PW325

DEPARTMENT OF PUBLIC WORKS

MANUAL

FOR

ELECTRICAL/ELECTRONICAL AND MECHANICAL

CONSULTING ENGINEERS

OCTOBER 2003

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PROCEDURE FOR THE DESIGN, SUPERVISION AND ADMINISTRATION OF PROJECTS BY ELECTRICAL/ELECTRONICAL AND MECHANICAL CONSULTING ENGINEERS

1. GENERAL

The purpose of this document is to serve as a guide to the functions, duties and responsibilities of **Consulting Engineer**s (Electrical/Electronical and/or Mechanical) appointed by the Department, regarding the design, supervision and administration of building, engineering and other related projects for the Department. The **Consulting Engineer** is required to execute the work in accordance with this Manual and with such supplementary instructions as the Department may issue from time to time. The sole **Client** for the work is the Director-General: Department of Public Works (hereinafter referred to as the Director-General) or his authorised representative.

The **Consulting Engineer**'s dealings with the **Client** as **Consulting Engineer** will be conducted through the Departmental Representative (**Project Manager**) as set out in this Manual, and the letter of invitation/appointment/confirmation.

In this document, except where the context otherwise requires or indicates: -

- The masculine includes the feminine
- The singular includes the plural
- Any reference to a natural person includes a body corporate, a firm, an association, joint venture, etc..

2. THE USER DEPARTMENT

The designated occupant(s) of a building is/are the **User Department**(s). Any discussions, which the **Consulting Engineer** may wish to have with a **User Department**, must be arranged through the **Project Manager**. Any requests from the **User Department** for more/less accommodation or for an item involving additional cost must be referred by the **User Department** to the Director-General, Key Account Manager, National Department of Public Works and his written authority obtained, before incorporating such additions in the design proposals.

3. THE PROJECT MANAGER

The Director-General will appoint the **Project Manager** from his own personnel or from a private firm as his representative who will manage the project. The **Project Manager** will be responsible for the financial, time and quality management of the project. All communications to the Director-General shall be directed through the **Project Manager**.

4. THE PRINCIPAL AGENT

4.1 Building Services

In the case of most building services, except as provided for in clause 4.2, the Architect will act in all matters as the **Principal Agent** of the Department. The **Principal Agent** will be the leader of the consultant's team and will be responsible to the **Project Manager** for the co-ordination of the project as defined in the brief. The **Consulting Engineer** must, therefore, liase very closely with the **Principal Agent**/Architect during all stages of the project and keep him and the **Project Manager** fully informed of relevant developments. The normal channel of communication with the **Project Manager** will be via the **Principal Agent**/Architect. The latter will in general channel all enquiries of the **Consulting Engineer** to the **Project Manager** appointed by the Department. In some of the following clauses, reference is made to the responsibility of the **Principal Agent**/Architect to the Department but this applies to co-ordination and the **Consulting Engineer** will remain responsible for all matters of design, specifications, monitoring, administration, etc of the work he is commissioned to do according to his appointment.

4.2 Engineering Services

In case of a project, where only engineering services are involved and if more than one engineering discipline and/or other disciplines are involved and if specifically so appointed, a **Consulting Engineer** will

act in all matters as the **Principal Agent** of the Department and will co-ordinate the work of the **Consulting Engineers'** team. In which case, where reference is made in this Manual to the **Principal Agent**/Architect as the principal agent, it will *mutatis mutandis* apply to the **Consulting Engineer** appointed as **Principal Agent**. The Department will designate the **Principal Agent** during the pre-design stage, when **Consulting Engineer**s are appointed to execute the work.

When a **Consulting Engineer** is appointed as the **Principal Agent** on a project, in addition to his normal functions as **Consulting Engineer**, the following functions are added to the basic brief: -

- Leadership of the professional team.
- Submission of preliminary and developed proposals in the form of consolidated reports, drawings and specifications together with estimates of costs for the project as a whole.
- Responsibility for the overall administration of all sections of the project including those, which fall within the ambit *of* the other professional members in the team.
- Responsibility for the overall coordination, programming of design and financial control of the project.
- Resolving differences that may arise between the Department and the Contractors, excluding mediation, arbitration or litigation.
- Certification of certificates for payment to Contractors issued by the other professional members in the team before their presentation to the **Project Manager** for settlement.
- Making arrangements to provide the Department, on completion of the works, with such record drawings as may be required for a proper record of the works as constructed and such manuals as may be required for the operation and maintenance of the relevant parts of the works.
- Certification for approval of the final contract account for the project as a whole by the **Project Manager.**
- Manage targeted procurement services.

It is necessary to keep the **Project Manager** in the picture at all times and the **Consulting Engineer** must ensure that copies of all relevant documents are forwarded to his/her office. The revised transparencies (variation drawings) together with covering schedules are to be handed to the **Project Manager**. The **Consulting Engineer** will arrange for all the required paper prints for the Contractor. Where instructions, due to the urgency, are issued directly to the Contractor with later confirmation to the **Project Manager**, the **Consulting Engineer** will be responsible for the prints to the Contractor. The **Consulting Engineer** must take the necessary steps to obtain official approval from the **Project Manager** for the printing of drawings. Monthly invoices for this type of work should be submitted.

4.2.1 Progress Report

A progress report is to be compiled every month and submitted to the **Project Manager**. The format will be provided to the **Consulting Engineer**.

4.2.2 Progress Payments (Where no Quantity Surveyor is appointed)

The **Project Manager** will be responsible for the progress payments to the Contractor on receipt of a progress payment certificate compiled by the **Consulting Engineer**. For this the **Consulting Engineer** is to assess the value of the work carried out since the last assessment and determine the value of material on site. The format of the progress payment certificate will be provided by the **Project Manager**.

4.2.3 Contract Completion Report

On completion of the Contract, the **Consulting Engineer** is to compile a 'Contract Completion Report'. This report must be submitted immediately at "First Delivery". Any delay over the contractual completion period or extended contractual completion period, if applicable, must be reported on. If the Contractor has submitted any representation as to the delay and/or the imposition of penalties during the contract period, this must be assessed and recommendation(s) regarding the imposition of penalties made. The format in which this report is to be submitted is fixed and can be obtained from the **Project Manager**.

The Conditions of Contract is clear regarding the application for extension to the contract period and the relevant clause(s) must be adhered to at all times. The **Consulting Engineer** has no authority to extend

the contract period - this remains the prerogative of the Department. On receipt of an application for the extension of the contract period the **Consulting Engineer** shall, within 14 days, submit the application together with his recommendation, fully analysed and motivated, to the **Project Manager**, who will in turn advise the Contractor with a copy to the **Consulting Engineer.**

4.2.4 As-Built Drawings (Record Drawings)

On completion of the works prepare and provide the Department, with record drawings on polyester negative prints. These prints shall be known as the original drawings and shall be on approved transparent film having a polyester base and a minimum thickness of 0,05 mm. You must also provide a CD in Caddie format with all the relevant as-built information on the drawings and detailed operation, operating and maintenance manuals.

4.2.5 Final Account

The **Consulting Engineer** will be responsible for the final account unless a Quantity Surveyor is appointed.

5. RESPONSIBLE MEMBER/S: FIRMS IN ASSOCIATION/TEAM OF CONSULTING ENGINEERS/CONSORTIUM/JOINT VENTURE

In the case of firms appointed in association as a **team of Consulting Engineers/Consortium/Joint Venture,** as Electrical/Electronical/Mechanical Engineers, the **Consulting Engineers** are requested in the letter of appointment to agree, together with the other members, to the nomination of a representative of the group, who will act as the lead **Consulting Engineer** for the purpose of liaison with the Department.

The Department reserves the right in certain instances to nominate the member/s of the group who will act as the lead **Consulting Engineer** to act as representative of the group.

6. APPOINTMENT OF CONSULTING ENGINEERS

The Department will appoint the Electrical/electronical/mechanical **Consulting Engineer**. The commission will be subject to the terms and conditions in the letter of appointment.

7. AGREEMENT

The duties, responsibilities and remuneration will be according to the letter of appointment.

The copyright of all documents (including drawings) prepared by the **Consulting Engineer** in terms of his appointment shall be vested in the Department, which shall have the right to its use on other projects on which the **Consulting Engineer** have not been appointed. Provided that where such documents are used without the **Consulting Engineer**'s prior knowledge and consent, such re-use shall be solely at the Department's risk and the **Consulting Engineer** will not be held liable (either in contract or in delict) to the Department or any other party whatsoever as a result of the re-use of the documentation. No fees shall accrue to the **Consulting Engineer** who did the original design for the re-use of his documents.

The **Consulting Engineer** undertakes not to furnish any information of any kind whatsoever during the validity of this service, or any period thereafter, in respect of costs or estimated costs of the Works to any person whomsoever, except in cases where such a person has been authorised thereto in writing by the Department.

All work in connection with this service must be carried out by the **Consulting Engineer**'s own staff. A person employed by the Government may not perform any portion of the work. No portion of the work may be sublet to any other person or persons without the approval of the Department in writing. Failure to observe any of the herein-mentioned provisions, will entitle the Department to cancel the appointment forthwith.

If the Consulting Engineer is appointed as the Department's agent as contemplated in section 4. (5) of the Construction Regulations, 2003, promulgated under the Occupational Health and Safety Act, Act 85 of 1993, he shall be responsible for the execution of the requirements of section 4. (1) to 4. (4) of these regulations.

8. THE CONSULTING ENGINEER TEAM

In terms of their various agreements, all members of the **Consulting Engineer** team are required to liase very closely with one another during all stages of the project and to keep each other fully informed of all relevant developments.

9. BRIEF

On appointment, the **Consulting Engineer** will receive a general brief by the **Project Manager** regarding the project. In all other respects, the **Principal Agent** will brief them. The **Consulting Engineer** must verify and co-ordinate the requirements and instructions discussed during the brief with the **Principal Agent** and other members of the **Consulting Engineer** team. Any amendments and additions to the brief are to be approved by the **Project Manager**.

It is stressed that it is the responsibility of the **Consulting Engineer** to determine the specific policies, requirements, departmental standards and specifications for the project in conjunction with the **Principal Agent**/**Project Manager** without exceeding the terms and limits of his commission. The **Consulting Engineer** will, as detailed hereafter, also have access through the **Project Manager** to the Chief Director: Professional Services of the Department on technical, procedural and policy matters, which do not significantly affect the other members of the design team.

10. ROUTING OF ENQUIRIES

Consulting Engineers are required to channel all enquiries through the **Principal Agent** to the **Project Manager** unless the **Project Manager** rules otherwise.

11. PROGRAMME PLANNING

Within three weeks after appointment, or within the period as agreed to, the **Consulting Engineer** shall discuss the service and the brief with the **Project Manager**. The **Consulting Engineer** shall then submit information on the proposed number of contracts, budget estimates of costs, planning periods and recommended forms of contract to the **Principal Agent** and the Quantity Surveyor. This information is needed to enable the Department to affect the necessary control of the project, as it appears on the Department's five-year Major Works Programme.

11.1 Type and Number of Contracts

An early decision should be made as to the type of contract, i.e.: comprehensive, nominated or specialist, Building or Engineering, conditions of Targeted Procurement, the number of contracts, e.g. electrical/electronical installation, lifts, standby plant, site distribution, air-conditioning, fire protection, etc. being either Building or Engineering**.**

The **Consulting Engineer** shall recommend to the **Principal Agent** which contract type of the various contracts are to be utilised. These may be one or more of the following:

(i) Comprehensive contract: All electrical/electronical and mechanical work included with building work.

(ii) Nominated contract: Separate tenders, but successful tenderer becomes a Sub-Contractor of the Main Contractor - documents prepared by **Consulting Engineer** and submitted to Main Contractor who calls for tenders, submits tenders for approval and thereafter makes a subcontract appointment. The list of likely tenderers is to be compiled in consultation with the Department's **Project Manager**.

(iii) Specialist contracts, which may be suitable where detailed co-ordination by the Main Contractor is not the deciding factor or can be done by others and where the value and extent of the specialist work far exceeds that of the building work. Documents are prepared by **Consulting Engineer** and submitted to the Department to obtain and process tenders and enter into direct contracts separate from the main building contract.

11.2 Budget Estimates

Even though the detailed technical requirements will seldom be available in the initial stage of planning, the **Consulting Engineer**, in consultation with the Quantity Surveyor/**Principal Agent**/Architect and the rest of the design team, must compile a budget estimate for each contract. The estimate must be based on the schedule of accommodation and, if available, preliminary architectural design drawings unless a Quantity Surveyor is appointed to do the bill of quantities. The **Consulting Engineer** shall assist the Quantity Surveyor in the case of a comprehensive contract and draw on his experience of the type of project to prepare as realistic an estimate as possible. The estimates are to be based on costs at the time of their preparation and no provision is to be made for any escalation or professional fees. The estimates are to be submitted to the Quantity Surveyor who, in turn, will incorporate them in a composite estimate and forward it to the **Principal Agent**/Architect, who has to forward it to the **Project Manager**.

11.3 Planning Periods

The **Consulting Engineer** must furnish the **Principal Agent**/Architect with the planning program and the recommended tender date for each contract. These periods and dates must be related to the **Principal Agent**/Architect's and Quantity Surveyor's planning periods and to the tender date(s) required by the Department. Provision for additional time is to be made for bills of quantities when these are required. Normally all design work, apart from preliminary planning during the design stage, should only be carried out on approved architectural working drawings. Full documentation is required for all contracts. These aspects must be taken into consideration when planning periods are determined.

12. DESIGN STAGE

12.1 General

The **Consulting Engineer** is to design the electrical/electronical/mechanical installation(s) to meet the requirements as stated in the brief including the norm restrictions when applicable, in consultation with the **Project Manager**, the **Principal Agent**/Architect and the **Consulting Engineer** team. The **Consulting Engineer** must ensure that the systems are as efficient and economical as possible, taking into consideration all aspects such as capital, running and maintenance costs. Should it be necessary to deviate from the brief to meet these requirements, the matter must be raised with the **Project Manager**.

All construction work or any other services (including workshops, Government Garages, service products factories, etc, as well as lifts, escalators, emergency generators etc.) shall be designed in accordance with the requirements of all the relevant Acts and Regulations including the Occupational Health and Safety Act, 1993, Act 85 of 1993, and the Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977) as amended. In order to ensure compliance with these Acts it will be necessary to liase closely with the Director of the Department of Labour and the relevant Local Authorities. Standard departmental specifications and a general policy document regarding all types of installations are available at the office of the Chief Directorate: Professional Services.

Details of the special requirements concerning the electrical/electronical/Mechanical installation in the complex must be determined in consultation with the **User Department**.

Furthermore, the onus will be on the Electrical/Electronical/Mechanical **Consulting Engineer** to ensure that the installation meets the requirements of all the relevant Acts and local authority regulations, as well as any other regulations, which might be applicable.

12.1.1 Installations Pertaining to Buildings and Structures

This would normally include the design of the complete electrical/electronical or mechanical installation in new buildings

All relevant information, requirements and needs of the **User Department** must be acquired from the **Principal Agent** and **User Department** in order to proceed with the design.

12.1.2 Engineering Services

This would normally entails the planning, design, specification and compilation of tender documents for items which would normally not form part of building services if so decided by the **Project Manager.**

12.1.3 Repair and Reparation of Existing Buildings and Structures

The existing installation must be investigated on site in consultation with the **Principal Agent** and any special requirements regarding the renovation work must be obtained from the **User Department** or an authority in charge of the building.

A complete report with recommendations in connection with the modernisation and renovation of the existing electrical/electronical/mechanical installation in the building(s) and the practicability of the rewiring of the old buildings, together with a detailed cost estimate for all the proposed electrical/electronical/mechanical work must be submitted.

If it is decided to proceed with the project after the submission of the report and cost estimate, unless a Quantity Surveyor is specifically appointed on the project, the **Consulting Engineer** will be responsible for the compilation of the complete tender document(s) including the bill of quantities.

If it is necessary to upgrade the electrical supply, the **Consulting Engineer** must discuss the matter with the Supply Authority and include any costs associated therewith in his estimate.

All available drawings of the buildings will be supplied by the Department if available. In the event of any drawings, being incomplete further drawings will have to be drawn by the **Consulting Engineer** to cover the complete installation.

The investigation and design of the installations in existing buildings where the service involves the repair and renovation of these installations and the submission of a report and an estimate of costs forms part of the **Consulting Engineers** commission.

12.2 Responsibility

The **Consulting Engineer** is solely responsible for the electrical/electronical or mechanical design but must work closely with the **Consulting Engineer** team and especially the **Principal Agent**/Architect on aspects affecting the aesthetics and structural design of buildings - any difference of opinion, which cannot be resolved, should be referred to the **Project Manager** for a decision. During the design stage, the **Consulting Engineer** shall liase closely with the **Principal Agent**/Architect and other members of the design team.

12.3 Security Clearance

If required of the **Consulting Engineer** and those members of his staff involved in the project that all shall obtain security clearance, the necessary clearance forms are available from the Department for completion. If the Department requests that a member or members of the **Consulting Engineer**'s staff be excluded from this project for security reasons, he must immediately give effect thereto and ensure that such a person or persons is/are denied access to any documents or information connected with the project. No additional costs, which arise from the foregoing, will be borne by the Department.

12.4 Operation and Maintenance Facilities

Where projects are of such a nature or size as to require special facilities for operational or maintenance purposes, e.g. workshops, stores, parking etc., these requirements must be determined in consultation with the **Principal Agent**/Architect and submitted to the Department for approval for incorporation in the design. Similarly, if site operating and/or maintenance staff are required on completion of the project, the **Consulting Engineer**'s recommendations, again after consultation with the Regional Manager in special cases, are to be submitted in the form of a report to the Department.

12.5 Site Particulars and Site Clearance

The **Principal Agent**/Architect has overall responsibility for obtaining all the necessary site particulars for the project. On his part, the **Consulting Engineer** must obtain the particulars concerning the electricity supply. (See **standard form Annexure A**, used by the Department for this purpose).

In the case of a building service, it is the responsibility of the **Principal Agent**/Architect, assisted by the **Consulting Engineer**, to ensure that the site is clear of restrictions in respect of user rights, pollution limits, leases, servitudes, way-leaves, rights of way and any other services. In the case of engineering services, it is the **Consulting Engineer**'s responsibility to determine the restrictions and requirements in consultation with the **Principal Agent**/**Project Manager**. Any requirements regarding servitudes for

electrical power lines or cable routes or pipelines must be submitted to the **Project Manager**. Arrangements to clear routes for supply lines must be made by the **Consulting Engineer**. This aspect and the submission of the information must receive early attention and should form part of the preliminary investigation to avoid delays.

12.6 Electrical Supplies

12.6.1 Electrical Connection

Negotiations with the power supply authorities in connection with the electrical power supply and the applicable tariff, must be arranged timeously in consultation with the Department. Preliminary negotiations can be conducted and draft agreements obtained (e.g. from ESKOM or local Supply Authority) but the Department should not be committed before approval of the proposals has been obtained from the Regional Manager, as he is responsible for the signing of the supply agreement with the Supply Authority and the payment of the monthly accounts. Where the Department is the Supply Authority, e.g. defence bases, prisons, etc., the information and requirements should be obtained in consultation with the Department's Regional Manager. The **Consulting Engineer** must ensure that the most beneficial tariff is obtained and must submit copies of the completed standard form to the Department's Regional Manager.

Where an agreement for the electrical power supply must be entered into with the Supply Authority, the necessary application to the authority concerned must be submitted by the **Consulting Engineer** to the **Project Manager**. Copies of any correspondence with the Supply Authority must be forwarded to the **Project Manager** for record purposes.

Any connection fees must be included in the estimate but must not appear in the bill of quantities as it will be paid to the Supply Authority by the Department.

The **Consulting Engineer** will be responsible to design and specify the building of transmission lines when the supply is to be taken from an existing supply point which is a distance away from the building site.

12.7 Building Requirements

The **Consulting Engineer** shall liase closely with the Architect during the various planning stages and to assist him with advice regarding any building work requirements for the electrical/electronical/mechanical installations, especially as far as substation accommodation, boiler rooms, air-conditioning rooms, switch rooms and/or switch cupboards, cable sleeve pipes, cable ducts, etc. are concerned.

The **Consulting Engineer** is responsible for the planning and design of any substation and/or switch rooms/boiler rooms, which may be required, in accordance with this Department's standard requirements as well as those of the Supply Authority, and the planning, layout and specification of any substation equipment for the main power supply in so far as it affects this Department for the supply and installation thereof. The Supply Authority's building work requirements in respect of substation accommodation must be ascertained at an early stage. When finality is reached concerning the size, positioning, etc. of the substation and/or switch room, the necessary information must be submitted to the **Principal Agent**/Architect for erection thereof.

The Department has standard drawings available for substations/boiler rooms, and where applicable, use must be made of these drawings for purposes of uniformity and standardisation. Where the Department does not act as the Supply Authority, the departmental substation drawings shall be used and adjusted to meet the Supply Authority's requirements.

12.8 Services Crossings

Where applicable, the Civil Engineer/s will plan and design the civil engineering services, inter alia, roads, stormwater drainage, water supply, site preparation for building and sewage for the complex, and the electrical **Consulting Engineer** must liaise closely with them during the various planning stages in order to draw their attention to existing and any future electrical services. Any documentation in respect of the electrical work which may arise from the civil engineering services as well as the preparation of an estimate (if no Quantity Surveyor is appointed) in connection therewith, will form part of the **Consulting Engineer's** duties.

The **Consulting Engineer** must ensure that where sleeve pipes are required to underneath proposed roads for future electrical cables, that they are specified as part of the civil engineering work. Permanent markers must also be supplied (e.g. on the curb) to indicate where pipes cross underneath the road(s). Any existing underground cables must be enclosed in suitable split sleeve pipes (as part of the civil work)

before new roads are built over them. All electric cables shall be laid at a depth of 1,1 metres under the centre level of roads where the latter are crossed. This depth shall be maintained for a distance of at least one metre on either side of the road.

12.9 Power Requirements

It is required of the **Consulting Engineer** to estimate all the power requirements and the maximum demand and to determine the rating of the transformer that may be required**.** Where possible, use must be made of miniature substations for reticulation purposes. Where substations are required for the larger transformers, a ring main oil switch unit with a ”T” connection fuse-switch must be used on the high voltage side of the transformer for transformer sizes up to 500kVA. Switchgear for transformers larger than 500kVA, shall be of the circuit breaker type. Transformers must be protected against overload on the low voltage side by means of suitable circuit breakers. Circuit breakers must preferably be used instead of fuses for all low voltage circuits. Fuses may only be used as back-up protection for circuit breakers of insufficient fault breaking characteristics.

12.10 Lighting Installations

The recommendations contained in SABS Code of Practice for interior lighting may be issued as a guide for the design of lighting installations in buildings, but the lighting levels outlined therein should be regarded as maximum values only and should be applied with discretion, having due regard to the application and the requirements of the **User Department**.

12.11 Emergency Power Supplies (Diesel Generators)

Where emergency power is required, the planning and specification in respect thereof will form part of the Electrical **Consulting Engineer**’s commission. Details concerning the requirements, load, etc., must be obtained from the **User Department** in conjunction with the **Project Manager**. During a power failure the change-over from the mains supply to the emergency supply shall be automatic by means of a change-over contactor on the control board of the emergency plant.

Where electrical services are thus connected to the emergency supply, the distribution board is to be divided into two sections, one for "essential" and one for "non-essential" services respectively. Each section is to be supplied by a separate cable from the main distribution board, which must also be fitted with separate busbars for "essential" and "non-essential" services. The control board of the emergency plant must be provided with a four position selector switch for either “Automatic control”, “Manual control”, or “Test” where the load is disconnected and “Off” where the set is completely isolated.

In the documentation for the emergency power supply system, provision must be made for a 12 month free maintenance period of the equipment after first delivery has been taken.

A maintenance contract of three years, starting after the period of the initial maintenance had expired, must be included in the documentation if required by the **Project Manager**. Furthermore, details of the available service facilities must be requested in the tender documents.

The decision for the supply and installation of the emergency generator(s), complete with control board(s) and change-over Contractors, as a comprehensive part of the building contract or as a separate contract will be made by the **Principal Agent** in consultation with the **Consulting Engineer**.

12.12 Uninterruptible Power Supplies

If uninterruptible power supplies are required, the various available systems must first be investigated and a report and recommendation submitted to the **Principal Agent**/**Project Manager** on the most suitable system that meets the specific requirements of the relevant service. This Department is only responsible for uninterruptible supplies of capacity larger than 5kVA. Smaller units must be provided by the **User Departments**.

The decision for the supply and installation of uninterruptible power as a comprehensive part of the building contract or as a separate contract will be made by the **Principal Agent** in consultation with the **Consulting Engineer**. The planning and specification in respect thereof will form part of the **Consulting Engineer’s** commission.

The same provisions regarding the maintenance period and maintenance contract as stipulated for emergency power supplies, apply. Furthermore, details of the available service facilities of the supplier must be requested in the tender documents.

12.13 Lift and/or Escalator Installations

If lift and/or escalator installations are required for the project, the design and specification thereof will form part of the Electrical **Consulting Engineer**'s duties.

The officer in charge of lift and escalator matters in the Department's Head Office must be consulted at an early stage for the details regarding this Department's standard requirements.

The decision for the supply and installation of lift and/or escalator installation as a comprehensive part of the building contract or as a separate contract will be made by the **Principal Agent** in consultation with the **Consulting Engineer**.

In the documentation for the lift and or escalator installation, provision must be made for a 12 month free maintenance period of the equipment after first delivery has been taken.

A maintenance contract of three years, starting after the period of the initial maintenance had expired, must be included in the documentation if required by the **Project Manager**. Furthermore, details of the available service facilities must be requested in the tender documents.

12.14 Security Lighting

The Department has standard requirements concerning security lighting and where such lighting is included in the commission, the details and requirements in respect thereof must first be obtained from the **Project Manager** before the design is commenced.

The decision for the supply and installation of security lighting as a comprehensive part of the building contract or as a separate contract will be made by the **Principal Agent** in consultation with the **Consulting Engineer**.

In the documentation for the installation, provision must be made for a 12 month free maintenance period of the equipment after first delivery has been taken.

12.15 Microphone System in Courtrooms

The Department of Justice will be responsible for the purchase and the installation of the complete microphone system in the courtrooms. Details of the required conduit installation with draw boxes and wire ways (provided with draw wires) to be installed under the contract must be planned in consultation with the Department of Justice at their Head Office in Pretoria.

12.16 Intercommunication Systems

The Department has standard requirements concerning intercommunication systems and where such systems are included in your commission, the details and requirements in respect thereof must first be obtained from the **Project Manager** before the design is commenced.

The decision for the supply and installation of intercommunication systems as a comprehensive part of the building contract or as a separate contract will be made by the **Principal Agent** in consultation with the **Consulting Engineer**.

In the documentation for the Intercommunication system, provision must be made for a 12 month free maintenance period of the equipment after first delivery has been taken.

12.17 Lightning Protection Of Buildings

The provision of a suitable lightning protective system forms part of the building work and the Architect will be responsible for any documentation required in this regard. The system must comply with the requirements of the latest issue of the SABS Code of Practice 03/1985 for the protection of structures against lightning, and on completion of the work, the SABS may be called upon to verify compliance with the Code in cases where this is deemed necessary by the Department.

If an earth resistivity test has to be undertaken on the site, the **Consulting Engineer**, after obtaining prior approval from the **Project Manager**, may arrange for such tests to be carried out. Any costs incurred in this regard will be refunded by the Department.

If the nature of the project is such that a detailed design of the lightning protective system has to be undertaken, the **Consulting Engineer** may be called upon to prepare the necessary documentation.

12.18 Services

Provision must be made in the documentation for the electrical work for the connection of any electric hot water cylinders. Fixing these in position and providing the plumbing connections thereto will form part of the building work. Details of the suggested positions, sizes and types of hot water cylinders (geysers) will be determined by the Architect in consultation with the **Consulting Engineer**. The supply of the hot water cylinders forms part of the building contract.

The design of mechanical services is not included in the Electrical Engineer's commission, but details of electrical connections required for ventilation and/or air conditioning equipment must be determined in consultation with the Mechanical Engineer. The supply and installation of any fans should be discussed with the Mechanical Engineer and the **Principal Agent** will decide whether these are to form part of the electrical or mechanical documentation. The Mechanical Engineer will be involved in the decision regarding the type of heating system to be employed.

Details of any permanently installed electrical kitchen equipment must be determined in consultation with the Mechanical Engineer and the Architect, who will have to prepare a detailed layout drawing indicating the exact positions of fittings and equipment. It will be necessary to determine full particulars of the electric loading for which only connections are to be provided. For island type equipment, isolators mounted on pedestals must be specified.

Details in respect of conduit and conduit boxes (supplied with draw wires) and boards required for the telephone installation inside the building must be planned by the architect and included in the documentation for the electrical/electronical work. Power skirting, which may be used for power and/or telephone and/or data cables, shall have complete separate compartments and cover strips for the different services and must be included in the bill of quantities for the building work.

12.19 Builder's Supply

Unless otherwise specified, arrangements for the temporary builder's electrical supply are the responsibility of the Main Contractor.

12.20 Meetings

The **Consulting Engineer** shall attend regular meetings as called for and chaired by the **Principal Agent**/Architect and liase closely with all members of the design team. The **Consulting Engineer** may contact the Chief Director: Professional Services directly to discuss any technical problems, which may arise during the preliminary stages if the **Project Manager** agrees.

12.21 Preliminary Design

The **Consulting Engineer** should carry out sufficient preliminary design work to enable the **Principal Agent**/Architect to complete the design drawings and to decide on the requirements for the particular project. Any changes to the design during this stage, for whatever reason and from whatever source, will be considered as part of the development of the scheme and no additional fees will be paid. Discussions should be held with the **User Department**(s) to determine particular technical requirements. Generally these cannot be established or finalised until the final design drawings are approved.

12.22 Sketch Plan Estimate

On completion of the final design drawings (sketch plans), the **Consulting Engineer** must immediately prepare a preliminary design layout and an estimate of cost (unless a Quantity Surveyor is appointed to measure the electrical/electronical work, in which case the Quantity Surveyor should be provided with all the information to do such an estimate). The estimate is to be submitted to the Quantity Surveyor for

inclusion in the overall cost report to the Department. If this estimate should differ from that of the budget norm figures, the reasons for the increase or decrease must be submitted by the **Consulting Engineer.**

12.23 Planning: Progress Report

Every month the **Consulting Engineer** must submit a progress report to the **Principal Agent**/Architect with a copy to the **Project Manager in the standard forms format**. During the planning stage, the estimated cost must be regularly reviewed and adjusted if necessary. The adjustment and the reasons therefore must be passed to the **Principal Agent**/Architect, who must obtain the Department's approval in case it is expected that the budget figure will be exceeded for reasons other than escalation.

13. PREPARATION OF DOCUMENTS

13.1 Working Drawings

The **Consulting Engineer** shall prepare his working drawings on transparencies from the approved working drawings of the Architect. The **Principal Agent**/Architect will issue the drawings. The design shall first be done in draft form for discussion with the **User Department** and the **Project Manager** for approval. It is sometimes necessary to submit prints of the approved **Principal Agent**/Architectural design drawings or preliminary working drawings to the **User Department** so that it can indicate its requirements, e.g. in technical buildings. Requirements which are not standard or which appear to be excessive, must first be cleared direct with the **Project Manager** before being incorporated in the design (e.g. intercom. standby plants and TV). No alterations to drawings, which involve additional cost and/or additional fees, shall be done without the prior written approval of the **Project Manager**.

13.1.1 Title block and Drawing numbers

<table>
<tr><td colspan="2">Director-General ( name)</td><td>REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF PUBLIC WORKS</td></tr>
<tr><td colspan="3">(This panel for Consulting Engineers use)</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>DATE:</td><td>WCS NO:</td><td>DWG: EE/ME</td></tr>
</table>

13.1.2 Electrical/Electronical Work

Departmental drawing numbers must be allocated to the drawings, which accompany the specification for the electrical/electronical work as follows:

The -/1 number must be allocated to the site plan.

DESCRIPTION OF INSTALLATION	EXAMPLE NUMBER
Electrical installations in buildings	EE *9718*/1, /2 etc
Telephone systems	EE *9718*/T1, /T2, etc
Intercom installations	EE *9718*/IS1, /IS2, etc
Public Address systems	EE *9718*/PA1,/ PA2, etc
Lift installations.	EE *9718*/L1, /L2, etc
Escalator installations	EE *9718*/ESC1, /ESC2, etc

X-ray inspection units	EE *9718*/X1, /X2, etc
Metal detectors (Walk Through Type)	EE *9718*/MD1, /MD2, etc
TV antenna installations	EE *9718*/TV1, /TV2, etc
Security systems	EE *9718*/SS1, /SS2, etc
All electrical and electronic detection equipment attached to gas, fluid and foam fire protection installations and equipment. (Supply and wiring diagrams)	EE *9718*/EFP1, /EFP2, etc
Electrical reticulation and distribution systems	EE *9718*/D1, /D2, etc
High voltage substations.	EE *9718*/HV1, /HV2, etc
Power lines (low and high voltage)	EE *9718*/PL1, /PL2, etc
Emergency and other power generators	EE *9718*/ES1, /ES2, etc
Uninterrupted power supplies	EE *9718*/UPS1,/UPS2, etc
DC converters	EE *9718*/DC1, /DC2, etc
Frequency converters (400 Hz)	EE 9718/FC1, /FC2, etc
Sewerage and water treatment plants (Supply and wiring diagrams)	EE *9718*/SP1, /SP2, etc
Pump and borehole installations (Supply and wiring diagrams)	EE *9718*/PB1, /PB2, etc

The relevant “EE” number for the specific project (the number in italics) must be obtained from the Electrical Engineering Services section of the Chief Directorate: Professional Services, at Head Office.

Telephone layout drawings and intercom drawings must be numbered corresponding to the floor plan showing the electrical/electronical installation, but with the letter’s "T" and “PA” respectively added as suffix.

13.1.3 Mechanical Work

Departmental drawing numbers must be allocated to the drawings, which accompany the specification for the mechanical work as follows:

The -/1 number must be allocated to the site plan.

DESCRIPTION OF INSTALLATION	EXAMPLE NUMBER
Air Conditioning and Ventilation	ME *1234*/ACV1, /ACV2 etc
Refrigeration	ME *1234*/REFR1, /REFR2 etc
Steam Boiler installations	ME *1234*/SB1, /SB2 etc
Central Heating	ME *1234*/CH1, /CH2 etc
Tank and Trailer Fire Fighting Unit	ME *1234*/TTU1, /TTU2 etc
Sprinkler Fire Extinguishing System	ME *1234*/SPR1, /SPR2 etc
Carbon Dioxide Fire Protection Installation	ME *1234*/CD1, /CD2 etc
Inert Gas Fire Protection Installation	ME *1234*/IG1, /IG2 etc
Fire Detection Installation	ME *1234*/FD1, /FD2 etc
Evacuation Communication System	ME *1234*/EC1, /EC2 etc
Prison Integrated Security Installation	ME *1234*/PSI1, /PSI2 etc
CCTV Installation	ME *1234*/CTV1, /CTV2 etc
Visitation Intercom System	ME *1234*/VI1, /VI2 etc

The relevant ME number for the specific project (the number in italics) must be obtained from the Mechanical Engineering Services section of the Chief Directorate: Professional Services, at Head Office.

13.2 Responsibility for Design

Acceptance of the design by the Department shall neither imply that the design was checked in detail nor relieve the **Consulting Engineer** of any of his responsibilities for the design.

The **Consulting Engineer** shall rectify any defects in the design, for which he is responsible, at his own cost.

13.3 Specification

Should the **Consulting Engineer** not be conversant with departmental electrical/electronical or mechanical standards, a copy of a sample specification (and bill of quantities if applicable) of a similar type of service will be supplied on request. The document is to serve as a general guide in respect of departmental requirements, standards and the form in which tender documents for the electrical/electronical or mechanical installation must be compiled. The technical documentation is to be prepared by the **Consulting Engineer**.

Departmental quality specifications for various items of equipment will be supplied to the **Consulting Engineer** on request, if available. The cost of the connection should be omitted from the documents and arrangements made with the Regional Manager for the placing of the order with the Supply Authority. A draft proposal of the completed final tender document may be submitted to the Chief Director: Professional Services, for perusal before production of sets of tender documents for tender purposes.

The required number of sets of completed tender documents (i.e. specifications, bills of quantities -if applicable - and paper prints of drawings for tender purposes only) must be submitted directly to the **Principal Agent**/Architect/**Project Manager**.

13.4 Check Estimate

If a Quantity Surveyor is not specifically appointed to measure the electrical/electronical/mechanical work, the **Consulting Engineer** must on completion of the documentation, or at the request of the **Principal Agent**/Architect, compile check estimates of cost for each contract, following the same procedure as for the sketch plan estimate. These estimates must be passed on to the Quantity Surveyor **Principal Agent**/Architect for inclusion in the building bills of quantities as provisional sums in the case of nominated subcontracts and the overall financial report to be submitted by the **Principal Agent**/Architect to the Department. Where bills of quantities have been prepared by the **Consulting Engineer**, these are to be priced as a basis for the estimate. Any increase in costs is to be fully motivated. The **Consulting Engineer** must bear in mind that where changes to the design or documentation occur without the prior written consent of the Department, and these changes involve work done by other **Consulting Engineer**s being discarded in such a manner as to involve fruitless expenditure, the responsible party will be held liable to defray the costs of such expenditure. In case of the cost of electrical supplies, special provision should be made in the budget for the connection fee.

13.5 Site Facilities

The **Principal Agent**/Architect must be advised as to the requirements for site offices and furniture, e.g. drawing hangers, tables, stools etc.

13.6 Notice Board

The **Consulting Engineer**s must provide the **Principal Agent**/Architect with the necessary particulars to appear on the notice board, prior to the building Contractor starting on site.

14. TENDER STAGE

14.1 Form of Tender

The normal procedure is the invitation of open tenders, but should the Department decide to invite tenders from selected firms, the **Consulting Engineer** shall assist the Department in compiling a list of suitable tenderers with particulars of their organisations, experience and capabilities.

14.2 Invitation of Tenders

The Department will arrange for the invitation of tenders.

14.3 Adjudication of Tenders

The **Consulting Engineer** will be called upon to do the recommendation of tenders by submission of a detailed written recommendation, taking into account the requirements of the APP (Affirmative Procurement Policy). The **Consulting Engineer** must liase with the **Project Manager**/**Principal Agent**/Architect regarding the tender recommendation.

14.3.1 Recommendation

The detailed recommendation must cover the following aspects:

Select the top three tenders and investigate and adjudicate them based on the following criteria:

- Previous Experience.
- Resources - skilled labour and equipment.
- Quality of work.
- Financial standing – bank grading.
- Ability to complete the contract successfully.
- Type of surety that must be provided and the Contractor's ability to provide it.
- Reports from **Consulting Engineer**s/organisations for whom they have previously delivered a similar service - technical acceptability.
- Price acceptability with reasons for difference from the estimate if not within reasonable bounds.
- Motivation in respect of the use of imported articles instead of items locally manufactured.
- Suitability of Contractor both in respect of standard of work and financial aspects. In the case of the latter, the Department can make further inquiries if considered necessary.
- Evaluation according to the latest affirmative procurement policy of the Government (see standard forms).

14.3.2 Deviations from Specification

If the lowest or any tender, or the tender with the highest points score, is, or appears to be, in any way not according to specification, the **Consulting Engineer** may with the written consent of the **Project Manager,** approach the tenderer for additional technical information or the withdrawal of qualifications (tenderer to confirm for instance that contract conditions will apply), provided the tender price is not affected.

It must be understood and made clear to the tenderer that prices cannot be discussed under any circumstances without the prior approval of the State Tender Board, except in the case of an unrealistically low tender price as detailed below.

14.3.3 Unrealistically Low Tender

If the tender price is such as to be considered "unrealistically low" in relation to the estimate and other tenders received, with the possible consequence that it would not be in the interest of the Department to accept it, the tenderer can be approached only to confirm his price. If in borderline cases a tenderer confirms the correctness of his price but the **Consulting Engineer** still considers the price to be

unrealistically low, the **Consulting Engineer** is then to institute further detailed investigations to establish beyond doubt, whether or not such tender is realistic and whether the tenderer reasonably expects to be able to complete the work without serious financial embarrassment, cognisance being taken of the protection afforded the Department by way of surety requirements. The **Consulting Engineers'** recommendation must include all details of approaches to tenderers and verify that unfair advantage was eliminated.

If the tenderer should inform the **Consulting Engineer** of a mistake in his tender, the Tenderer shall provide the necessary documentary evidence to establish the genuineness of the mistake. In genuine cases, the tender at the original price is normally not recommended for acceptance. Mistakes should only be rectified in exceptional cases and the adjusted tender can only be considered for acceptance if it is in the interests of the State to do so, e.g. the higher tenders are unacceptable for some sufficient reason and there are very good reasons why tenders should not be re-invited.

It is stressed that the procedure is not necessarily intended to exclude the acceptance of a low tender where the tenderer, because of a mistake made in tendering, would or could suffer capital loss.

14.3.4 Tender Price too High

When tenders are considered to be too high to recommend acceptance, the **Consulting Engineer** in reporting on the tenders, must cover such aspects as to whether there is time to re-invite tenders in the normal way or whether Tender Board approval is required to obtain urgent quotations/tenders or for negotiations with the firm submitting the lower tender to specification.

14.4 Financial Provision

With the tender recommendation, the **Consulting Engineer** shall submit a summary of the funds required for all the parts of the project for which he is responsible. The summary shall include all contracts, including any already let and those for which tenders have still to be invited. The funds summary shall be revised with the recommendation for each subsequent contract if more than one contract is involved.

14.5 Contract

The submission to the Tender Board and arranging of the contract will be a departmental function. In the case of a nominated subcontract, the Department will approach the Main Contractor to accept the tender and to close a contract with the Sub-Contractor, after the tender has been accepted by the State Tender Board.

14.6 Successful Tenderer and Contract Documents

On acceptance of a tender, the **Principal Agent**/**Consulting Engineer** will be advised of the tender amount and the name of the Contractor. Where necessary, the specification and priced bill of quantities, if applicable, will be submitted to the **Consulting Engineer** for checking of item pricing, making adjustments where necessary in consultation with the Contractor within the contract amount and for the making of copies. In order to avoid any delay in the signing of the contract, it is essential that immediate attention be given to this matter and that the original documents be returned to the Department as soon as possible. The contract period will commence from the date of the letter of acceptance of the Department.

14. 7 Signing of Documents

The Contractor must sign the original contract document in the presence of the **Project Manager** of the Department. The **Project Manager** may sign the document on behalf of the Director-General.

Copies of the signed documents must be handed to the following persons:-

(i) Original document to the Departments Contract Section;

(ii) One copy to the **Project Manager**;

(ii) One copy to the **Principal Agent**/Architect; (with bill of quantities which is not priced and thus not signed);

(iii) One copy to the Quantity Surveyor, if required.

15. SUPERVISION STAGE

The Architect/**Principal Agent**, will be responsible for such aspects of the administration of the main contract and for the supervision and co-ordination of the works as are included in his commission. The **Consulting Engineer** will similarly be fully responsible for the supervision of the electrical/electronical/mechanical work.

The **Consulting Engineer**'s attention is drawn to the fact that, in terms of the Conditions of Contract, certain functions are reserved for the Director-General, such functions comprising:

- approval of Variation Orders
- nomination of nominated/selected Sub-Contractors
- release of the securities
- extension of the contract period
- application of penalties and the termination of the contract
- various actions should the Contractor be in default
- work charged as day-work.

15.1 Handing Over of Site

15.1.1 Letter of Instructions

In the case of a selected or nominated subcontract, there is no formal handing over of the site as the successful tenderer closes a contract with the Main Contractor. However, at the commencement of the Sub-Contractor's work it is desirable that the **Consulting Engineer** should write a letter to the Main Contractor (routed via the **Principal Agent**/Architect) for the specific information of the Sub-Contractor, setting out and emphasising those aspects of the tender documents which require particular attention; procedures relating to installation work could also be included. In the case of separate contracts, a formal handing over of the site shall take place. A copy of a typical departmental handing over procedure is available - standard form. Copies of the letter are to be submitted to the **Principal Agent** and **Project Manager**. Handing over of the site shall be done in the presence of the **Principal Agent**/**Project Manager**, if possible.

15.1.2 Distribution of Documents

During site handover, three sets of documents, consisting of specification (and where applicable, a copy of the bill without prices) and a print of each of all drawings, are to be made available to the Contractor/Sub-Contractor by the **Consulting Engineer**.

15.2 Supervision

The **Consulting Engineer** will be fully responsible for supervising the electrical/electronical/mechanical work to ensure compliance with the provisions of the contract, the standards and quality requirements of the Department. The frequency of inspection is left to the discretion of the **Consulting Engineer**, but should not be less than once a week in the early stages of the contract with at least one inspection every two weeks during the rest of the contract period. During the execution stages of the electrical/electronical/mechanical contracts, the **Consulting Engineer** shall carry out regular inspections for the purpose of quality control. The **Consulting Engineer** shall ensure that the work, equipment and materials are according to specification and the quality of al equipment, e.g. large switchboards, minisubs, high voltage swichgear, should be inspected during manufacture.

The procedure shall not in any way, relieve the Contractor of his responsibilities regarding quality control and programming of his work. The representatives of the Chief Director: Professional Services and the Regional Manager may visit the site and inspect the works at the request of the **Project Manager**, but where possible, this will be done in consultation with the **Consulting Engineer**.

15.2.1 Site Staff for Construction Monitoring

Where the **Consulting Engineer** is of the opinion that the size or nature of the project requires the appointment of a full time or part time site supervisor to assist him in exercising **Construction Monitoring** (quality control of workmanship, materials and components), he should submit a motivation to the Department as early as possible. The Department will, where necessary, approve the appointment of such a person or alternatively, at its discretion, appoint a member of its own staff to act in this capacity under the direction of the **Consulting Engineer**.

15.2.2 Site Meetings

It is expected of the **Consulting Engineer** to attend site meetings. In the case of engineering services, the **Consulting Engineer** must arrange for site meetings with the Contractor at least once a month and minutes of the meetings must be submitted in duplicate to the **Project Manager** and **Principal Agent** as well as a copy to each of the other parties present at the meeting. Representatives of the Chief Directorate: Professional Services and Regional Manager may attend meetings at their discretion after informing the **Project Manager**. The minutes shall include any matters affecting the progress of the service or which could lead to claims. Such claims shall be fully investigated by the **Consulting Engineer** and any action to be taken, or already taken, be recorded in the minutes to avoid future disputes.

15.2.3 Building Programme

The building construction programme, compiled by the building Contractor, must be examined in detail to ensure that the completion of sections of the buildings, e.g. lift shafts, lift rooms and plant rooms, fits in with the construction programme of the electrical/electronical or mechanical work. However, it remains the responsibility of the Main Contractor to monitor the progress of his electrical/electronical/mechanical Sub-Contractor. Further, where the contract provides for price adjustments, it is important to ensure that where possible, and if not already allowed for in the main bill of quantities, early completion of certain sections, or alternatively adequate storage space, is arranged for to enable major equipment to be delivered on site as early as practicable. The building progress in these respects is to be constantly monitored and any difficulties or requirements brought to the attention of the **Principal Agent**/Architect.

15.2.4 Extension of Contract Period

The **Consulting Engineer** must ensure that should the building contract completion period be extended, a similar extension of separate electrical/electronical or mechanical contracts also receives consideration except where the electrical/electronical/ mechanical Contractor caused the delay which gave rise to the building contract being extended. All recommendations for extension must be passed, with full details of reasons and financial implications, to the **Principal Agent**/Architect and for him to submit to the **Project Manager** for attention and approval before any contract can be formally extended. The **Principal Agent**/**Consulting Engineer** must be advised of adjusted authorised completion dates. The Engineer must also pertinently advise the Contractor that any requests for an extension of time must be made within the time period in terms of the Standard Conditions of Contract. It must be accompanied by detailed motivations.

The **Consulting Engineer** on his part must deal immediately with such requests.

15.3 Financial Control (only if a Quantity Surveyor is not appointed)

The Department will authorise the required funds to its **Project Manager**. The **Principal Agent**/**Consulting Engineer** shall exercise financial control over the engineering contracts or subcontracts for which he is responsible. He shall ensure in respect of each contract that the funds authorised are not exceeded. The **Consulting Engineer**, in case of engineering contracts, shall regularly produce figures of the estimated completion cost and expenditure in the financial year for each contract. He shall furnish the **Principal Agent**/Architect (who is responsible for overall financial control of the project and who must be consulted on all matters affecting the cost of the work) with a comprehensive financial report. The latter must be produced at monthly intervals. Copies of the report must be submitted to the **Project Manager**. It is stressed that under no circumstances is the **Consulting Engineer** permitted, in respect of any contract, to commit the Department financially in excess of the authorised funds for the particular contract.

Together with the financial report, the **Consulting Engineer** shall submit a cash flow sheet for each contract, which shall indicate the overall financial position in respect of the estimated cost and actual expenditure for each month in the current financial year and the expected estimated total expenditure for each of the subsequent financial year(s) until the completion date. The Department's financial year runs from 1 April to 31 March of the following year.

The format of the above-mentioned reports should be in accordance with the departmental requirements (standard PRM forms).

The funds authorised will include the amount for contract price adjustment. If it is evident or considered that the authorised funds will be exceeded, the **Consulting Engineer** shall request the **Principal Agent**/Architect in writing (standard form) with the necessary motivation to approach the Department's **Project Manager** for additional funds. The **Principal Agent**/Architect's motivated submission to the **Project Manager** for an increase in the financial authority for any particular contract must include the financial position in respect of all the relevant contracts of the project. The submission must reflect all expected savings and/or excesses to enable a decision to be taken on the transfer of funds from one contract to another so as to avoid any unnecessary increase in the total cost provision of the project.

15.4 Instructions to the Contractor

In the case of selected or nominated sub-contracts, the **Consulting Engineer** shall arrange for a site instruction book, which will be issued by the Department.

The **Consulting Engineer** will issue written instructions via the **Principal Agent**/Architect to the Contractor. Written site instructions may be issued directly to the Sub-Contractor where quality of work only, and not the other trades, is affected. Where the quality of the work or progress is unsatisfactory and direct approaches have no effect, the **Consulting Engineer** shall write to the Main Contractor via the **Principal Agent**/Architect with a copy to the **Project Manager**. If the response is still unsatisfactory, the **Project Manager** must be consulted regarding further steps to be taken.

15.5 Legal Aspects

Where any action or decision could have legal and/or financial implications or if there is doubt as to the interpretation of the contract conditions, e.g. claims, payments, liquidation, desirability of putting the Contractor off site, etc. the Department must not be committed in any way. The matter must immediately be referred in writing via the **Principal Agent**/Architect to the **Project Manager** for a decision.

15.6 Record Drawings

A set of polyester prints of the working drawings is to be kept on site and kept up to date to show the "as-built" installation. On completion of the contract, the original transparencies are to be amended accordingly and returned to the Department's head office in Pretoria by the **Consulting Engineer**. A full set of transparencies must also be handed to the Regional Manager for his records. If so specified in the contract, the "as-built" drawings are to be prepared by the Contractor and checked by the **Consulting Engineer** before the **Consulting Engineer** send it to Head Office.

15.7 Co-ordination of all Engineering Services

Whatever form of contract is entered into for such services, the **Consulting Engineer** must ensure that the Contractor complies in all respects with the requirements of the co-ordination drawings, such as maximum sizes and exact positions of services and fittings.

16. VARIATIONS

The **Principal Agent**, on the recommendation of the **Consulting Engineer**, accepts Variation Orders arising out of the documentation for the contract, provided that the extent or scope of the service as defined by the tender/contract drawings and specification is not thereby increased and funds are available on the project. Such variations may arise from unforeseen site conditions, co-ordination of drawings or substitution of specified materials, fittings or equipment in the event of these being no longer available or, through interim experience, having been found to be less suitable or otherwise unsatisfactory. Variations covering minor planning changes and additions may also be similarly being accepted, provided the

functioning of the installation or system is thereby improved and provided also that no work is undone thus causing fruitless expenditure. All requests for approval of Variation Orders must be submitted by the **Principal Agent**/Architect to the Department via its **Project Manager**. Please note that, under no circumstances, may the value of the non-scheduled items exceed 5% of the contract value unless the total value of all Variation Orders is within 20% of the contract value. The total value of variations on any contract, under no circumstances, may exceed 50% of the contract amount unless prior approval is received from the State Tender Board.

16.1 General Procedure

The **Consulting Engineer** shall prepare Variation Orders complete with any drawings and schedules for issue by the **Principal Agent**/Architect, and shall also acquire and assist the Quantity Surveyor regarding the estimates relating to the Variation Orders ensuring that Tender Board requirements are met. The **Principal Agent**/Architect will issue Variation Orders (see standard form) on the contract during the course of the contract(s) to the Contractor. The Variation Orders shall be on the prescribed standard forms. Variations should be priced, checked and recommended by the **Principal Agent** and approved by the **Project Manager** before the work is executed. Before the **Consulting Engineer** arranges for any variations via the **Principal Agent**/Architect, the **Consulting Engineer** must satisfy himself that the necessary funds are available; therefore each variation submitted to the **Principal Agent**/Architect shall have a financial statement, detailing the funds position for the contract, attached. It is however stressed that all variations are to be processed, priced, approved and issued – immediately and before or at the latest within 48 hours after the instruction to the Contractor has been issued. Copies of the approved Variation Orders must be submitted to the **Project Manager**.

16.2 Procedure (when time permits)

In case of all contracts with a bill of quantities, the variation is to be compiled in bill form for both omits and adds, priced and checked and submitted to the **Principal Agent**/Architect for official issue to the Contractor. This method will also apply where schedule rates are applicable. For non-schedule items, the **Consulting Engineer** may obtain quotations directly from the Contractor and there is no objection to obtaining confirmation from him that he is satisfied with quantities and prices, prior to submitting the variation to the **Principal Agent**/Architect. Prior approval from the State Tender Board is needed, before non-scheduled work exceeding the 5% limit is executed. The **Principal Agent** will be responsible to ensure that sufficient funds are available and that State Tender Board regulations are complied with. Under no circumstances, may the value of the non-scheduled items exceed 5% of the contract value unless the total value of all Variation Orders is within 20% of the contract value or if prior approval is received from the State Tender Board. No Variation Orders whatsoever are to be issued without prior approval by the Department.

16.3 Procedure (when previous procedure cannot be followed)

An alternative procedure is as follows:

(i) Issue instructions in writing directly to the Contractor and confirm as soon as possible with the official Variation Order issued via the **Principal Agent**/Architect/**Project Manager**.

(ii) Request the **Principal Agent**/Architect to issue the Variation Order based on instruction or drawing only, the other details to follow later.

In the case of (i), small additions or alterations will normally be involved with corresponding minor financial implications, but the **Consulting Engineer** must still satisfy himself that the necessary funds are available and supply the **Principal Agent**/Architect/Quantity Surveyor as soon as possible with the variation drawings and estimated cost of the variation (included in statement).

In the case of (ii) the procedure is almost as per the previous one, except that there is insufficient time to measure quantities. The variation drawings must be passed to the **Principal Agent**/Architect with an estimated cost.

16.4 Form of Variations

The variation should be compiled in bill or schedule form, priced and accepted by the **Principal Agent**/Architect and approved by the **Project Manager**, before execution of the work. Again, as stated,

there is no objection to quantities and prices being agreed to between the Contractor and the **Consulting Engineer** before the variation is submitted to the **Principal Agent**/Architect, provided the negotiations are within the terms of the contract. Such variations can therefore be certified as being in order by both the Contractor and the **Consulting Engineer** before the latter passes it to the **Principal Agent**/Architect and for final approval to the **Project Manager**.

Where time does not otherwise permit the variation bill or schedule may be drawn up after the issue of the official Variation Order. This should be forwarded within 48 hours after the order for the work is issued to the **Principal Agent**/Architect and **Project Manager** with a copy directly to the Contractor. The Contractor shall return his copy with any amendments to the **Consulting Engineer** via the **Principal Agent**/Architect for final approval. Again, there is no objection to the Contractor and **Consulting Engineer** rectifying any discrepancies, before the Contractor returns his copy to the **Principal Agent**/Architect and **Project Manager**. The Variation Orders for each electrical/electronical or mechanical contract must be numbered in an alphabetic-numeric sequence separate from any other contract for easy checking and financial control.

16.5 Non-Schedule Items

For work and materials not covered by the rates in the Bill of Quantities or priced Schedule, the **Consulting Engineer**/Quantity Surveyor is to negotiate directly with the Contractor. Where the costs are obtained prior to execution of the work, the negotiations are to be in the form of quotations submitted by the Contractor and checked and certified by the **Consulting Engineer** as being fair and reasonable, before being passed to the **Principal Agent**/Architect for acceptance and approval by the **Project Manager**. Where work is to be executed and cannot be measured, the costs can be based on day-work. In the latter case, where labour returns are not practicable, quotations may be obtained. For uniformity it is required that all quotations be broken down into material and labour, i.e. the direct costs plus the applicable percentages for overhead costs and profit. The following examples illustrate the manner in which the non-schedule items should be set out:

(a)	Quotation (i.e. before work is executed)	
	Supply of special fitting @ cost ……..	R2000,00
	plus10 % ……	R 200,00
		R2200,00
(b)	Installation of fitting:	
	3 hours (estimated) R120/hr …… …	R360,00
	plus 33%	R 120,00
	Total add	R 480,00

The Contractor's quotation for material items must be substantiated, where possible, by a copy of the supplier's invoice or quotation.

Further, where the individual cost of an item is appreciable, say R1000 or more (this figure is given as a guide only), the **Consulting Engineer** should request the Contractor to obtain quotations from three suppliers to ensure that the material is purchased to the best advantage of the Department.

As far as the labour costs are concerned, these are the direct costs with an acceptable percentage added to cover overheads, profit, etc., and although it can vary from Contractor to Contractor, the **Consulting Engineer** must satisfy himself that the prices are reasonable.

16.6 Variations arising from Principal Agent/Architectural Variation Order Drawings

Before variations arising from **Principal Agent**/Architectural Variation Order drawings are processed, the **Consulting Engineer** must ensure that the funds are available. The **Consulting Engineer** is to use his discretion, but in cases of doubt the matter should be discussed with the **Principal Agent**/Architect and/or with the **Project Manager** as the merits of the case may warrant. In the case of additional requirements emanating from the **User Department** or from a member of the design team and which have considerable financial implications, approval of the Director-General must be obtained before the work is carried out. The normal procedure is to advise the person to put his request through the proper channels to the Department's Key Account Manager. If the matter is urgent, the **Consulting Engineer** may himself submit the request, in writing, together with his recommendation and estimate of cost to the **Principal Agent**/Architect for forwarding to the **Project Manager**. If an immediate decision is required, the matter should be discussed directly with the **Principal Agent**/Architect and the **Project Manager**.

16.7 Approval of Variation Orders

All Variation Orders are to be sent for acceptance to the **Principal Agent**/Architect for his signature, within the ambit of the authority delegated to him by the Department, after having been checked, recommended and signed by the **Consulting Engineer**. The **Project Manager** must approve all Variation Orders before the work is executed. With each Variation Order, the **Consulting Engineer** must also inform the **Principal Agent**/Architect whether or not fruitless expenditure is involved and if so, the reason therefore and the estimated amount. Wherever possible, the approval of the **Project Manager** must be obtained before any work, which may result in fruitless expenditure, is authorised. Copies of the approved Variation Orders are to be retained by the **Consulting Engineer** and the Quantity Surveyor for inclusion in the final account.

16.8 Procedure for Engineering Services (where the Consulting Engineer act as Principal Agent)

16.8.1 Financial Control

Strict control, as laid down hereunder, over expenditure in respect of variations shall be exercised to ensure that projects are executed within the financial provisions, that fruitless expenditure and claims from Contractors are avoided and that the Department is not placed in the invidious position of having to obtain ex post facto approval from the State Tender Board. Application for additional funds for Variation Orders shall be made on the appropriate standard forms.

16.8.2 Responsibility for issuing of Variation Orders

If, for reasons of changes of requirements or unforeseen circumstances, variations become desirable or unavoidable, the **Consulting Engineer**, as **Principal Agent**, shall complete the standard forms in accordance with the directives hereunder and issue all the necessary Variation Orders in respect of the contracts.

16.8.3 Approval from State Tender Board

If the **Principal Agent** requires to issue Variation Orders falling in any of the foregoing categories but the amount transferred by the **Project Manager** from other services is insufficient and/or involving substantial re-planning, major or basic changes to the design, additions and/or major substitutions of materials, fittings or equipment, the **Project Manager** shall obtain prior approval from the State Tender Board. For the purpose of obtaining such approval, the **Principal Agent** shall submit full particulars of the proposed Variation Order through the **Project Manager**, including estimated cost, possible effect on the contract period, an assessment of any fruitless expenditure and a financial report detailing the funds position for all contracts, in order that cognisance may be taken of the overall financial position of the project.

16.8.4 Variation orders originated by User Departments

The **Principal Agent** shall not issue any Variation Order requested by officials of **User Department**s, but shall advise such officials to apply to the Key Account Manager of the Department for approval through their Head Office. If the matter is urgent, the **Principal Agent** may himself submit the request in writing, together with his recommendation and estimate of cost, to the **Project Manager**.

16.8.5 Variation Orders originated from the Client

The **Principal Agent** shall issue all Variation Orders specifically authorised by the Department.

16.8.6 Distribution of Variation Orders

In addition to the copy to the Contractor, copies of Variation Orders shall be submitted to the **Consulting Engineer** from whom the variation originated, the private Quantity Surveyor, if one is appointed, and to the **Project Manager** for record purposes at the Regional and Head office.

16.8.7 Variation Orders to be processed expeditiously

All Variation Orders shall be processed expeditiously within five working days of the issuing thereof and not accumulated for attention at a later stage.

16.8.8 Monthly Financial Report

The **Consulting Engineer** shall provide a monthly financial report to the **Principal Agent** who shall submit it to the **Project Manager**. The monthly financial report shall reflect the cost implications of all Variation Orders issued and the current total expenditure on the contract.

16.9 Fruitless Expenditure

For the purpose of this Manual, fruitless expenditure comprises the following:

"Where work carried out is changed, resulting in the work already planned and executed in good faith being made undone, the cost of such work or portion thereof so undone plus the cost incurred to undo such work or portion thereof, is fruitless expenditure."

The above is valid where variations are made because of negligence and/or defective planning. Where improvements are effected, and negligence and/or defective planning are not involved, the cost is accepted as expenditure on unforeseen improvements and is not fruitless expenditure. Further, if there are additional planning costs because of changes to completed working drawings during the documentation stage, such costs are also to be regarded as fruitless expenditure. All cases of fruitless expenditure must be reported to the Director-General. Where the cost of an item does not exceed R1000, only a brief explanation is required and all such items may be included in one report to be submitted to the **Project Manager** after completion of the contract. The report must indicate, for each item, whether any person(s) could be held responsible for the cost and whether steps should be taken to recover such cost. Where the cost of an item exceeds, or is estimated to exceed, R1000, the circumstances must be reported to the **Project Manager** as soon as possible. Where possible, approval must be obtained before the work is executed. Such a report should be comprehensive and include such details as cost, reasons for the change, why it could not have been foreseen, the person(s) responsible for the change and for the original planning and whether or not the costs should be recovered from the person or persons responsible.

If there are any doubts as to the interpretation of fruitless expenditure, the matter must be discussed with the **Project Manager**.

16.10 General

All variations, involving additional expenditure, should only be considered if the functional efficiency of the accommodation and/or system is improved thereby.

17. PROGRESS OF WORK

17.1 Construction Programme

17.1.1 Programme to be submitted by the Contractor

Immediately upon the site being handed over to him, the Contractor is required to prepare and submit a detailed construction and cash flow programme, taking into account all trades and aspects of the works and allowing for any procedure requirements. When the **Consulting Engineer** is satisfied that the programme is adequate, he must submit a copy to the **Principal Agent**/Architect/**Project Manager** and other parties concerned, for their records, and advise them of any subsequent amendments.

17.1.2 Progress in Relation to the Programme and Reports thereon

After having accepted the programme, the **Consulting Engineer** shall satisfy himself regularly as to the progress made against such programme, discuss this at all site meetings and record any action taken in the minutes.

If any delay in the progress of the work occurs or the Contractor reports circumstances which indicates that delay is likely to occur, the **Consulting Engineer** must ascertain the cause and minute at the next meeting what steps are to be taken, and by whom, to rectify matters.

If the delay is due to failure in the supply of necessary drawings or instructions to the Contractor, the **Consulting Engineer** must immediately rectify the matter. If the **Consulting Engineer** is unable to do so himself, e.g. delay due to other **Consulting Engineer**s, the **Consulting Engineer** must instruct them in writing to rectify the matter immediately and send copies of his instructions to the **Principal Agent** and the **Project Manager** and subsequently inform them of the outcome of the instructions.

If the delay is due to any other cause outside the control of the Contractor, such as changes in the requirements of this or the **User Department**, or to organised work stoppages by any workmen not due to any action on the part of the Contractor, the **Consulting Engineer** must remind the Contractor of the procedure which should be followed in terms of the Conditions of Contract relating to extension of the contract period.

If the progress of the works is behind schedule and the **Consulting Engineer** is satisfied that the delay is due to default by the Contractor, the **Consulting Engineer** must so inform him in writing, stating the reasons and also drawing his attention to the terms of the Conditions of Contract. The **Consulting Engineer** must further immediately report the matter to the **Project Manager** and the **Principal Agent**, enclosing a copy of his letter to the Contractor.

If the **Consulting Engineer** does not receive a satisfactory response from the Contractor to the notification in writing as described above, the **Consulting Engineer** must warn the Contractor in writing, on a continuing basis as long as this stage of affairs prevails, that the **Consulting Engineer** will be obliged to recommend that the Department takes action in terms of the Conditions of Contract.

The monthly progress report must be completed in such manner as to enable the Department to take cognisance of the reasons for the unsatisfactory progress of the works. Delays caused by the Contractor himself and/or those beyond his control, as well as those caused by Nominated Sub-Contractors or Specialist Contractors and/or the Director-General or his Representatives/Agent, must be stated in the minutes. Mention should also be made of what steps the **Consulting Engineer** have taken to improve the progress or to rectify matters, as the case maybe, as well as the results of the steps taken by the **Consulting Engineer**. If the unsatisfactory progress is solely or partially due to failure on the part of the Contractor and if he fails to respond to the **Consulting Engineer**'s warnings, recommendations must be made in the minutes regarding the steps to be taken.

The **Project Manager** must advise the **Consulting Engineer**, what further steps the **Consulting Engineer** are required to take or alternatively what action the Department itself intends to take.

17.2 Claims for Extension of the Contract Period

All claims for extension of the contract period must continuously be dealt with during the contract. Decisions must not be delayed until the end of the contract. Within the period as prescribed in the conditions of contract, after receiving a claim for extension of the contract period from the Contractor, the **Consulting Engineer** must investigate the claim and submit it to the **Principal Agent** with the complete motivation and his recommendation. Each event shall be separately claimed for.

The recommendations must contain the following information in respect of every claim:

(i) Number of claims.

(ii) Date of event.

(iii) Period claimed.

(iv) Date on which claim was made.

(v) Reasons given by Contractor.

(vi) Recommendation in respect of extension, condonation and application of penalties.

Any notice of delays and claims for compensation and extension of the contract period must be brought to the attention of the **Project Manager** immediately, with notification of the steps being taken to avoid or end the delay. The claims for compensation for delays must be submitted with the **Principal Agent**'s comments to the **Project Manager**.

The **Project Manager** will examine the recommendation within 14 days and make a recommendation to his Director for a decision after which the Contractor will be informed in writing by the **Principal Agent/Project Manager**. The letter from the Department to the Contractor will explain the extension granted or refused and give reasons, in the case of refusal.

17.3 Monthly Reports

Every month the **Consulting Engineer** shall submit a combined report on the progress of the work and the financial status on each subcontract to the **Principal Agent**/Architect. The standard form must be used for this purpose. Copies of progress reports on engineering or separate contracts must be submitted to the **Project Manager**.

18. PROGRESS PAYMENTS

The **Principal Agent**/Architect will be responsible for arranging through the **Project Manager** for the progress payments to the Contractor on the standard form (PRM form). The Quantity Surveyor/**Consulting Engineer** is to assess the value of the work carried out and material on site - normally this is based on the claim submitted by the Contractor - and to submit such information in the form of a progress payment for each contract/subcontract to the **Principal Agent**/Architect. The **Principal Agent**/Architect will in turn give the **Consulting Engineer** a copy of each payment certificate as compiled by the Quantity Surveyor and passed to the **Project Manager** for issue and payment to the Main Contractor so that the total payments can be reflected in future reports of the **Consulting Engineer**.

18.2 Materials on Site

The value of electrical/electronical or mechanical equipment and materials on site and not installed must be reflected separately on the voucher. No payment for such equipment and materials may be made until the Contractor has submitted proof of ownership. The Contractor shall apply for payment on form PRM035, each month, by listing the equipment and materials and giving their value (cost prices supported by invoices if necessary) and certifying that the listed equipment and materials are his bona fide property, ownership of which has been passed to him according to law. For price adjustment purposes the value of equipment and materials on site shall be considered as work done.

19. RELEASE OF GUARANTEE

In the case of separate contracts, the **Consulting Engineer** may, at his discretion, at the request of the Contractor and after first delivery has been taken of the work, apply on the standard form to the **Project Manager** for the release of the guarantee.

20. RELEASE OF RETENTION

The retention money is to be released according to the conditions of contract. However, if not specified and if beneficial partial occupation is taken, the **Project Manager** may be approached for approval to release the retention money related to that portion of the work completed and after the specified maintenance period.

21. FIRST DELIVERY

First delivery is to be taken on practical completion of the work. The final inspection of the work should be done in conjunction with the **Project Manager**, the Contractor and the **User Department** and everyone must certify on the standard form the acceptability of the installation. The **Consulting Engineer** shall advise the **Principal Agent**/Architect in writing accordingly. In the case of separate contracts, the Contractor must also be advised in writing of the taking of first delivery with copies to the **Principal Agent**/**Project Manager**.

22. TESTING OF INSTALLATION

As the Electricity Supplier (Supply Authority) is not compelled to test the installation, the **Consulting Engineer** must arrange for the required tests in conjunction with the Contractor. The necessary test certificate as required by the Occupational Health and Safety Act, (the Certificate of Compliance, SABS 0142), must be completed by the Contractor, who must be an Accredited Person. Furthermore the **Consulting Engineer** must arrange for all acceptability and commissioning tests of equipment including the provision of manuals, diagrams, operating instructions in triplicate, etc., as called for in the specification. Proof of submission is required.

23. CLOSING DOWN OF CONTRACT

23.1 Delay Report/Contract Completion Report

On completion of the project, the **Consulting Engineer** is to compile a Contract Completion Report on the standard form. Any delay in completion must be assessed and reasons submitted to the **Principal Agent**/Architect together with recommendations as to whether the delay should be condoned or a penalty imposed.

23.2 Final Account

The **Consulting Engineer** will be responsible for the compiling of the final account on the standard form for each electrical/electronical/ mechanical subcontract and separate contract if a Quantity Surveyor is not appointed. The accounts for nominated or selected, subcontracts are to be included in the composite final account compiled by the **Principal Agent**/Quantity Surveyor. Where the maintenance period of a subcontract is longer than that of the main contract, the final account for the subcontract must be excluded from that of the main contract, to avoid delays. The subcontract can then be treated as a separate contract between the Department and Sub-Contractor with the approval of the relevant parties and the Main Contractor ceding the contract to the Department. In these cases, it is necessary to obtain a certificate from the Main Contractor, endorsed by the Sub-Contractor, as to the payments already made to the Sub-Contractor, to ensure that these payments agree with the records of the Quantity Surveyor and **Consulting Engineer**.

23.3 Final Delivery

On expiry of the maintenance period, the **Consulting Engineer** shall arrange for the taking of final delivery, ensuring that the installation is in good working order and in accordance with the specification by completing the standard form. He shall also complete the standard form to indemnify the Department and certify the work must be completed by a Professional Electrical/electronical/mechanical Engineer. The final accounts of the Contractor and the **Consulting Engineer** are only paid after final delivery is taken.

24. GENERAL ADMINISTRATION

The **Project Manager** is the Department of Public Works' local representative and must be consulted in connection with the practical application of the Manual and any problems or queries arising from the execution of the work.

The **Project Manager**/**Principal Agent**/Architect will supply the **Consulting Engineer** with all documents and necessary information to enable him to administer the contract in a satisfactory manner.

The **Consulting Engineer** will arrange for all the required paper prints for the Contractors. The Engineer must take the necessary steps to obtain official approval for the printing of drawings. Regular, but not more frequent than monthly accounts for this type of work should be submitted to the **Project Manager**.

On completion of the project, the **Consulting Engineer** must ensure that all service records, such as site instruction book(s), operation manuals and test certificates as well as any guarantees pertaining to systems and specific equipment, are handed to the **Project Manager** for the Regional Manager.

Sepias of the as-built drawings must be submitted to the **Project Manager** for the Chief Directorate: Professional Services at Head office, before the final delivery is taken.

Records will be kept at the Department's head office and transparencies of the final as-built drawings are to be submitted the head office via the **Project Manager**. Final fees will not be paid unless the as-built drawings, final account and indemnity certificate have been received.

All reports, forms, etc., from the **Consulting Engineer** to the **Principal Agent**/Architect should be submitted in duplicate or as directed by the **Principal Agent**/Architect. It is stressed that the **Principal Agent**/Architect remains in overall control of the service and that after reading through this Manual, all aspects should be discussed with him.

25. SUBMISSION OF THE CONSULTING ENGINEER'S INVOICES/ACCOUNTS

25.1 Form of Submission

All invoices must be submitted on the forms provided as Annexure B of this Manual, and must be accompanied by tax invoices, where relevant. Use only the appropriate forms and fill in only the relevant portions of the form.

25.2 Claims for Subsistence and Travelling

Such claims must be submitted as soon as possible after the journey has been made and included in the next fee invoice. The latest rates for reimbursable expenses should be obtained from the **Project Manager** or the Departments website

25.3 Claims for other Disbursements

Claims for disbursements must be submitted as soon as possible after the event or as soon as the **Consulting Engineer** receives receipted invoices. Claims for disbursements older than 3 months will normally not be entertained.

25.4 Payment of Claims

Please note that the Department may apply the Prescription Act of 1969, as amended.

27. INFORMATION ON THE INTERNET

Please note that all the Manuals and specifications are published on the Department's website at **www.publicworks.gov.za**.

ANNEXURE A

PARTICULARS FOR THE PREPARATION OF WORKING DRAWINGS FOR ELECTRICAL/ELECTRONICAL SERVICES

N.B. -This form must be submitted as soon as possible. Delete sections which are not applicable.

Service. - _____

_____

_____

File No : _____

A. ELECTRICITY SUPPLY

1. Is electricity supply available _____
2. If not available, will generator be essential _____
3. Supply Authority _____

B. LOW TENSION CONNECTION FROM SUPPLY AUTHORITY

1. Supply Voltage _____
2. Is connection given overhead or by cable _____
3. Maximum load permitted _____
4. Tariff applicable for:
   a. Lighting _____
   b. Power _____
5. Tariff for hot-water cylinders if available _____
6. Off peak- or night tariff if available _____
7. Special requirements of Supply Authority _____
8. Total estimated cost of connection: R _____
9. Remarks _____

_____

_____

C. HIGH VOLTAGE CONNECTION FROM SUPPLY AUTHORITY

1. Supply voltage _____
2. Will Supply Authority Provide:

(i) High voltage switchgear _____
(ii) Transformer _____
(iii) Metering equipment _____

3. Is metering on high voltage or low voltage side _____
4. Bulk tariff applicable _____
5. (a) (i) Will a miniature substation be acceptable: Yes/No _____
   (ii) Must the miniature substation be equipped with a separate metering compartment: Yes/No _____

(iii) Special requirements if miniature substation will be used _____

(iv) Who will supply and install the miniature substation. _____

(b) Is a standard substation in accordance with drawing GEN.001 acceptable? If not acceptable, please advise: _____

(c) Number and size of switch and transformer rooms required by Supply Authority, with sketch plan showing ducts. _____

(d) Can the substation form an integral part of the planned building: Yes/No _____

(e) May the Department of Public Works install its low voltage switchgear in the low voltage section of the above-mentioned substation? _____

6. Special requirements of Supply Authority. _____

7. Total estimated cost of connection: R _____

8. Remarks marks _____

D. SUPPLY TO BE PROVIDED BY THE DEPARTMENT

1. Voltage at point of supply _____
2. Distance from point of supply _____
3. Requirements at point of supply _____
4. Overhead line or cable _____
5. Remarks _____

E. CONNECTION FROM EXISTING DEPARTMENTAL DISTRIBUTION

1. Can connection be given from low voltage system _____

2. Distance from nearest supply point _____
3. Can low voltage system take the additional load _____
4. Specify any alterations necessary to the low voltage system _____
_____
_____
_____

5. Can high voltage system take the additional load _____
6. Specify any alterations necessary to high voltage system _____
_____
_____
_____
_____

7. Estimated total cost of connection including any necessary alterations to low voltage and/or high voltage system: R _____

8. Remarks _____
_____
_____
_____
_____

_____ _____
Date **Consulting Engineer**

_____ _____
Date **Project Manager**

ANNEXURE B

(NOTE: Annexure C must be done in MS Excel and e-mailed to the Project Manager with each claim)

Summary Page of Professional fees

CONSULTANTS NAME	
ADDRESS	
PROJECT	

		CONTRACT VALUE	VALUE COMPLETED
INVOICE NO	NET NEW WORKS	R	R
VAT REG NO.	NET REPAIR & RENOVATION	R	R
DATE	VARIATION ORDERS	R	R
YOUR REF	ESCALATION	R	R
OUR REF	EXCHANGE RATE ADJUSTMENTS	R	R
CLAIM NO.	TOTAL	R	R
WCS NO.			
EE NO.			
	APPOINTMENT DATE		

DESIGN

	% x{(	R0.00	x	R 0.00	)+(	% x	R 0.00	)}=	R 0.00
PLUS 25% x	% x{(	R0.00	x	R 0.00	)+(	% x	R 0.00	)}=	R 0.00
				R 0.00					
BILL OF QUANT.	% x{(	R0.00	x	R 0.00	)+(	% x	R 0.00	)}=	R 0.00
				R 0.00					

TOTAL FEES FOR DOCUMENTS (a) **R0.00**

SUPERVISION

	% x{(	R 0.00	x	R 0.00	)+(	% x	R 0.00	)}=	R 0.00
				R 0.00					
PLUS 25% x	% x{(	R 0.00	x	R 0.00	)+(	% x	R 0.00	)}=	R 0.00
				R 0.00					
BILL OF QUANT.	% x{(	R 0.00	x	R 0.00	)+(	% x	R 0.00	)}=	R 0.00
				R 0.00					

TOTAL FEES FOR DOCUMENTS (b) **R 0.00**

TOTAL PERCENTAGE FEES (a) + (b) **R 0.00**

TIME BASED FEES

TIME BASED FEES & TRAVELLING TIME PREVIOUSLY CLAIMED	R 0.00	
TIME BASED FEES ANNEXURE A1	R 0.00	
TRAVELLING TIME: ANNEXURE A2	R 0.00	
TOTAL TIME BASED FEES (c)	R 0.00	**R 0.00**

DISBURSEMENTS

DISBURSEMENTS PREVIOUSLY CLAIMED (excluding VAT)	R 0.00	
MOTOR VEHICLE CHARGES: ANNEXURE A2 (excluding VAT)	R 0.00	
PUBLIC TRANSPORT: ANNEXURE A3	R 0.00	
SUBSISTENCE CHARGES: ANNEXURE A3	R 0.00	
PRINTING COSTS: ANNEXURE A4	R 0.00	
TYPING COSTS: ANNEXURE A5	R 0.00	
DUPLICATING COSTS: ANNEXURE A5	R 0.00	
COVERS AND BINDING: ANNEXURE A5	R 0.00	
TOTAL DISBURSEMENTS (d)	R 0.00	**R 0.00**

TOTAL PROFESSIONAL FEES AND DISBURSEMENTS DUE (a) + (b) + (c) + (d)		R 0.00
PLUS VAT @ 14% OF R		R 0.00
PLUS NON-TAXABLE SERVICES ANNEXURE A3		R 0.00
TOTAL DUE		R 0.00
LESS PREVIOUS PAYMENTS		R 0.00
TOTAL AMOUNT NOW DUE		**R 0.00**

CERTIFIED CORRECT

COMMENTS:

ANNEXURE B1

TIME BASED FEES					
(In terms of R1113 as amended) (Refer to Annexure C of Letter of Appointment) Attached to Claim No ________________ Dated ________________ Approval Date/s ____________ Time Based Fee					
Date	Name and Designation	Reason for Work on Time Base/Task Name	Rate	Hours	Amount Claimed
					R
					R
					R
					R
					R
					R
					R
					R
					R
					R
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					R
					R
					R
					R
				TOTAL	**R**

ANNEXURE B2

TRAVELLING COST

(Refer to Annexure C of Letter of Appointment)

Attached to Claim No _____ Dated _____

1. Travelling Time

Date	Name and Designation	From - To	Total Hours	Minus 2 Hours	Rate	Amount Claimed
						R
						R
						R
						R
						R
						R
						R
						R
						R
						R
						R
						R
						R
						R
						R
					TOTAL	**R**

2. Motor Vehicle Charges

Make: Vehicle Capacity:

Date	Name and Designation	From - To	Total Distance	Minus 50km	Rate	Amount Claimed
						R
						R
						R
						R
						R
						R
						R
						R
						R
						R
						R
						R
						R
						R
				Total including 14% VAT		R
				Total excluding 14% VAT		R

ANNEXURE B3

SUBSISTENCE AND PUBLIC TRANSPORT

(Refer to Annexure C of Letter of Appointment)

Attached to Claim No _____ Dated _____

1. **Public Transport**

Date	Name and Designation	From - To	Invoice Number	Invoice Date	Amount Claimed
					R
					R
					R
					R
					R
					R
					R
					R
					R
					R
					R
				TOTAL	**R**

2. **Subsistence Charges**

Date	Name and Designation	From - To	Invoice Number	Invoice Date	Amount Claimed
					R
					R
					R
					R
					R
					R
					R
					R
					R
					R
					R
				TOTAL	**R**

3. **None Taxable Services**

Date	Name and Designation	From - To	Invoice Number	Invoice Date	Amount Claimed
					R
					R
					R
					R
					R
					R
					R
					R
				TOTAL	**R**

ANNEXURE B4

PRINTING COSTS

(Refer to Annexure B of Letter of Appointment)

Attached to Claim No _____ Dated _____

Date	Delivered To	No of Prints	Drawing Numbers	Size	Type	Rate	Amount Claimed
							R
							R
							R
							R
							R
							R
							R
							R
							R
							R
							R
							R
							R
						TOTAL	**R**

ANNEXURE B5

TYPING AND DUPLICATING COSTS

(Refer to Annexure B of Letter of Appointment)

Attached to Claim No _____ Dated _____

1. Typing

Description of Document	Pages	Rate	Amount Claimed
			R
			R
			R
			R
		TOTAL	R

2. Duplicating

Description of Document	Pages	Copies	Rate	Amount Claimed
				R
				R
				R
				R
				R
				R
				R
				R
				R
			TOTAL	R

3. Covers and Binders

Description of Document	No. of Documents	Rate	Amount Claimed
			R
			R
			R
			R
			R
			R
		TOTAL	R

ANNEXURE C

LIST OF STANDARD DEPARTMENTAL DOCUMENTS TO BE USED BY THE PRINCIPAL AGENT/CONSULTING ENGINEER IN THE EXECUTION OF THE PROJECT.

DESCRIPTION	PRM NO	Pages
Detail Project Planning Progress Report	PRM008	1-2
Progress Report on Project Appraisal Phase	PRM009	1
Report of Property	PRM011	1-9
Environmental aspects to be considered	PRM012	1-2
Consultants planning programme proposal: design development and documentation	PRM014	1
Monthly progress report from Architects		2
Monthly progress report from Quantity Surveyor		3
Monthly progress report on electrical/mechanical engineering design		4
Monthly progress report on structural engineering design		5
Monthly progress report on Civil Engineering Design		6
Progress / Bar Chart	PRM015	1
Submission of Drawings - Local Authorities	PRM017	1
Standard letters to tender committee for tender adjudication (All examples)	PRM028	
Example 1 above R2 Million		1-5
Example 1a above R2 Million		1-5
Master above R2 Million		1-5
Master under R2 Million		1-12
APP Tender Report	PRM030	1-4
Handing over of site meeting minutes	PRM031	1-8
Acknowledgement of Handing Over of Site - Clause 20 - PW677	PRM032	1
Acknowledgement of Handing Over of Site - GCC 1990		2
Site Staff	PRM033	
Progress Payment Certificate - Pen Version (PW1525)	PRM034	1
Progress Payment Certificate - Electronic Version (PW1526)		2
Application for an Advance in Respect of Material / Equipment in Terms of Clause 23 of the Conditions of Contract	PRM035	1
Contract Status Report	PRM036	1
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ANNEXURE D

DEPARTMENT OF PUBLIC WORKS

STANDARD MECHANICAL ENGINEERING TECHNICAL SPECIFICATIONS

STS 1	AIR CONDITIONING AND VENTILATING INSTALLATIONS: ISSUE XI, 1998
STS 2	REFRIGERATION SERVICES: ISSUE VIII, 1998
STS 3	STEAM BOILER INSTALLATIONS: ISSUE VII, 1997
STS 4	CENTRAL HEATING INSTALLATIONS: ISSUE XI, 1999
STS 5	THE STANDARD SPECIFICATION FOR ELECTRICAL INSTALLATIONS AND EQUIPMENT PERTAINING TO MECHANICAL SERVICES: ISSUE IX, DECEMBER 1998
STS 6	THE SUPPLY OF A TANK AND TRAILER FIRE FIGHTING UNIT WITH PETROL DRIVEN CENTRIFUGAL PUMP AND SUNDRY ACCESSORIES: FPO/82/1E: JANUARY 1999
STS 7	TECHNICAL SPECIFICATION FOR ZONE ALARMS FOR A SPRINKLER FIRE EXTINGUISHING SYSTEM: FPO/82/2E: JANUARY 1999
STS 8	TECHNICAL SPECIFICATION FOR A FIXED CARBON DIOXIDE FIRE PROTECTION INSTALLATION: FPO/82/3E: JANUARY 1999
STS 9	TECHNICAL SPECIFICATION FOR AN INERT GAS AGENT FIRE EXTINGUISHER SYSTEM: JANUARY 1999
STS 10	TECHNICAL SPECIFICATION FOR AN AUTOMATIC FIRE ALARM INSTALLATION: FPO/82/5E: JUNE 1994
STS 11	TECHNICAL SPECIFICATION FOR THE PUMP INSTALLATION FOR AN AUTOMATIC SPRINKLER FIRE EXTINGUISHING SYSTEM: FPO/82/6E: OCTOBER 1981
STS 12	TECHNICAL SPECIFICATION FOR AN AUTOMATIC SPRINKLER FIRE EXTINGUISHING SYSTEM: FPO/82/7E: OCTOBER 1981
STS 13	TECHNICAL SPECIFICATION FOR EVACUATION COMMUNICATION SYSTEMS: FPO/86/8E: JANUARY 1999
STS 14	TECHNICAL STANDARD SPECIFICATION FOR SECURITY EQUIPMENT: F.P.O.9E: REVISED SEPTEMBER 1995
STS 15	MANUAL OF THE COMPILATION OF FIRE PROTECTION SPECIFICATIONS: DECEMBER 1999
STS 16	SCHEMATIC DIAGRAM FOR A FIRE PUMP INSTALLATION: FPO/89
STS 17	PREVENTATIVE MAINTENANCE FIRE AND SECURITY INSTALLATIONS: NOVEMBER 2000
STS 18	MANUAL FOR: ELECTRICAL/ ELECTRONICAL/MECHANICAL CONSULTING ENGINEERS: September 2003.

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