# THEMBISILE HANI LOCAL MUNICIPALITY

## PROJECT No: THLM/SCM22/2025-2026/WS06

## APPOINTMENT OF A PANEL OF CONTRACTORS FOR REHABILITATION, REFURBISHMENT AND MAINTENANCE OF WATER AND SANITATION INFRASTRUCTURE AS AND WHEN REQUIRED FOR A PERIOD OF 36 MONTHS – MECHANICAL WORKS

## SCOPE OF WORK

## C3.1. SCOPE OF WORKS

### C3.1.1 Employer's objectives

The objective of the Employer 's objective is to appoint a panel of contractors to routinely maintain existing water and sanitation infrastructure within Thembisile Hani Local Municipality as and when required.

***Bidders must note that preference will be given to local based companies and that this bid Will be awarded to more than one company.***

### C3.1.2 Overview of the works

The routine maintanance /construction activities will ensure that Municipal water and sanitation infrastructure is maintained to a level of serviceability as set out in the document.

### C3.1.3 Extent of the works

The routine maintenance work to be performed as part of this Contract mainly consists of the activities listed below to be carried out on all water and sanitation infrastructure in the THLM. Additional works to minor infrastructure will only be carried out upon specific request from the Client. This list is not necessarily complete nor will it limit the extent of work to be carried out under this Contract:

- Establishment of camps on site
- Refurbishment of valves and flow meters
- Maintenance of pumps
- Maintenance of WWTW
- Refurbishment of WWTW
- Maintenance of WTW
- Refurbishment of WTW
- Maintenance of RO plants
- Installation of telemetry systems
- Manage all site staff, CLO and local laboures, plant, equipment and materials
- Manage all quality controls as required by the Engineers
- Refurbishment of RO plants

### C3.1.4 Location of the works

All 32 Thembisile Hani Local Municipality wards

### C3.1.5 Temporary works

The following items shall generally form most temporary works required under this Contract, however, shall not be limited to such, and might be expanded or changed by the Engineer should circumstances on site validate such decisions.

These works will be as follows:

- Clearing site and surroundings to create accessible working areas as required
- Provide temporary fencing around Contractor's camp site and Contractor's site office;
- Provide Contractor's Camp site and Contractor's site office;
- Provide site and administrative personnel, including security staff etc. as required;

- Setting out of the works by the Contractor;
- Monitor and report levels as construction progresses;
- Manage all required quality control procedures as specified and as instructed by Engineer;
- Provide all personnel, equipment, clothing, accessories etc. in order to adhere to the OHS Act
- Attend official Site Meetings scheduled and chaired by the Engineer and managed sufficient additional meetings on site with all personnel and CLO to ensure compliance with the OHS Act and to ensure progress on site according to the accepted Construction programme.

## C3.2 ENGINEERING

### C3.2.1 DESIGN

a) The Employer is responsible for the design of the Permanent Works as reflected in the Contract Documents unless otherwise stated.

b) The Contractor is responsible for the design of the Temporary Works and their compatibility with the permanent Works.

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

### C3.2.2 EMPLOYER'S DESIGN

The Employer is responsible for the design of the entire scope of works, including all peripheral repair and site works.

### C3.2.3 CONTRACTOR'S DESIGN

Where 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.

### C3.2.4 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 pipelines, valves, storage tanks, flow meters 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 Drawings prepared by the Employer for the permanent Works shall be issued as and when required.

### C3.2.5 DESIGN PROCEDURES

Existing infrastructure will be considered under this contract.

## C3.3 SUBCONTRACTING

Where there is a need, subcontractors shall be appointed as per Thembisile Hani Local Municipality sub-contracting policy

## C3.4 CONSTRUCTION

### C3.4.1 GENERAL SPECIFICATION

This section of the Contract documents should be read together with all other sections and Standardized and Particular Specifications included in the Contract documents or Standardized Specifications mentioned in the Contract documents, but separately available. The documents should be read and interpreted jointly to determine the full requirements of the Contract.

### C3.4.2 SITE ESTABLISHMENT

The Contractor is responsible for Site Establishment. The construction yard will not be serviced, and the Contractor shall make arrangements to connect all necessary services to specific points. The Contractor shall bring to the Site all his necessary construction equipment and install all stationary construction equipment and plant at locations and in the manner accepted by the Engineer. The Contractor shall submit sufficiently detailed plans showing the proposed locations of such stationary equipment and other pertinent data. No installation of such stationary equipment shall be undertaken unless the corresponding plans have been accepted by the Engineer.

**Services and facilities provided by the Employer**

Source of water supply

The Contractor shall make his own arrangements for the supply of water for construction and testing purposes. The Contractor will be required to supply, install, operate, and maintain at his cost, such temporary pipework and storage facilities as may be necessary to ensure sufficient supply. The supply shall be metered. The Contractor will also be required to pay all connection fees, cost of water drawn from the water supply authority's system at the ruling tariffs in force at the time as well as include all such requirements throughout the duration of the Contract.

Source of power supply

The Contractor shall make his own arrangements temporary power supply for construction purposes. The Contractor will be required to make his own arrangements with, and pay all the requisite connection and consumption charges for whatever temporary power supplies he may require for his use on the site as well as include all such requirements throughout the duration of the Contract.

**Facilities provided by the Contractor**

Contractor's camp

On this Site, the Contractor shall be responsible in establishing the final grade for his site establishment requirements including; construction offices, storage areas, warehouse, machine and repair shops, fuel tanks, storage tanks, power and water distribution lines and provide such related facilities and sanitary conveniences that are necessary for maintaining health, peace and order, and safety in the work areas. The positions of all buildings constructed by the Contractor for his own use will be subject to the acceptance of the Engineer. Temporary and permanent fencing around the Contractor's Site establishment areas and electrical and mechanical apparatus connected to the electrical supply shall be erected by the Contractor where needed. On completion of work on Site, buildings constructed by the Contractor for his own use shall be demolished, including foundations, and the ground reinstated. Underground services to these buildings shall be removed.

The Contractor shall be responsible for all temporary services required by him both for the site establishment area, camp site and for construction purposes, including water, electricity, sewage, and communication facilities.

Covered accommodation for perishable or corrodible materials, fittings and the like shall be adequate and suitable for their purpose and, particularly in the case of cement stores, shall be well ventilated, weatherproof and waterproof with floors raised off the ground, so as to keep the materials perfectly dry and freely aerated. All such accommodation shall be subject to the approval of the Engineer who shall always have free access to the premises.

In addition to the above, the Contractor shall provide one toilet per 10 workmen. Portable toilet facilities shall be made available to workers of both male and female genders, the number provided to be in proportion to the ration of the sexes. The toilets shall be in the vicinity of the work site, shall be screened from public view and the use thereof shall be enforced. The Contractor shall, where applicable, make the necessary arrangements for the regular removal of night soil. The Contractor is to ensure portable toilet facilities are cleaned on a regular basis.

Storage and laboratory facilities

The Contractor shall provide all storage and laboratory facilities required for the proper execution of the works.

Other services and facilities

The requirements of the Engineer's Site establishment will be issued by the engineer as and when required.

Disposal of refuse

The Contractor shall be responsible for the disposal of refuse and waste generated by his staff daily. The site is to be kept clean, neat, and tidy, to the Employer's satisfaction.

Telephone facilities

The Contractor is to provide his own telephone facilities as well as facilities for the use of the Engineer, or his representative for the duration of the Contract.

Housing facilities

The Contractor will not be required to provide housing facilities for the Engineer's staff. No accommodation for the Contractor's employees will be permitted on site.

Notice boards

The Contractor will be permitted to display two notice boards advertising his Contract on or near the Site or access points to the project area. The notices shall be of a form and in a position accepted by the Engineer and shall include details of other parties involved (including the Employer) as well as the Contractor. No advertisement shall be displayed without the acceptance of the Engineer.

Site usage

Working with road reserves, Eskom servitudes, etc.

The Contractor is to confine his activities strictly to the indicated working areas and to the spoil sites and the direct access roads to these. He shall not work outside his designated working areas except with the prior approval of the Employer, in writing. It is advised that the Contractor takes note of damaged structures or parts thereof and report these to the Engineer in writing before work starts at or near an existing structure to prevent possible disputes with the occupant or owner.

Site safety and precautions against nuisance

The Works is to be conducted within residential areas with pedestrian and vehicular traffic. The watching, barricading, lighting, and traffic control on site shall be carried out where required in strict compliance with these specifications. The Contractor shall ensure that all safety measures are strictly adhered to.

Plant used on the Works shall be as efficiently silenced as possible and noisy operations will be permitted between the hours of 07:00 and 17:00 only. Any work outside normal working hours requires written approval by the Engineer 24 hrs in advance.

Dust suppression is required for all earthworks activities prone to form excessive dust. Any rock or debris falling from trucks on any haul road shall be removed immediately. Precautions shall be taken to prevent fouling of the site and public roads by trucks. The Engineer may instruct the Contractor to clean roads where any material or debris deposited by any construction vehicle may constitute a danger to the public.

The Contractor is solely responsible for the security of his camp, plant, and materials. The Contractor is to familiarise himself with the locality of the proposed site and allow sufficient security measures to protect the works. The Employer will not be held responsible for any damages, theft or

Permits and wayleaves

The Employer will make the arrangements for all security access permits and wayleaves necessary within the Works.

Alterations, additions, extensions, and modifications to existing works

Interfaces with existing works are indicated on the relevant drawings as far as possible. The Contractor shall take note of these and make appropriate allowances for dealing with, and where necessary, making modifications or tying into these services.

Inspection of adjoining properties

The Contractor will be required to inspect all properties within 50m radius of any excavation on site before and after completion of the works. A detailed written and photographic record of the inspections is to be submitted to the Engineer and Client prior to excavation activities commence.

Water for construction purposes

The Contractor is required to construct and maintain standpipes for construction water, in case of water carts and similar plants the contractor is required to follow all the rules and regulations that are in place in order for one to acquire water from local streams and rivers.

Survey control and setting out of works

Before commencing the operations, the Contractor shall locate and mark all survey pegs and beacons and shall immediately submit a written report in duplicate of any missing or damaged pegs and beacons to the Engineer's Representative, who shall verify the facts and return a countersigned copy of the report to the Contractor. Other than in the case of setting out pegs, the Contractor will be held responsible for the replacement by a registered land surveyor of all beacons or pegs found damaged or missing on completion of the Works which were not reported as such by the Contractor before commencing operations.

Survey records of beacons, bench marks, etc., replaced shall be submitted to the Engineer. Attention in this regard is drawn to Sections 35(1) and (2) of the Land Survey Act of 1927 which lays down the penalties applicable to those who are responsible for interfering with permanent survey beacons, bench marks, reference marks or trigonometric stations.

## C3.4.3 PLANT & MATERIALS

Materials supplied by the Employer

No materials will be supplied by the Employer. The construction yard will not be serviced, and the Contractor shall arrange to connect all necessary services.

Materials, samples, and shop drawings

All materials required for incorporation into the permanent works are to be supplied by the Contractor. Where possible, these materials shall be sourced from within the area, considering availability of supply, price, and continuity of supply. In-situ material can be used where suitable. Spoiling and spreading of material will not be permitted on site and suitable temporary stockpile areas must be identified by the Contractor and approved by the Engineer prior to stockpiling.

## C3.4.5 CONSTRUCTION EQUIPMENT

The Contractor shall provide all construction equipment and plant necessary to complete the works.

Requirements for equipment

All construction equipment shall be used for the purpose that it was designed for, should be in good working condition and shall be used in a safe manner and shall comply with all relevant legal and roadworthy aspects.

Equipment provided by the Employer

The Employer will not provide any plant and equipment required for construction purposes. All equipment and plant required shall be provided by the Contractor.

## C3.4.5 EXISTING SERVICES

Known services

The position of the known existing services will be indicated on the layout drawings as far as reasonably possible. The Contractor shall, however, take note of the fact that this is a developed site which is adjoined and crossed by many services. The Contractor must therefore make provision for suitable means of locating and accommodating all services, including those not known or shown on the drawings. This, however, does not relieve the Contractor from responsibility of verifying if any additional services are present in the area by searching and probing the terrain in question for any existing services or indications of the presence of such services. The Contractor shall at all times exercise the utmost care when working in their vicinity and shall take all necessary steps to protect any existing services 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 him in good time. All cables and pipes shall be considered "live" unless confirmed otherwise by the relevant service authority.

Treatment of existing services

Work will be carried out in the vicinity of existing services and all such services shall remain in operation at all times, except where arrangements have been made for the interruption of the service for the purposes of carrying out the Works under this Contract.

Existing overhead and underground services may be indicated on drawings held by the respective service providers. Should the Contractor find evidence of possible buried services, he shall notify the Engineer immediately thereof. The Engineer will assess the situation and instruct the Contractor on an appropriate course of action to be taken.

The Contractor shall be responsible for checking the locations of all services and to ensure that no damage is cause by construction operations.

The Contractor, before starting any excavations or where indicated in the scope of work or site information that underground services either cross or are located adjacent to the Works that is to be constructed, such services shall be exposed by hand ahead of trenching operations to enable any changes that might be needed in the design of the pipelines to be made timeously. Care shall be taken in exposing such services to avoid damaging them. An item has been allowed for in the Bill of Quantities for hand excavation or other methods to search for existing services.

All cables and pipes shall be considered "live" unless confirmed otherwise by the relevant service authority.

Use of detection equipment for the location of underground services

The Contractor shall be allowed to use non-intrusive equipment for the location of existing services if so agreed. Should excavation be required to identify and or expose any services this shall be for the account of the contractor and shall only proceed once the relevant permits or approvals have been issued by the Employer.

Damage to services

Should any existing services be damaged by the Contractor, the Engineer shall be informed immediately. The Contractor shall repair the damaged service if so instructed by the Engineer or shall assist in the repair of the service as instructed by the Engineer at the Contractor's own cost.

**C3.4.5 PROCUREMENT**

**Preferential procurement procedures**

The works shall be executed in accordance with the Preferential Procurement Policy Framework Act and Preferential Procurement Regulation 2011.

## C3.5 PROJECT MANAGEMENT

### C3.5.1 Management of works

#### C3.5.1.1 Planning and programming

The Contractor shall ensure that he:

- is well informed about the *Employer*'s overall implementation programme for construction and investigative projects and makes available resources as required to efficiently complete required services; and
- compiles designs, documentation, reports, and drawings timeously as not to unnecessarily delay the implementation of the construction or investigative projects.

The programme shall at minimum contain:

- Time Scale (minimum): Days, where the project period does not exceed three months. Weeks, where the project period exceeds three months.
- Time Scale (maximum): Months, where the project period does not exceed one year. Years, where the project period exceeds one year.
- Tasks: All construction tasks and activities shall be shown. Where phases or stages are anticipated, this shall be the highest level of division and all tasks related to the successful accomplishment of

that phase of the project shall be grouped. Resources allocation and task dependency shall be indicated.

- Multiple Project Programming: Where multiple projects are part of the same Contract documentation, the Contractor shall provide a programme per project. However, where interdependency exists the programmes shall be integrated, but divided on the highest level per project followed subsequently by further divisions per phase or stage.
- Start and Finish Dates: All tasks shall have specific start and finish dates.
- Critical Path: All tasks forming the programme line that will establish any delays in the overall project period shall be clearly indicated and an indication of their sensitivity characteristics shall be provided.
- Progress Tracking: The Contractor shall be required to periodically (at minimum monthly) indicate the project progress per task graphically and on a percentage basis.
- Non-working Time: All South African public holidays, weekends, and the local traditional annual builder's break (as identified in the contract data) shall be incorporated in the programme.

The Contractor's Programme shall include:

- Dates for submission (by the Contractor) of designs and or design documents.
- Dates for ordering of special and/or long delivery items.
- Dates for issue of or approval of drawings for planning purposes.
- Dates for issue of or approval of drawings for manufacture and construction purposes requiring the approval of the Engineer.
- Dates for the placement of orders for material, receipt of material, fabrication, and manufacture, works (factory) testing, shipment, erection and commissioning.
- Dates showing start and completion of site construction of each section and each major component of the permanent works.
- Dates showing the delivery of all built-in steelwork, anchor bolts, etc.
- Dates for start and completion of Engineering Design (including allowances for review/approval by the Engineer).
- Dates for submittal and acceptance of drawings.
- Dates for submittal of operation and maintenance manuals.
- Dates for submittal of commissioning check lists and detailed commissioning schedules for acceptance (3 months before the commencement of commissioning).
- Dates for submittal of commissioning check lists and detailed schedules of approval (3 months before the commencement of commissioning).
- Dates for submission of complete schedules for all manufactured items.
- Dates for Test on Completion as defined in the Contract Data.

Activities shall be timed in week units except for commissioning or similar detailed programmers, which shall have activities, specified in days. Activities on which it is intended to operate multiple shifts working shall be clearly defined.

Method and resources statements are required for all critical items to prove that the period allocated to them fits the overall programme and that the Contractor's plant and labour are consistent with the time allowed. Critical items shall include (as a minimum) all reinforced, structural steelwork, pipework, tie-ins to existing services and specialist work.

The Contractor shall update and revise the Programme once a week or when required by the Engineer.

The submission to and acceptance by the Engineer of such updated and revised Programme, shall not relieve the Contractor of any of his duties or responsibilities under the Contract and existing laws.

Sequence of the Works

Whenever work being done by other Contractors is contiguous or related to the Works included in this Contract, the sequence of handling the Works shall be such that the least delay possible will result to each Contractor and such sequence may be determined by the Engineer. The Engineer will establish

the respective rights of the various interests involved to secure the completion of the various portions of the Works in general harmony.

The Contractor shall be responsible for the co-ordination and proper execution of the Works, including co-ordination with other Contractors and organizations to the extent specified in the Contract Documents. The Contractor shall, as specified in the Contract Documents, afford all reasonable opportunities for carrying out their work to:

- any other Contractors employed by the Employer,
- the staff and workmen of the Employer, and
- the staff and workmen of any legally constituted public authorities who may be employed in the execution on or near the site of any work not included in the Contract, which the Employe*r* may require.

The Contractor shall obtain, co-ordinate and submit to the Engineer for his information all details (including details of work to be carried out off the Site) from Sub-contractors. The Contractor shall be responsible for the locations of their work or materials, in order to ensure that there is no conflict with the work of other Sub-contractors, the Contractor or other Contractors.

The Contractor shall give the *works* the constant attention necessary to facilitate the progress thereof and shall cooperate with the Engineer and other Contractors in every way possible.

**C3.5.1.2. Software application for programming**

Only the “Microsoft Project” software package will be accepted.

The Contractor shall make the programme available in MS Project format and in print version. The Contractor shall also ensure that all necessary hardware and software in this regard are always available on site and that at least one member of the permanent site staff is competent on their operation.

**C3.5.1.3 Methods and procedures**

**C3.5.1.3.1 Monthly report**

The Contractor shall prepare and submit to the Engineer within 15 days after the first day of every month a written progress report together with a monthly progress schedule summarizing the progress of the various sections of the work both at the place of manufacture and at site. Three (3) copies of the monthly progress report shall be submitted in accordance with the correspondence procedures.

Such progress reports shall indicate accurately the status of different activities covering design, material procurement, manufacture, works (factory) tests, shipping, erection, testing and commissioning and shall be related to key dates identified in the programmers referred to in the *conditions of contract*. The report shall also include data on labour strength and equipment employed. The programme submitted with the monthly report shall show cumulative progress towards scheduled completion, expressed as a percentage, of all items shown in the contract schedule.

The reports shall indicate the degree of criticality on each section of the Work, together with the slippage or impending slippage on any key event and shall be directly related to the contract schedule and supporting detail program for sections of work.

The monthly progress report shall be in the format acceptable to the Engineer and written in the English language and shall include:

- Photographs and detailed descriptions of progress, including each stage of design (if applicable), procurement, manufacture, delivery to the Site, construction, erection, testing and commissioning.
- Charts showing the status of construction documents, drawings, purchase orders, manufacture, and construction.
- For the manufacture of each main item of plant and materials, the name of manufacturer, manufacture location, percentage progress, and the actual or expected dates of commencement of manufacture, Contractor’s inspections, tests and delivery.
- Records of personnel and Contractor’s equipment on the Site.

- Copies of quality assurance documents, test results and certificates of materials.
- Safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and
- Comparisons of actual and planned progress, with details of any aspects which may jeopardize the completion in accordance with the Contract, and the measures being (or to be) adopted to overcome such aspects.
- Financial status of Contract.

**C3.5.1.3.2 Weekly report**

The Contractor's Site Manager shall prepare a weekly summary report covering all the site activities and submit it to the Engineer. This report shall include projected work activities for at least 2 weeks ahead of those being reported upon. In addition, this report shall include a weekly site labour return giving imported and local labour and each *Sub*-Contractor's labour, broken down into trades. Full details of site labour disputes (or off-site disputes affecting the Contract) shall be reported to the Engineer immediately. The weekly statement shall give details of all construction plant machinery, offices, and materials. The Contractor shall submit three (3) copies of weekly report to the Engineer which shall include.

- Summary of progress.
- Potential problems and proposed solutions.
- Project schedule update.
- Project permit status.
- Construction photographs.
- Status of orders and procurement.
- Drawing list.
- Plant test schedule.
- Construction schedule (critical path method, S-curve).

The Contractor shall submit to the Engineer a weekly return detailing the numbers of the various classes of workmen employed by him on the Site, the plant and Contractor's equipment on the Site or on order and any other information that may reasonably be required.

**C3.5.1.3.3 Detailed programme and progress reports**

Detailed monitoring of the progress of the Contract by the Contractor is to be achieved using critical path network planning and review techniques.

Following approval of the Programme, the Contractor shall submit within thirty (30) days, detailed program for all work to be executed during the Contract. These programs, which shall embrace design, supply, manufacture, and site construction shall be based on the Contract Programme and be used as target program and may be subject to revision. Further detailed program for progressive stages of the Contract shall be prepared by the Contractor as required by the Engineer.

The Contractor shall, whenever required by the Engineer, also provide in writing for his information a general description and drawing or sketch of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works.

The Contractor shall plan in detail his section of the work using bar charts to record progress of the design, manufacturing, and delivery elements and using the critical path network procedure for work on site. The issue and approval of drawings shall be covered in detail using appropriate check points in the detailed programme, including design information interface events with others. The manufacturing work shall be broken down into check points in the detailed programme. The manufacturing work shall be broken down into sufficient detail for the information supplied to relate correctly to the erection detailed programme on which the activity durations shall not exceed four weeks. Activities shall cover all aspects for which the Contractor or his Sub-contractors are responsible and indicate site access, points at which terminals and access will be available to or required from others and services required from the *Employer.*

The Contractor shall ensure that the resources required to meet these programs are available to him and his Sub-contractors. A table shall be prepared indicating the expected level of each type of resource for the duration of the site work.

The detailed programs must be analyzed by the Contractor, either manually or by computer, and three copies of the following tabulations presented:

- A schedule tabulated in order of increasing total float showing for each activity:
    - event numbers,
    - brief description of activity and responsibility,
    - duration,
    - early and late starting and finishing dates,
    - total float.
- A schedule tabulated in order of early start date by total float for eight weeks ahead of the 'up-date' date. The information given in this schedule shall be the same as that indicated above.

All programs and progress reports shall be provided by the Contractor in a form acceptable to the Engineer. Full access shall be made available to the Engineer to visit the Contractor's and Sub-contractor's works to verify the status of design and manufacture.

Other requirements in respect of programs are given in the Conditions of Contract.

**C3.5.1.3.4 Progress meetings**

The Contractor will be required to attend regular formal construction progress meetings with the Engineer during manufacture and on site. The site meetings will also involve the other Contractors so that the progress of construction both on this Contract and the entire Project may be reviewed. Such meetings may be monthly and may require the up-dating of the Contractor*'s* Contract and detailed Programs, in which case three copies of the up-dated programme shall be submitted to the Engineer within 7 days of the agreed up-dating.
The Contractor shall also attend informal weekly meetings with the Engineer on site and provide a weekly estimate of the work anticipated on each work section.

The updated programme, if necessary, after reconciliation and incorporation of changes, shall become the new basis for further execution of the *Works* without any modification of the Contract's *completion date*. The updating of the programme shall not give rise either to any extension of time or to any entitlement for any additional payment.

**C3.5.1.3.5 Interface meetings**

The Contractor shall hold regular interface meetings with all other contractors who may be performing work on behalf of the Employer and with representatives of the Employer involved with the activities related to or in the vicinity of the works to be performed under this Contract.

The purpose of the interface meetings shall be to ensure that the work the Contractor is performing on the project is efficiently and effectively coordinated without duplication or miscommunication and that there is full compatibility between sections that are designed and constructed by the various contractors.

**C3.5.1.4 Quality plans and control**

**C3.5.1.4.1 General**

The Contractor shall have a well-organized Quality Control and Assurance System (QAS) based on ISO 9000 Series or equivalent (Quality System Model for Quality Assurance in design/development, production, installation and servicing) to assure that items and services, including subcontracted items and services, comply with the Works Information.

This clause specifies the minimum requirements necessary to ensure that proper attention is given to the materials used, the standard of workmanship, the manufacturing and construction processes, and the quality of all components.

The Contractor shall include in all his orders to Sub-contractors a note stating that materials and plant covered are subject to inspection by the Engineer.

**C3.5.1.4.2 Quality Control and Assurance System**

All design, manufacturing, processing, testing and inspection operations affecting the plant or material shall be governed by Quality Assurance procedures in accordance with the directives of the ISO 9001 standards while the production and installation shall be governed by quality assurance procedure in accordance with the directives of the ISO 9002 standards or equivalent. These may be subject to surveillance by the Engineer. A tentative QAS shall be submitted together with the tender and shall meet the requirements stated in the Design Procedure. Within thirty (30) days of the Commencement Date, the Contractor shall submit six (6) copies of his complete quality control and assurance procedures, manuals for review and acceptance by the Engineer. The manual shall include pro-forma checklists for all requirements of the Contractor*'s* quality control and assurance program and those called for in the Works Information.

The Quality Control and Assurance System to be submitted shall include but not necessarily be limited to the following:

Programme requirements for materials and plant procurement and manufacture with description of design control, purchased material control, quality verification tools, manufacturing control, materials and components selection, handling, and packaging, etc.

- Programme requirements for plant production with detailed description of Quality Assurance organization of the Contractor, Quality Assurance Functions and Procedures and Performance Monitoring.
- Quality Assurance Programme Tests with detailed description of the test procedures to be conducted.
- Quality Assurance Programme requirements for installation and commissioning (for turnkey Contracts with detailed description of Quality Assurance Organization of the Contractor, Quality Assurance Functions and Procedures, etc.).
- In addition to the requirements of these ISO Standards or their equivalents the Contractor shall:
- Establish procedures for adequate planning and resourcing of all quality related activities including the preparation of quality plans.
- Establish measures for the identification and control of items throughout all stages of the Contract. This shall include measures to maintain traceability as identified in agreed quality plans.
- Arrange for the protection of quality of the product to include delivery to the specified destination.
- Control their measuring and test equipment in accordance with established procedures for measurements and calibration systems and ensure that such equipment that may be used by Sub-contractors to verify work is similarly controlled.

Where any site installation and/or test and commissioning work is involved, the Contractor shall prepare contract specific quality assurance procedures in agreement with the Engineer prior to commencements of such works.

The Contractor shall be responsible for specifying the quality assurance requirements to his Sub-contractors, for approving Sub-contractor's quality assurance programme and for ensuring compliance with the requirements.

The Contractor shall ensure that all appropriate technical information is extracted from the Contract documents and specifications and passed on to the Sub-contractors.

The Contractor shall ensure that all computer systems and software to be utilized on the project is qualified for the application under consideration and such qualification is documented.
The following surveillance requirements shall be included for affirmation by the Engineer or his representative:
Record (R). Documentary evidence of the activity and statistical analysis of the data to be retained and copied to the Engineer.

Verification (V). The Engineer or his representative will not necessarily be present during the activity but documentary evidence to permit verification of compliance with the requirements is generated, retained, and copied to the Engineer.

Witness (W). The Engineer or his representative requires notification to permit witnessing of the activity. The notice period shall be agreed to depending on the nature of the activity and shall be reviewed from time to time. Documentary evidence shall be retained and copied to the Engineer.

Hold (H). The Contractor may not proceed to the following activity until the Engineer or his representative has approved the proceeding activity. Documentary evidence shall be retained and copied to the Engineer.

Random (R). Construction monitoring by random inspection. Random construction monitoring may be carried out at any stage of the activity or preparation for the activity. Documentary evidence shall be retained and copied to the Engineer.

**Categorization**

The following categories shall apply in determining the requirement for a Quality Control Plan:

| Category | Clarification | Quality Control Plan |
|---|---|---|
| Critical | A component, group of components, structure, the failure of which to comply with the specifications may affect the performance of the works of which it is a part and /or will cause a detrimental environmental impact, and /or may result in hazardous or unsafe conditions. | Required for all components. |
| Major | A component, group of components, structure, element of a structure or facility, other than categorized as critical, the failure of which to comply with the specifications may compromise the performance of the works of which it is a part, result in increased , maintenance and/or impact negatively on the quality of the works. | As determined by the Contractor and to the approval of the Engineer. |
| Minor | All items other than those categorized as critical or major and which are visible and capable of rectification during routine inspections. | As determined by the Contractor |

**C3.5.1.4.3 Quality management audit**

The Contractor shall carry out periodic assessments of the adherence to the Quality Plan and Quality Control Plans by senior qualified staff who are not normally employed on the Site. The Engineer and/or his representative shall be invited to attend at the periodic assessments meeting and be

afforded the opportunity to report on the implementation of the Quality System at the Site. The assessment reports shall be copied to the Engineer.

**C3.5.1.4.4 Corrective action**

The Contractor*'s* quality assurance programme shall provide for prompt detection and correction of all events and conditions adversely affecting quality, including failures, malfunctions, incidents, trends, deficiencies, deviations, non-conformances, and defective materials.

The Contractor shall establish and maintain methods for verifying and determining the cause of an adverse condition and for initiating necessary improvement and corrections to preclude repetition. Quality trends shall be analyzed to furnish a basis for improvement in work performance. The Contractor*'s* corrective action system shall extend to the performance of other participating Contractors and Sub-contractors when necessary and shall provide for the interchange of corrective action information. Identification of the adverse condition, its cause, and the corrective action taken shall be recorded and reported to appropriate levels of management.

The Contractor shall establish and implement procedures for reporting, verifying, analyzing, and correcting failures, including those that occur during development and qualification testing. The procedure shall provide assurance that the cause and mode of each failure are determined that the potential safety and availability implication is evaluated, and that corrective action is taken.

A failure report shall be prepared to identify the failed item and its origin or source of manufacture and shall describe the failure, the test status at time of failure, and the probable cause and mode of failure, and recommended corrective action.

Failure to confirm to the specified requirements will result in the issuing by the Engineer of a Corrective Action Request. Failure to rectify the deficiencies covered by a Corrective Action Request within the period stated will result in the Engineer invoking the provisions of GCC.

**C3.5.1.5 Design revision and substitution of material**

Any revision affecting the design and manufacturing of the *Works*, or any substitution of materials that is deemed necessary shall be notified by the Contractor to the Engineer for the latter's review and approval.

**C3.5.1.4.6 Contractor*'s* responsibility**

Acceptance by the Engineer of the Contractor*'s* quality assurance programme, quality plans and inspection and test plans, or of those of his Sub-contractors will not relieve the Contractor of his obligation to provide goods and services which meet the requirements of the Contract.

**C3.5.1.4.7 Environment**

The Contractor shall strictly comply with the requirements of the EMP issued for this *Works*. He shall be liable for any damages/destruction to the environment including penalties that will be imposed by the relevant government agency arising from non-compliance of the requirements of EMP occasioned in any manner by his acts or neglect, or his agents, employees, or workmen in the execution of the *works*.

**C3.5.1.4.8 Accommodation of traffic on public roads occupied by the Contractor**

The Contractor shall draft a traffic accommodation plan and submit to the Engineer prior to commencement of work on any road. The approval by the Engineer shall not relieve the Contractor of any of his responsibilities or obligation in terms of the legislation and plan.

**C3.5.1.4.9 Other Contractors on site**

The Contractor needs to take note that other contractors may also be working on the same site and allow therefore in his planning/work scheduling.

### C3.5.1.5 Testing, completion, commissioning, and correction of defects

#### C3.5.1.5.1 General requirements

The Contractor shall be responsible for conducting all testing as described herein. Work under this section shall include all labour, materials, and support services required to completely test all hardware and software.

If a type of equipment does not meet the specifications or requirements as stated in these Specifications or the System Design Document, it shall be the Contractor's responsibility to correct the problem in all units of that equipment furnished, at no additional cost to the Employer.

All the components, sub-systems, interfaces and systems processes constituting the works shall be tested individually and together to demonstrate that they meet the contract requirements and provide a system that functions in accordance with the contract.

The Contractor shall be responsible for the performance of all the tests described below to satisfy the objectives of each testing phase as determined by the Engineer.

The Employer shall have the right to witness all tests.

Test plans shall be submitted to the Engineer a minimum twenty-one (21) days prior to the planned start of testing. Testing shall not commence until the plans have been approved.
Unless otherwise specified, all test plans shall include at a minimum the following:

- Overview of test including test objectives
- Pass/fail criteria
- Traceability matrix listing of all requirements and specifications from the Contract that are included/to be verified in the test and their cross-reference to the Specifications and System Design Document.
- Test setup and test measuring equipment (including descriptive diagrams)
- Listing of tools, test applications, simulators, etc. required to perform the test
- Entry/start-up conditions
- Exit/closing conditions
- Test procedures and scripts to be executed
- Test recording form
- Test comments form
- Signatures and verification form

The Employer reserves the right to direct, at no additional cost, the following changes to the test plans:

- The addition of procedural changes and other reasonable tests to reasonably assure System performance and conformance.
- Investigation into any apparent troubles or anomalies with respect to the System
- An audit of all test reports and verification of any or all previous tests and Measurements.

The Contractor shall provide written notification of readiness to test for all required test stages a minimum of two (2) weeks in advance of the testing.
Upon successful completion of any test, the Contractor shall prepare and submit within two (2) weeks a report summarizing the results with relevant test records appended. All such test reports will be reviewed by the Engineer.

**C3.5.1.5.2** Test suspension criteria and defect resolution

The Contractor shall maintain a database of and shall track the status of all defects.

The Contractor shall develop and maintain a standard set of regression tests for each device or subsystem. Regression tests shall be run for any affected device or subsystem if any testing is halted and restarted in accordance with the requirements of the defect resolution.

### C3.5.1.5 Training

#### **C3.5.1.5.1** General

The Contractor needs to take note that the Employer aims to use the infrastructure contracts to expose students from various institutions to construction activities as part of their training programme. Full support needs to be provided by the Contractor in this programme to obtain maximum benefits for the students allocated to the contract.
The Contractor shall be responsible to train the Employer's designated personnel according to the requirements specified herein. The Contractor shall be responsible for the supply of all training materials including, at a minimum:

a) Training setups of equipment, including mounting and all power supplies and simulators required to simulate normal operation.
b) Instructor guides.
c) Student guides.
d) Operations manuals.
e) Training presentations.
f) Training handouts.
g) Quick reference guides.
h) Interactive videos or demonstrations.
i) Course and instructor comments sheets.

A Training Program shall be developed and submitted a minimum forty-five (45) days before delivery of training materials that describes:

- Each course to be conducted.
- An overview of delivery methods for each course, including hands-on and group work experience.
- The course objectives for trainees.
- An evaluation plan, including criteria for success of the course, based upon the goals and objectives, and evaluation steps and instruments to be employed.
- A proposed schedule for each class, keyed to the installation process and constrained by availability of trainees away from regular duties.
- A plan for developing or customizing course material.
- Resumes of personnel proposed to be trainers for each class, demonstrating that they are experienced, effective training professionals.

Training shall include course development, providing instructors, and supplying all handouts, materials, classroom aids, etc. required to conduct the training. Training shall take place at the site facilities. Practical training on equipment shall occupy a significant portion of all training classes. The training presentations and material shall be in English.

#### C3.5.1.5.2 Recording of weather

The Contractor shall be permitted to take his own rainfall measurements on site subject to the Engineer's approval, but access to the measuring gauge(s) shall be under the Engineer's control. The Contractor is to provide and install all the necessary equipment for accurately measuring the rainfall as well as to provide, erect and maintain a security fence plus gate, padlock, and keys at each measuring station, all at his own cost.

#### C3.5.1.5.3 Format of communications

All Contract communication shall be in English and in writing (letters, faxes, and electronic mail).

### C3.5.1.6 Key personnel

The Contractor shall be required to allocate sufficiently experienced personnel to execute the Contract successfully.

### C3.5.1.7 Management meetings

The Contractor and such other persons as may be nominated by the Engineer shall be required to attend periodic site meetings, the date and place for which will be set by the Engineer in consultation with the *Employer* and Contractor.
A main purpose of the site meetings will be to review and discuss progress and programme, and all persons attending the site meetings must be empowered to act on behalf of the firms they represent.

### C3.5.1.8 Forms for contract administration

The Contractor shall maintain a file or files (hard copy and electronically) per Contract project, which shall contain:

- the details of the Sub-contractors, if any;
- project programme, with commencement and completion date;
- procurement information;
- progress reports, minutes, letters, faxes, emails of all project or project related correspondence;
- record documentation, reports, designs, and drawings;
- a copy of the Health and Safety Plan and the Environmental Management Plan;
- record of cost implications, variations, claims and disputes; and
- empowerment records.
- copy of quality (QMS) plan and all related documentation/procedures.

At the end of this Period of Performance the Contractor shall hand-over such hard copy files to the *Employer*, including all electronic records, documentation, reports, designs, and drawings.

### C3.5.1.9 Daily records

The Contractor is to provide a site diary, which is to be kept on site, for the purpose of keeping daily records in respect of work performed on the site. This shall be made available to the Engineer upon request.

### C3.5.1.10 Bonds and guarantees

If the Tenderer, when notified of the acceptance of his tender, fails to provide a guarantee within the period stipulated in the Contract Data and the *Employer* elects to cancel the contract on that ground, the *Employer* may demand a sum of R1 000 per day, or the *Employer* may take other action whether by way of a claim for loss or damage suffered by the *Employer* arising out of such breach.

### C3.5.1.10 Payment certificates

The Contractor shall be required to complete a progress report before he will be allowed to complete the standard payment certificate required to be submitted with his tax invoice.

### C3.5.1.10.1 Measurement of work for payment

All measurements for the purpose of payment shall be made by the Contractor and accepted by the Engineer. The Contractor shall be responsible for obtaining the Engineer's acceptance not later than one week after the measurements have been made.

### C3.5.1.11 Permits

The Contractor shall acquire all permits, approvals and/or licenses from all local or national government authorities or public service undertakings in South Africa and abroad, which such authorities or undertakings require the Contractor to obtain and which are necessary for the performance of the Contract, including without limitation, visas for the Contractor*'s* and *Sub*-Contractor's personnel and entry permits for all imported Contractor*'s* plant and equipment.

**C3.5.1.12 Lock-out procedure**

Lock-out systems consist of isolation of electrical, hydraulic, pneumatic, mechanical systems and isolating valve and pipeline systems. Where the Contractor uses his own procedure, this procedure will be forwarded to the Engineer for review prior to commencement of work.
A lock-out procedure shall be available at all electrical distribution boards. Valves isolated shall be locked and the Contractor shall be in possession of the keys. The Contractor and his employees shall be trained in accordance with this procedure and declared competent by the Contractor to lock out electrical equipment. They shall always adhere to the procedure's requirements.

**C3.5.1.13 Permit to work**

A system shall be implemented to control identified high risk activities. The Contractor shall ensure that the proper permit is issued as agreed upon and authorized by an appointed competent person before commencing with the work.
Some of the activities that may require a permit to work within a construction or plant area are:

- Cold work in areas where operational plant or equipment can pose a threat
- Radiographic works
- Working in confined spaces
- Excavation work (cable clearance permit)
- Blasting
- Piling
- Work being done within 50 m of an overhead power line
- Use of a hazardous substance, e.g. lead

Contractors are to ensure that all personnel who will be signing on work permits within the Site are trained in the work permit procedures and declared competent.

**C3.5.1.14 Use of documents by the *Employer***

All information (communications, designs, drawings, documents, or reports) provided to the *Employer* by the Contractor, in the course of performing the service required for this Contract, are intended to ensure that the projects are implemented successfully.

**C3.5.1.16. Property provided for the service provider's use**

The Contractor shall provide all physical resources, including properties, for the successful execution of the project.

**C3.5.1.17 Proof of compliance with the law**

The Contractor shall ensure that he complies to all prevailing legislation that applies to the provision of his services as part of this Contract and indemnifies the *Employer* where he deliberately neglects compliance with such legislation.

## C3.6 HEALTH AND SAFETY

The following particular and generic specifications are applicable to this contract.

(1) Occupational Health & Safety

## C3.6.1 HEALTH AND SAFETY REQUIREMENTS AND PROCEDURES

### C3.6.1.1 Framework for an occupational health and safety plan

#### C3.6.1.1.1 Introduction

The Principal Contractor must demonstrate to the Employer that it has a suitable and sufficiently documented Occupational Health and Safety plan as well as the necessary competencies, experience and resources to perform the construction work safely. The Principle Contractor could be required to submit the following documentation for perusal and verification by the Employer:

- Management structure.
- Quality plan.
- Human resources plan.
- Registered workplace skills plan.
- "Letter of good standing" from the Compensation Commissioner or licensed compensation insurer.
- Proof of Induction and other training of employees.
- Example copy minutes of previous Occupational Health and Safety Committee meetings and copies of Incident Investigation reports.

The following specifications are supplied as a guide only. The Employer's Health and Safety Agent may amend and/or expand on the specifications by means of an addendum to Tender or after the award of the Contract.

#### C3.6.1.1.2 OH&S plan at tender stage

Tenderers shall submit an OH&S plan with their tender document. This shall be a preliminary plan that may be expanded on and finalised after the award of the contract. The OH&S Plan should be based on the following principles:

- A proper risk assessment of the construction work.
- Pro-active identification of potential hazards and unsafe working conditions.
- Informing and/or training of employees in hazards and risk areas.
- Provision of a safe-working environment and safety equipment.
- Ensuring the safety of sub-Contractors through their safety plans.
- Monitoring the health and safety on the construction works on a regular basis.
- Using competent safety officers.

### C3.6.2 Contents of an occupational health and safety plan

### C3.6.2.1 Occupational Health and Safety Management Programme

- Management of Occupational Health and Safety risks.
- Occupational Health and Safety structures and appointments.
- Programme of Occupational Health and Safety inspections.
- Occupational Health and Safety Representatives.
- Occupational Health and Safety committee.

#### C3.6.2.1.1 Communication and management of the work

- Management structure and responsibilities.
- Details of the construction supervision and his appointed assistants.
- Details of the Construction Safety Officer.

- Occupational Health and Safety goals for the project and arrangements for monitoring and review of Occupational Health and Safety performance.
- Arrangements for:
  - Regular liaison between parties on site.
  - Consultation with the workforce.
  - The exchange of design information between the Employer, designers, supervisors and Contractors on site.
  - Handling design changes during the project.
  - Selection and control of Contractors.
  - The exchange of Occupational Health and Safety information between all Contractors.
  - Security.
  - Site induction and onsite training.
  - Facilities and first-aid.
  - The reporting and investigation of accidents and incidents.
  - The production and approval of risk assessments and method statements.
  - Site OH&S rules.
  - Fire and emergency procedures.
  - Reporting to the Employer i.e. results of Occupational Health and Safety inspections, incident and incident investigations and committee meetings.
  - Reporting of incidents to the Department of Labour and Compensation insurer where appropriate.

**C6.2.1.2 Arrangements for controlling significant site risks**

The following are some examples of the arrangements for controlling the most significant site risks:

**C3.6.2.1.3 Safety risks**

- Services, including temporary electrical installations.
- Preventing employees from falling into excavations, from trucks etc.
- Work with, on or near fragile materials.
- Control of lifting operations.
- The maintenance of plant and equipment.
- Traffic routes and segregation of vehicles and pedestrians.
- Traffic control during pipeline crossing of existing roads.
- Handling and storage of hazardous materials.
- Dealing with existing unstable structures/land.
- Working in confined spaces.
- Working at elevated heights (> 3,0 m).
- Other significant safety risks as and when identified.
- Working in excavations to a depth of 7,0 metres.

**C3.6.2.1.4 Health risks**

- Working environment.
- Handling, storage and use of hazardous chemical substances.
- Dust containing cement, silica and other hazardous substances.
- Dealing with contaminated land or material.
- Manual handling.
- Reducing noise and vibration.
- Provision of adequate lighting.
- Ventilation considerations.
- Extreme heat and cold temperature considerations.
- Dealing with HIV/Aids and other illnesses.
- Provision of and maintaining ablution and eating facilities.
- Other significant health risks as and when identified.

### C3.6.2.1.5 Special risks

Contractors are to take note of the special risks that may be encountered during the project and to include these special risks in the OH&S plan.

### C3.6.2.1.6 Working environment

- Rotating machinery (and pumps if required).
- Electrical infrastructure not indicated on “As Built” drawings.
- Electrical storms during summer months.
- Traffic control during pipeline crossings of existing roads.

### C3.6.2.1.7 Installation work

- Use of electricity may be hazardous in wet conditions.
- Working space may be limited.
- Lifting and placing of heavy equipment, pipes and manhole rings and covers.

### C3.6.2.1.8 Preparation of an occupational health and safety operational reference file/manual

The Principle Contractor shall open and maintain an OH&S file for the duration of the contract. On completion of the contract the Principle Contractor shall hand the OH&S file to the Employer.

### C3.6.2.1.9 Following are some of the requirements to be addressed

- Layout, format and content requirements.
- Arrangement for the collection and gathering of information.
- Storage and archiving of all the information.
- Copy to the Client at completion of project.
- Appointment of a health and safety officer in writing.

### C3.6.2.1.10 Contents of an OH&S file/manual

- OH&S Policy.
- Notice of new project.
- Site start-up.
- Security measures.
- Written designations and appointments.
- Arrangements with Contractors / mandatory’s
- OH&S rules and procedures.
- Induction.
- OH&S training.
- OH&S promotion.
- OH&S representatives.
- OH&S committees.
- Workplace facilities e.g. ablutions, sheltered eating areas etc.
- Protective equipment.
- Workplace inspections and audits.
- Investigation and reporting of incidents/accidents.
- Mechanical safeguarding.
- Electrical safeguarding.

- Safeguarding against trench excavations with depths ranging between 2 to 7 metres.
- Safeguarding against hazardous substances.
- Lifting machinery and equipment.
- Construction vehicles and mobile plant.
- Welding, heating and flame cutting.
- Protection of the environment affected by construction activities.
- Keeping of records in terms of the OH&S Act (85 of 1993).
- General details of construction methods and materials used.
- Details of equipment and maintenance facilities within the structures.
- Maintenance requirements and procedures for structures / equipment / plant.
- Manuals produced by suppliers and specialist Contractors, including operating and maintenance procedures and schedules for plant and equipment.
- Details of the location and nature of utilities and services, including emergency and fire-fighting systems.

**(a) Construction Regulations, 2003**

The Contractor shall be required to comply with the Occupational Health and Safety Act, 1993: Construction Regulations, 2003 (the regulations) as promulgated in Government Gazette No 25207 and Regulation Gazette No 7721 of 18 July 2003. (Not included in this Volume). Non-compliance with these regulations, in any way whatsoever, will be adequate reason for suspending the Works.

The proposed type of work, materials to be used and potential hazards likely to be encountered on this Contract are detailed in the Project Specifications, Schedule of Quantity and Drawings, as well as in the Employers' health and safety specifications (regulation 4(1)) of the Construction Regulations 2003, which are bound in the Contract document

The Contractor shall in terms of regulation 5(1) provide a comprehensive health and safety plan detailing his proposed compliance with the regulations, for approval by the Employer.

The Contractor shall at all times be responsible for full compliance with the approved plan as well as the Construction Regulations and no extension of time will be considered for delays due to non-compliance with the abovementioned plan or regulations.

Payment items are included in the Schedule of Quantities to cover the Contractor's cost for compliance with the OHS Act and the abovementioned regulations.

## C3.6.2 PROTECTION OF THE PUBLIC

The Contractor shall at all times ensure that his operations do not endanger any member of the public.

## C3.6.3 BARRICADES AND LIGHTING

All excavation must be marked with drum, reflecting tape and warning signs to satisfaction of the engineer and OHS appointed official.