) Advise the Local Authority at least 3 days in advance of the intention to commence work, in order for them to shut down the mains.
 - (d) Arrange with the Local Authority to have an official present on site when the work commences.
 - (e) Advise the Local Authority when work is complete and thrust block in place and sufficiently cured, for the system to be recharged. Work to be completed to minimise the disruption to the supply to a maximum of 12 hours.
- All arrangements and planning must be made in close collaboration and with the approval of the Employer's Agent's Representative on site. Names and contact personnel at the Local Authority shall be provided at the required time.

PSL 5.13 PIPE MARKERS (NEW CLAUSE)

Pipe markers shall be installed above the pipeline centreline at all horizontal changes of direction and at intersections with property boundaries.

PSL 7 TESTING (CLAUSE 7)

PSL 7.3 STANDARD HYDRAULIC PIPE TEST (CLAUSE 7.3)

PSL 7.3.1 Test Pressure and Time of Test (Sub-Clause 7.3.1)

Testing shall be carried out as detailed in Clause 7 of the latest SANS 1200 L, except that the test shall not be less than 1.3 or more than 1.5 times the working pressure for the class of pipe under test.

Payment for field-testing of pipelines shall be included in the rate for supply, lay and bed pipes as described in SABS 1200:L Clause 8.2.1.

The Contractor shall give the Employer's Agent 24 hours' notice of his intention to have water admitted to any length of new pipeline for any purpose whatever.

PSL 7.5 COMMISSIONING TEST (NEW CLAUSE)

Prior to the handing over to the client of a particular area or zone, it shall be subjected to a commissioning test.

The section to be tested shall be isolated by closing sluice valves in the line and brought up to a pressure equivalent to the working pressure of 12 bar being applied at the lowest point in the installation.

The duration of the test and the permissible leakage rates shall be in accordance with SABS 1200:L Clause 7.3.3.

Payment for commissioning tests of pipelines shall be included in the rate for supply, lay and bed pipes as described in SABS 1200: L Clause 8.2.1.

PSL 8 MEASUREMENT AND PAYMENT (CLAUSE 8)

PSL 8.1 GENERAL (SUB-CLAUSE 8.1)

Add the following to Sub-Clause 8.1 :

The tendered rates for the supply of materials shall cover the cost of all protective coatings and linings, including denso petrolatum tape and priming solution (or equivalent) where required.

No extra payment will be made for testing which will be held to be included in the price for laying of pipes, valves and specials.

The cost of conforming to the requirement to install repair couplings as specified in PSL 3.8.12 and PSL 5.2.1 must be allowed for in the cost of the pipes and fittings.

Notwithstanding instructions for backfilling the Contractor shall bear the cost of finding and repairing leaks.

Jointing of Pipes

The rates tendered for all pipes, specials and valves shall include provision for all cutting of pipes, flanges, nuts, bolts, short collar joints and insertion jointing pieces.

No additional payment shall be made for cutting lengths of pipe, laying or bedding for short lengths for pipework between structures and the costs of all additional cutting of pipes, including of pipe material, in order to construct the pipework to the lengths as shown on the drawing deemed to be included in the tendered rates.

PSL 8.2 SCHEDULED ITEMS

PSL 8.2.1 Supply, Lay and Bed Pipes

The costs of carrying out as-built surveys of pipelines as specified in PSA 5.10 shall be included in the rate for laying of the pipelines.

No payment will be made for laying of pipes unless the as-built survey data has been submitted to and approved by the Employer's Agent.

No additional payment will be made for small changes of direction achieved by deflections at pipe joints as specified in PSL 5.1.6.

No payment will be made under this sub-clause until acceptable as-built survey data has been submitted to the Employer's Agent in respect of the length of pipeline concerned.

PSL 8.2.2 Extra-over 8.2.1 for the Supplying, Laying, and Bedding of Specials Complete with Couplings

Must comply with a material clause or construction clause or will payment be for the fitting complete with additional fittings to complete the task.

PSL 8.2.4 Extra-over 8.2.1 for the cutting of the pipe and the supplying and fixing of the extra coupling

Add the following item as specified in PSL 5.11.

<u>Item</u>	<u>Unit</u>
Flexible joints at structures (diameter stated)	No.

PSL 8.2.16 Connect to existing pipelines (New Clause)

Connection to existing mains shall be measured by number for each diameter of existing pipe.

The tendered rate shall cover the cost for excavating to expose the existing main, cutting the existing pipeline and reaming if required to suit the new fittings, dealing with water, supplying and fitting appropriate fittings and special adaptor pieces to suit the old and new pipes, completing the connection, backfilling, disposal of spoil and making good.

<u>Item</u>	<u>Unit</u>
Connect to existing pipeline (diameter stated)	No.

PSL 8.2.17 Extra Over for dealing with existing flow (New Clause)

The unit of measurement shall be the number of connections made (No.)

The tendered rate shall cover all the extra over costs for dealing with the existing flow in the pipe including plant, labour, materials, pumping, delays or any diversions works that may be required. The method of dealing with the existing flow as well as the direct and indirect consequences, spillages, repairs or cleanup thereof is entirely the Contractors responsibility.

<u>Item</u>	<u>Unit</u>
Extra Over Item PSL 8.2.16 for dealing with existing flow	No.

PSL 8.2.19 Break through wall and cast in pipes (New Clause)

The unit of measurement shall be the number of pipes entrances through the wall (No.)

The tendered rate shall cover the cost for breaking or drilling through the wall to create a hole of suitable size for the pipe, at the limited times when the reactor level is low enough to do so, formwork around the pipe (including venting hole), casting the pipe into the wall with an approved flowable non-shrink grout (Sika 'Sikacrete 214' or equivalent) as shown on the drawings and making good the exposed surfaces with grout to form a neat finish to the satisfaction of the Employer's Agent.

<u>Item</u>	
Break through existing, cast in pipe and make good for pipes (diameter stated)	

PSLB SANS 1200 LB: BEDDING (PIPES)

PSLB 3 MATERIALS

PSLB 3.1 SELECTED GRANULAR MATERIAL (BEDDING GRADLE)

Selected granular material shall comply with the provisions of Clause 3.1 of SABS 1200 LB and in addition, the P/ shall not exceed 2.

PSLB 3.2 SELECTED FILL MATERIAL (FILL BLANKET)

Selected fill material shall comply with the provisions of clause 3.2 of SABS 1200 LB.

PSLB 3.3 BEDDING

The bedding of the rising main shall be in accordance with the drawings.

There are no designated borrow pits, and the Contractor will be expected to make his own arrangements regarding importing bedding and blanket material.

PSLB 5 CONSTRUCTION

PSLB 5.1 GENERAL

PSLB 5.1.4 Compaction

The degree of compaction required will be 93% Mod. AASHTO density (or 100% for sand).

PSLB 8 MEASUREMENT AND PAYMENT

PSLB 8.2 SCHEDULED ITEMS:

PSLB 8.2.6 Bedding in Waterlogged Conditions (New Item; refer to PSDB 5.1.2)

In the event of waterlogged conditions occurring in the bottom of the trench, the Employer's Agent may order the Contractor to place a crushed stone bedding layer (minimum thickness 150 mm) on the trench bottom.

Should the trench bottom conditions remain unstable due to the nature of the soil and the degree of saturation, the Employer's Agent may order the Contractor to install a geotextile on the trench bottom prior to the provision of the stone layer. After placing the stone bedding, the geotextile shall be folded over the stone with a minimum overlap of 300 mm to form an enclosed drain. The specified bedding material shall then be used to bed the pipe.

The Contractor shall only provide and lay the stone bedding layer and geotextile after receipt of the written order to do so from the Employer's Agent. No payment shall be made under this item if the Contractor is not in possession of a written order prior to commencing the work.

The tendered rate shall cover the cost of all additional excavation and preparation of the trench bottom to accommodate the layer of stone, the removal of unsuitable material, the supply and placing of a 150 mm thick layer of stone over at least the specified width, the cost of supply of the geotextile, placing and losses as a result of overlaps and over excavated trench widths and all related activities in order to produce a stable platform.

Where the use of a layer of crushed stone in the trench bottom has been authorised by the Employer's Agent, it will be measured by volume calculated according to the length multiplied by the minimum base width and specified thickness.

The cost of dealing with water as specified in SANS 1200 DB, Sub-Clause 5.1.2.1 will be held to have been included in the tendered sums for excavation.

Item

Unit

- a) Single size 19mm stone..... m³
b) Geotextile.....

PSLD	SANS 1200 LD: SEWERS
PSLD 3	MATERIALS (CLAUSE 3)
PSLD 3.1	PIPES, FITTINGS, AND PIPE JOINTS (SUB-CLAUSE 3.1) Unless otherwise scheduled or shown on the drawings the pipes shall be of unplasticised polyvinyl chloride (uPVC) Class 34 heavy duty complying with SABS 791.
PSLD 3.5	MANHOLES, CHAMBERS, ETC. (SUB-CLAUSE 3.5)
PSLD 3.5.2	<u>Precast Concrete Sections (Sub-Clause 3.5.2)</u> Add the following to Sub-Clause 3.5.2: All sand and aggregate used in concrete for sewer manholes and chambers shall be dolomitic.
PSLD 3.5.8	<u>Manhole Covers and Frames (Sub-Clause 3.5.8)</u> Notwithstanding the requirements of Sub-Clause 3.5.8 all covers and frames shall be constructed using polymer concrete (AV mouldings or equivalent) and shall be designed to withstand the loadings specified for Type 2A covers and frames in SABS 558.
PSLD 5	CONSTRUCTION (CLAUSE 5)
PSLD 5.6	MANHOLES (SUB-CLAUSE 5.6) Refer to PS LD 3.5.2 above for the type of material. Notwithstanding the requirements of Sub-Clause 5.6 manholes constructed of precast concrete rings shall have watertight joints. Manholes shall be provided with copolymer polypropylene step irons with a 12 mm diameter high tensile steel core ("Calcamite" or equivalent) installed according to the manufacturer's specifications.
PSLD 5.11	PIPE LAYING WITH HIGH WATER TABLE (NEW CLAUSE) Where a high water table is encountered and a probability exists of water entering the trench after the pipeline has been laid, the Contractor is to take all reasonable steps to keep the excavations dry. However, in exceptional circumstances, provided that he has written approval from the engineer to do so, he will be permitted to bed and lay the pipes and backfill sufficiently to prevent flotation, prior to testing.
PSLD 8	MEASUREMENT AND PAYMENT (CLAUSE 8)
PSLD 8.2	SCHEDULED ITEMS
PSLD 8.2.1	<u>Supply, lay, Joint, Bed and Test Pipeline (Sub-Clause 8.2.1)</u> add the following : No deductions will be made for the internal length of manholes and the cost of all invert channels irrespective of diameter shall be included in the rate tendered for this payment item.
PSLD 8.2.2	<u>Extra-over Item 8.2.1 for specials</u> add the following: Rodding Eyes Rodding eyes shall be measured by number complete as shown on the drawing, for each different diameter and type of material. The tendered rate shall cover the cost of all excavation, disposal of material, supply of fitting labour to construct the rodding eyes as detailed on the drawings.
PSLD 8.2.3	<u>Manholes (Sub-Clause 8.2.3)</u> Manholes will be measured and paid in accordance with Sub-Clause 8.2.3.

The tendered rates for the different types of manholes shall cover the cost of the supply and installation of the complete precast concrete or brick manhole, including flexible joints, benching, step irons, concrete landing slabs where applicable, concrete cover slabs, masonry between concrete cover slab and covers and covers and frames, as shown on the drawings. The rate shall also cover the cost of waterproofing the joints between manhole rings in the case of precast manholes.

For the purposes of measurement and payment, the depth of a manhole is defined as the depth from the top of the cover to the lowest invert level of the manhole.

PSLD 8.2.4 Extra-over Item PSLD 8.2.3 for construction of manholes on existing pipelines

The rate tendered shall include full compensation for breaking into the pipeline, cutting pipes, dealing with the existing flow, preventing unacceptable debris entering the drain line and making good.

PSLD 8.2.13 Connections into Existing Manhole (New Item)

The unit of measurement for connecting into existing manholes shall be by the number of connections.

The rate tendered shall include full compensation for breaking into the manhole, connecting the pipe, modifying or enhancing the benching, cutting pipes, dealing with the existing flow, preventing unacceptable debris entering the drain line and making good any benching, finish walls, covers and frames.

The item shall distinguish between type of structure, diameter of connecting pipe or size of culvert.

<u>Item</u>	<u>Unit</u>
Connections into existing manhole for pipe (diam)	No.

PSMJ SEGMENTED PAVING

PSMJ 3 MATERIALS

PSMJ 3.2 UNITS

Paving units used in trafficked areas shall be 80 mm S-A type interlocking grey concrete pavers.

Paving units used in pedestrian areas shall be 60 mm S-C type grey concrete pavers.

All pavers shall have a minimum wet compressive strength of 25 MPa.

PSMJ 5 CONSTRUCTION

PSMJ 5.4 LAYING OF UNITS

All paving units in both trafficked and pedestrian areas shall be laid in a herringbone pattern.

Where paving butts up against structures and base slabs, a header row shall be constructed around the perimeter thereof.

PSMJ 5.8 RE-USE OF EXISTING PAVING BLOCKS

Where instructed by the Employer's Agent, existing block paving on the site is to be lifted, stockpiled and maintained for reuse. This is described and paid under item PSC 8.2.14. When these blocks are to be reused, the contractor shall carefully select all undamaged blocks from the stockpile, transport these to the site in a manner that will eliminate as far as possible damage to the units and lay these in full accordance with SABS 1200 MJ section 5.

PSMJ 8 MEASUREMENT AND PAYMENT (CLAUSE 8)

PSMJ 8.2 SCHEDULED ITEMS (SUBCLAUSE 8.2)

PSMJ 8.2.2 Construction of Paving complete

Delete:

"supplying units"

and replace with the following:

"selecting and transporting unbroken units from stockpile and supplying"

PSMJ 8.2.3 Cutting Units to Fit Edge Restraints

Were so indicated in the Bills of Quantities, this item shall include all costs associated with forming a header row along the edge of structures and slabs.

PSME	SUBBASE
PSME 3	MATERIALS (CLAUSE 3)
PSME 3.2	STABILISING AGENT (SUB-CLAUSE 3.3)
	The stabilising agent to be used shall be Portland Cement II 32,5N manufactured to SANS 50197-1.
PSME 5	CONSTRUCTION
PSME 5.4.4	<u>Compaction (Sub- Clause)</u>
PSME 5.4.4.2	The subbase layers shall be compacted to the densities specified in C3.4.
PSME 5.4.4.3	<u>Add the following New Sub-Clause:</u>
	The Contractor must make allowance for the penetration of the subbase gravel material into the selected subgrade layer.
	The layer thickness specified shall be a net homogeneous layer. Only the homogeneous layer will be measured for payment purposes.
	No hardening layer has been specified for the working of cement treated subbase and the contractor shall take all necessary precautions when working the layer to prevent contamination from the underlying supporting layers and shall include any additional costs which may be incurred in the rate tendered for placing and mixing the layer.

PSMK KERBING AND CHANNELING

PSMK 3 MATERIALS

PSMK 3.9 Bedding Material

Delete Subclause 3.9 and replace with the following:

Bedding material upon which kerbs and channels are bedded shall consist of Class 15/6.7 concrete of minimum thickness 60mm unless otherwise stated on the drawings.

Add the following clause

PSMK 3.10 Cast in-situ concrete

Cast in-situ concrete comply with SABS 1200G or SABS 1200GA, where applicable. Concrete to be Class 20/13, unless otherwise indicated on the drawings.

PSMK 3.11 Epoxy mortar

At certain instances, epoxy mortar is indicated on the drawings to bind the pre-cast kerbing on concrete surfaces. This epoxy mortar shall be by SIKADUR 43/ZA or other approved supplier / material.

PSMK 5 CONSTRUCTION

PSMK 5.1. Excavation and bedding

Replace "90%" wherever it occurs to "93% (100% for sand)".

In certain instances, the concrete bedding material, as indicated above, shall become a hardening blinding layer for cast in-situ concrete units (kerbing, channels, etc.) and shall be treated as such.

PSMK 5.2 Precast concrete kerbing and channelling

Provision shall be made for expansion joints of width 10mm at intervals not exceeding 10m.

Joints shall be filled with expanded polyethylene filler- "Jointex" or equivalent and sealed with a 20mm thick two part polysulphide sealant- Durakol G HM" or equivalent.

Notwithstanding the fact that vertical curves may not have been specified where changes of grade of up to 2% occur, the kerbs and channels shall be laid to levels based on a minimum curve length of 20m. The same shall not apply at intersections.

PSMK 5.11 Kerb Transitions

The Contractor shall construct the various kerb transitions in 20 MPa concrete, each transition being 1m long, or as per the typical details. Transition shall be cast in-situ and finished off with a smooth steel trowel finish.

PA MAINTAINING CONTINUITY OF FLOW IN WASTE WATER TREATMENT WORKS

PA 1 SCOPE

This particular specification covers special provisions for dealing with and maintaining continuity of flow in waste water treatment works.

PA 2 INTERPRETATIONS

PA 2.1 APPLICATION

This particular specification identifies specific portions of work which would require special attention and lays out the requirements for diverting flow and keeping the area where work is to be executed dry.

PA 2.2 SUPPORTING SPECIFICATIONS

This specification is specifically applicable to this contract and shall be read in conjunction with all other standardised and particular specifications referenced by the Contract Document.

PA 3 MATERIALS

PA 3.1 GENERAL

Materials shall comply with the relevant SANS 1200 standardised specifications unless stated otherwise herein.

PA 4 PLANT

PA 4.1 PLANT FOR TEMPORARY WORKS

The Contractor shall be responsible for sourcing, transporting to site, installing, operating, maintaining, and removing from site when no longer required, all the plant required to temporarily deviate flow.

PA 4.2 PUMPS

Where pumps are required to divert process flows around areas where work is to be executed, pumps shall be of the type and capacity stated in the specification. At least one standby pump of capacity equal to that of the largest duty pump shall be present for the full duration that diversion is maintained.

Where pumps are required for dewatering or pumping out of sumps, tanks etc, the capacity of the pump will not be specified and the contractor shall select an appropriately sized pump to suit his production rates and method of work.

PA 4.3 PIPEWORK

Temporary pipework shall be of a type and size selected by the Contractor to suit the required flow rates. Pipes sizes and pump capacities shall be designed as a system to provide the required flow rate at the static head concerned.

PA 5 CONSTRUCTION

PA 5.1 APPROVAL

The Contractor shall submit to the Engineer, for approval, the full details of the proposed diversion works (Method Statements), 14 days prior to the start of the work concerned.

The Contractor's proposal shall include full details of the plant to be used including:

- i) Number, type and capacity of pumps;
- ii) Length, type and diameter of pipes;
- iii) Details of pipe couplings
- iv) A sketch showing the point at which water is to be diverted, the route of pipework and discharge point.

PA 5.2 PUMPING OUT OF SUMP

The sump will have to be pumped dry to allow the construction work to be undertaken.

To avoid discharging partially treated effluent and sludge into the treated effluent channel, the following procedure shall be followed:

- i) The inlets to the sump shall be closed off by placing sand bags in the manholes at the head of the sump.
- ii) The contents of the sump shall be pumped out using the recirculation and sludge pumps in the pump station.
- iii) Treated effluent shall be pumped out of the nearby treated effluent channel and into the sump to keep the suction pipes submerged so that the pumps do not draw air.
- iv) This operation shall continue until the sumps have been washed out and effectively contain only treated effluent.
- v) The pumps shall be switched off and the sumps shall be drained by pumping the contents back into the treated effluent channel.

PA 5.3 DIVERSION OF FLOW FROM CLARIFIERS TO THE CHLORINE CONTACT TANK

PA 5.3.1 Accommodation of Existing Flow

Currently, the flow entering the plant averages 2.5Ml/d. The contractor is to make sure all the new chambers constructed over the existing pipeline do not interfere with the functioning of the WWTW. The flow should be pumped from the clarifier to the chlorine contact tank. The contractor is to make provision for this in his planning and must be closely co-ordinated with the WWTW manager.

PA 6 TOLERANCES

Not Applicable.

PA 7 TESTING

Not Applicable

PC	PARTICULAR SPECIFICATION PC: METHOD FOR SURVEYING SUBMERGED SLUDGE
PC 1	SCOPE This specification covers the method to be used for the measurement of sludge in the Maturation Pond and where the sludge is submerged by clear water.
PC 2	GENERAL PRINCIPLE Where sludge is submerged, the surface shall be surveyed by measuring the depth of the sludge blanket below the water surface.
PC 3	MATERIALS Not Applicable.
PC 4	PLANT
PC 4.1	BOAT The Contractor shall establish on site a small boat with an outboard motor to be used on the pond to take measurements at points on a regular grid over the pond surface. The boat shall be of adequate size to carry at least two people.
PC 4.2	DEPTH MEASUREMENT The recommended method of determining the depth of the sludge below the water surface is by means of white ceramic tile, or a mirror, at least 300 x 300 mm square, suspended from its centre by a flexible measuring tape not less than 5 m in length. The tile shall be lowered into the water until it is no longer visible from the surface and this point shall be taken to be the level of the sludge blanket. The depth of the sludge blanket below the water level shall be read off the tape. The Contractor may, at his option, use sonar equipment, provided that such equipment can be demonstrated to yield comparable results to the method described above.
PC 4.3	GPS EQUIPMENT The contractor may use GPS equipment to coordinate the survey points.
PC 5	METHOD
PC 5.1	SAFETY Personnel working in the boats shall wear life jackets at all times and shall be equipped with rubber gloves, gumboots and water proof jackets and leggings.
PC 5.2	SURVEY CONTROL The Contractor shall establish a control network of coordinated benchmarks to which all survey work can be referenced. These benchmarks shall be positioned in places where they will not be disturbed or covered up during the execution of the Works A square grid shall be established by placing pairs of markers on the shore. These markers shall be clearly visible from anywhere on the pond so that depth measurements can be taken at the grid intersections by sighting on the markers. Alternatively, the Contractor may use GPS equipment to coordinate each depth measurement.
PC 5.3	EXECUTION OF SURVEY The level of the water surface in the pond shall be determined by levelling to the water from a benchmark, immediately before starting and after completing the survey. The surface of the sludge shall be measured on a regular grid, using the method given above. The gridlines shall be spaced at 10 m intervals.

The level of the sludge at each point shall be calculated from the average water level less the depth of the sludge blanket.

The outboard motor of the boat shall be operated at low speed at all times to avoid disturbing the sludge.

PC 5.4 **ALTERNATIVE METHODS**

The Engineer may, at his option, consider alternative methods of measurement proposed by the Contractor, but shall be under no obligation to accept such alternatives.

PC 6 **TOLERANCES**

PC 6.1 **GRID COORDINATES**

Setting out of grid markers shall be to an accuracy of ± 50 mm.

The coordination of depth measurement points shall be to an accuracy of ± 1.0 m

PC 7 **TESTING**

The Engineer may, at his option, carry out independent checks of the Contractor's survey. All the equipment described herein shall be made available to the Engineer, upon request for this purpose.

PLX	PARTICULAR SPECIFICATION: ALTERATIONS TO EXISTING STEENBRAS RAW WATER MAIN
PLX 1	SCOPE
	This particular specification covers the alterations to be made to the existing Steenbras raw water supply pipe and associated works.
PLX 2	INTERPRETATIONS
PLX 2.1	SUPPORTING SPECIFICATIONS
	a) Project specification; and b) SANS 1200 L.
PLX 3	MATERIALS
PLX 3.1	DISPOSAL OF MATERIAL
	Surplus material obtained from excavation and demolition shall be disposed of in a manner appropriate to the type of material, or as instructed by the Employer's Agent.
PLX 4	PLANT
PLX 4.1	PLANT
	The Contractor shall provide plant suitable for the construction activities described below.
PLX 5	CONSTRUCTION
PLX 5.1	EXISTING SCOUR VALVE ALTERATIONS
	The existing scour valve on the 1675mm diameter steel Steenbras raw water pipe, located at Chainage 1786 of the pipeline and at chainage 1416 of the Sir Lowry's River channel, requires the following changes, refer Drawing 4974-0178-DRD-C301:
	- The chamber reinforced concrete roof slab must be removed, the double compartment chamber walls raised by approximately 3.24 m to suit new ground levels and the roof slab reinstated. - The existing outlet to the wet-chamber must be bricked up. - A new DN 300 outlet steel puddle pipe with flange adapter installed as indicated. - The outlet pipe to be extended in 315 uPVC class 34 at a constant slope of 1:56 over a length of approximately 56 m to the new outlet point below the new river hydraulic control structure. This will include two pipe bends secured with concrete thrust blocks and a wing wall at the river outlet. - Note that the depths of pipe indicated on the drawing refers to the future berm heights. The outlet pipe will be installed prior to constructing the new berms while the trenches are relatively shallow.
PLX 5.2	MOVE EXISTING AIR VALVE TO NEW LOCATION
	The existing air valve on chainage 1852 of the 1675mm diameter steel Steenbras raw water pipe will be inside the main flow path of the revised Sir Lowry's River. The valve will be reinstated at a different location, that is at chainage 1711 of the 1675mm diameter steel Steenbras raw water pipe, refer Drawings 4974-0178-DRD-C302 and -C303:
	- The 1675mm diameter Steenbras raw water pipe will require a new air valve chamber at chainage 1711 involving the careful excavation to minimise disturbance to existing surrounding pipe bedding. - A 600mm diameter flanged steel pipe must be welded on top of the existing 1675mm diameter steel Steenbras pipe with 10mm fillet weld. The inside on the existing steel pipe must be cut out and the welding smoothed. Confirm the exact sizing to match the existing stub at chainage 1852 of the existing Steenbras pipe. - The flange thickness and drilling must be the same as for the existing air valve at chainage 1852 of the existing Steenbras pipe. - The zones disturbed by welding and cutting must be cleaned from any loose particles and the steel bared for corrosion coating material. - The 600mm stub pipe must be coated in double 300-micron layers of Copon or equivalent.

- Complete the concrete encasement and valve chamber as per Drawing 4974-0178-DRD-C302.
- A new blank flange must be installed on the existing air valve opening at chainage 1852. The existing flange with 150mm air valve at chainage 1852 must be installed on the new stub at chainage 1711.
- The extent of removal of the existing air valve chamber at chainage 1752 of the Steenbras pipe will be confirmed during construction depending on actual site conditions on completion of the new river channel. The current intention is to cover the existing chamber and mark the location as an existing inspection access point to the inside of the Steenbras pipe.

PLX 6 TOLERANCES

PLX 6.1 GENERAL

The tolerances specified in SANS 1200 L Clause 6 must be adhered to.

PLX 7 TESTING

PLX 7.1 GENERAL

The appropriate tests specified in SANS 1200 L Clause 7 must be carried out.

PLX 8 MEASUREMENT AND PAYMENT

PLX 8.1 GENERAL

Excavation and backfilling of trenches, and laying of medium-pressure pipelines, will be measured separately. Excavation and backfilling associated with the construction work described in 5.1 and 5.2 is deemed to be included in the rates for these activities.

PLX 8.2 SCHEDULED ITEMS

PLX 8.2.1 Alterations to existing scour valve on the 1675mm diameter steel Steenbras raw water pipe

The item shall cover the construction activities described in PSLX 5.1. The rate shall include shoring and dewatering activities.

Item

Unit

Alterations to existing scour valve on the 1675mm diameter steel Steenbras raw water pipe Sum

PLX 8.2.2 Relocation of existing air valve on chainage 1852 of the 1675mm diameter steel Steenbras raw water pipe

The item shall cover the construction activities described in PSLX 5.2. The rate shall include shoring and dewatering activities.

Item

Unit

Relocation of existing air valve on chainage 1852 of the 1675mm diameter steel Steenbras raw water pipe Sum

3.4.3. WAYLEAVES, PERMISSIONS AND PERMITS

The Contractor shall be responsible for obtaining all of the necessary wayleaves, permissions or permits applicable to working near any existing services or other infrastructure on Site, and shall ensure that any wayleaves, permissions or permits obtained by the Employer's Agent prior to the award of the contract are transferred into the Contractor's name.

The Contractor shall abide by any conditions imposed by such wayleaves, permissions or permits.

The Contractor shall ensure that all wayleaves, permissions and permits are kept on site and are available for inspection by the relevant service authorities on demand.

The Contractor shall also ensure that any wayleaves in respect of electricity services are renewed timeously every three months.

Environmental Authorisation and Water Use Licence

The contractor shall take special note of the conditions of the Environmental Authorisation and the Water use license and shall meet all of the requirements therein.

3.4.4. LOCAL PRODUCTION AND CONTENT

The Contractor will be required to comply with all requirements as stated in this document.

3.4.5 EMPLOYMENT OF SECURITY PERSONNEL

All security staff employed by the contractor on behalf of the CCT or at any CCT property must be registered with Private Security Industry Regulatory Authority (PSIRA). Proof of such registration must be made available to the employer's agent upon request.

3.4.6 UNIVERSAL ACCESS

In pursuit of becoming a fully accessible city, the City of Cape Town expects all Consultants and Service Providers to design and construct to SANS Standards for accessible Design, and any relevant City of Cape Town documents as may be relevant, and to exhibit a commitment to employing Universal Design Principles in their design, construction, service and product delivery of construction projects. This applies to all projects whether new, temporary, upgrades or rehabilitation works.

The contractor will engage with project representatives and the CCT's Universal Accessibility Department on how Universal Design Principles will enhance accessibility, within this project, that meets a variety of needs and creates a city that is accessible to everyone.

3.4.7 SITE ESTABLISHMENT

3.4.7.1. SERVICES AND FACILITIES PROVIDED BY THE EMPLOYER

Disclaimer

The Employer does not guarantee the adequacy or continuous availability of any service or facility. The Contractor is deemed to have assessed the availability, adequacy and risks associated with services and to have allowed for any additional services required to meet his contractual requirements.

Contractor's Camp

The Contractor shall make his own arrangements to lease the land from the registered owner, for the property on which the Contractor's stores and offices will be located.

The Contractor shall make his own arrangements for the accommodation of all labour, the provision of toilet facilities for all his employees and for the supply of electrical power and lighting if required. So, the Contractor shall comply with the requirements of the respective authorities. However, no temporary structures shall be erected at any areas along the site (except for an approved number of watchmen, see Clause 2.2.6). Temporary shelters or canopies may be erected where labour rests, eg during tea and lunch breaks, to enjoy a meal. However, no open fires will be allowed and no food shall be prepared or cooked at the temporary site areas.

Source of Water

Water can be supplied for construction and drinking purposes from the existing watermain, via a metered connection at various locations adjacent to the site. The contractor shall apply to the Municipality for a temporary water connection. At other locations the contractor shall make his own arrangements for the supply of water.

The provision of the metered connection and the supply of water used by the Contractor will be charged for and the costs thereof must be included in the tendered rates. Water will be charged for at the standard municipal rates.

Water for pressure testing of pipelines may be drawn off the existing reticulation by prior arrangement with the Municipality. The Contractor shall supply all necessary tee-pieces, valves and pipe work. An isolating valve shall be installed immediately downstream of the connection tee. All pipework connected to the rising main shall have a 12 bar rating.

The Contractor shall make use of water from non-potable sources for construction wherever possible.

Treated effluent for construction purposes is available from the Gordon's Bay WWTW. However, continuity of supply cannot be guaranteed. The contractor shall make arrangements directly with the WWTW management to access this supply and the costs thereof shall be included in the tendered rates.

Furthermore, the Contractor will be held responsible for any wastage of water due to his negligence.

Disposal Site

All material cleared on the site, rubble, spoil and refuse shall be disposed of at a designated area.

3.4.7.1. FACILITIES PROVIDED BY CONTRACTOR

Water

The Contractor shall make his own arrangements for the supply of water at locations where there is no existing potable water reticulation.

Electricity

There is no readily available source of electricity on site. The Contractor shall make his own arrangements for the provision of electricity and may make use of generators or apply to the relevant supply authority for an electrical connection.

Telephone

The Contractor shall make his own arrangements for the supply of telephone facilities for his own use.

Office and Storage Facilities

All offices, storerooms, etc. required by the Contractor are to be supplied by the Contractor. No storage facilities, shelters or eating facilities are available on Site and the Contractor shall make his own arrangements and pay all costs associated with such facilities if required.

Security

The security and safety of the Contractor's equipment, the storage, safekeeping and prevention of deterioration of all material, goods, plant and equipment delivered to Site shall be the responsibility of the Contractor until the Certificate of Completion has been issued, notwithstanding that the Employer may have previously paid for such items.

The Contractor shall make his own arrangements for a security fence enclosing the camp.

Housing and Transport

The Contractor's employees, except for an approved number of night watchmen, shall not be housed on Site and the Contractor shall make his own arrangements and pay all costs associated with housing employees and/or transporting them to Site.

The Contractor will have to make his own arrangements for accommodating night watchmen.

Sanitary Facilities

The Contractor shall provide portable toilet facilities at his depot and within reasonable distances of work fronts along the working area. These shall be regularly serviced and maintained in a sanitary condition.

Laboratory Facilities

No on-site laboratory facilities will be required. The Contractor is to make his own arrangements for the testing of materials where specified. All specified tests shall be done at an approved laboratory.

The laboratory shall be SANAS approved for the testing being undertaken.

Medical Attendance

The Contractor shall at all times maintain adequate medical attendance on Site. A person holding a current first aid certificate shall be immediately available on Site at all times when work is in progress. Arrangements, with the nearest suitable hospital, shall also be made by the Contractor for the acceptance of urgent cases of injury.

Facilities Provided by the Contractor for the Employer's Agent

The Contractor shall provide facilities for the Employer's Agent as specified in the standardised specification and the Works Specifications. The Contractor shall provide a suitable venue for the purposes of monthly site meetings, with adequate space and seating for at least eight people.

Removal of Facilities on Completion

The Contractor shall remove all temporary offices and storage facilities, toilets, temporary water connections and the like on completion of the contract and leave the areas used in a neat and tidy condition free of any rubble, debris, oils spillage, concrete and the like.

3.4.8 SITE USAGE

The Contractor shall not use the site for any purposes other than the execution of the Works. The Contractor shall confine her/his activities to the site of the works and to the area allocated to her/him for her/his site offices and materials storage. The Contractor may not use or damage in any way any area that falls outside the boundaries of the site. Any area damaged by the Contractor outside the site boundaries shall be rehabilitated to the satisfaction of the Employer's Agent at the Contractor's expense.

3.4.9 ALTERATIONS, ADDITIONS, EXTENSIONS AND MODIFICATION TO EXISTING WORKS

The contractor shall satisfy himself within 14 days of moving onto site that the dimensional accuracy, alignment, levels and setting out of existing structures or components thereof are compatible with the proposed works and procedures. Any discrepancies shall be brought to the attention of the Employer's Agent in writing where this is not the case.

Failure by the contractor to timeously give written notice to the Employer's Agent in this regard shall result in any claim for additional time and / or costs being rejected.

3.4.10 WAYLEAVES AND PERMITS

The Contractor will be required to apply for wayleaves and pay all sureties, bank guarantees, or deposits required by the service authority issuing the wayleave, as detailed in the Scope of Work.

Known services are indicated on the drawings and include:

- Eskom overhead and underground power lines;
- City of Cape town overhead power lines.
- Telkom overhead telephone lines.
- Vodacom/MTN underground cables and optic fibres (May not be fully shown. Refer to wayleaves)
- SANRAL road reserves and infrastructure.
- Private irrigation pipework (Not indicated on drawings)
- Bulk Water pipelines up to 1675mm.
- Private potable water and sewer connections (Not indicated on drawings).
- Private electrical connections (Not indicated on drawings).

3.4.11 TREATMENT OF EXISTING SERVICES

The positions of existing services, insofar as they are known, are shown on the Site Development Drawings. Items have been allowed in the Bill of Quantities for dealing with and protecting such services. Refer to Site Development Drawings for the positions of the existing services.

The exact location and depth of all existing services, such as sewers, stormwater pipes, culverts, water mains, manholes, valve boxes, conduits, cables for electricity and telephone lines, electricity, lightning and telephone poles and any other services or features on the ground which may infer the existence of services, must be verified prior to the commencement of any excavations – either for trench excavations or for the relocation or adjustment of existing services.

The Contractor shall take whatever precautions as deemed necessary to protect these services from damage during the period of the Contract.

3.4.12 DAMAGE TO SERVICES

Any known services damaged by the Contractor shall immediately be reported to the relevant service authority. The cost of repair of these services will be for the Contractor's account. Known services include those services shown on the drawings as well as services not shown on the drawings but the presence of which can be reasonably expected or determined on site.

Any unmarked or unknown services that may be damaged shall immediately be reported to the relevant service authority. The repair cost for such services will not be the Contractor's responsibility. In the event that the Contractor is requested to repair the damaged service, she/he shall submit the actual cost of repair with his next claim for payment and shall be paid the actual cost plus 10%.

3.4.13 REINSTATEMENT OF SERVICES AND STRUCTURE DAMAGED DURING CONSTRUCTION

The Contractor shall liaise directly with the responsible Municipal Services Departments, Telkom, etc with regards to the reinstatement of existing services. The Contractor shall take whatever actions are required to have damaged services repaired by Municipal Services Silos, Telkom or any other relevant service provider as soon as possible.

3.4.14 CERTIFICATION BY RECOGNISED BODIES

Where materials to be used in the works are required to comply with a SABS/SANS specification, they will be accepted as complying with the SABS/SANS specification if one of the following is satisfied:

- The display of a SABS/SANS mark on the product with a copy of the SABS/SANS certificate that allows the manufacturer to use the mark; or
- All the criteria in the relevant SABS/SANS specification is measured and confirmed on site or in an approved laboratory.

The same will apply to materials specified to comply with ISO, BS, ASTM or other international specifications.

Only SANAS accredited laboratories or other institutions may be used for certification purposes. For concrete durability testing, the laboratory shall be approved by the Employer's Agent.

3.4.15 AGRÉMENT CERTIFICATES

The use of alternative materials, which may be fit for purpose and are subject to an Agrément certificate, may be considered providing the following are adhered to:

- A full copy of the Agrément certificate must be provided,
- The certificate must be currently active,
- All work must be done in accordance with the terms of a specific certificate for the product,
- Details of any and all variations approved by Agrément South Africa must be provided,
- Details of who will erect or install the product must be provided

3.4.16 PLANT AND MATERIALS SUPPLIED BY THE EMPLOYER

The employer will not supply any materials or plant to the Contractor. The Contractor shall be responsible for procuring all plant and materials required for construction of the works.

3.4.17 MATERIALS SAMPLES AND SHOP DRAWINGS

The Contractor shall timeously provide the Employer's Agent with samples and/or test results of materials he intends to use in the works. All materials are to be approved by the Employer's Agent

writing before being used in the Works. Such approval shall not relieve the Contractor of his obligation to ensure that materials supplied comply with the Specifications.

The Contractor shall ensure that all materials are ordered timeously so as not to result in delays to the programme. Delays in delivery of materials necessary for completion of the works shall not be considered grounds for compensation. The Contractor shall make allowance in her/his programme for any anticipated lead times or delays in procuring specific materials.

Where material to be used in this contract is specified to comply with the requirements of a South African National Standard Specification and such material is available with the official SANS (SABS) mark, the material shall bear the official mark.

The Contractor shall supply samples of sufficient size of proposed bedding, imported material and concrete materials, as applicable, to a SANS accredited laboratory for testing prior to any such materials being used. Only materials that comply with the specifications may be used. No separate payment shall be made for the testing of materials, the cost of which shall be deemed to be covered by the rate for the relevant items.

Copies of all test results shall be given to the Employer's Agent for his approval.

3.4.18 CONSTRUCTION PLANT

All construction plant and equipment used on this contract shall be in good working order, well maintained, of adequate size and fit for purpose. No machinery that leaks oil, fuel or hydraulic fluids may be used on site. Any plant or equipment that, in the opinion of the Employer's Agent, is not of adequate size or fit for use shall be removed from site and replaced with acceptable plant or equipment, all at the Contractor's cost.

3.4.19 CONNECTION TO EXISTING SERVICES

Seven (7) days written notice shall be given to the Employer's Agent and to the Employer of intention to connect to any existing service or structure. Such connection may only be undertaken once written approval is granted. The work to connect to existing services may have to be done outside of normal working hours to accommodate the requirements of the Employer. Allowance for this must be made in the tendered rates as no additional payments shall be made in this regard.

3.4.20 SURVEY CONTROL AND SETTING OUT OF THE WORKS

Survey pegs and reference marks shall be pointed out to the Contractor. The Contractor is solely responsible for the setting out of the works from the pegs and reference marks. The Contractor is also solely responsible for the protection of the pegs and reference marks. The Contractor's attention is specifically drawn to the requirements of SANS 1200 A: General, Clause 5.1 Survey, in this regard.

The Contractor shall be responsible for the preservation of all land survey, erf or other pegs, benchmarks and beacons. If damage or disturbance of any such pegs or beacons is caused by the operations of the Contractor or his subcontractors, the pegs are to be replaced by a Registered Land Surveyor at the cost of the Contractor. Benchmarks will be replaced by the Employer's Agent at the Contractor's expense.

Information regarding the position of all such pegs will be made available to the Contractor by the Employer's Agent on request.

The Contractor is to ensure that no spoil is placed over any erf peg or benchmarks and that these are adequately protected for the full duration of the Contract.

Where disturbances of boundary pegs are unavoidable due to excavation or other operations adjacent to the pegs, the Contractor shall advise the Employer's Agent or his Representative immediately, and agreement is to be reached that the disturbance of the peg is unavoidable and a strict record of such disturbed pegs is to be kept. Such pegs are to be replaced by a Registered Land Surveyor as described above and the Contractor is to submit proof of the cost of replacement of pegs. The Contractor will be reimbursed on a basis pro-rata to the total cost of peg replacement determined on completion of the Works.

3.4.21 PROTECTION OF EXISTING WORKS

The Contractor shall take all necessary steps to protect any existing works whatsoever against damage which may arise as a result of his operations on Site. The Contractor shall bear the cost of the repair of damage to any service, the possible existence of which could reasonably have been ascertained by the Contractor in good time.

Where the Contractor is responsible for damage for which repairs have to be carried out by the Employer or an outside Authority, the costs of these repairs will be recovered by means of a deduction from the Contractor's monthly Payment Certificate. The Employer will attend to the payment of monies due to outside authorities, should the Contractor not make direct payment, to the outside authorities, timeously.

3.4.22 TIDYING UP OF THE WORKS

The Contractor shall take note that progressive and systematic finishing and tidying will form an essential part of this contract. On no account shall spoil, rubble, materials, equipment or unfinished operations be allowed to accumulate in such a manner as to unnecessarily be a hindrance to or impede the activities of other contractors or service providers. In the event of this occurring, the Employer shall have the right to withhold payment for as long as may be necessary in respect of the relevant works in the area(s) concerned.

Upon completion of the Works or any portion thereof, the ground, fences, gates and any structures that have been interfered with are to be carefully restored to their original condition and all rubbish, tools, tackle, plant and material must be removed so as to leave the Site in a clean and orderly condition. No additional payment shall be made for work set out above.

3.4.23 RECORD DRAWINGS

As the work progresses, the Contractor shall keep full sets of records of all the true levels, sizes and positions of structures as well as all amendments to and deviations from the drawings issue by the Employer's Agent from time to time. This information must be submitted monthly at the Site Meetings. A separate set of drawings will be issued to the Contractor for this purpose.

The completion certificate shall only be issued after the Employer's Agent has received a properly completed set of "record" drawings from the Contractor. No separate payment shall be made for this service as all costs related thereto shall be deemed to be included in the rates for the relevant items.

3.4.24 CONSTRUCTION WORK IN THE VICINITY OF BULK WATER MAINS

The Contractor will be required to expose existing bulk water mains for the purposes of tying in or for crossings. The Contractor shall proceed in accordance with all conditions of the relevant wayleaves and the following specific requirements:

Excavation to locate water mains shall be carried out only with the permission and in accordance with the requirements of relevant authority and with their personnel in attendance.

Where at any stage during excavation or construction, cover over the water mains and services will be less than 0,6 m, or in special cases where the Employer's Agent deems it necessary, excavation shall be carried out by hand over a width extending to 1,0 m clear on each side of these services. No excavation shall be carried out behind any bend, cap, valve, or tee before the service authority has undertaken any necessary precautionary measures.

Only the service authority's staff shall operate valves on existing water mains.

Where alterations or connections to water mains are required, at least 72 hours' notice of the commencement of work is to be given to the service authority and at least 48 hours' notice to affected consumers.

The Contractor shall programme the activities required to connect into the supply lines to ensure that all work is complete within one day (per connection) with disruption to the supply being limited to 12 hours maximum. Should there be more than one connection on the same supply line, the time period between each successive supply interruption shall be subject to the approval of the Employer's Agent and the supply authority.

The cost of any damages and consequential losses incurred as a result of these operations shall be borne by the party causing the damage.

The Contractor must take the above into account when drawing up the works programme and calculating rates. Unless specifically itemised in the bills of quantities, no additional payment shall be made for any expense or delays incurred as a direct consequence of adhering to these procedures.

At the start of the Contract, The Contractor shall obtain from the relevant service authority, the contact details of the emergency control room or other personnel to be contacted in the event of burst mains or damaged services. These emergency numbers shall be kept readily available on site.

3.4.25 FEATURES REQUIRING SPECIAL ATTENTION

High Standard of Work Required

The Contractor's attention is drawn to the fact that a high standard of materials, testing and performance is applicable. Compliance to specifications and tolerances will be strictly enforced.

Throughout the duration of the Contract, the work shall be supervised by an approved representative of the Contractor with proven experience and competence in civil engineering projects of a similar size and nature.

All materials supplied by the Contractor shall be unused and of the highest quality.

Dealing with Water

The Sir Lowry's River is a perennial stream that flows all year round. The Contractor will need to take cognisance of the fact that he will be working in wet and/or waterlogged conditions for the entire duration of the contract and shall plan his activities and work methods accordingly.

In addition, the response time of the catchment is relatively short, so the flow in the river channel increases rapidly and reaches a peak typically within an hour of the start of a storm. The contractor will need to plan his works in the river channel so that he can react appropriately during wet weather to ensure the safety of personnel and limit damage to plant.

Additional information is included in Section C4: Site Information.

C3.5 Management

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- 3.5.5. ENVIRONMENTAL MANAGEMENT PROGRAMME
- 3.5.6. HEALTH AND SAFETY

3.5.1. FORMS FOR CONTRACT ADMINISTRATION

The Contractor shall complete, sign and submit with each monthly statement for payment, the following updated returns (the format of which are attached in C3.6 Annexes as amended from time to time):

- Monthly Project Labour Report (Annex 1)
- B-BBEE Sub-contract Expenditure Report (Annex 2)
- Joint Venture Expenditure Report (Annex 3)
- Targeted Labour Contract Participation Expenditure Report (Annex 4)
- Targeted Enterprises Contract Participation Expenditure Report (Annex 5)

The Monthly Project Labour Report must include details of all labour (including that of sub-contractors) that are South African citizens earning less than R350.00 per day, as adjusted from time to time (excluding any benefits), who are employed on a temporary or contract basis on this contract in the month in question.

In addition to the Monthly Project Labour Report the Contractor shall simultaneously furnish the Employer's Agent with copies of the signed employment contracts entered into with such labour, together with certified copies of identification documents as well as evidence of payments to such labour in the form of copies of payslips or payroll runs. If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it and proof of such acknowledgement shall be furnished to the Employer's Agent.

The Monthly Project Labour Reports shall be completed and submitted in accordance with the instructions therein and copies of all submitted documents must be kept on site be made available to the employer's agent upon request.

The **B-BBEE Sub-contract Expenditure Report** is required for monitoring the prime contractor's compliance with the sub-contracting conditions of the **Preference Schedule**.

The Joint Venture Expenditure Report is required for monitoring the joint venture's compliance with the percentage contributions of the JV partners as tendered, where the joint venture has been awarded preference points in respect of its consolidated B-BBEE scorecard.

The Targeted Labour Contract Participation Expenditure Report (if applicable) is required for monitoring the contractor's compliance for achieving the specified minimum targeted labour contract participation goal (CPGL) and, if applicable, for calculating any penalty in terms thereof.

The Targeted Enterprises Contract Participation Expenditure Report (if applicable) is required for monitoring the contractor's compliance for achieving the specified minimum targeted enterprises contract participation goal (CPGE) and, if applicable, for calculating any penalty in terms thereof.

The Expenditure Reports shall be verified by the Employer's Agent/Employer's Agent's Representative.

In respect of Annexes 2 and 3, the Employer shall, in addition to any other sanctions available to it, apply the financial penalties applicable to breach of preferencing conditions in the **Preference Schedule** in Part T2.2 Returnable Schedules. In the case of joint ventures (Annex 3), the contractor shall prove his compliance with item 6) in Section 2 of the Preference Schedule by providing a consolidated scorecard at his own cost on instruction from the Employer's Agent.

3.5.2 PARTICIPATION OF TARGETED LABOUR

3.5.2.1 Minimum targeted labour contract participation goal

In support of the National Department of Public Works' Expanded Public Works Programme which is aimed at alleviating poverty through the creation of temporary employment opportunities using labour intensive methodologies and practices where possible, the Employer is seeking to increase the intensity of labour, as appropriate, in all of its infrastructure sector projects.

It is a requirement of this contract, therefore, that the work be executed in such a manner so as to maximise the use of labour intensive construction methods in order to provide low and semi-skilled temporary employment opportunities.

To this end, a minimum targeted labour contract participation goal is specified below, which shall be achieved by the Contractor in the performance of the contract, failing which, penalties as described will be applied. The Contractor is required to provide all skills training where necessary, so as to ensure that a minimum level of competence is achieved and maintained, such that the various activities are carried out safely and to the required standard. The cost of training shall be included in the rates for the various work activities.

The specified minimum targeted labour contract participation goal (CPGL) is **2.5 %**

The minimum CPGL is such that the Contractor will have to carry out some of the work that would normally have been undertaken using mechanised construction methods, by using labour intensive construction methods instead. It is left to the discretion of the Contractor to identify suitable work activities for the intensification of labour. The Contractor shall, within 5 working days of being requested in writing by the Employer's Agent to do so, submit details of his/her plan to achieve the minimum CPGL.

3.5.2.2 Definitions

For the purposes of the requirements in respect of the participation of targeted labour, the following definitions shall apply:

"Target area" means the geographical area shown on the plan in Part C4: Site information

"Targeted labour contract participation goal (CPGL)" means the sum of the wages (excluding any benefits), for which the Contractor, or any of his/her sub-contractors contracts targeted labour in the performance of the contract, expressed as a percentage of the value of the contract.

"Targeted labour" means low and semi-skilled individuals, whose wages (excluding any benefits) do not exceed the threshold value, who reside in the target area, that are employed by the Contractor, or any of his/her sub-contractors, in the performance of the contract.

"Threshold value" is R365.00 per day as adjusted from time to time (excluding any benefits). The threshold value is not to be confused with any industry sector minimum wage determined in accordance with the Basic Conditions of Employment Act, 75 of 1977.

"Value of the contract" means the contract sum (accepted contract amount) less provisional sums contingencies and VAT.

3.5.2.3 The selection and recruitment of targeted labour

Where targeted labour is to be drawn from specific local communities (defined in terms of the target area), such labour shall be identified using the relevant Sub-Council Job-Seekers Database. The Contractor shall request, via a Community Liaison Officer (if required in terms of the contract), a list of suitable candidates from the database, from which the Contractor shall make his/her final selection. The contractor shall enter into written contracts of temporary employment with all targeted labour.

Any difficulty experienced by the Contractor in identifying candidates through the Job-Seekers Database, or as regards any matter relating to the employment of targeted labour, shall be immediately referred to the Employer's Agent.

3.5.2.4 Contract participation goal credits

Credits towards the achieving the minimum CPG_L shall be granted by converting the total monetary value of wages paid to targeted labour (including that of sub-contractors) to a percentage of the value of the contract. No credits shall be accorded should the contractor/sub-contractor fail to enter into written contracts with the targeted labour. Furthermore, no credits shall be accorded in respect of targeted labour employed on work in respect of provisional sums or prime cost items. Such labour shall nevertheless be recorded on the Project Labour Report which is required to be furnished by the Contractor.

3.5.2.5 Training of targeted labour

The Contractor is required to provide all informal (on-the-job) skills training so as to ensure that a minimum level of competence is achieved and maintained, such that the various activities are carried out safely and to the required standard. The cost of informal training shall be included in the rates for the various work activities.

3.5.2.6 Penalties

The financial penalty to be applied for failing to meet the specified minimum targeted labour contract participation goal in the performance of the contract (unless proven to be beyond the control of the Contractor), is as follows:

$$\text{Penalty} = (\text{CPG}_L^S - \text{CPG}_L^A) \times P^*$$

Where CPG_L^S = the specified minimum targeted labour contract participation goal (expressed as a percentage).

CPG_L^A = the targeted labour contract participation goal achieved (expressed as a percentage).

P^* = the value of the contract.

3.5.3. COMMUNITY LIAISON OFFICER

It is a requirement of this Contract that a Community Liaison Officer (CLO) shall be appointed by the Contractor. The primary functions of the CLO shall be to assist the Contractor with the selection and recruitment of targeted labour, to represent the local community in matters concerning the use of targeted labour (and/or enterprises) on the works, and to assist with and facilitate communication between the Contractor, the Employer's Agent and the local communities.

The identification of suitable candidates (maximum 5; minimum 3) for the CLO position shall be resolved by the relevant Ward Councillor/s. Should suitable candidates not be identified within two weeks of the date of request, the Contractor shall be allowed to seek candidates from the relevant Sub-Council Job-Seekers Database. The final selection and appointment of the CLO in terms of the contract shall be the responsibility of the Contractor.

The period of appointment of the CLO shall be as stated in the Contract for Temporary Employment as a Community Liaison Officer referred to below. The date of commencement of temporary employment of the CLO shall be as agreed with the Employer's Agent.

It is required, therefore, that the Contractor enter into a contract of temporary employment with the selected CLO, the contracting parties being the Contractor and the CLO. To this end, a specimen Form of Contract of Temporary Employment as Community Liaison Officer is included in this document (Part C1.7: Agreement and Contract Data). This Form of Contract sets out, inter alia, the agreement between the parties, the duties and conditions of employment of the CLO (including the rate of remuneration to be

paid). As said contract will be between the Contractor and the CLO, all costs involved shall be borne by the Contractor and the tender shall be deemed to include for this.

3.5.4. PARTICIPATION OF TARGETED ENTERPRISES

3.5.4.1 Minimum targeted enterprises contract participation goal

It is a requirement of this contract that enterprises located within the target area, as defined, be engaged by the Contractor for the provision of supplies, services or works necessary for the performance of this contract.

To this end, a minimum targeted enterprises contract participation goal is specified below, which shall be achieved by the Contractor in the performance of the contract, failing which, penalties as described will be applied.

The specified minimum targeted enterprises contract participation goal (CPG_E) is **2.0 %**

The Contractor shall engage targeted enterprises directly or indirectly in the performance of the contract to the extent that the total monetary value of such engagements (exclusive of VAT), expressed as a percentage of the value of the contract, is sufficient to achieve the specified minimum CPG_E.

3.5.4.2 Definitions

For the purposes of the requirements in respect of the participation of targeted enterprises, the following definitions shall apply:

"Target area" means the geographical area within the Cape Town Municipal boundaries, but shall also include the town of Grabouw and surrounds.

"Targeted enterprises contract participation goal (CPG_E)" means the value of supplies, services or works (exclusive of VAT), for which the Contractor contracts targeted enterprises, either directly or indirectly, in the performance of the contract, expressed as a percentage of the value of the contract.

"Targeted enterprises" means any sole trader, partnership or legal entity that acts as a supplier, manufacturer, service provider or sub-contractor, and which has its base of operations in the target area.

"Value of the contract" means the contract sum (accepted contract amount) less provisional sums, contingencies and VAT.

3.5.4.3 Achieving the contract participation goal

The contractor may achieve the specified minimum CPG_E as follows:

- by engaging one or more targeted enterprises to perform commercially useful functions in the performance of the contract;
- by engaging non-targeted enterprises, who in turn engage one or more targeted enterprises to perform commercially useful functions in the performance of the contract;
- by a combination of the above.

The Contractor shall, within 5 working days of being requested by the Employer's Agent to do so, submit details of his/her plan to achieve the minimum CPG_E.

3.5.4.4 Contract participation goal credits

Credits towards achieving the minimum CPG_E shall be granted by converting the total monetary value (exclusive of VAT) of the agreements between the Contractor, or Contractor's sub-contractors, and targeted enterprises, to a percentage of the value of the contract.

No credits shall be accorded should the Contractor (or sub-contractors):

- make direct payment to third parties in connection with the contract on behalf of targeted enterprises when such payment is recovered by making deductions from payments due to the targeted enterprise

b) fail to enter into written contractual agreements with the relevant targeted enterprises.

Credits claimed towards the contract participation goal shall be denied where such written contractual agreements contain any of the following:

xxix) conditions which are more onerous than those that exist in the prime contract (this contract);

xxx) payment procedures based on a pay when paid system;

xxxi) authoritarian rights given to the employing contractor, with no recourse to independent adjudication in the event of a dispute arising.

No credits may be claimed in respect of targeted enterprises that do not adhere to statutory labour practices.

No credits shall be accorded in respect of targeted enterprises engaged on work in respect of provisional sums or prime cost items.

In the event that a targeted enterprise sub-contracts to another targeted enterprise, only the value of the higher level sub-contract shall be granted as credit towards achieving the specified minimum CPGE.

In addition to the form required for contract administration (the Targeted Enterprises Contract Participation Expenditure Report), the Contractor shall furnish the Employer's Agent, upon written request, with documentary evidence that the targeted enterprises have their base of operations in the target area, copies of the contractual agreements with the various targeted enterprises, as well as documentary proof of payments made to the various targeted enterprises.

3.5.4.5 Penalties

The financial penalty to be applied for failing to meet the specified minimum targeted enterprises contract participation goal in the performance of the contract (unless proven to be beyond the control of the Contractor), is as follows:

$$\text{Penalty} = (\text{CPGE}^S - \text{CPGE}^A) \times P^*$$

Where: CPGE^S = the specified minimum targeted enterprises contract participation goal (expressed as a percentage).

CPGE^A = the targeted enterprises contract participation goal achieved (expressed as a percentage).

P^* = the value of the contract.

3.5.5. ENVIRONMENTAL MANAGEMENT PROGRAMME

Particular Specification E: Environmental Management Specification and its Annexures are attached hereto.

3.5.6. HEALTH AND SAFETY

Particular Specification H: Health and Safety Specification is attached hereto.