ARCHITECTURAL SPECIFICATION

PROJECT: ACSA ABLUTIONS
ORTIA KEMPTON PARK

CLIENT: Airports Company South Africa (ACSA)

ISSUED FOR: TENDER
Table of Contents

A - General Requirements
B80 - Alterations - Spot Items
C20 - Demolition Works
F10 - Insitu Concrete Mixes/ Casting/ Curing
H10 - Brick/ Block Walling
H40 - Accessories/ Sundry Items For Brick/ Block/ Stone Walling
L21 - Timber Doors/ Frames/ Shutters/ Hatches
L60 - Purpose Made Joinery
M20 - Panel Partitions
M30 - Demountable Suspended Ceilings
N12 - Trowelled Resin Flooring
O10 - Signs/ Notices
O20 - Ironmongery
Q50 - Architectural/ Sundry Metalwork
R10 - Screeds And Toppings
R20 - Plastered/ Rendered/ Roughcast Coatings
S10 - Ceramic/ Stone/ Marble/ Slate/ Glass/ Mosaic Tiling
T60 - Sanitary Appliances/ Fittings
U21 - Lighting And Small Power
W10 - General Glazing And Mirrors
X10 - Painting/ Clear Finishing
Z11 - Metalwork
Z15 - Holes/ Chases/ Recesses For Services
Z20 - Fixings/ Adhesives
Z21 - Mortars
Z22 - Sealant Joints
Z25 - Glass And Coatings
Z30 - Metalwork Finishes
Z31 - Powder Coatings
A GENERAL REQUIREMENTS

A.100 FORMAT OF SPECIFICATION

A.101 Format

a. The Specification is made up of Sections A to Z.

b. Sections A and Z provide general requirements applicable to Sections B to Y. Sections B to Y detail particular requirements specific to individual trades or elements of the Works.

c. The types of Specification are as follows:

1). Descriptive: Shows the design intent and performance requirements with which the Contractor, and/or his sub-contractor must comply when completing the Detailed Design.

2). Prescriptive: Provides detailed materials and workmanship requirements reflecting the Architect's design solution.

3). Performance Specification: Gives the performance criteria that the Contractor shall satisfy utilising appropriate materials, methods and techniques.

d. Read the Specification along with other contract documentation.

A.102 Standard System of Measuring Building Work Section Categories

a. A Section List:

1). A100 Format of Specification
2). A200 Description of the Project
3). A300 Contractors Responsibilities
4). A400 Submittals
5). A500 Performance Requirements and Data
6). A600 Quality Control
7). A700 Owner’s Requirements

b. Prescriptive Section List:

1). C20 Demolition Works
2). H10 Brickwork/ Blockwork
3). H40 Brickwork/ Blockwork Accessories
4). L21 Timber Doors
5). M20 Panel Partitions
6). M30 Demountable Suspended Ceilings
7). N12 Trowelled Resin Flooring
8). O20 Ironmongery
9). Q50 Architectural/ Sundry Metalwork
10). R10 Screeds And Toppings
11). S10 Ceramic/ Stone/ Mosaic Tiling
12). T60 Sanitary Appliances/ Fittings
13). U21 Lighting And Small Power
14). X10 Painting/ Clear Finishes

c. Descriptive Section List:
1). B80 Alterations – Spot Items
2). F10 In Situ Concrete Mixes/ Casting/ Curing
3). L60 Purpose Made Joinery
4). O10 Signs/ Notices
5). R20 Plastered/ Rendered/ Roughcast Coatings
6). W10 General Glazing And Mirrors

d. Z Section List:
1). Z11 Metalwork
2). Z15 Holes/ Chases/ Recesses for Services
3). Z20 Fixings/ Adhesives
4). Z21 Mortars
5). Z22 Sealant Joints
6). Z25 Glass and Coatings
7). Z30 Metalwork Finishes
8). Z31 Powder Coatings

A.103 Supplemental Information

a. Refer to the requirements of the following client documents as appropriate:

1). Types:
   a). Health and Safety Requirements.
   d). Structural/ Engineer’s Drawings.
A.104 Definitions

a. The following definitions apply to the Specification:

1). "Specification": This document, comprising Sections A-Z inclusive.

2). "Design": The visual intent prepared by the Architect for Tender purposes, represented by the Contract Drawings and the Specification.

3). "Detailed Design": That prepared by the Contractor, and/ or his sub-contractor, represented by the Working Drawings and Contractor’s, and/ or sub-contractor’s, specifications in relation to work to be executed in terms of a provisional sum, described in the bill of quantities as a design, supply and installation item.


5). "Construction Drawings": Drawings issued by the Principal Agent, or other duly authorized design consultant, as a contract instruction to the Contractor, for construction purposes.

6). "Shop Drawings/ Working Drawings": Drawings representing the Design, prepared by the Contractor (or his sub-contractor) based upon the Contract Drawings, maintaining the design intent.

7). "As-built Drawings": Drawings produced by the Contractor, and/ or his sub-contractor, where required, which show the Works as finally constructed.

8). "Testing Authority": Competent accredited independent testing body or association, subject to acceptance by the Architect.

9). "Works": The extent of work to be executed by the contractor described in the contract documents and contract instructions, which includes free issue, and materials and goods. Work or installations to be executed by direct contractors and others responsible to the employer are excluded.

10). ‘Inspection’: Inspection carried out by the Architect of materials, components, equipment and installation of the Works. Such inspection shall be limited to an inspection of the visual appearance only.

11). ‘A(a)cepted, A(a)ceptance or A(a)ceptable’: Materials, components, equipment and installations accepted by the Architect shall be based upon Inspections (as defined above).
A.200 DESCRIPTION OF THE PROJECT

A.201 Overall Project Description

a. [.........].

A.300 CONTRACTOR’S RESPONSIBILITIES

GENERAL, SAFETY, PROGRAMME

A.301 General Requirements

a. Comply with the provisions of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) and any regulations promulgated in terms of that Act or the Factories Machinery and Building Works Act of 1941.

b. The Contractor shall, before establishing on site, appoint and submit to the Architect in writing the name(s) of the person(s) who is/ are the responsible person(s) in terms of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) and the regulations promulgated in terms of the Act within 14 days from being appointed.

A.302 Safety

a. From date of site handover to the Contractor until the completed work is handed back to the Owner, the Contractor shall be responsible for maintaining safe working conditions on site.

b. The Contractor shall be responsible in terms of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) and the regulations promulgated in terms of the Act or Factories, Machinery and Buildings Work Act, whichever is applicable.

c. The Contractor shall be responsible for supplying and installing the required safety signs as determined by the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) and the regulations promulgated in terms of the Act or Factories, Machinery and Building Works Act, whichever is applicable, both during the construction phase and for the completed Works.

d. All safety signs shall comply with the requirements of the latest edition of SANS 1186-1 as applicable.

A.303 Programme

a. The Contractor shall submit his programme of work to the Architect in accordance with the tender and contract conditions.

CONTRACTOR/ SUBCONTRACTOR RESPONSIBILITIES UNDER THE DIFFERENT SPECIFICATION TYPES

Descriptive Type Specification

A.304 Design Responsibility

a. Complete the Detailed Design keeping the function, visual requirements, performance and intent of the Design.

b. Provide, with the Tender, detailed proposals, showing compliance with the design intent and confirm the provision of fully warranted systems and guarantees of goods acceptable to the Architect.
c. The Contractor's Proposals to include full supporting documentation to facilitate a full technical appraisal.

d. Tenders may be modified and amended prior to Contract award to reflect the agreed final scope of the Works, materials and systems selected to reflect the design intent.

e. Provide submittals outlined in each particular trade section.

f. Do not start any portion of the Works without acceptance of submittals by the Architect.

g. Be responsible for the final selection and proper installation of products and associated parts, using them solely for the purpose intended by the manufacturer.

h. The completion of all testing to certify compliance with the specification and Contract Documents.

i. Provide necessary warranties.

j. Provide relevant documents for Building Control and other Statutory Authorities when instructed by the Architect.

k. When requested, provide calculations and any other relevant information to the Architect for submission to and approval by the Local Authorities. Make any changes required by the local authorities, following submissions, to the satisfaction of the Architect.

A.305 Contractor's Proposals

a. The Contractor's Proposals will be reviewed during the Tender Evaluation period. Attend evaluation meetings as required and make necessary changes and alterations prior to Contract award.

b. The Contractor's Proposals to include:

1). Detailed drawings of systems, typical details and principal interfaces.

2). Working Drawing programme.

3). Samples.

4). Technical specifications of proposed systems and products.

5). Details of guarantees and warranties.

6). Summary of deviations from/ non-compliance with the Tender.

A.306 Completing the Detailed Design


b. Comply with all relevant Codes of Practice, Standards, Fire Regulations, Building Regulations and local Building Codes, Safety Regulations and any other regulations applicable to the Works, together with all relevant Statutory Rules, Regulations, Bye-laws and other enforceable instruments applicable to both the design and execution of the Works.

c. Provide a programme for the Detailed Design showing all tasks, submissions and Working Drawings.

d. Do not alter the Contract Specification without the Architect's prior written consent.
e. Use materials, fixings and sealant of suitable sizes, thicknesses, types and locations.

f. Allow for all necessary movement and tolerances in the Detailed Design.

g. Include descriptions of relevant structural performance principles of the Works; including how and where loads are transmitted to the primary structure and the accommodation of tolerances.

h. Detail all fixing requirements to interfacing elements of the Works, to be accepted by the Architect prior to starting installation.

i. Co-ordinate all interfaces.

j. The Architect’s review of Working Drawings will relate to visual performance and functional matters only.

A.307 Additional Supplemental Information

a. Provide any additional information in respect of the Detailed Design, materials, systems, methods, installation and procedures as required by the Architect after Contract award.

b. Submit any additional information necessary to show compliance with the Specification to the Relevant Authorities.

A.308 Material Preferences

a. Use materials of sufficient quality, size, thickness and type.

b. Where the choice of a particular material, type of construction, dimension, size or thickness is indicated in the Specification or on the Design Drawings, or a particular method of construction is implied, satisfy yourself/ itself that the choice indicated satisfies the design intent and performance requirements. If they are considered inadequate or inappropriate, make alternative proposals at the time of Tender.

c. Acceptance of alternative proposals does not relieve the Contractor from responsibility to provide suitable materials, parts and assemblies fit for the purpose intended by the manufacturer and in compliance with the Contract Documents.

d. If, with the Tender, no such alternative proposal is submitted to any of the preferences indicated in the Tender Documents, then the solutions proposed in the Specification and on the Design Drawings shall be deemed to be accepted, as fit for the intended purpose, by the Contractor.

e. Final surface finish of similar materials to remain visually consistent, including colour and texture, regardless of orientation or natural grain.

f. Where proprietary products are used provide any modification, additional bracing, reinforcing, suitable fixings, etc. to ensure that the products meet the requirements of the Specification.

A.309 Detailed Design, Manufacturing and Installation Tolerances

a. The Specification together with the related Contract Drawings indicate the dimensional tolerances (hereafter referred to as ‘tolerances’) required during Detailed Design, manufacture, sub-assembly, setting out and installation of the Works.

b. The Working Drawings to indicate clearly methods of achieving manufacturing and construction tolerances.

c. Advise any tolerance omissions, inconsistencies, or incompatibilities.
d. Check site dimensions critical to the Works, in sufficient time to enable corrective action to be taken.

e. Inform the Architect of any work that does not meet the specified tolerances.

f. The Works to be free from deformation and not be subject to warping, twisting and/or perishing, remaining stable, firm, free from vibrations, knocking, rattles and/or whistles, squeaks or other such noises.

g. In the event of there being any discrepancy in the values of existing datum reference points, datum levels, buildings, foundations or other features to which the Works are related, determine and report such a discrepancy and obtain written instructions before proceeding.

h. Permissible tolerances to be progressively checked up to handover. Where two or more different tolerances can be derived by calculation and/or from the Design Drawings for the same dimension, the least tolerance to apply. Tolerances not to be cumulative.

Prescriptive Type Specification

A.310 Contractor's Undertaking

a. Comply with all material and workmanship requirements.

b. Provide everything necessary for the execution and completion of the Works in accordance with the Contract Documents, more specifically the Contract Drawings and Specification. Deliver the Works complete and ready for use.

c. Where necessary, provide technical information and details to show compliance with the Contract.

d. No portion of the Works to start without acceptance of the appropriate submittals.

e. If additional bracing, reinforcing or fixings are necessary to ensure a safe installation, provide notice to the Architect prior to start of any part of the Works. Convey any concerns that the manufacturers may have expressed regarding the suitability of products specified.

f. Alternative products may be proposed but such proposals must be accepted by the Architect in writing before proceeding. For such alternative products, provide full technical literature to show that proposals are of a standard at least equal to that specified and show compatibility with the design.

Performance Type Specification

A.311 General Contractor's Requirements and Responsibilities

a. Provide suitable goods, products and techniques to meet the specified performance criteria.

A.312 Detailed Requirements

a. Demonstrate compliance at the time of Tender.

b. Ensure that all products and systems are fit for the intended purpose.

A.313 Contractor’s Proposals

a. A statement confirming compliance with the Specification, showing how the Works will be carried out and which products will be incorporated.
b. Include details of warranties and guarantees.

A.400 SUBMITTALS

A.401 Procedure

a. No portion of the Works to start without acceptance of the required submittals.

b. Provide a final schedule indicating the dates on which submittals will be available for inspection.

c. Provide submittals in accordance with the following:
   1). Deliver submittals to premises identified by the Architect.
   2). Individually identify each submittal for the project element.
   3). Include all relevant information with each submittal.
   4). Identify submittals that differ from the requirements of the design.

d. Submission of Working Drawings/ Shop Drawings/ Documents:
   1). Allow 21 days between the first submission of a Working Drawing and receipt of A or B status confirmation. Failure to achieve status A or B, as described in clause A. 411(e) below, to be at the Contractor’s risk.

   2). Provide a list of Working Drawings/ Shop Drawings proposed.

e. Incorporate into the contract submittals reviewed and altered during the Tender evaluation period.

A.402 Tender Submittals

a. Provide, at the time of Tender, the submittals listed in the Specification and a Non-compliance Report stipulating any deviations/ non-compliance with the specification or Design Drawings.

A.403 Tender Submittals

a. Provide a method statement supported by plans, sections, elevations and typical details of all buildings and external Works, maintaining the design intent.

b. Provide detailed specifications to show compliance with the Specification for materials and workmanship including structural and services elements.

c. The Contractor’s Proposals to be agreed prior to Contract award.

A.404 Post Contract Submittals

a. After Contract award provide Working Drawings/ Shop Drawings, samples, mock-ups, prototypes, quality benchmarks, calculations, test reports and other relevant data.

A.405 General Samples

a. Samples to include various natural materials, fabricated items, equipment, devices, appliances or parts thereof, as may be required to satisfy the visual appearance and technical requirements of the Design.
b. Review samples for their visual characteristics and where moving or operating elements are involved, the Architect to be given the opportunity to review working samples.

c. Provide samples where a range of colour, graining, texture and other characteristics is anticipated.

d. Where custom colours are specified, samples to be submitted illustrating precise colours, textures, patterns and finishes for review by the Architect.

A.406 Tender Samples

a. Samples provided with the Tender or during the evaluation period.

b. Provide the samples, listed in the Specification, required to verify visual appearance and/ or quality.

c. Deliver tender samples to the Architect’s office showing type and quality of material proposed for use in the Works.

d. Final agreed Tender samples will be labelled and kept by the Architect as a record of materials agreed for Contract.

A.407 Control Samples (Post Contract)

a. Provide samples during the completion of the Detailed Design for checking against the Tender samples to ensure that quality and type have been maintained.

b. The samples listed in the Specification to be kept as a record of materials to be incorporated in the Works and used as references for controlling consistency throughout installation.

c. Provide samples of materials in their final form.

A.408 Mock-ups

a. During Detailed Design provide mock-ups for inspection as described in the Specification.

b. Mock-ups need not use final materials to be incorporated in the Works but should adequately represent the design.

c. Mock-ups to confirm visual intent including colour, size, fit and co-ordination.

A.409 Prototypes

a. Prior to manufacture of elements of the Works, construct off Site (or on Site if specifically requested by the Architect) full scale three-dimensional sections as described in the Specification utilising final specified materials but not necessarily final production techniques.

b. Prototypes to be tested to demonstrate system performance of the maximum applied loads, climatic conditions and structural movements.

c. Prototypes to be used as a Quality Assurance ‘Hold Point’.

d. Manufacture of materials/ products for use in the Works not to start until receipt of the Architect’s written acceptance of the prototypes.

e. Produce Working Drawings/ Shop Drawings for the prototypes.
f. Where tests are specified, carry out or arrange for the testing by an approved independent test authority.

g. Any changes required to be recorded on As-built Drawings to show their final construction.

A.410 Quality Benchmarks

a. Upon start of installation, erect complete sections of elements of the Works, where described in the Specification, for acceptance of the Architect. Use these as a quality benchmark for the remainder of the Works until Practical Completion.

b. Do not start installations in other areas of that particular element until the Architect has examined, accepted and visually recorded the quality benchmark. Carry out any alterations or adjustments required in order to achieve an acceptable quality.

c. Upon receipt of acceptance, fully protect the quality benchmark. Use, from time to time, to check and monitor quality of materials and workmanship incorporated in the remaining areas of the Works, or where specifically stated for further testing. Remove and replace all protection for such purposes.

A.411 Working Drawings/ Shop Drawings

a. Provide Working Drawings/ Shop Drawings, as required by the Contract Documents.

b. The Working Drawings/ Shop Drawings will be reviewed for compliance with visual, performance and Contract requirements.

c. The Working Drawings/ Shop Drawings review will not relieve the Contractor of his responsibility for errors, or for supplying components and materials to the full satisfaction of the Architect.

d. Working Drawings/ Shop Drawings to be fully dimensioned in metric, to an agreed scale appropriate to the detail, and include:

1). Full size details and graphic representation describing materials, components and equipment, construction, finishes, provision for movements, fabrication and erection tolerances.

2). Layouts, locations and assemblies of all types of construction detail and junctions, details of materials, method of jointing, details of all Site connections and fixing and sealing methods, finishes and all pertinent information related to:
   a). Method of fabrication and construction.
   b). Proper relation to adjoining work.
   c). Finishes.
   d). Amplification of details.
   e). Minor changes to the Design to suit actual conditions.

e. Submit Working Drawings/ Shop Drawings in accordance with the Contract Documents and do not start fabrication of components until formally returned by the Architect with either ‘A’ or ‘B’ stamped on each of the Working Drawings/ Shop Drawings. Ensure that space is left clear on each of the Working Drawings/ Shop Drawings for stamping by the Architect. The following drawing inspection codes to be used when returning the Working Drawings/ Shop Drawings to the Contractor:

1). Drawing stamped ‘Category A’ - Fabrication, manufacture or construction may proceed in accordance with the drawing submitted.
2). Drawing stamped ‘Category B’ - Fabrication, manufacture or construction may proceed in accordance with the drawings submitted subject to the Contractor taking necessary action based on the Architect’s comments and all annotations added to the returned drawings. Unless indicated to the contrary on such drawings, the work to comply with the Contract Documents. To achieve ‘Category A’ status, the required number of copies of amended drawings to be sent to the Architect.

3). Drawings stamped ‘Category C’ - No work to be fabricated, manufactured or constructed. Submit new drawings to the Architect for review until re-submission is not required.

f. The Architect’s final comment on the Working Drawings/ Shop Drawings (Category A) will be conditional upon receipt of all documentation, certification, acceptances in respect of anchorages, fire stop assemblies, samples, mock-ups and test reports, etc. as defined in the Specification.

g. When preparing the Working Drawings/ Shop Drawings consult the current Architect, Structural and Services Contract Drawings, adjusting the Working Drawings/ Shop Drawings to allow for any changes to Site tolerances and/or discrepancies where applicable.

h. Utilise manufacturer’s standard details as appropriate ensuring compliance with the design intent.

i. Annotate the Working Drawings/ Shop Drawings in English and title in the manner determined for the Contract, with the title block fully indicating the part of the Works to which they apply.

j. Treat as confidential information contained in any of the Contract Drawings and do not utilise for any purpose other than for the Works.

k. No Working Drawings/ Shop Drawings acceptable if produced to a reduced size.

l. Submit Working Drawings/ Shop Drawings in two polyester printed copies and two electronic format copies.

A.412 Other Submittals

a. Product Data: Provide technical information detailing the characteristics of each system, system part or material incorporated in the Works. Include material schedules and manufacturer’s literature.

b. Certifications: Provide independently certified reports verifying compliance of each element or part with the requirements of the Contract Drawings and Specification. These reports to include the chemical and physical properties of various building materials.

c. QA/ QC Programme: Provide a programme to satisfy the requirements of the Specification, the Contract conditions or any other documents referred to in the Contract Documentation.

d. Pre-construction Testing Reports:

1). Provide technical reports recording test results for systems, parts and materials as required by the Contract Drawings, the Specification, the Architect or a testing laboratory, prior to start of installation.

2). The reports to state compliance with the technical requirements of the Specification and include, where appropriate, test certificates.
e. Maintenance/ Operation Manuals: Manuals prepared by the Contractor for the Client/ building user’s maintenance and operation of the various building systems and/ or parts thereof.

f. Supplementary Product Literature: Such literature may include manufacturer’s catalogue information, product specifications, standard illustrations, diagrams and standard details. The supplementary product literature to describe physical characteristics such as size, weight, finish, material analysis, electrical requirements and other information such as load tables, test results, assessments and industry quality standards.

g. Technical Calculations: Technical engineering calculations which document technical performance of various systems, system components and/ or materials, as required by the Contract Drawings and Specifications.

h. All submittals provided to be written in the English language.

A.413 Review of Submittals

a. The submittals will be reviewed for visual and performance compliance and if acceptable, stamped or marked in accordance with the project procedure. Submittals that are incomplete or erroneous, or which are not required, will be returned and a new submittal made as necessary.

A.500 PERFORMANCE REQUIREMENTS AND DATA

A.501 Performance Requirements

a. The Works to comply with the performance criteria stated in the Specification and the Contract Documents.

b. Stated performance criteria sets the minimum standards with which the Detailed Design shall comply.

c. No warranty or representation is given by the Architect as to the accuracy of the Contract Drawings or the adequacy or buildability of details shown. Such warranties only relate to Construction Drawings. Should the Contractor adopt the details or arrangements indicated on the Contract Drawings it shall be deemed that he has checked their buildability and performance in terms of this Specification, all relevant Regulations and codes of practice, and manufacturers’ recommendations for any products referred to.

d. Where relevant South African National Standards, British Standards, BS codes of practice, or Agrément Certificates applicable to the design exists, the recommendations and requirements of such documents to be considered a minimum standard for the Works.

Service Life

e. The design life of the building to be a minimum period 60 years.

A.502 Service Life of Parts

a. Various elements/ parts have varying ‘service life’ (i.e. actual period of time during which no excessive expenditure is required on operation, maintenance or repair of a component or construction – as recorded in use).

b. Primary components are all components with a predicted service life not less than the design life of the building without the need for maintenance other than regular cleaning.
c. Secondary components are all components with a predicted service life of design life equal to the element being specified, assuming regular cleaning and maintenance. Secondary components shall be capable of easy replacement without progressive dismantling of adjacent elements.

d. Confirm the predicted service life (i.e. the service life predicted from recorded performance or accelerated tests) and maintenance requirements of the parts of the Works for review by the Architect and provide detailed information at Tender Stage.

e. Use materials solely for the purpose intended by the manufacturer and which satisfy the requirements of the Specification and the Contract Documents.

f. Premature deterioration is not acceptable.

**Structural**

**A.503 Movements**

a. The Detailed Design, fabrication and installation to take into account all tolerances and movements of the building structure in both permanent and temporary conditions.

b. Movements include the application of dead, live and wind loads plus moisture, shrinkage, deflections, creep, seismic and thermal effects, that may occur during the fixing, final installation or lifetime of the Works.

c. The Works to withstand all movements of the building structure under all design loads or combination of loads without damage or any reduction in performance.

d. Fixings to be capable of providing adequate restraint and with adjustment to suit building movement and prevent system/ installation failure.

e. Movement joints to accommodate the maximum movement that can be derived from the specified and determined design loads and movements and to meet all the performance requirements of the Specification.

f. The Works to resist torsional stresses, static and dynamic design loads without causing permanent deformation of components or the failure of systems and materials and to transmit such loads safely to the points of support.

g. Refer to the Movement and Tolerance requirements produced by the Structural Engineer.

**A.504 Dead and Live Loads**

a. Withstand the following loads without any deterioration or reduction in performance:

1). Accommodate the component and final assembly dead load.

2). The various loads imposed by other trades or derived from any fittings or services fixed to, pass through or connect to the Works. Provide strengthening and support work as required.

b. Take special care to identify and design for any situation not clearly defined in SANS 10160 where it is believed that the geometry of the building may cause increased pressure due to vortex or eddy conditions.

c. Calculate maximum gust wind pressure in accordance with SANS 10160.

d. Impact loads, or transferred impact loads, that occur during the service life of the Works, without deterioration in performance and without sustaining non-repairable damage.
e. Loads imposed during replacement of components.

f. When calculating loads the worst combination to be considered.

A.505 Deflections

a. The Works, when carrying full design loads, not to exceed the deflection limits specified within the relevant Work Section of this document.

b. The Works not to deflect under loading in any way that is detrimental to any part or adjacent structural or building element.

c. All parts, couplings and fixings to be capable of accommodating deflections without permanent distortion, deformation or failure.

d. The Works to accommodate differential structural movements arising from adjacent structures.

e. Reduce the magnitude of the allowable deflections if they are detrimental to any part of the Works, its support structure or internal finishes.

A.506 Wind Loads

a. The Works to withstand without permanent deformation, the effects of wind loads where appropriate (e.g. external conditions or internal areas subject to external wind pressure).

A.507 Preceding Work

a. At the appropriate time check all preceding work, including checking line, level and fixing points and report immediately to the Architect if any is considered to be unsuitable. Propose remedial action if so requested by the Architect.

b. Prior to manufacture of parts/elements, where possible, inspect the Site and check measurements of the preceding Works while completing the Working Drawings. Coordinate all Site dimensions.

A.508 Vibration

a. Make sure that the Works withstand all vibration caused by traffic, aircraft, equipment effects or any other shocks, slamming, strains, stresses and movement imposed, avoiding deterioration or fracture of any element, both during construction and after installation.

Environmental Conditions

A.509 Generally

a. Make sure that the Works conform to all aspects of the Specification and Contract Documents, taking into account all local environmental conditions prevailing at Site.

b. Allow for the fact that the Works will be erected in all extremes of weather conditions throughout the year.

Durability

A.510 General Requirements

a. Ensuring that the Works complies with the relevant requirements of SANS 10400.

b. Use materials in the Works that suit the design and service life of the building.
A.600 QUALITY CONTROL

General Quality Assurance, Quality Control, Testing

A.601 General

a. Set up, document and maintain a quality assurance and quality control system, able to be checked to the satisfaction of the Architect, that all materials and workmanship, whatever their sources, meet the requirements of the Specification and Contract Documents. Should the Contractor or any of his sub-contractors be certified to the SANS 9000 family of standards then monitor these Works accordingly.

b. Define the quality programme in a quality control manual or similar document in which the organisation systems, inspection and test plan procedures are fully described to ensure that all essential inspection requirements are determined and satisfied throughout all phases of the design and construction of the Works.

c. Establish a tolerance quality control manual to cover all aspects of tolerance compliance relating to the Works. Prepare a quality control proposal for submission to the Architect for acceptance. This shall describe, in detail, the various types of quality control checks to be carried out during each stage of the Works; what means and methods to be used; which personnel to be employed, together with their qualifications, and how each type of tolerance check is to be recorded and kept for future reference.

A.602 Testing and Inspection

a. Where required, engage an accredited independent testing specialist, as agreed with the Architect, to verify that the requirements of the Contract have been satisfied.

b. Make the following minimum provisions available to the Architect at all times:

1). Suitably qualified personnel using appropriate validated equipment.

2). All necessary access and facilities for inspection and testing in fabrication shops and on Site.

3). Regularly calibrated equipment for the purposes of load measuring.

c. Maintain the following:

1). Tests and inspection results during all stages of manufacture, assembly and installation of components.

2). Certificates relating to the materials used in the work, as confirmation of tests carried out in accordance with the relevant standards and codes.

3). Records of all inspections and tests performed to substantiate conformity with the Specification and Contract Documents, including those carried out by sub-contractors and sub-suppliers.

d. Should any test reveal defective material and/ or workmanship, immediately carry out any remedial work and/ or re-testing, including that of a special nature, under instruction from the Architect.

e. Indicate on the Contract Programme the exact timing of all testing, procedural trials and trial assemblies, in order to allow the Architect the opportunity of attending.

f. If the Architect is of the opinion that the Works do not conform to the requirements of this document, the Contract Documents or to the details indicated on the Working Drawings, then special tests to be carried out to establish the case.
Statutory Regulations

A.603 Standards

a. South African National Standards to be the governing standards for the Works.

b. Only where expressly stated in the Specification are other National Standards to be applicable to the Works.

c. All reference to standards, regulations and requirements of statutory bodies mean the latest published editions at the time of Contract award.

d. Where such standards, regulations and requirements are amended after Contract award and affect the Contractor’s responsibilities during the course of the Works, immediately inform the Architect in writing.

e. If unable to comply with the governing standards or regulations and proposing to substitute other National Standards, inform the Architect within the summary of deviations from the Specification.

1). Provide fully detailed reasons for being unable to comply, together with any design and/or technical implications.

2). Failure to provide such notification prior to Contract award shall be deemed acceptance of the governing standards or regulations and later notification shall be invalid.

A.604 Building Codes and Regulations

a. All materials, components, equipment and workmanship to comply with Local Authority Codes and Building Regulations, South African National Standards, and any other regulations applicable to the Works, together with all relevant Statutory Rules, Regulations, Bye-Laws and other enforceable instruments in both the design and execution of the installation.

b. Unless stated otherwise, South African National Standards to apply to the Building Design and Materials as listed herein.

Safety and Protection

A.605 Regulations

a. Give full consideration to the health and safety of operatives when completing the Detailed Design, manufacturing, installing or operating and maintaining the Works.

b. The Working Drawings only to incorporate methods of manufacture, installation, maintenance and use that are safe and comply with all Health and Safety requirements.

A.606 Damage Anticipation

a. Anticipate the possible sources of damage to the Works and take active and positive protective measures to maintain them in pristine condition until full Practical Completion. The acceptance of responsibility for making good in the event of damage is not considered adequate.

A.607 Protective Devices
a. Provide necessary protective devices to protect all goods and materials incorporated into the Works, at all stages through to Practical Completion, against damage arising from but not limited to weather conditions, construction, other contractors, warping, distortion, abrasion and other conditions which could have an adverse effect on any goods and/or materials used in the Works.

A.608 Protective Measures

a. Provide full details of the protective measures proposed for use at each of the following five stages:

1). Manufacture and packaging of goods and materials at off-Site locations.
2). Shipment to Site and unloading.
3). Storage on Site and movement to point of installation or construction.
4). Installation/construction.
5). Completion to handover.

A.609 Packing and Crating

a. Where parts/components are delivered to the Site in packages or crates, then each package or crate to be labelled on the outside giving the reference and quantity of the contents so that deliveries can be accepted at the Site without the necessity of breaking open any package.

b. Carefully remove all protection from the Works immediately before Practical Completion and leave the Works perfectly clean and fit for immediate use.

A.610 Protection of Glazed Elements

a. All elements of framework and associated beads and strips to be stored on Site such that they are not damaged, distorted or weathered unevenly.

b. All finished components to be carefully packed in stillages or crates such that they are suitably separated and protected to prevent scratching, scuffing or other surface damage.

c. All glass panes, sealant and gaskets to be stored on Site in accordance with their manufacturer’s written recommendations.

A.611 Earth Bonding

a. Effectively bond to earth all extraneous conductive parts of the Works.

1). An extraneous conductive part is defined as being that part which is liable to transmit a potential, including earth potential, and not forming part of the electrical installation.

2). Each component is to constitute an extraneous conductive part.

b. The Works to be electrically continuous as required by the latest edition of the IEE (Institution of Electrical Engineers) Regulations.

c. Provide equipotential bonding to ensure that the various exposed conductive parts and extraneous conductive parts as defined by the IEE Regulations are at a substantially equal potential.
d. Earthing connecting to comply with SANS 10142, SANS 10199, SANS 10200 and
SANS 10292.

A.612 Electrolytic Protection

a. At all locations where different metals are assembled together, ensure that electrolytic
corrosion does not occur and that the necessary protection is provided where needed,
in both temporary and permanent conditions.

A.613 Corrosion Protection

a. Take protective measures to avoid any corrosion or any deleterious effects caused
by manufacturing, finishing, transportation, storage and installation of materials.

b. Ensure full resistance to any corrosion for components that are secured or bolted to
each other, paying particular attention to the surface damage caused by such bolting
or securing.

c. Ensure full resistance in repair of corrosion protection to cope with the Site cutting
of components, especially at boundary and external conditions.

d. The minimum requirements for the corrosion protection system for all steelwork to
conform to SANS 10120-3 HC and SANS 1200 HC.

e. Allow for protection against all corrosion arising from exposure to seawater, non-
saline water, soil, high humidity, low or high temperatures, chemical acids and alkalis,
abrasion and impact, fungi and bacteria.

f. Take particular care with delivery and storage on Site, particularly if storage is
prolonged. On no account store or use materials or components beyond the
manufacturer’s expiry date.

A.614 Fire Protection

a. Fire performance in terms of fire resistance of elements and structure to be
determined in accordance with the SANS 10177 and the National Building
Regulations.

b. Non-combustible materials to be as defined in SANS 10177 and the Building
Regulations.

c. Materials of limited combustibility to be as defined in SANS 10177.

d. Internal surfaces and linings requiring to be rated in terms of ‘surface spread of flame’
to be rated for performance by the method specified in the Building Regulations.

e. Composite products and synthetic materials requiring to be fire rated to be subject
to the limitations specified in SANS 10177.

f. Supply test certificates to demonstrate that all materials meet the above
requirements.

g. Ensure compliance with all Statutory Authorities’ and Fire Services’ requests/
recommendations.

Maintenance, Training and Replacement Materials

A.615 General

a. Replaceable materials/ components to be maximised.
b. Materials to be capable of simple maintenance/repair and integration with other maintenance systems.

A.616 Maintenance Manual

a. One month before programmed completion/practical completion of the Works prepare and submit three copies and one electronic copy of the Maintenance Manual required to maintain the Works.

A.617 Training of User’s Personnel

a. Prior to Practical Completion of the Works, provide skilled staff/operatives to instruct the user’s staff on the correct and efficient operation and maintenance of all systems, components, plant, equipment and controls as detailed in the Maintenance Manual.

A.618 Replacement Materials

a. Where required by the Contract, provide replacement materials upon completion of the Works.

b. All replacement materials to be of identical quality to those installed in the Works.

A.619 Health and Safety File

a. Provide information as required by the Safety Health and Environmental Officer for inclusion in the Health and Safety File.

As Built Drawings

A.620 As Built Drawings

a. The Contractor shall at all times keep a set of updated as-built drawings on site.

b. On completion of the Works the Contractor shall produce and provide the Architect with a set of as-built drawings consisting out of three paper prints and one electronic copy per drawing.

General Materials Requirements

A.621 Standard of Materials and Quality

a. Materials to be new, unless otherwise specified, carefully selected and of the best merchantable quality.

b. Materials are to comply with the appropriate South African National Standard or British Standard where not provided for in the SANS.

c. All materials to be acceptable to the Architect.

A.622 Alternative Materials

a. Be responsible for the supply and installation of materials, all in accordance with specified standards.

A.623 Health Hazards

a. No proposed materials to be a potential health hazard. Maintain a full, up-to-date knowledge of all current published research and legislation in this respect.

A.624 Deleterious Materials
a. Do not use the following materials in the Works unless it can be demonstrated that they are safe during manufacture, installation and use and that their suitability is ensured:

1). Asbestos or asbestos-containing products.

2). Lead where the metal or its corrosive products may be directly ingested, inhaled or absorbed. Applications of lead such as roofing, flashings, rainwater goods and copper alloy fittings containing lead which are specifically required are acceptable.

3). Lead based paints and primers.

4). Urea formaldehyde.

5). Materials which generally comprise mineral fibres, either man-made or naturally occurring, which have a diameter of 3 microns or less and a length of 200 microns or less, or which contain any fibres not sealed, encapsulated, or otherwise stabilised to ensure that fibre migration is prevented. Products that may contain these fibres include insulation, fire protection and air filters. For all mineral wool insulation products, test evidence must be available and produced confirming that the materials fulfil the requirements of European Directive 97/69/EC and consequently are not classified as a possible human carcinogen.

A.625 Sustainable Sources of Timber

a. Procure all softwood timbers and all temperate hardwoods from sustainable sources.

b. All plywood used in the Works to be from softwood or temperate hardwoods from sustainable sources.

Workmanship

A.626 Skilled Personnel

a. Execute the work using persons skilled in the processes to be adopted. Where requested, provide such documentation necessary to demonstrate an individual’s ability to carry out the work to which he has been assigned.

A.627 Suitability of Structure

a. Before commencing any part or element of the Works, survey the structure, checking line, level and fixing points and report immediately to the Architect if the structure is considered to be unsuitable. If the structure is unsuitable, propose remedial action.

A.628 Setting Out

a. Ensure accurate setting out in accordance with the Contract Documents.

A.629 Compatibility

a. Ensure that all materials and processes employed in the Works are compatible with each other. Store all materials and associated components in a clean dry area, in accordance with the manufacturer’s written recommendations.

A.630 Manufacturer’s Instructions

a. Where proprietary systems are specified and included in the Works, ensure that the method of building or installing is strictly in accordance with the manufacturer’s printed instructions and that copies of all such documentation are supplied to the Architect prior to start of the Works.
A.631 Visual Inspection

a. All finished surfaces to be subject to visual inspection and acceptable to the Architect.

A.632 Suppliers

a. Be responsible for all materials, components and equipment supplied or manufactured by sub-contractors or suppliers, until the end of the warranty period defined in the Contract.

A.633 Covering Up

a. No work to be covered up without agreement by the Architect. Afford reasonable notice and full opportunity for the examination and measurement of any work that is about to be covered up.

A.634 Cutting

a. All methods, principles, details, etc. for Site cutting of components to be submitted as part of the Contractor’s method statement to the Architect for review. No manufacture to start until it can be demonstrated that all proposed techniques have been reviewed by the Architect.

b. Cutting of metal products to be straight and free from burrs and all joints to be flush, without gaps or imperfections. If base metal is exposed, protect the surface to the same level of protection as stated in the Specification and Contract Documents.

A.635 Deterioration

a. Treat/ select all materials to prevent any damage from all possible combinations of atmospheric deterioration, corrosion, wet rot, dry rot, fungi, mould and all other deleterious effects, including atmospheric pollution and pH factor of the adjacent elements.

b. Ensure that no chemical or electrolytic action takes place where dissimilar metals and/ or materials are used together.

c. No materials to discolour, crack or otherwise be damaged by the worst possible combination of environmental conditions identified herein.

d. With materials subject to surface treatment, give special attention to the substrate to ensure that the preparation is compatible with the surface treatment.

e. Ensure that all superficial dust and friable materials are removed and that adequate protection is provided during the process of the surface treatment and finishes to prevent contamination by dust and other debris.

f. No materials used in the manufacture of the Works to be liable to infestation attack by micro-organisms, fungi, insects or other vermin, nor provide harbourage for same.

A.636 Line and Level

a. All components to be installed such that they are plumb or horizontal and line up with adjacent components, in all directions, taking account of the allowable tolerances as defined in the Project Common Tolerance and Movements Document.

A.637 Method Statements
a. Prepare a detailed method statement describing the sequence and methods to be employed in carrying out this work, identifying proposed solutions regarding workmanship which affects the fabrication, holding, storing and handling, setting-out, Site assembly, bolting, joining and welding of components and the protection of the metalwork against corrosion. Such notes to be clearly written on the Working Drawings to be used for Site fixing.

A.700 EMPLOYERS REQUIREMENTS – MANUALS

Maintenance Manuals

A.701 General

a. Prepare the manual in the format as agreed with the Architect.

b. Content:

1). The Maintenance Manual shall incorporate all maintenance systems and give details of the operation and required maintenance of all items, components and systems comprising the Works.

2). This information shall be supplied for the Architect’s review in the following format:

a). Specially written information shall be on A4 size pages with typed text using double spacing and in a format agreed prior to submission.

b). Drawn information shall generally be on A1 size sheets.

c). Standard published information shall be carefully selected and edited to include only those items installed. Where editing is not appropriate, the relevant items shall be typed out and included.

A.702 Submission of Manual

a. Submit the manual in draft for approval as directed by the Architect.

b. One month before programmed completion/ the issue of the Taking-Over Certificate prepare and deliver to the Architect three bound copies and one electronic copy in Word format of the approved maintenance manual.

c. Demonstrate its usage to the Building Maintenance Manager.

A.703 Usage

a. The manual is designed to make information needed for maintenance available to non-specialist people.

b. It shall tabulated and cross referenced to make access to information easy.

c. It shall be illustrated with drawings and reference the as-built drawings.

d. It shall form the product reference for future replacements.

A.704 Products and Components

a. Component Information: -Provide the following information for every item, component and/ or system.

1). Certified manufacturing certificate.
2). Full description giving any special features. A full breakdown of the parts and the catalogue number of the constituent parts.

3). The guarantee period of any element or material where in excess of the warranty required by the Specification and Contract Documents.

c. Detail the finishes/coatings of the as installed components.

c. Provide names, addresses and phone numbers of all manufacturer’s and suppliers.

A.705 Servicing Components, Materials and Assemblies

a. Maintenance Procedures: The Maintenance Manual shall include fully comprehensive details in respect of:

1). Cleaning procedures for all elements of the Works.

2). Replacement procedures.

3). Regular cyclical maintenance procedures (avoiding damage).

4). Repair procedures in the event of damage.

5). Cleaning and Lubrication:

a). Provide all necessary information regarding materials for cleaning and treating surfaces, including the frequency and method of washing required to maintain performance and appearance.

b). Provide a list of all methods and materials which shall not be used in cleaning and treating surfaces.

c). Recommend methods and materials for adjusting and lubricating mechanisms and moving parts.

b. Service Life:

1). Provide in tabulated format materials, components, fabricated elements, finishes and coatings, grouped by service life.

2). Recommend dates for replacement to pre-empt failure, loss of function or visual deterioration.

3). Service Intervals:

a). List intervals, or specific dates, and describe work needed to be done to maintain appearance and function as intended, to achieve durability and predicted service life.

A.706 Replacement Instructions

a. Describe in detail the construction of each fabricated element.

b. Provide method statements and detailed instructions for:

1). Dismantling and re-assembling in situ of elements.

2). Removal and replacement with a duplicate element.

3). The replacement of short life materials and components.
A.707 Guarantees, Warranties

a. Include copies of all guarantees, warrantees, manufacturer’s assurances and certified test results.

A.708 Names and Addresses

a. Provide contact names, company names, addresses telephone and fax numbers for all sub-contractors and suppliers engaged upon the Works.

b. Indicate the nature and extent of their work

A.709 Training of User’s Maintenance Personnel

a. Prior to Practical Completion of the Works provide skilled staff/ operatives to instruct the user’s staff on the correct and efficient operation and maintenance of all systems, components, plant, equipment and controls as detailed in the Maintenance Manual.

b. Provide a programme and schedule of training requirements, prior to completion of the Works, stating the minimum amount of time which is required for the skilled staff to train the user’s staff.

c. Throughout the training period remain responsible for the operation and maintenance of the Works.

d. Where such training cannot be carried out prior to Practical Completion of the Works due to the nature of the equipment, return to Site at a later mutually agreed date to complete the training period.

END OF SECTION
B80 ALTERATIONS - SPOT ITEMS

a. To be read in conjunction with Sections A and Z, the Preliminaries and Contract Conditions.

B80.100 PRODUCTS, SYSTEMS AND MATERIALS

Specification and Scope

B80.101 Descriptive Works

a. Complete the Detailed Design, manufacture, supply, install and warrant that the works comply with the visual intent shown on the Contract Drawings and criteria stated in the Specification.

b. Where no material, product or supplier is indicated in the Specification, propose suitable materials and systems prior to Contract award which comply with the visual intent and performance criteria stated and remain fully responsible for the Detailed Design of the works.

c. Where a particular material, product or supplier is indicated in the Specification, such material, product or supplier shall be deemed indicative representing the Architect’s design intent only. The Contractor may complete the installation using that material or product, or such other confirmed as acceptable by the Architect in writing, but shall remain fully responsible for the Detailed Design and performance of the works.

B80.102 Section Coverage:

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the works, which include the following:

1). Minor Demolition Works.

2). Stripping out.

3). Protection of retained works.

4). Alterations.

5). Temporary supports.

6). Observance of Health and Safety requirements.

b. Ensure that all interfaces are fully co-ordinated prior to commencement.

Materials

B80.103 Primary Materials

a. Same materials or types of construction as that in existing structure, as needed to make good, extend, or match existing Work.

b. Generally, Contract Documents will not define material or standards of workmanship present in existing construction.

B80.104 New Materials

a. Comply with Specifications for each material involved.
B80.105 Salvaged Materials

a. Salvage sufficient quantities of cut or removed material to replace damaged Work of existing construction, when material is not readily obtainable on current market.

b. Store salvaged items in dry, secure place on site.

B80.106 Recycled Materials

a. Materials arising from demolition work may be recycled or reused elsewhere in the project as approved by the Architect, subject to compliance with the appropriate work section specification.

b. Submit full details and all supporting documentation.

B80.107 Ownership of Materials

a. Components and materials arising from the demolition work are to become the property of the Contractor except where otherwise provided. Remove from site as work proceeds.

B80.108 Services to Remain Operational

a. Existing services to remaining portions of the building(s) must remain continuously operational.

b. Where disconnection or alteration is necessary give timely notice to the Architect.

Minor Demolition Works / Stripping Out

B80.109 Extent of Demolition/ Stripping out

a. As described in Section C20 of this Specification.

b. Site enabling works shall facilitate the carrying out of the Permanent Works.

B80.200 QUALITY AND WORKMANSHIP

Submittals

B80.201 Response

a. Provide submittals in accordance with the requirements of Section A of the Specification.

Minor Demolition Work

B80.202 Workmanship Generally

a. Demolition works to be conducted in accordance with the Construction Regulations 2003 issued by the Chief Directorate: Occupational Health and Safety.

b. Operatives must be appropriately skilled and experienced for the type of work.

c. Site staff responsible for supervision and control of the work are to be experienced in the assessment of the risks involved and in the methods of demolition to be used.

B80.203 Unrecorded Bench Marks
a. Do not remove or destroy.

b. Bench marks and other survey information give notice to the Architect when found.

**B80.204 Dust**

a. Reduce dust by periodically spraying demolition works with water.

**B80.205 Health Hazards**

a. Take adequate precautions to protect site operatives and the general public from health hazards associated with vibration, dangerous fumes and dust arising during the course of the Works.

**B80.206 Hazardous Materials**

a. Report immediately to the Architect any suspected hazardous materials discovered during demolition work. Avoid disturbing such materials.

b. Remove all surplus hazardous materials and their containers regularly for disposal off Site in a safe and competent manner in accordance with relevant regulations.

**B80.207 Completion**

a. Clear away all debris and leave the site in a tidy condition on completion.

**Creating Openings**

**B80.208 Creating Openings in Existing Structure(s)**

a. Create openings in consultation with the Structural Engineer including any special cutting requirements, to the Architect’s acceptance.

b. Leave partly demolished structure(s) in a stable condition, with adequate temporary support at each stage to prevent risk of uncontrolled collapse prior to the installation of lintels and pre-cast surrounds.

c. Prevent debris from overloading scaffolding platforms.

d. Prevent access of unauthorised persons to partly demolished structure(s).

e. Leave all structures safe outside working hours.

**B80.209 Temporary Supports**

a. Design temporary supports and submit method statements and Detailed Design proposals for acceptance by the Architect.

**Noise**

**B80.210 Noise**

a. Noise levels shall be restricted at reasonable times, as acceptable to the Architect.

b. Fit all compressors, percussion tools and vehicles with effective silencers of a type recommended in writing by the manufacturers of the compressors, tools or vehicles.

c. Do not use or permit employees to use radios or other audio equipment in ways or at times that may cause a nuisance.
Preparation

B80.211 Preparation

a. Cut, move, or remove items as necessary for access to alteration and renovation Work.

b. Remove unsuitable material such as rotted wood, corroded metals, deteriorated masonry, and other deteriorated materials. Replace materials as specified for finished Work.

c. Remove debris and abandoned items from area and from concealed spaces.

d. Prepare surface and remove surface finishes as necessary to provide for proper installation of new materials and finishes.

e. Control operations to prevent spread of dust to occupied portions of building.

f. Provide temporary barriers and closures.

Installation

B80.212 Installation

a. Co-ordinate Work of alterations and renovations to expedite completion and to accommodate Owner occupancy.

b. Remove, cut, and make good Work in manner to minimise damage and to provide means of restoring materials and finishes to original condition.

c. Refinish visible existing surfaces to remain in renovated rooms and spaces with neat transition to adjacent finishes.

d. Install new materials as specified in individual Specification sections.

e. Where new Work abuts or aligns with existing, perform a smooth and even transition to match existing adjacent surface in texture and appearance.

f. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and request instructions from Architect as to method of making transition.

B80.213 Adjustments

a. Where removal of partitions or walls results in adjacent spaces becoming one, adjust floors, walls, and ceilings to provide smooth plane without breaks, steps, or bulkheads.

b. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.

c. Fit Work at penetrations of surfaces as specified in Section Z15.

d. Make good or replace portions of existing surfaces which are damaged, lifted, discoloured, or showing other imperfections. Repair substrate prior to application of finishes.

B80.214 Finishes

a. Finish new surfaces as specified in individual Specification sections.
b. Finish making good to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

Cleaning

B80.215 Cleaning

a. Thoroughly clean areas and spaces affected by Work. Completely remove paint, mortar, oils, putty and items of similar nature.

b. Clean Owner occupied areas daily. Clean spillage, overspray, and heavy collection of dust in Owner occupied areas immediately.

Protection

B80.216 Protection

a. Protect existing work indicated to remain from damage.

b. Protect existing floors with suitable coverings when necessary.

c. Construct temporary dustproof partitions and seal return air plenums where necessary to areas where noisy or dirt and dust operations are being performed.

d. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

e. Insulate ductwork and piping to prevent condensation in exposed areas.

f. Provide barricades, coverings or other types of protection necessary to prevent damage to existing works or adjoining properties.

END OF SECTION
C20  DEMOLITION WORKS

a. To be read in conjunction with Sections A and Z, the Preliminaries and Contract Conditions.

C20.100 DEMOLITION

Specification and Scope

C20.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

C20.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the works, which include the following:

1). Demolition/stripping out.

2). Observed of Health, Safety, Environmental and Asbestos regulations.

3). Removal of all materials arising from the demolition activities.

4). Ensure that all interfaces are fully co-ordinated prior to commencement.

C20.103 Adjacent Occupation

a. At all times take suitable measures to ensure that owners and occupiers of any property adjacent to the works are not unduly or unreasonably inconvenienced by the work.

b. In the event of complaints arising, take immediate steps to eliminate the cause of the problem, rectify any damage done and indemnify the Architect from and against all claims arising out of such cause.

c. Before Tendering, ensure that the processes intended for use during the Contract do not result in problems for adjoining owners/occupiers. No claim shall be entertained if the Contractor is forced to alter his method of working as a result of complaints.

C20.104 Schedule of Conditions

a. Agree a Schedule of Conditions of the existing adjacent areas.

b. Upon completion of the work make a joint inspection with the Architect of adjacent areas to agree and record their condition, including record photographs for retention.

c. Any damages so occasioned to be rectified at the Contractor's expense.
Description of Works

C20.105 Extent of Demolition

a. The demolition of the existing structures or part thereof as shown on the Contract Drawings, and removal from site of materials arising from the demolition in accordance with the requirements of the local Waste Management Authority.

b. Bathroom element demolition and strip out:

1). Demolish existing wall and remove all existing sanitaryware fittings and plumbing. Make wall and floor good again to receive new finishes as shown on the Contract Drawings and described elsewhere in this Specification.

2). Demolish existing slab wash hand basin and remove all existing sanitaryware fittings and plumbing. Make wall and floor good again to receive new finishes as shown on the Contract Drawings and described elsewhere in this Specification.

3). Remove toilet cubicles and remove all existing sanitaryware fittings, plumbing and bathroom accessories. Remove all fixing screws and bolts, make wall and floor good again to receive new finishes as shown on the Contract Drawings and described elsewhere in this Specification.

4). Remove existing door and frame as well as all door accessories (door closers, door striker plates etc.) fixed to walls. Make wall good again to receive new finishes as shown on the Contract Drawings and described elsewhere in this Specification.

5). Demolish portion(s) of walling as shown on the Contract Drawings. Make wall good again to receive new door, opening, access panel and/ or louvre as shown on the Contract Drawings and described elsewhere in this Specification.

6). Remove existing wall finishes including all adhesive. Make good again to receive new finishes as shown on the Contract Drawings and described elsewhere in this Specification.

7). Remove existing floor finishes including all adhesive. Make good again to receive new finishes as shown on the Contract Drawings and described elsewhere in this Specification.

C20.106 Licences/ Approvals

a. Obtain all necessary licences and approvals for, scaffolding or hoarding and also provide all hoardings, fencing, lighting, barricades, platforms, props, handrails, etc., as required by the Statutory Authorities or the Architect.

C20.107 Health and Safety

a. Demolish structure(s) in accordance with the latest Construction Regulations, Guidelines, and Occupational Health and Safety regulations.

b. Operatives must be appropriately skilled and experienced for the type of work.

c. Site staff responsible for supervision and control of the work are to be experienced in the assessment of the risks involved and in the methods of demolition to be used.

C20.108 Assessment and Safety Method Statement

a. Prior to the start of demolitions undertake an assessment which takes due account of the waste and contaminated materials (solid, liquid and gaseous) likely to be encountered.
b. Produce a written safety method statement which describes in detail the manner in which the workforce (including any sub-contractors), other Site personnel and the general public in the surrounding neighbourhood to be protected during the course of the works.

c. No demolitions to be carried out until the method statement has been formally accepted in writing by the Architect.

d. All contractors/ sub-contractors working with asbestos must submit a written Method Statement (MS) for acceptance of the Architect before commencement of work.

Submittals

C20.109 Site Survey

a. Before commencing any work, examine all available information, carry out a survey of the structures, site and adjacent areas and submit a method statement and a survey report to the Architect, covering all relevant matters listed below:

1). The form and condition of the structure(s), and proposed demolition methods and sequence.

2). The form, location and removal methods of any toxic or hazardous materials.

3). The type and location of adjoining or surrounding premises that may be adversely affected by noise, vibration, dust or removal of structure.

4). Arrangements for disconnection and removal of services, control of traffic, protection of personnel and exclusion of the general public.

General

C20.110 Ownership

a. Components and materials arising from the demolition work are to become the property of the Contractor except where otherwise provided. Remove from site as work proceeds.

C20.111 Recycled Materials

a. Materials arising from demolition work may be recycled or reused elsewhere in the project as approved by the Architect, subject to compliance with the appropriate work section specification.

b. Submit full details and all supporting documentation.

C20.112 Contaminated material

a. Remove and carry out remediation required by the Environmental Authority.

C20.113 Existing Drains to be Demolished

a. Break out to the extent shown on the drawings.

b. Seal off drain ends and remove contaminated soil.

C20.114 Existing Drains and Services to Remain in Use

a. General: Protect drains and services, still in use and ensure that they are kept free of debris.
b. Provide bypass connections as necessary to maintain continuity of services to occupied areas of the same and adjoining properties.

c. Damage: Make good damage arising from demolition work. Leave clean and in working order at completion.

d. Damage: Give notice and notify service authority or owner of damage arising from the execution of the works.

e. Repairs: Complete as directed, and to the satisfaction of the service authority or owner.

C20.200 WORKMANSHIP

Demolition

C20.201 Generally

a. Ensure that Site staff responsible for supervision and control of the works are experienced in the assessment of the risks involved and in the methods of demolition to be used.

b. Take account of the Site limitations and restrictions as to access and the use of equipment and plant necessary to complete the works.

c. Provide and maintain temporary barricades, fences, guardrails, warning signs, and warning lights.

d. Provide and maintain fire extinguishers.

e. Maintain existing utilities which are to remain in service and protect from damage during demolition operations.

C20.202 Pedestrian Traffic

a. Maintain accessibility for fire fighting apparatus.

b. Conduct demolition operations and debris removal to avoid interference with use of walkways, and adjacent occupied facilities.

c. Ensure safe passage of persons around area of demolition.

d. Provide and maintain temporary covered passageways; comply with requirements of local authorities.

C20.203 Gas or Vapour Risks

a. Take adequate precautions to prevent fire or explosion caused by gas or vapour.

C20.204 Health Hazards

a. Take adequate precautions to protect Site operatives and the general public from health hazards associated with dangerous fumes and dust arising during the course of the works.

C20.205 Control of Dust

a. Control dust caused by the works to avoid inconvenience to the occupants of adjacent areas.
b. Sprinkle debris with water to minimise dust. Provide hoses and water connections as necessary.

c. Do not cause flooding or contaminated run-off.

**C20.206 Completion**

a. Clear away all debris and leave the Site in a tidy condition on completion.

**C20.207 Materials Arising**

a. Components and materials arising from the works to become the property of the Contractor, unless otherwise stipulated. Remove from Site as work proceeds.

**C20.208 Noise**

a. Restrict noise levels to levels acceptable to the Architect.

b. Fit all compressors and percussion tools with effective silencers of a type recommended in writing by the manufacturers of the compressors and tools.

c. Do not use or permit employees to use radios or other audio equipment in ways or at times that may cause a nuisance.

**C20.209 Fire**

a. Take all necessary precautions to prevent damage to the works or other property from fire.

**C20.210 Burning on Site**

a. Burning on Site of materials arising from the work not permitted.

**C20.211 Waste removal**

a. The Contractor shall propose a method of waste removal so that other areas of the airport are not contaminated nor any finishes damaged during the process. This proposal needs to be accepted by the Architect prior to commencement of any demolishing or stripping out.

b. Remove rubbish, debris and surplus material and spoil regularly; keep the Site and works clean and tidy.

c. Waste is not to be allowed to build up within the work area and must be removed at least at the end of every working day to suitable transportation or storage areas.

d. Remove all rubbish, dirt and residues from voids and cavities before filling or closing in.

e. Remove all waste hazardous materials and their containers regularly for disposal off Site in accordance with relevant regulations.

f. Retain waste transfer documentation on Site.

g. All waste to be transported in appropriate vehicles.

**C20.212 Rubbish**

a. Remove rubbish, debris and surplus material and spoil regularly; keep the Site and works clean and tidy.
b. Remove all rubbish, dirt and residues from voids and cavities before filling or closing in.

c. Remove all waste hazardous materials and their containers regularly for disposal off Site in accordance with relevant regulations.

d. Retain waste transfer documentation on Site.

C20.213 Electromagnetic Interference

a. Prevent excessive electromagnetic interference to apparatus outside the Site.

C20.214 Nuisance

a. Prevent nuisance from smoke, dust, rubbish, vermin and other causes.

C20.215 Asbestos Based Materials

a. Report immediately to the Architect any suspected asbestos based materials discovered during demolition work. Avoid disturbing such materials.

b. Removal: By a Contractor licensed by the Health and Safety Authority, or submit proposals, prior to other works starting in these locations.

c. Asbestos waste is not allowed to remain on Site overnight unless contained within a suitable locked container.

d. Disposal to only be at a site licensed for the disposal of asbestos waste.

C20.216 Dangerous Openings

a. Illuminate and protect as necessary.

C20.217 Adjoining Property

a. Provide temporary support and protection, maintain and alter as necessary as work progresses.

b. Damage: Minimize any damage and repair promptly.

c. Make good as required to ensure safety, stability, weather protection and security.

C20.218 Finishes

a. Finish new surfaces as specified in individual Contract Drawings sections.

b. Finish making good to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

Cleaning

C20.219 Cleaning

a. Clean Owner occupied areas daily. Clean spillage, overspray, and heavy collection of dust in Owner occupied areas immediately.

b. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations.

c. Return adjacent areas to condition existing prior to start of Work.
F10 INSITU CONCRETE MIXES/ CASTING/ CURING

a. Read in conjunction with Sections A and Z, other related sections of the Specification, the Preliminaries and Contract Conditions.

F10.100 PRODUCTS, SYSTEMS AND MATERIALS

Specification and Scope

F10.101 Descriptive Works

a. Complete the Detailed Design, manufacture, supply, install and warrant that the works comply with the visual intent shown on the Contract Drawings and criteria stated in the Specification.

b. Where no material, product or supplier is indicated in the Specification, propose suitable materials and systems prior to Contract award which comply with the visual intent and performance criteria stated and remain fully responsible for the Detailed Design of the works.

c. Where a particular material, product or supplier is indicated in the Specification, such material, product or supplier shall be deemed indicative representing the Architect’s design intent only. The Contractor may complete the installation using that material or product, or such other confirmed as acceptable by the Architect in writing, but shall remain fully responsible for the Detailed Design and performance of the works.

F10.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). In situ concrete.

F10.103 Supporting Specifications

a. All in situ concrete work shall comply with the requirements of SANS 2001-CC1 supplemented by the Specification.

b. Where a conflict arises between SANS 2001-CC1 and the Specification, the Specification shall take precedence.

c. All materials, mixing, placing, curing and workmanship shall comply with SANS 2001-CC1.

In situ Concrete

F10.104 ICC-121: Existing Concrete Slab To Engineers Detail

a. Existing concrete slab as shown on the Structural Engineer’s documentation.

END OF SECTION
H10 BRICK/ BLOCK WALLING

a. To be read in conjunction with Sections A and other related sections of the Specification, the Preliminaries and Contract Conditions.

H10.100 PRODUCTS, SYSTEMS AND MATERIALS

H10.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

H10.102 Section Coverage:

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Brick Walling:

   a). Solid common brick walling.

Solid Common Brick Walling

H10.103 BRK-219: 115mm Clay Common Brick Wall - Plastered


b. Type: 115mm solid common brick wall.

c. Manufacturer: To be agreed.

d. Brick skins:

   1). Clay common Non-Facing Plastered (NFP) bricks.

   2). Compressive strength: As deemed necessary by the Structural Engineer.

   3). Working size: 222 x 106 x 73mm.


   5). Joints: Flush to receive selected finish.

e. Mortar:

   1). As Section Z21

   2). Type: Cement: sand.

f. Accessories: Welded wire bed joint ladder reinforcement. As Section H40.

g. Other: Head restraints, starters and lintels as shown on the Contract Drawings and as specified in Section H40.

H10.104 BRK-231: 230mm Clay Common Brick Wall - Plastered

b. Type: 230mm solid common brick wall.
c. Manufacturer: To be agreed.
d. Brick skins:
   1). Clay common Non-Facing Plastered (NFP) bricks.
   2). Compressive strength: As deemed necessary by the Structural Engineer.
   3). Working size: 222 x 106 x 73mm.
   5). Joints: Flush to receive selected finish.
e. Mortar:
   1). As Section Z21
   2). Type: Cement: sand.

f. Accessories: Welded wire bed joint ladder reinforcement. As Section H40.

g. Other: Head restraints, starters and lintels as shown on the Contract Drawings and as specified in Section H40.

H10.200 QUALITY AND WORKMANSHIP

Submittals

H10.201 Pre-contract Samples

a. Not required.

H10.202 Post-contract Samples

a. In accordance with Section A, post contract samples of the following shall be provided:
   1). 3 No. samples of each brick type.

H10.203 Control Samples

a. Provide the following control samples:
   1). 3 No. samples of each brick and block type.
a. Prior to commencement of the works, a sample panel of each type of walling, with all options of mortar specified, in panel sizes of nominally 1000mm x 1000mm shall be built on site. The sample panels shall be constructed in an agreed location using randomly selected masonry units but rejecting any that are damaged. Acceptance from the Architect shall be obtained prior to commencement of construction for that type. If a panel is rejected, construct other sample panels of each type until acceptance is obtained from the Architect.

H10.205 Mock-ups
a. Not required.

H10.206 Prototypes
a. Not required.

H10.207 Benchmark Requirements
a. The following quality benchmarks shall be provided in locations to be agreed with the Architect, in accordance with Section A:

1). First 10m² of each type incorporating accessories as listed in Section H40 of the Specification where possible.

Testing

H10.208 Testing Clay Masonry
a. All sampling and testing shall be carried out in accordance with SANS 227.

b. Additional testing and sampling shall be performed if the materials do not comply with the Specification.

H10.209 Mortar Testing
a. Carry out tests to determine the compressive strength of mortars as described within Section Z21 of the Specification.

Holes, Recesses and Chases

H10.210 General
a. Comply with the requirements of Section Z15.

Structural Performance Requirements

H10.211 General
a. Comply with the structural requirements of SANS 10164.

H10.212 Specific Movements and Deflections
a. Refer to the Structural Engineer’s Specification and Structural Movements and Tolerances Report.

b. Accommodate all tolerances and movements of the building structure, including dead, live, seismic and wind loads plus moisture, shrinkage, creep and thermal effects, without damage or any reduction in the performance of the works.
c. Expansion and movement joints shall accommodate the appropriate range of movement.

d. The Contractor to be responsible for determining the requirement for and location of movement joints, whether indicated on the Contract Drawings or not.

Environmental Performance Requirements

H10.213 Thermal Movement

a. The service temperature range for components of the works to be taken as -25°C and +90°C.

b. Thermal movements shall not result in audible noise.

H10.214 Moisture Movement

a. Changes in moisture content of components shall not affect the works.

b. Expansion of absorbed or retained moisture caused by freezing shall not affect the works.

H10.215 Mortar

a. Comply with the requirements of Section Z21.

H10.216 Cement/ Sand Mortar Mix Proportions:

a. To SANS 10164.

b. Class 1: 1:4 Cement: Sand: Highly stressed masonry, work below ground, severe exposure.


Workmanship

H10.217 Site Control

a. Site installation shall be carried out in accordance with SANS 10164, SANS 10249 and SANS 10145.

b. Materials shall be clean and built uniform and level within the tolerances specified.

c. Quoins and jambs shall be plumbed as the work proceeds. The head of walls shall be laid level.

d. Damaged material shall not be used.

e. Materials shall only be cut by power-driven masonry saw, wet hosed down to remove any slurry, and then dried prior to laying. No cut faces shall be exposed unless agreed with the Architect.

f. Where areas of the works incorporate service openings, the reveal edges of these shall be treated as fair-faced.
g. Provide head restraints as required in accordance with Section H40 of the Specification, fixed to top courses, which consist of full size, uncut units only. No cut materials that reduce the structural or fire-rating integrity of the wall shall be used.

**H10.218 Laying**

a. Wet bricks well two hours before laying.

b. Place on a full bed of mortar, properly jointed with other work, to correct lines and levels. Perpend joints shall be aligned plumb within vertical tolerance.

c. Keep courses level and evenly spaced using gauge rods. Vertical and horizontal joints to be equal and of uniform thickness.

d. Mortar shall be applied to obtain full vertical perpend joints. Slushing of perpend joints or furrowing of bed joints is not permitted.

e. Intersections, external corners and internal corners shall be fully bonded, except where indicated otherwise.

f. Grout all joints in the foundation walls with 3:1 liquid cement mortar to eradicate crevices.

g. Do not shift or tap units after mortar has taken initial set. Where adjustment is necessary, mortar shall be removed and replaced.

h. Excess mortar shall be removed as the work proceeds.

i. Point joints as the work proceeds. Where coloured mortar is specified, rake out joints and point after walls are complete.

j. Overhand laying shall be avoided unless dictated by the confines of the Site and accepted by the Architect.

k. Walls shall be racked back when raising quoins and other advanced work. Tooothing is not permitted.

l. The gauge shall be based on the combined height of four courses of masonry unit plus bed joint with a tolerance of ±2mm.

m. Build in lugs and grout all pressed steel door frames with cement mortar as the work proceeds. Frames to be plumb and without twist.

n. Rake out joints to a depth of 30mm for flashings and repoint later in 1:3 cement: mortar.

o. Start facework not less than 150mm below finished levels externally.

**H10.219 Bed Joint Reinforcement**

a. Place throughout the building:

1). 3 courses above concrete footings, below window cills, above door and window heads and at wall plate level to gable ends.

2). Otherwise at every fourth course.

3). Internal half brick walls to be reinforced at every course to the eighth course and three courses above all openings.

**H10.220 Height of Lifts**
a. Do not carry any portion of the work more than 1200mm above another section, rake back between levels.

b. Complete each lift of facework in one period of operation.

c. Build no part of a wall more than 1500mm high in one day, unless permitted by the Architect.

H10.221 Vertical Control Joints

a. Refer to the Contract Drawings to derive the standard joint details and locations.

b. Refer also Section H40 of the Specification.

c. The works shall be divided into panels separated by vertical control joints, which shall be located such that the length of each panel is generally 6m, or as shown on the Contract Drawings.

d. Vertical control joints shall coincide with the structural support elements where possible, and shall utilise proprietary sleeved tie anchors, as specified in Section H40 of the Specification. Those not shown on the Contract Drawings shall be at junctions with a column or different material. Restrict control joints to the corner of abutting walls where possible.

e. Control joint fillers, sealants and/ or fire stops shall be in accordance with the respective manufacturer’s written instructions or written recommendations.

H10.222 Joints in Mortar

a. Generally all masonry shall be well buttered with mortar before being laid and filled at each course.

b. All mortar joints shall be of a thickness consistent in appearance and density.

c. Tooling of joints shall be carried out while the mortar is thumbprint hard. Any excess mortar that extrudes from the joints of fair-faced units shall be cut away as work proceeds and not smeared on the face of the works. No washing or scrubbing of the finished face with proprietary cleaners or acids shall be allowed. To avoid staining of the surface of the works, smears shall be removed by gentle brushing off with a soft brush and water only.

H10.223 Keyed Finish

a. Rake out joints to a nominal depth of 10mm to receive render/ plaster or tile finishes as shown on the Contract Drawings.

H10.224 Bonding to Steel and Concrete

a. Secure masonry walls to structural steel with anchors or to concrete with dovetail slots and anchors or anchor strips as specified.

b. Position anchors at 450 millimetres overall centres vertically on columns or walls.

c. Install anchors in full bed of mortar.

d. Do not place in same course as horizontal joint reinforcement.

Curing and Protection

H10.225 Curing
a. Maintain all walls in a damp condition for at least 24 hours after laying.

**H10.226 Protection**

a. Cover up and protect finished work from damage by subsequent operations.
b. Prevent soiling of the fair-faced surfaces.
c. Clean off any traces of mortar as the work proceeds.

**H10.227 Service Penetrations**

a. Service penetrations through the works shall be provided as required and the fire integrity of the works maintained in compliance with the relevant South African Standards.

**H10.228 Fire and Smoke Stopping**

a. All fire and smoke stops shall be positively fixed in position in such a manner that they shall not become dislodged in the event of fire. The fixing shall secure the stop in position for a period at least equal to that required for the compartment wall or floor against which the fire works abut.

**H10.229 Site Storage, Handling and Transportation**

a. Deliver material to Site suitably packaged to prevent damage and contamination, clearly identified with type, grade, date of manufacture, etc. Do not remove labels or packaging until time for use. Inspect materials before use and reject any that are cracked, damaged or contaminated.

1). Masonry Units:

a). Store masonry units in stable stacks clear of the ground and clearly identified by type, strength, grade, etc. Protect from adverse weather, moisture, staining and contamination with earth and other foreign materials and keep clean and dry. Allow air to circulate around units.

b). All components shall be stacked, before and after delivery on Site, in such a manner that they are not damaged in any way through excessive stresses or by atmospheric deterioration, paying particular attention to the finished surfaces.

c). Handle block units to prevent chipping, breakage, soiling or other damage. Lift with wide-belt type slings wherever possible; do not use wire ropes or ropes containing tar or other substances that might cause staining. If required use wood rollers and provide cushion at end of wood sides.

d). Handle brick units on pallets or flat-bed wheel barrows.

2). Mortar Materials:

a). Store in a weatherproof structure clear of the ground.

b). Portable silos can be used for bulk storage of cement.

c). Protect packaged materials against contamination and moisture.

d). Stockpile and handle aggregates to prevent contamination from foreign materials.
e). Store admixtures to prevent contamination or damage from excessive temperature changes.

f). Keep water free of harmful materials.

H10.230 Site Dimensions

a. Take site dimensions as necessary to ensure a proper fit between the masonry and adjacent work and to achieve specified erection tolerances.

H10.231 Setting out

a. Be responsible for the true and proper setting out of the works, the correctness of position, levels, dimensions and alignment of all walling including openings.

b. Before work begins on Site submit proposed methods for dimensional setting out and crosschecking with other trades to satisfy the required accuracy.

c. All controlling dimensions, especially at interface with surrounding elements, shall be observed. All dimensions shall be checked on Site.

d. Setting-out shall be taken from grid lines as shown on the Contract Drawings.

e. Allow for all necessary formers to achieve required opening sizes and tolerances.

H10.232 Lintel Bearings

a. Carefully predetermine setting out to ensure that full units occur below lintel ends and ensure that all materials are fully bonded or tied together.

H10.233 Tolerances

a. Comply with the requirements of Code of Practice SANS 10155.

b. Alignment and Levelling:

1). Length:

   a). Up to 5m: +/- 10mm.
   b). 5m to 10m: +/- 15mm.
   c). Over 10m: +/- 20mm.

2). Height:

   a). Up to 3m: +/- 5mm.
   b). 3m to 6m: +/-15mm.
   c). Over 6m: +/- 20mm.

3). Straightness in any 5m length: 10mm (non-cumulative).

4). Vertically in any 1m height: 3mm (non-cumulative).

5). Vertically in any 3m height: 10mm (non-cumulative).
c. Notwithstanding the provisions of SANS 10155 and the tolerances above, tolerances shall be reduced when, for the purposes of fit and/or appearance, the tolerances within SANS 10155 would fail to meet the design intent and dimensional criteria required by the works.

**H10.234 Final Clean**

a. Clean down all work immediately prior to completion or prior to the handing over of any part of the work and leave clean, to the acceptance of the Architect.

b. Do not use wire brushes, acid type cleaning agents or other cleaning compounds with caustic or harsh constituents.

END OF SECTION
H40 ACCESSORIES/ SUNDRY ITEMS FOR BRICK/ BLOCK/ STONE WALLING

a. Read in conjunction with Sections A and other related sections of the Specification, the Preliminaries and Contract Conditions.

H40.100 SCOPE, SUBMITTALS, TESTING AND PERFORMANCE

Specification and Scope

H40.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

H40.102 Section Coverage:

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Wall Ties.
2). Head Restraint.
3). Bed joint reinforcement.
4). Damp-proof Courses.
5). Movement Joints.

Column Ties / Starter Strips

H40.103 MAC-132: Wall Starter/ Connectors

a. Metal ties to columns to anchor brickwork in infill type applications.

b. To SANS 3575.

c. Manufacturer: Mitek South Africa Ltd. Tel: +27 (0) 11 237 8700.

d. Product: eCo Tibond 40mm wide x 1.6mm thick hot dip galvanised lug system, or acceptable equivalent.

e. Type: Galvanised steel wall starter strip.

f. Material finish: Hot dipped galvanised mild steel.

g. Length: 305mm.

Head Restraint
MAC-162: Angle Cleat Head Restraint

a. Manufacturer: To the acceptance of the Architect.

b. Product: Galvanised mild steel 75 x 100mm angle 3mm thick.
   1). Length: 200mm long.
   2). Fixing: fixed to underside of soffit at 1200mm centres staggered either side of wall.

c. Joint filler: 10mm non-combustible mineral wool board.

d. Placement: Full no gaps.

MAC-164: Debonded Internal Head Restraint

a. Manufacturer: To the acceptance of the Architect.

b. Product: 30mm wide x 3mm thick galvanised mild steel bent tie strip with debonded plastic cover.
   1). Length: 200mm long.
   2). Fixing: shot fired to underside of soffit at 1200mm centres and debonded end built into centre joint of double skin wall.

c. Fixing: shot fired to underside of soffit at 1200mm centres and debonded end built into centre joint of double skin wall.

d. Placement: Full no gaps.

Soft Joints

MAC-168: Soft Joint at Top of Wall

a. Type: Non-combustible mineral wood board.

b. Manufacturer: To the acceptance of the Architect
   1). Thickness: 10mm.
   2). Width: to suit the width of the wall.
   3). Board must be fitted to give a tight and accurate fit, closely following the profile of the gap.

Reinforcement

MAC-412: Bed Joint Reinforcement

a. To SANS 190 Part II.

b. Manufacturer: BRC Mesh Reinforcing (Pty) Ltd, Tel: +27 (0) 16 421 3520.

c. Product: Brickforce welded wire bed joint ladder reinforcement, or acceptable equivalent.

e. Wires size: 2.8mm diameter, cross wires at 300mm centres.
f. Width: 150mm for 230mm walls, 75mm for 110mm walls.

**Movement Joints**

**H40.108 MAC-452: Movement Joints with Sealant**

a. Filler: Compressible, closed cell polyethylene.
b. Manufacturer: Sondor industries Ltd. Tel: (011) 452 4530.
c. Product: Jointex board or acceptable equivalent.
d. Sealant:
   1). Type: Acrylic.
   2). Colour: To match mortar.

**H40.200 QUALITY AND WORKMANSHIP**

**Submittals**

**H40.201 Response**

a. Provide submittals in accordance with the requirements of Section A of the Specification.

**H40.202 Pre-Control Samples**

a. Not required.

**H40.203 Post-Control Samples**

a. In accordance with Section A, post-contract samples of the following shall be provided:
   1). 3 No. of each accessory.

**H40.204 Quality Benchmark Requirements**

a. The following quality benchmarks shall be provided in locations to be agreed with the Architect, in accordance with Section A of the Specification:
   1). The first installation of each element. Co-ordinate with requirements for benchmarks in Section H10 of the Specification.

**Testing**

**H40.205 General**

a. Provide independently certified test literature for each type of accessory. The test result data shall meet the requirements of the Specification.

b. Where test results for a material or product are not available, undertake testing to show compliance with the Specification at an independent testing laboratory as accepted by the Architect.
c. The provision of test data shall not relieve the Principal Contractor of any responsibility with regard to the performance and integrity of materials and products used within the works.

Performance Requirements

H40.206 General

a. Comply with the requirements for brick/ block walling as specified in Section H10 of the Specification.

b. Comply with general performance requirements specified in Section A of the Specification.

Material Quality

H40.207 Accessories Generally

a. Use items suitable for the application and capable of accommodating differential movement between elements as necessary. Increase frequency of ties as necessary to withstand loading and properly restrain insulation.

b. Fully protect all exposed ends of wall ties from damage with adequate protection during construction.

Workmanship

H40.208 Generally

a. Unless specified otherwise, the works shall be installed in accordance with the manufacturer’s written recommendations and all relevant South African Standards.

H40.209 Templates

a. Where frames are not to be built in as the work proceeds, openings using rigid templates shall be formed and accurately fabricated to the required size.

H40.210 Cleanliness

a. Ties and DPCs shall be kept free from debris and mortar. Adequate precautions shall be taken to ensure jointing, fixings, DPCs and other like are installed in a neat and workmanlike manner.

b. Keep any insulation dry and free from mortar droppings, grout and other debris during the course of construction.

General Installation

H40.211 Restraint Ties

a. Where the restraint tie does not have a proprietary debonding sleeve, one half of the length shall be debonded by wrapping with polyethylene sheet before building into the joint.

H40.212 Joint Reinforcement

a. Reinforcement shall be concealed within the joint.

b. Width: Approximately 40-50mm less in width than the wall or leaf.
c. Lay on an even bed of mortar in a continuous strip with 225mm laps at joints and full laps at angles.

d. Keep back 20mm from the face of the external work, 12mm back from the face of the internal work and finish the mortar joint to normal thickness.

**H40.213 Movement Joint with Sealant**

a. Build in as the work proceeds ensuring no projections into cavities and correct depth of joint to receive sealant system. Thickness of filler to match design width of joint.

b. Prepare joints and apply compatible sealant as Section Z22.

**H40.214 Movement Joint without Sealant**

a. Build in as the work proceeds, completely filling the joint but without projecting into cavities. Thickness of filler to match design width of joint.

b. In case of fire resistant filler compress, insert and slide into place in open joint. Install with accessories or adhesives where recommended in writing by the manufacturer.

**H40.215 DPC**

a. Lay in unjointed lengths with corners lapped full thickness of wall.

b. Lap end joints a minimum of 150mm.

c. Bed DPC's on an even bed of fresh mortar, on no account bed them dry.

d. Extend DPC's through the full width of the wall, including any surface finish.

e. Build in carefully in accordance with the manufacturer's recommendations to ensure a fully watertight installation.

f. Overlap DPC at junction with DPM a minimum of 75mm.

**H40.216 Door Frame Installation**

a. Set up door frames plumb and brace prior to building in.

**H40.217 Fire Stopping**

a. Fill joints around ends of timber built into walls with mortar to seal cavities form the interior of the building.

**Storage of Material**

**H40.218 Storage of Materials**

a. Stack 300mm above ground surface on uniform supports.

b. Protect with tarpaulin or similar covers, including sides and ends.

END OF SECTION
L21 TIMBER DOORS/ FRAMES/ SHUTTERS/ HATCHES

a. Read in conjunction with Sections A and Z, other related sections of the Specification, the Preliminaries and Contract Conditions.

L21.100 MATERIALS AND PRODUCTS

L21.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

L21.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Doors:
   a). Solid timber doors.

L21.103 DRT-211: Solid Core Interior Flush Single Doorset with Kickplate

a. Door type(s) 05, 10, 11, 16, 18, 20, 25, 26, 30, 32, 31 as shown on the Project Door Schedule.

1). Size and configuration: As shown on the Project Door Schedule.

2). Manufacturer: To be agreed.

3). Product: To be agreed.

4). SANS 545 classification:
   a). Performance: Heavy duty.

5). Type: Hardwood veneer faced, solid core, single leaf and single swing door.

6). Edges: Concealed hardwood edge.

7). Thickness: To be agreed.

8). Facing: Hardwood veneer.
   a). Thickness: To be agreed.

9). Finish: Matt clear varnish.

10). Kickplate:
a). Material: To be agreed.
   i. Thickness: To be agreed.

b). Height: 1200mm.

11). Doors to be delivered with protection for the finished surfaces.

12). Frame:
   a). To SANS 1129.
   b). Type: Double rebated for single leaf door to suit 115mm wall.
   c). Size: Refer to Door Schedule.
      i. Thickness: To be agreed.
   e). Factory finish as delivered:
      i. Red oxide primed for site decoration.
      ii. Finishing coat:
          (a). Type: As described in Section X10 of the Specification.
          iii. Colour: To be agreed.
   f). Fixing: Lugs for building in.

13). Ironmongery: As indicated on the Project Ironmongery Schedule.


a. Door type(s) 01, 03, 06, 12-14, 22, 27, 04, 07, 08, 15, 19, 23, 29, 02, 09, 17, 21, 24, 28 as shown on the Project Door Schedule.

1). Size and configuration: As shown on the Project Door Schedule.

2). Manufacturer: To be agreed.

3). Product: To be agreed.

4). SANS 545 classification:
   a). Performance: Heavy duty.

5). Type: Hardwood veneer faced, solid core, single leaf and single swing door.

6). Edges: Concealed hardwood edge.

7). Thickness: To be agreed.

8). Facing: Hardwood veneer.
a). Thickness: To be agreed.

9). Finish: Matt clear varnish.

10). Kickplate:
   a). Material: To be agreed.
       i. Thickness: To be agreed.
   b). Height: To be agreed.

11). Pushplate:
   a). Material: To be agreed.
       i. Thickness: To be agreed.
   b). Height: 1200mm.

12). Doors to be delivered with protection for the finished surfaces.

13). Frame:
   a). To SANS 1129.
   b). Type: Double rebated for single leaf door to suit 115mm wall.
   c). Size: Refer to Door Schedule.
       i. Thickness: To be agreed.
   e). Factory finish as delivered:
       i. Red oxide primed for site decoration.
       ii. Finishing coat:
           (a). Type: As described in Section X10 of the Specification.
           iii. Colour: To be agreed.
   f). Fixing: Lugs for building in.

14). Ironmongery: As indicated on the Project Ironmongery Schedule.

**Accessories**

**L21.105 Galvanised Fixing Cramps**

a. 375 x 38 x 2mm mild steel “L” shaped galvanised to Z275.

b. One end turned up 75mm and fixed to timber frame with No.2 sherardized wood screws.

c. Other end fishtailed and built into brickwork.
Fixings

L21.106 Nails to SANS 820
b. Type: Round wire.
c. Protection: Galvanised.

L21.107 Screws to SANS 1171
b. Head type: Countersunk, cross recessed drive.

Adhesives

L21.108 Adhesives
a. PVA adhesives shall comply with SANS 1348.
b. Phenolic, aminoplast and polyurethane adhesives shall comply with SANS 1349.
c. Adhesives used in the manufacture of all external joinery shall be suitable for Exposure Class 1 of SANS 10183.

L21.200 QUALITY AND WORKMANSHIP

Submittals

L21.201 Response
a. Provide submittals in accordance with the requirements of Section A of the Specification.

Samples and Quality Benchmarks

L21.202 Pre-contract Control Samples
a. Not required.

L21.203 Control Samples
a. Provide the following control samples:
   1). 300 x 300mm samples of all doors.
   2). Door frame minimum 300mm of each type.
   3). Typical ironmongery components in the proposed materials and finishes to include operating handle, hinge and locking device.

L21.204 Benchmark Requirements
a. Provide the following quality benchmarks:
   1). First installed of each type, in location to be agreed provide the following quality benchmark.
**Moisture Content**

L21.205 Moisture Contents

a. Maintain moisture content manufacture and storage within the range specified for the component.

b. Produce joinery in humidity conditions resembling those of the finished building.

L21.206 Moisture Content of Timber

a. Adhere to the following moisture contents for timber.

1). Highveld: 10%.

**Accuracy**

L21.207 Accuracy

a. Comply with the following tolerances:

1). Thickness: +/-1.5mm.

2). Width: +/-2mm.

3). Length: +/-2mm.

4). Cup: 3mm maximum.

5). Bow: 5mm maximum.

6). Twist: 6mm.

**Installation**

L21.208 General Requirements

a. Install all elements in the correct position, within tolerance, and in the correct relationship to the building structure.

b. Install all fixings in accordance with the manufacturer’s recommended procedures.

c. Keep materials dry until fixed.

d. The finished work to be square, regular, true to line, level and plane, with a satisfactory fit at all junctions.

L21.209 Building In

a. Components that are being built in must be braced and protected as necessary to prevent distortion and damage during erection of adjacent structure.

L21.210 Fixing

a. Plugged and screwed items to be screwed with appropriate size and length screws to fibre or plastic plugs placed in predrilled holes in the masonry or concrete.

b. Fix DPC with galvanised clout nails to backs of all frames that are built into external openings.
L21.211 Fixing Centres
a. When not predrilled, position at 150mm from the ends of jambs, at hanging points and at not more than 600mm centres.

L21.212 Hanging of Doors
a. Mortice locks to fit snugly with face plate flush with the edge of the door.
b. Internal doors to be hung on 1 pair 100mm steel hinges.
c. Glazed doors to be hung on 1 pair 100mm brass hinges.
d. External doors to be hung on a minimum of 1½ pairs of 100mm brass butt hinges fixed with brass screws.

L21.213 Adjustment of Door Size
a. Do not trim more than 10mm from the stile of an exposed edge door.
b. Do not trim more than 3mm from the stile of a concealed edge door.
c. Do not trim more than 10mm from the top or bottom rails.

L21.214 Priming/ Sealing
a. Before fixing components ensure that surfaces of timber that will be inaccessible after installation are primed or sealed as specified.

L21.215 Sealant Joints
a. Sealant for frames to be gun applied acrylic sealant, silicone or mastic where required.

L21.216 Ironmongery
a. Assemble and fix carefully and accurately using fasteners with matching finish supplied by ironmongery manufacturer.
b. Prevent damage to ironmongery and adjacent surfaces.
c. At completion check, adjust and lubricate as necessary to ensure correct functioning.

Installation Tolerances

L21.217 Generally
a. At the time of handover the visual requirements of the works to be as follows:
   1). The works to be straight and flat.
   2). Gaps to head and jambs of doors to frames to be 2mm all round.
   3). Thresholds to have a 7mm gap where located above a carpeted floor.
   4). The maximum variation from plumb to be plus or minus 1.5mm.
b. Take responsibility for checking dimensions on Site.

Protection
**L21.218 Protection**

a. Do not fit any doors and ironmongery whilst "wet" trades are still in progress.

b. Protect all built-in work and ironmongery from dirt, stains and damage until Practical Completion.

c. Protect doors and ironmongery during construction after fitting and care taken to.

d. Doors and ironmongery to be kept away from abrasives, acids and other corrosive materials.

e. Ensure that all door frames have protective coverings during storage and after installation to protect factory applied finishes.

**Storage & Handling**

**L21.219 Storage**

a. Stack 300mm above ground surface on uniform supports.

b. Protect with tarpaulin or similar covers including sides and ends.

c. Do not deliver to site components that cannot be put immediately into suitably dry, floored and covered storage.

d. Stack on bearers, separated with spacers to prevent damage by and to projecting ironmongery, beads, etc.

END OF SECTION
L60 PURPOSE MADE JOINERY

a. Read in conjunction with Sections A and Z, other related sections of the Specification, the Preliminaries and Contract Conditions.

L60.100 PRODUCTS, SYSTEMS AND MATERIALS

Specification and Scope

L60.101 Descriptive Works

a. Complete the Detailed Design, manufacture, supply, install and warrant that the works comply with the visual intent shown on the Contract Drawings and criteria stated in the Specification.

b. Where no material, product or supplier is indicated in the Specification, propose suitable materials and systems prior to Contract award which comply with the visual intent and performance criteria stated and remain fully responsible for the Detailed Design of the works.

c. Where a particular material, product or supplier is indicated in the Specification, such material, product or supplier shall be deemed indicative representing the Architect’s design intent only. The Contractor may complete the installation using that material or product, or such other confirmed as acceptable by the Architect in writing, but shall remain fully responsible for the Detailed Design and performance of the works.

L60.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Manufacture of purpose made joinery.

Purpose Made Joinery - Ablutions

L60.103 FXB-211: Mild Steel Plate Metal Shelf

a. Size and configuration: As shown on the Contract Drawings.

b. Material: Mild steel.


d. Colour: To be agreed.

e. Fixing: To be agreed.

L60.104 FXB-213: Mild Steel Plate Metal Shelf - Paraplegic Bathroom

a. Size and configuration: As shown on the Contract Drawings.

b. Material: Mild steel.


d. Colour: Black.

e. Fixing: To be agreed.
L60.105 FXB-511: Custom Built Joinery Item

a. Granite counter with mitred joint fascia and cabinet on framework as shown on the Contract Drawings.

1). Counter:
   a). Material: Granite top with eased and polished edges.
   b). Type: Zimbabwe black granite.
   c). Finish: Leathered finish.
   d). Size and configuration: As shown on the Contract Drawings.
   e). Thickness: To be agreed.
   g). Cut outs: As shown on the Contract Drawings and factory precut.

2). Fascia:
   b). Size: As shown on the Contract Drawings.
   c). Thickness: To be agreed.

3). Cabinet:
   a). Suitable core material, minimum 16mm thick.
      i. Manufacturer: To be agreed.
      ii. Product: To be agreed.
      iii. Edging: 1mm thick, high impact, PVC edge strips to match board finish.
      iv. Finish: To be agreed.
      v. Colour: To be agreed.
   c). Front panels:
      i. Material: Sheet metal fixed panels.
      ii. Finish: To be agreed.
   d). Door fronts:
      i. Material: Sheet metal door panels.
      ii. Finish: To be agreed.
e). Hinges:
   i. Type: To be agreed.
   ii. Manufacturer: To be agreed.

f). Handles:
   i. Type and colour to the acceptance of the Architect.

4). Sanitaryware: As shown in Section T60 of this Specification and on the Contract Drawings.

5). The system shall include fixings, bracketry, support framing and all other components/accessories necessary to complete the installation.

L60.106 FXT-131: Change Room Bench

a. Size and configuration: As shown on the Contract Drawings.

   1). Frame:
      a). Material: To be agreed.
      b). Finish: To be agreed.
      c). Height: To be agreed.

   2). Seat:
      a). Material: To be agreed.
      b). Thickness: To be agreed.

Timber Generally

L60.107 Timber

a. To be free from decay and active insect attack with no knots wider than half the section width. No knots, pitch pockets, splits and shakes will be allowed on faces to be exposed in finished work.

Softwoods

L60.108 Softwood for Framing

a. Shall comply with the general requirements of SANS 1783: Part 1.

   b. Surface finish: Planed.

   c. Wrought exposed woodwork to a smooth surface where exposed to view.

   d. Fixing: Countersunk, screwed and filled.

Hardwoods

L60.109 Hardwood

a. To comply with SANS 1099.
b. Species: To be agreed.
c. Grade: Clear.
d. Surface finish: Planed.
e. Fixing: Countersunk, screwed and pelleted where exposed to view.

**Fibreboards**

**L60.110** Medium Density Fibreboard

a. Type: Medium Density Fibreboard to comply with SANS 540.
b. Profile and thickness: As shown on the Contract Drawings.
c. Provide a suitable balancing paint to backs of MDF.
d. Fixing: Countersunk, screwed and filled.

**L60.111** Standard Hardboard

b. Type: To be agreed.
c. Thickness: To be agreed.
d. Grade: Standard Grade.

**Laminated Boards**

**L60.112** Plywood

a. Manufactured to SANS 929.
b. Type: To be agreed.
c. Grade: Standard Grade.
d. Exposure Class: To be agreed.
e. Nominal thickness: As shown on the Contract Drawings.

**L60.113** Marine Plywood

a. The board to comply with BS 1088.
b. Supplier/Proprietary reference: To be agreed.
c. Thickness/Number of plies: To be agreed.
d. Board Grade: To be agreed.
e. Glue type to be: To be agreed.

**Particleboards**
L60.114 Chipboard
a. Wood chipboard to comply with SANS 50312.
b. Supplier/Proprietary reference: To be agreed.
c. Type to be agreed.
d. Thickness: To be agreed.

L60.115 Faced Chipboard
a. Supplier/Proprietary reference: to be agreed.
b. Substrate: Wood chipboard to comply with SANS 50312.
c. Decorative facing: To be agreed.
d. Backing to be agreed.
e. Thickness: To be agreed.
f. Finish: To be agreed.

Wood Veneer Panels

L60.116 Wood Veneer Panels
a. Wood veneer faces and balanced panels with lipped edges all round to include:
   1). Core material:
      a). [MDF].
      b). [Plywood].
      c). [Chipboard].
   2). Core material thickness: To be agreed.
   3). Facing Veneer:
      a). Species: To be agreed.
      b). Minimum thickness: 0.7mm.
      d). Apply veneers with edges tight butted, with no gaps or other open defects.
      e). Set out veneers so that veneers are aligned in regular uniform symmetry, unless otherwise specified.
   4). Edge treatment:
      a). Edges to be solid hardwood to match face veneer in colour and texture.
      b). Edges, including rebated edges, to be fully lipped and bevelled on all sides.
5). Finish: To be agreed.
6). Underside of panel to have a balancing laminate.
7). Maintain moisture content at appropriate levels in relation to the core material and to suit the internal environmental conditions.
8). Finished components to be free from bow, twist, scratches, chipping, pimpling, depressions, glue spill, staining and other defects.

**Adhesives**

**L60.117 Adhesives**

a. PVA adhesives shall comply with SANS 1348.
b. Phenolic, aminoplastic and polyurethane adhesives shall comply with SANS 1349.
c. Adhesives used in the manufacture of all external joinery shall be suitable for Exposure Class 1 of SANS 10183.

**Fixings**

**L60.118 Nails**

a. To comply with the requirements of SANS 820.

**L60.119 Screws**

a. To comply with the requirements of SANS 1171.

**L60.200 QUALITY AND WORKMANSHIP**

**Submittals**

**L60.201 Response**

a. Provide submittals in accordance with the requirements of Section A of the Specification.

**Samples and Quality Benchmarks**

**L60.202 Pre-tender Samples**

a. Not required.

**L60.203 Control Samples (Post-contract)**

a. Provide the following control samples:
   1). 300 x 300mm sample of each surface and finish.

**L60.204 Benchmark Requirements**

a. Provide the following quality benchmarks:
   1). Each item of specialist furniture installed, in location to be agreed.
Dimensions

L60.205 Maintain

a. Within tolerance the dimensions shown in the Contract Drawings and/ or Shop Drawings/ Working Drawings of timber sub-frames, material thicknesses, the dimensions of mullions and transoms.

Moisture Content

L60.206 Moisture Contents

a. Maintain moisture content during manufacture and storage within the range specified for the component.

b. Produce joinery in humidity conditions resembling those of the finished building.

L60.207 Moisture Content of Timber

a. Adhere to the following moisture contents for timber:

1). Highveld: 10%.

Fabrication

L60.208 Cross-sectional Dimensions

a. Cross-sectional dimensions of timber shown on the Contract Drawings are nominal sizes unless stated otherwise.

L60.209 Fabrication

a. Form sections out of the solid when not specified otherwise.

1). Carefully machine timber to accurate lengths and profiles, free from twist and bowing.

2). After machining, surfaces to be smooth and free from tearing, woolliness, chip bruising and other machining defects.

b. Assemble with tight, close fitting joints to produce rigid components free from distortion.

c. Screws:

1). Countersink screw heads not less than 2mm below timber surfaces that will be visible in completed work.

2). All screws to have clearance holes.

3). Screws of 8 gauge or more and all screws into hardwood to have pilot holes.

d. Fixings and fastenings not to protrude above the surface of boards or other finished work.

e. Arrises:

1). Arrises to be pencil rounded unless specified otherwise.

2). Angle rounded to be rounded to a 6mm radius.
L60.210 Grain/ Pattern
   a. Grain or pattern to be vertical on vertical surfaces and parallel to walls on horizontal surfaces.

L60.211 Fixing
   a. Fix joinery to masonry or concrete with appropriate plugs and screws.
   b. Provide matching pellets to fixings on facework.

L60.212 Wood Veneers
   a. Condition core material and veneers before bonding. Unless specified otherwise, apply to the reverse side of flat boards a balancing veneer with the same moisture and temperature movement characteristics as the facing veneer.
   b. Apply veneers with edges tight butted, no gaps or other open defects and no lipping.
   c. Bond in presses whenever possible.
   d. Finished components to be free from bow, twist, scratches, chipping, pimpling, depressions, glue spill, staining and the like.
   e. Sand to a fine, smooth finish, free from sanding marks.

L60.213 Finishing
   a. Sand all joinery to give smooth, flat surfaces suitable to receive specified finishes.
   b. Before assembly, seal all end grains for external components with primer or sealer as specified and allow to dry.

L60.214 Protection
   a. Protect completed joinery against damage, dirt, moisture and other deleterious substances.

END OF SECTION
M20 PANEL PARTITIONS

a. To be read in conjunction with Sections A and Z, the Preliminaries and Contract Conditions.

M20.100 PRODUCTS, SYSTEMS AND MATERIALS

Specification and Scope

M20.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

M20.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the works, which include the following:

1). Panel partitions (relocatable).

b. Ensure that all interfaces are fully co-ordinated prior to commencement.

Partition Systems

M20.103 PAN-141: Prefabricated Toilet Cubicle with Removable Panel

a. Modular frameless toilet cubicle system which is supported with end and mid panels fixed in to floor anchors and overhead aluminium extrusion and bracketed to walls, mids and ends using stainless steel brackets. The system contains formed in through coloured compact grade high pressure laminate partitions and a aluminium removable sanitaryware fittings panel.

1). Size and configuration: As shown on the Contract Drawings.

2). Manufacturer: Cubicle Solutions. Tel: +27 (0) 86 100 0451.

3). Product: Cube Max Range; Ref: CSMax/ALU, or acceptable equivalent.


5). Thickness: 12mm.

6). Partitions to be 2500mm high and fixed in to position 150mm off the floor.

7). Doors to be flushed with beveled edges.

8). Modular framing system:

a). Floor anchors:
i. Material: Aluminium extrusion.

ii. Finish: Powder coated, Qualicoat Class 1 as in Section Z31 of this Specification.

iii. Colour: To be agreed.

b). Overhead anchors:

i. Material: Aluminium extrusion, 200mm from the ceiling.

ii. Finish: Powder coated, Qualicoat Class 1 as in Section Z31 of this Specification.

iii. Colour: To be agreed.

c). Stainless steel brackets:

i. Mids and ends: CSSBr01/304.

ii. Walls: U brackets CSTUbr01/316.

d). All fixings and ironmongery in 304 and 316 grade stainless steel and aluminium as specified.

9). Ironmongery to include hat and coat hook CSSH&C02/304 with buffer stopper, indicator bolt CSTIN01/316/17 and PBA wide auto open hinge CSPBAR&F01/open/316.

10). Removable panel:


b). Finish: Powder coated, Qualicoat Class 1 as in Section Z31 of this Specification.

c). Colour: To be agreed.

d). Width: 200mm.

e). Sanitary fittings: As shown in Section T60 of this Specification and on the Contract Drawings.

M20.104 Framework

a. Provide a suitable support system as recommended by the manufacturer.

b. Provide additional supports at door openings.

c. Fabricate metal framework from hot-dip zinc coated and iron zinc alloy coated sheet steel to BS EN 10143, being not less than 0.55mm thick, fixed by zinc or cadmium plated self-drilling and self-tapping headed screws.

d. All inaccessible steel sheet to be hot dip galvanised in accordance with BS EN ISO 1461.

M20.105 Partition Doors

a. All doors to be as indicated on Contract Drawings, supplied with factory fitted thumb lock and indicator.
b. Doors not to twist or deform when opening and not to rely on the closed position to maintain their rigidity.

c. Doorsets to include ironmongery.

d. Ironmongery to be from a range acceptable to the Architect. All hinges to be compatible to the designed door jamb section and all outward opening doors to have concealed hinges.

e. All access doors to be readily demountable, without major lifting equipment, for maintenance purposes and shall not disturb the surrounding elements of the works.

Fixings

M20.106 General

a. All bolts, screws, nuts and anchors to be of adequate strength for their designed purpose and manufactured from a suitable grade of stainless steel.

b. All necessary fasteners and fixings to be provided for the works and associated flashings and closures.

c. Fixings within aluminium framing components not to be visible unless shown on the Contract Drawings.

d. Visible fixings to be restricted to the assembly of elements to the support steelwork using types described on the Contract Drawings.

Tolerances

M20.107 Manufacturing Tolerances

a. Deviations in panel length, width and diagonal dimensions not to exceed ±1mm.

b. The twist and warping not to cause any point of the panel to be more than 0.5mm out of plane. The twist and warping not to cause any point of the structural frame to be more than 2mm out of plane.

c. All return edges to metal components to be formed to a minimum external bending radius of 1.5mm and a maximum of 3mm. Confirmation of the preferred radius to be given to the Architect for review. This to be consistent throughout the works.

d. Where panels are required to have perforations, make slotted holes in alignment and match with adjacent panels. Panel to panel slippage on perforations not to be more than 1mm.

Finishes

M20.108 Colours

a. Unless otherwise specified in the Contract Drawings or in the Specification, the colours to be finished to the RAL reference.

M20.200 QUALITY AND WORKMANSHIP

Submittals

M20.201 Response
a. Provide submittals in accordance with the requirements of Section A of the Specification.

**Samples and Quality Benchmarks**

**M20.202 Pre-contract Samples**

a. Not required.

**M20.203 Post-contract Samples**

a. Provide the following post contract samples:

1). Minimum 300 x 300mm solid partition panel of each type.

2). Framing members.

3). All fixings.

**M20.204 Benchmark Requirements**

a. Provide the following quality benchmarks:

1). First installed structural bay of each type of panel partition, in location to be agreed.

**Moisture Content**

**M20.205 Moisture Contents**

a. Maintain moisture content manufacture and storage within the range specified for the component.

b. Produce components in humidity conditions resembling those of the finished building.

**M20.206 Moisture Content of Timber**

a. Adhere to the following moisture contents for timber.

1). Highveld: 10%.

**Accuracy**

**M20.207 Accuracy**

a. Comply with the following tolerances:

1). Thickness: +/-1.5mm.

2). Width: +/-2mm.

3). Length: +/-2mm.

4). Cup: 3mm maximum.

5). Bow: 5mm maximum.

6). Twist: 6mm.
Testing

M20.208 Test Requirements

a. Include for testing by an accredited independent testing specialist or provide independently certified test data to demonstrate compliance with the Specification.

Performance Requirements

M20.209 General

a. Comply with the general performance requirements of Section A and the following specific performance requirements.

Structural Performance Requirements

M20.210 Support System

a. The works to be fixed to a proprietary support system in accordance with the manufacturer’s written recommendations and to comply with the requirements of the Specification.

b. All fixing details shown on the Contract Drawings are indicative. Prepare final details.

c. The Detailed Design to accommodate the fixing zones indicated on the Contract Drawings.

d. The Detailed Design to accommodate the specified construction tolerances and deflection criteria for the support structure as described in the Specification:
   1). Concrete.
   2). Dry lining.
   3). Raised floors.

e. Every precaution is to be taken that no chemical or electrolytic action takes place where dissimilar metals and/or materials are used together, and to isolate aluminium components from cementitious surfaces. The necessary insulation to be provided wherever dissimilar metals occur at interfaces with works described in other sections of the Specification.

f. The support system for the partitions to hold the facing panelling firmly without lateral movement on the restraint slots.

Fire

M20.211 Specific Fire Performance Requirements

a. The works to be classified as ‘materials of limited combustibility’ as defined in the Building Regulations. Linings to have a Class 0 surface spread of flame when tested in accordance with SANS 10177.

Installation

M20.212 General

a. Handle, store, assemble and fix partition component and accessories in accordance with manufacturer's recommendations ensuring compliance with design and performance requirements.
b. Set out accurately with all frames/panels plumb, true to line and level and free from bowing, undulations and other planar distortions.

c. Align all joints accurately with a lipping.

d. Fix securely, ensuring provision of additional supports where necessary of perimeter to give a stable partition resistant to specified design loads.

e. Make adequate allowance for moisture and thermal movement of boards/panels.

f. All elements of framework and associated beads and strips to be stored on Site such that they are not damaged, distorted or weathered unevenly.

g. All finished components to be carefully packed in stillages or crates such that they are separated and protected to prevent scratching, scuffing or other surface damage.

h. Site dimensions and levels of the structure to be verified before commencing installation.

i. The framing members for the works to be set out and installed in the correct position, within tolerance, and in the correct relationship to the building structure.

j. All fixing bolts and anchors to be installed in accordance with the manufacturer’s recommended procedures.

k. Internally, the protection to remain in place until the works are complete. All protective measures to be replaced following any inspections by the Architect.

l. Acceptance to be obtained from the Architect before drilling or cutting parts of the structure, other than where shown on the Shop Drawings/Working Drawings.

m. Isolating tape, plastic washers or other suitable means to be provided to prevent bi-metallic corrosion between dissimilar metals.

M20.213 Installing Relocatable Partitions

a. Check dimensions on site well in advance of fabrication/installation. Report any discrepancies and problems of fit to the Architect and obtain instruction before proceeding.

b. Protect all floor finishes during installation of partitions using a suitable non-slip covering.

c. Deviations at perimeter abutments must be accommodated whilst maintaining the performance of the partition system.

d. Form make up/closer pieces accurately around any projections and features. Do not cut or otherwise alter panels except where shown on the Contract Drawings or otherwise agreed with the Architect.

e. Keep intermediate joints in exposed frame members and trims to a minimum by using the longest unjointed lengths available from the manufacturer.

f. Ensure that all substantial conductive parts of the partition are electrically continuous and fully earth bonded.

g. Provide and maintain protection to all components in vulnerable positions (doorsets, ironmongery, panels, corner posts, etc.) until practical completion.

M20.214 Perimeter Seals
a. Sealant material: A type recommended by the partition/panel manufacturer.
b. Apply continuous to clean, dry, dust-free surfaces, leaving no gaps.

M20.215 Fire Stopping

a. Seal any gaps at junctions of partitions with perimeter abutments, services, etc. using tightly packed mineral wool or approved intumescent sealant, to prevent penetration of smoke and flame.

M20.216 Ironmongery for Relocatable Partitions

a. Prepare frames and doors accurately to accept locks, strike plates, hinges, etc. and associated fixings.
b. Assemble and fix carefully and accurately using fasteners with matching finish supplied by partition/ironmongery manufacturer. Prevent damage to ironmongery and adjacent surfaces. At completion check, adjust and lubricate as necessary to ensure correct functioning.

M20.217 Post Installation Requirements for Relocatable Partitions

a. Thoroughly inspect the partition installation for defects. Prepare a schedule of outstanding defects and submit a copy to the Architect. Ensure that all components fit and operate correctly. Rehang doors as necessary.
b. Provide duplicate sets of user instructions at practical completion for each partition type, including procedures for dismantling and reassembling partitioning and maintenance (replacement of individual panels, access to wiring, cleaning, etc.).
c. Provide the following spares and hand over to the Client at Practical Completion.

Tolerances

M20.218 Installation Tolerances

a. Maintain a high degree of accuracy when installing the works.
b. At the time of completion, the works to be visually acceptable to the Architect such that within any planning grid section the allowable tolerances are equally distributed so that:

1). The panel partitions are vertical.
2). The vertical joints are of equal size and at equal centres.
3). Any support mullions are vertical and at equal centres.
4). The panel partitions and supports have straight lines and flat planes.
5). The horizontal joints are of equal size and in line between adjacent panels.
6). The gap between the panels and mullion structure is constant.
c. Alignment: Erect the works in proper alignment in relation to established lines and grades as shown on the Shop Drawings/Working Drawings. Take account of the installation tolerance requirements of the panel system, such that units are accurately located, relative to grid lines.
d. Joints between panels: The average width of any joint not to deviate from the nominal width by more than 1mm. Equally distribute any variation with no sudden changes or steps.

e. The maximum variation in plan location, from the planning grid of any part of the panel system, not to exceed 2mm.

f. The maximum variation in height of any part of the panel system, from the datum, not to exceed 2mm, including manufacturing tolerances.

g. The maximum offset in plan, level or section between any two adjacent panels not to exceed 1mm, including manufacturing tolerances.

h. Joints between panels and support mullions: The actual width of any joint not to deviate from the nominal width by more than 1mm. Equally distribute any variation with no sudden changes. Align the centre of the joint with the centre of the support mullion, except where shown otherwise on the Shop Drawings/Working Drawings. The misalignment between joints not to exceed 1mm.

i. Erect the works such that no joint on any panel or support mullion is more than 1.5m from a vertical plane. The cumulative slope between the same locations on any vertical plane not to exceed 1 in 1000. The vertical plane of the works to be within 2mm of the theoretical position.

j. Any misalignment between the panels and the structural mullions not to exceed 1mm.

k. Cut-outs for interfacing works to be to the dimensions shown on the Shop Drawings/Working Drawings ±1mm.

l. Fix the base plates and floor sockets to an accuracy of ±2mm in line and level.

m. All bolts in slotted holes to be within 2mm of their intended position.

n. Submit a detailed list of tolerances to which the works are fabricated and installed for review by the Architect. As a minimum include the following:

1). Position on plan.

2). Level.

3). Alignment.

4). Joints between panels.

5). Diagonal.

6). Eccentricity.

7). Inclination.

Storage & Handling

M20.219 Storage

a. Stack 300mm above ground surface on uniform supports.

b. Protect with tarpaulin or similar covers including sides and ends.

c. Do not deliver to site components that cannot be put immediately into suitably dry, floored and covered storage.
d. Stack on bearers, separated with spacers to prevent damage by and to projecting ironmongery, beads, etc.

END OF SECTION
M30 DEMOUNTABLE SUSPENDED CEILINGS

a. Read in conjunction with Sections A and Z, other related sections of the Specification, the Preliminaries and Contract Conditions.

M30.100 PRODUCTS, SYSTEMS AND MATERIALS

 Specification and Scope

M30.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

M30.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Linear metal ceiling system.

2). Lay in vinyl clad plasterboard ceilings.

b. Ensure that all interfaces are fully co-ordinated prior to commencement.

M30.103 Type CLG-541: Suspended Linear Aluminium Ceiling

a. Open slatted linear ceiling incorporating incorporating suspension system.

1). Manufacturer: Hunter Douglas, Tel: +27 (0) 11 251 7000


3). Panel size: To be agreed.

4). Thickness: To be agreed.

5). Finish: To be agreed.

6). Colour: To be agreed.

7). Suspension System: To be agreed.

8). Perimeter trim: To be agreed.

9). Clip panels to suspension system to prevent movement.

10). Accessories: Incorporate penetrations to receive downlighters, PA speakers or other service penetrations required where shown on the Contract Drawings. Allow for additional supports necessary at the location of penetrations to receive such fittings.
Vinyl Faced Ceiling Tiles

M30.104 CLG-411: 600 x 600mm Lay-in Vinyl Faced Ceiling Tiles

a. Type: Lay-in vinyl faced gypsum ceiling tiles in exposed suspension grid system.

1). Tiles:
   a). Manufacturer: To be agreed.
   b). Product: Vinyl faced gypsum ceiling tiles, or acceptable equivalent.
   c). Panel size: 600 x 600 x 12.5mm.
   d). Edge: Square.
   e). Finish: To be agreed.

2). Suspension System:
   a). Supporting structure: Concrete soffits and steel truss and purlin systems. The warehouse ceiling to be suspended by lightweight cold rolled sections from the steel roof truss, all as indicated on the Contract Drawings.
   b). Suspension depth: As indicated on the Contract Drawings.
   c). Product: OWAConstruct S3 exposed demountable butt-cut T24 suspension system, or acceptable equivalent.
   d). Hangers:
      i. Type to be as recommended in writing by the ceiling grid manufacturer, all components to be hot dipped galvanised.
      ii. Centres to be as recommended in writing by the ceiling grid manufacturer.
   e). Finish: Exposed face powder coated black.
   f). Perimeter trim: OWAConstruct Shadowline W-trim plugged and screwed at centres not exceeding 200mm.

3). Clip panels to suspension system to prevent movement.

4). Tiles to incorporate penetrations to receive downlighters, smoke detectors, PA speakers, sprinkler heads or other service penetrations required where shown on the Contract Drawings. Allow for additional supports necessary at the location of penetrations to receive such fittings.

M30.105 Accessories

a. Provide a trim and fix to the perimeter as required.

b. Provide smoke barriers to the ceiling void where indicated on the Contract Drawings, comprising layers of 12.5mm plasterboard plus supports.

M30.200 QUALITY AND WORKMANSHIP
Submittals

M30.201 Response
a. Provide submittals in accordance with the requirements of Section A of the Specification.

Samples and Quality Benchmarks

M30.202 Pre-contract Samples
a. Not required.

M30.203 Post-contract Samples
a. Provide the following control samples:
   1). Paint finishes as specified.
   2). Support system.
   3). Samples of panels, grilles, trims, etc.
   4). All fixing types.

M30.204 Benchmark Requirements
a. Provide the following quality benchmarks:
   1). First structural bay of each type in location to be agreed.

Testing

M30.205 Testing
a. All materials/products shall have been tested to demonstrate their fire properties and acoustic performance.

b. Where the sub-contractor/manufacturer is unable to provide independently certified test data demonstrating compliance with the specification, then testing of the prototypes/materials is to be undertaken.

M30.206 Test Requirements
a. Provide evidence of independent tests carried out to demonstrate that the products comply with the Specification or carry out such tests necessary to demonstrate compliance.

b. Such tests to demonstrate compliance in respect of the following criteria:
   1). Fire resistance.
   2). Air leakage.
   3). Acoustic integrity.
   4). Structural stability.

Durability
M30.207 Components
   a. The works not to deteriorate under normal usage provided regular cleaning and maintenance is carried out in accordance with the manufacturer’s recommendations.
   b. All visible elements of the works (e.g. panels, trims, tiles) to be replaceable.

M30.208 Demountability
   a. Visible elements of the works to be interchangeable and removable for maintenance purposes.
   b. All ceilings’ panels and support systems to be demountable within the supporting framework for access to the services void above.

General

M30.209 Conditions
   a. Do not install material until the building is weathertight.
   b. Ensure that services above ceilings are completed.

Ceilings

M30.210 Setting Out
   a. Unless otherwise stated set out to ensure that edge tiles are never less than half in width or length.
   b. Joints between panels to be consistent, square and flush.

M30.211 Tolerances
   a. Grid dimensions as shown on the Contract Drawings to be maintained ±1mm.
   b. Finished ceiling levels to be as shown on the Contract Drawings ±2mm in 1000mm length.
   c. Deflection of the works due to self-weight not to exceed L/400 for spans up to 1200mm and L/500 for spans up to 1800mm.
   d. Grid creep across any ceiling not to exceed 1.5mm in a 10m length.
   e. Panel to panel lipping or plan offset not to exceed 0.5mm and be non-cumulative across any ceiling.

M30.212 Suspended Grid
   a. Set out accurately, free from undulations and lipping, with all lines and joints straight and parallel to the planning grid.
   b. Install square, regular to line, level and plane within specified tolerances.
   c. Fix securely with additional bracing and stiffening as necessary to provide a rigid system.
   d. Light fittings, grilles, fire and smoke barriers, etc. to be in the correct positions relative to the ceiling grid, prior to commencing installation. Common setting-out points to be used.
e. Install the suspension system for the works in accordance with the manufacturer’s recommendations.

**M30.213 Movement Joints**

a. Movement joints to be as shown on the Contract Drawings.

b. Provide movement joints as appropriate for the area of ceiling and/or to coincide with movement joints in the surrounding structure.

**M30.214 Fire Stopping**

a. Seal all gaps at junctions with walls, cavity barriers, ducts, pipes and other penetrations using tightly packed mineral wool, intumescent sealant or other fireproof material to prevent penetration of smoke and flame.

**Workmanship**

**M30.215 Galvanised Strap and Angles**

a. Fix with steel pop rivets to suspended grid.

**Protection**

**M30.216 Protection**

a. Protect edges and arrises from mechanical damage.

b. Protect finished ceilings from dirt and following trades.

**M30.217 Remedial Works**

a. Repair all damage when directed by the Architect.

b. All remedial works to surface finishes only to be accepted if a perfect match is achieved. Failure to comply with this requirement will require replacement of the component.

END OF SECTION
N12 TROWELLED RESIN FLOORING

a. To be read in conjunction with Sections A and other related sections of the Specification, the Preliminaries and Contract Conditions.

N12.100 PRODUCTS, SYSTEMS AND MATERIALS

Specification and Scope

N12.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

N12.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the works, which include the following:

1). Resin flooring.

2). Floor Accessories.

N12.103 Particular Interfaces

a. Ensure that all interfaces are fully co-ordinated prior to commencement.

N12.104 Particular Requirements

a. Epoxy coatings must be installed by an approved Contractor with a written 10 year guarantee.

b. The resin flooring manufacturer shall retain broadcasting material of the same batch as that used for a period of 10 years. Propose the anticipated amount required for acceptance by the Architect.

c. The resin flooring manufacturer shall propose a cleaning and maintenance regime for the lifetime of the works.

d. All maintenance/replacement of the epoxy coatings needs to be able to be completed and cured within the 7 hour period that the Airport is closed at night.

e. The existing substrate shall be ground back to a smooth finish as recommended by the manufacturer and to the acceptance of the Architect.

f. Protect the works after curing with softboard so that following trades do not damage the finished floor surface.

Resin Flooring
N12.105 FLF-741: Epoxy Seamless Floor Finish with Infinity Curves and 150mm High Skirting - Colour 1

a. Flow applied non-slip, durable, decorative system consisting of coloured quartz granules encapsulated in a clear resin binder.

1). Manufacturer: Flowcrete SA (Pty) Ltd, (Tel: +27 (0) 11 394 1980).

2). Product: Flowcrete Peran STB, or acceptable equivalent.


4). Primer: Flowprime, application as recommended by the manufacturer.

5). Coats: Number of application coats as recommended by the manufacturer.

6). The material manufacturer to have valid certification to the SANS 9000 family of standards.

7). Thickness: 3-4mm as recommended by the manufacturer to suit the proposed application.

8). Colour: To be agreed.

9). Finish: Smooth gloss self smoothing non-slip and free from sudden irregularities. Maximum permissible deviation of surface measured under a 3m straightedge using a slip gauge to BS 8204: Part 1 to be 5mm.

10). Joints:

a). Provide movement joints as necessary.

b). Once cured, all joints must be re-cut to original geometry and filled with Eucolastic 1NS.

i. Colour: To be agreed.

N12.106 FLF-743: Epoxy Floor Finish - Shower Stall

a. Antimicrobial treated polyurethane high performance system for use in wet areas.

1). Sub-base: Self level renovation screed.

2). The substrate must be clean, dry and free of all contaminants such as dirt, oil, grease, coatings and surface treatments, etc.

3). Apply in strict accordance with the manufacturers published recommendations.

4). Finishing coat:

a). Manufacturer: Flowcrete SA (Pty) Ltd, (Tel: +27 (0) 11 394 1980).


c). Colour: To be agreed.

d). Thickness: 4-5mm.

5). Provide movement joints as necessary.
N12.107 Movement Joints

a. Provide structural movement joints to accommodate the following:

1). Primary movement joints: Stainless steel/ aluminium extrusions as recommended by the manufacturer.

2). Control joints: Movement centre joints recommended in writing by the manufacturer and generally comprising the following:
   a). Neoprene inserts of a colour to match the coating system.
   b). Aluminium metal side plates generally to manufacturer’s written recommendations.

Skirtings

N12.108 SKR-421: Epoxy Coved Skirting

a. Epoxy resin coved skirting for use in wet areas.

1). Surface preparation is to be completed by hand grinders and / or sanders. All cementitious laitance must be removed to expose a sound screed and provide a dry, dust free, open textured surface.

2). Any damage areas must be made good with Flowfresh mortar material.

3). Anchor grooves, minimum 4mm wide × 4mm deep, must be formed at all edges, bay joints, columns, doorways, drains and at regular centres across the floor.

4). Apply in strict accordance with the manufacturers published recommendations.

5). Primer: Flowprime, application as recommended by the manufacturer.

6). Finishing coat:
   a). Manufacturer: Flowcrete SA (Pty) Ltd, (Tel: +27 (0) 11 394 1980).
   c). Colour: To match that of the floor finish.

b. Install vertical skirting at 75mm and coved radius at 75mm.

c. Coving to floor detail: Aluminium Strip where the coving detail meets the floor to allow for movement.

d. Coving to tile detail: The tiles on the wall to be finished with an aluminium strip to create a straight edge.

Wall Finish

N12.109 PNT-451: Epoxy Wall Coating

a. Durable, decorative system consisting of coloured quartz granules encapsulated in a clear resin binder.

1). Manufacturer: Flowcrete SA (Pty) Ltd, (Tel: +27 (0) 11 394 1980).

2). Product: Flowcrete Peran STB Hand Trowel, or acceptable equivalent.
3). Concrete substrates must be sound and of sufficient compressive strength (minimum 25 N/mm²).

4). The substrate must be clean, dry and free of all contaminants such as dirt, oil, grease, coatings and surface treatments, etc.

5). Apply in strict accordance with the manufacturers published recommendations.

6). Height: 2800mm above finished floor level.

7). Primer: Flowprime, application as recommended by the manufacturer.

8). Coats: Number of application coats as recommended by the manufacturer.

9). Colour: To be agreed.

10). The material manufacturer to have valid certification to the SANS 9000 family of standards.

11). Thickness: 5mm as recommended by the manufacturer to suit the proposed application.


13). Provide movement joints as necessary.

14). Sealant to shower stall walls:
   a). 2 no. coats of Hydro Seal as recommended by the manufacturer.
   b). Thickness: To be agreed.
   c). Colour: To be agreed.

15). Wall to coved skirting: Wall application to create a seamless bond with coving detail, as shown on the Contract Drawings.

**N12.200 QUALITY AND WORKMANSHIP**

**Submittals**

**N12.201 Response**

a. Provide submittals in accordance with the requirements of Section A of the Specification.

**Samples, Mock-ups, Prototypes and Quality Benchmarks**

**N12.202 Post-contract Samples**

a. In accordance with Section A, provide post contract samples of the following:
   1). 300 x 300mm sample of agreed colour in specified finish.

**N12.203 Mock-ups**

a. Not required.

**N12.204 Prototypes**
a. Not required.

N12.205 Benchmark Requirements

a. Provide the following quality benchmarks in accordance with Section A:

1). First structural bay of each type in location to be agreed.

Testing

N12.206 Test Requirements

a. Provide evidence/testing data and reports to demonstrate that all installations have been tested to meet the standards specified herein.

b. Where evidence cannot be provided by the manufacturer, arrange for tests to be carried out to comply with the requirements of the Specification to the satisfaction of the Architect.

c. The provision of testing data or the carrying out of tests does not relieve the Contractor of his responsibility regarding the performance requirements, durability or service life requirements, etc.

N12.207 Slip Resistance Testing

a. Testing for slip resistance to comply with the following documents:

1). ‘The assessment of pedestrian slip risk’ by The Health and Safety Executive (latest published version).


b. Testing to be performed at an independent UKAS accredited laboratory accredited to perform the specified test methods.

c. Pendulum Test: Test internal flooring in both dry and wet conditions using the TRL Pendulum Tester in accordance with BS 7976 and the recommendations of the UK Slip Resistance Group to obtain the pendulum test value (PTV) specified.

d. Roughness Test: Test internal flooring using a surface roughness meter, in accordance with the recommendations of the UK Slip Resistance Group, to obtain the surface roughness (Rz) value specified.

e. Test samples must include any surface sealer to be applied to the finished flooring.

f. Submit test results in both wet and dry conditions to the Architect for acceptance prior to ordering.

N12.208 Slip Resistance

a. When tested using the TRL Pendulum Tester, internal flooring to achieve the following pendulum test value (PTV):

1). Wet: Not less than 26 PTV.

2). Dry: Not less than 67 PTV.

b. When tested using the surface roughness meter, internal flooring to achieve the following surface roughness (Rz) value:
1). Not less than 20 \( \mu \)m Rz.

**N12.209 Weather Conditions**

a. Do not apply coating in wet weather when the temperature is below 5°C.

b. Do not apply coating in direct sunlight.

c. Protect coating from rain for at least 24 hours after application.

**N12.210 Suitability of Bases**

a. Ensure that before starting work:

1). Bases are flat enough to permit specified levels and flatness of finished surfaces, considering the permissible minimum and maximum thicknesses of the works.

2). Bases are clean and free from dirt, dust, grease and oil. Remove droppings of cement mixtures and surface contamination during application.

3). Bases are dry to accept the works and achieve the specified requirements.

**N12.211 Application of Coating**

a. Apply coating as follows and strictly in accordance with the manufacturer's instructions:

1). The works to be applied by a recommended and experienced applicator, having a minimum of 10 years experience with specified type (not similar) of flooring system. The applicator shall have a valid certificate to the SANS 9000 family of standards.

**N12.212 Movement Joints**

a. Design bay divisions and movement joints in flooring to co-ordinate with wall joints and other elements. Check and agree locations shown on the Specification.

**N12.213 Texture and Colour**

a. Ensure uniformity of texture and colour through the work.

**N12.214 Warranty**

a. On completion, provide a warranty to guarantee that the full design, construction durability and performance of the complete works meet all aspects of the Specification and Contract Drawings.

END OF SECTION
O10 SIGNS/ NOTICES

a. To be read in conjunction with Sections A and other related sections of the Specification, the Preliminaries and Contract Conditions.

O10.100 PRODUCTS, SYSTEMS AND MATERIALS

Specification and Scope

O10.101 Descriptive Works

a. Complete the Detailed Design, manufacture, supply, install and warrant that the works comply with the visual intent shown on the Contract Drawings and criteria stated in the Specification.

b. Where no material, product or supplier is indicated in the Specification, propose suitable materials and systems prior to Contract award which comply with the visual intent and performance criteria stated and remain fully responsible for the Detailed Design of the works.

c. Where a particular material, product or supplier is indicated in the Specification, such material, product or supplier shall be deemed indicative representing the Architect's design intent only. The Contractor may complete the installation using that material or product, or such other confirmed as acceptable by the Architect in writing, but shall remain fully responsible for the Detailed Design and performance of the works.

Specification and Scope

O10.102 Section Coverage:

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Non-illuminated signs.

b. Ensure that all interfaces are fully co-ordinated prior to commencement.

Signs/ Notices

O10.103 SGN-311: Female WC Signage

a. Non-illuminated black icon on yellow circle with black background wayfinding 'ladies' symbol sign and frame.

b. Material: Adhesive vinyl on backing paper.

1). Colour(s):

a). Yellow vinyl to be Avery 739.

b). Black vinyl to be Avery 701.

c. Dimensions: 250 x 250mm.

d. Fixing: Adhesively fixed.

e. Frame:

1). Type: Single sided clip frame with clear anti glare cover.
2). Supplier: Snapper Display, Tel: +27 (0) 11 708 1538.

3). Reference: Custom size ‘Classic’ Frame Style, or acceptable equivalent.


5). Fixing: Mounted to wall as recommended by the supplier and to the acceptance of the Architect.

O10.104 SGN-312: Male WC Signage

a. Non-illuminated black icon on yellow circle with black background wayfinding 'gents' symbol sign and frame.

b. Material: Adhesive vinyl on backing paper.

1). Colour(s):
   a). Yellow vinyl to be Avery 739.
   b). Black vinyl to be Avery 701.

c. Dimensions: 250 x 250mm.

d. Fixing: Adhesively fixed.

e. Frame:
   1). Type: Single sided clip frame with clear anti glare cover.
   2). Supplier: Snapper Display, Tel: +27 (0) 11 708 1538.
   3). Reference: Custom size ‘Classic’ Frame Style, or acceptable equivalent.
   5). Fixing: Mounted to wall as recommended by the supplier and to the acceptance of the Architect.

O10.105 SGN-315: Paraplegic WC Signage

a. Non-illuminated black icon on yellow circle with black background wayfinding 'mobility impaired' symbol sign and frame.

b. Material: Adhesive vinyl on backing paper.

1). Colour(s):
   a). Yellow vinyl to be Avery 739.
   b). Black vinyl to be Avery 701.

c. Dimensions: 250 x 250mm.

d. Fixing: Adhesively fixed.

e. Frame:
   1). Type: Single sided clip frame with clear anti glare cover.
2). Supplier: Snapper Display, Tel: +27 (0) 11 708 1538.

3). Reference: Custom size ‘Classic’ Frame Style, or acceptable equivalent.


5). Fixing: Mounted to wall/ door as recommended by the supplier and to the acceptance of the Architect.

**O10.106  SGN-316: Baby Change Room Signage**

a. Non-illuminated black icon on yellow circle with black background wayfinding 'baby change' symbol sign and frame.

b. Material: Adhesive vinyl on backing paper.

1). Colour(s):
   a). Yellow vinyl to be Avery 739.
   b). Black vinyl to be Avery 701.

c. Dimensions: 250 x 250mm.

d. Fixing: Adhesively fixed.

e. Frame:
   1). Type: Single sided clip frame with clear anti glare cover.
   2). Supplier: Snapper Display, Tel: +27 (0) 11 708 1538.
   3). Reference: Custom size ‘Classic’ Frame Style, or acceptable equivalent.
   5). Fixing: Mounted to wall/ door as recommended by the supplier and to the acceptance of the Architect.

**O10.107  SGN-317: Toilet Signage**

a. Non-illuminated black icon on yellow circle with black background wayfinding 'ladies and gents' symbol sign and frame.

b. Material: Adhesive vinyl on backing paper.

1). Colour(s):
   a). Yellow vinyl to be Avery 739.
   b). Black vinyl to be Avery 701.

c. Dimensions: 250 x 250mm.

d. Fixing: Adhesively fixed.

e. Frame:
   1). Type: Single sided clip frame with clear anti glare cover.
2). Supplier: Snapper Display, Tel: +27 (0) 11 708 1538.

3). Reference: Custom size ‘Classic’ Frame Style, or acceptable equivalent.


5). Fixing: Mounted to wall as recommended by the supplier and to the acceptance of the Architect.

O10.108 SGN-319: Hoarding Signage

a. Non-illuminated black text on yellow background hoarding sign.

b. Material: Adhesive vinyl on Foamex backing.

1). Colour(s):

a). Yellow vinyl to be Avery 739.

b). Black vinyl to be Avery 701.

c. Wording: Bliss bold typeface - 80mm.

d. Dimensions: 500 x 500mm.

e. Fixing: Adhesively fixed.

Materials and Components

O10.109 Fixings Generally

a. All fixings selected to be suitable for their intended purpose and adequate to comply with the performance requirements. Fixings not to be visible.

b. All bolts, screws, nuts and anchors to be of adequate strength for their designed purpose.

c. All necessary and appropriate fasteners and fixings to be supplied.

d. Fixings to conform to all statutory requirements in respect of strength and type.

e. Prevent bi-metallic corrosion between dissimilar metals.

f. Use fixings, which are suited to the stresses, movements and vibrations in use without allowing any wobble, creaks or deflection of any fixtures or fittings.

g. Fix items that require accessibility or removal with screws, bolts and hinges.

h. Access panels to be removable independently of any other panels.

i. Design to withstand all vibrations caused by traffic, aircraft, wind effects or any other such shocks, strains, stresses and movements including the operation of smoke detectors and any mechanical ventilation devices that may be imposed by the users. Suitable devices for absorbing or damping any such vibration to be included.

j. Design so as not to transmit any drumming noise as a result of vibration, shocks or stress. Use sound deadening material in all areas.

O10.110 Acrylic Sheet
a. The acrylic used for the signs:
   1). To be cast, colourless, clear and break resistant.

b. Ensure good resistance to dilute acids, limited resistance to organic solvents and good resistance to alkalis.

Fabrication

O10.111 Manufacturing Tolerances

a. Glass and Acrylic Tolerances:
   1). Manufactured glass/ acrylic sizes not to exceed ±1mm on each straight length and diagonal.

   2). After final processing, the deviation in flatness at any peak not to exceed 0.13mm and the difference between adjacent peaks not to exceed 0.08mm. Where bow tolerance and wave tolerance differ, the stricter requirements to prevail.

b. Submit a detailed list of tolerances to which the work is to be fabricated within the requirements of the Specification, for the overall geometric requirements.

c. The dimensional and detailed provisions intended to accommodate the construction tolerances of surrounding elements, in order to ensure that all aspects of the works relate satisfactorily to the project as a whole, to be stated and shown on the Shop Drawings/ Working Drawings.

O10.200 QUALITY AND WORKMANSHIP

Submittals

O10.201 Response

a. Provide submittals in accordance with the requirements of Section A of the Specification.

Samples and Quality Benchmarks

O10.202 Pre-contract Samples

a. Not required.

O10.203 Control Samples

a. Provide the following post contract samples:
   1). 300 x 300mm sign of each type in specified colour.

   2). Font and lettering/ Numbering sample.

   3). Fixing and seals.

O10.204 Benchmark Requirements

a. Provide the following quality benchmarks:
   1). First sign/ notice of each type installed, in location to be agreed.
Testing

O10.205 Test Requirements
a. Provide evidence/testing data and reports to demonstrate that all materials/products
proposed have been tested to meet standards specified herein.

Structural Performance Requirements

O10.206 Movements
a. Provide full structural calculations.
b. Accommodate all specified static and dynamic design loads likely to be imposed
without causing permanent deformation of components or the failure of members or
components. Such loads to be transmitted safely to the points of support.

O10.207 Dead Loads
a. Accommodate the following dead loads without any reduction in performance:
   1). The works’ own dead loads without causing deflections or movements.
   2). Vertical deflection of any supporting member.

O10.208 Live Loads
a. All loads resulting from movement and horizontal applied loads acting on the surface
   of the works arising from maintenance and cleaning operations.
b. A horizontal load of 1.75kN/m to cantilevered floor signs.

Durability

O10.209 Impact and Abrasion Resistance
a. Resist impacts from hand-held objects without any noticeable change to the surface
appearance. Also resist abrasion from cleaning methods and maintenance systems
without any noticeable change in surface appearance.

Fire

O10.210 Specific Fire Requirements
a. Materials to be non-combustible.
b. Graphical symbols and signs are to comply with the requirements as given in SANS
   1186.
c. All emergency signage to remain fully functional during a fire in accordance with the
   Fire Strategy Report.

Installation

O10.211 General
a. Ensure that the final appearance of the works is of a uniform quality.

Contractor’s Supplemental Information
Tolerances

O10.212 Signs/ Notices Tolerances

a. A high degree of accuracy is required in the fabrication and installation of the works and support structure.

b. On-site Dimensions:
   1). Take responsibility for checking all dimensions on Site.
   2). Accommodate any given tolerances and differences between actual Site dimensions and dimensions shown on the Contract Drawings.

END OF SECTION
O20 IRONMONGERY

a. Read in conjunction with Sections A and Z, other related sections of the Specification, the Preliminaries and Contract Conditions.

O20.100 PRODUCTS, SYSTEMS AND MATERIALS

Specification and Scope

O20.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

O20.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings and Ironmongery Schedule, provides particular requirements with respect to the following:

1). Ironmongery.

2). Refer to the Ironmongery Schedule.

O20.200 QUALITY AND WORKMANSHIP

Submittals

O20.201 Response

a. Provide submittals in accordance with the requirements of Section A of the Specification.

Samples and Quality Benchmarks

O20.202 Pre-Contract Control Samples

a. Not required.

O20.203 Control Samples

a. Provide the following control samples:

1). Samples of each type of ironmongery in specified finish.

2). A complete sample board of standard items. The exact extent to be agreed.

O20.204 Benchmark Requirements

a. Provide the following quality benchmarks:
1). First item of ironmongery installed, of each type, in location to be agreed.

**Hinges**

**O20.205 Hinges**

a. Hinges shall be of the strength class to suit the door weight, duty, number of hinges.

b. All butt hinges shall be template drilled, shall have removable or fixed pins and shall incorporate stainless steel bearing washers or self-lubricating bearings as specified.

c. External hinges shall be brass.

**O20.206 Locks, Cylinders and Keys**

a. Unless otherwise specified, keyed locks shall be of the pin tumbler, cylinder type, with a minimum of 6 pins.

b. Where cylinders are fitted with an inside turn this shall be with an easi-grip pattern.

c. All keys shall be labelled and handed over upon completion to the Architect, in sealed containers.

d. Cylinders shall conform to SANS 4.

e. Locks and latches shall comply with SANS 4.

**O20.207 Lever Handles**

a. Lever handles shall comply with SANS 4.

b. Lever handles shall be round in section, minimum 19mm diameter, and be safety shape in form.

c. The lever handle shall rotate freely on a ball race type bearing contained in a 25mm diameter cup welded to the rose or back plate to give minimal wear and friction.

d. All roses shall have a minimum 3mm thickness and be bored and countersunk with star drilling to accept countersunk back-to-back fittings.

**O20.208 Door Selectors**

a. Suitable selectors shall be provided if both leaves of a pair of rebated edge doors have closers or rebated latchbolts, etc.

b. The selectors shall not obstruct other ironmongery or affect the fire ratings of the doors.

c. On doors opening outwards, spring type, under-frame fixing selectors shall be used. If doors open inwards, rebate or face fixing types shall be used.

**O20.209 Door Bolts**

a. Bolts shall be provided at the top and bottom of one leaf of the locking double doors.

b. Top bolts shall have suitable plates or keeps and bottom bolts shall have easy clean sockets. Unless otherwise required, top bolts shall be 300mm long and bottom bolts 225mm.
c. Bolts generally shall be of a high quality flush type, with dovetail returns to resist door damage.

d. Bolts shall have projecting slides where escape may be required and lever action in other locations.

e. Bolts to plant room and duct doors shall be of a good quality anodised aluminium surface type. Where doors open outward, top bolts shall be necked types, to allow proper fixings.

f. Indicator bolts to WC cubicles shall be of a mortice type, unless door and frame details are unsuitable, when a surface type shall be permitted. They shall have red/white outside indicator and coin operated emergency releases.

O20.210 Doorstops

a. Suitable stops shall be provided where required to protect doors, hardware or surfaces.

b. Doorstops shall have robust holders matching other ironmongery on the door and rubber inserts.

O20.211 Door Plates

a. Push or kick plates shall be 1.5mm thick.

b. Plates shall be fixed with suitable countersunk screws located 5mm from the edges, with one screw at each corner and screws at equal centres, not more than 240mm apart, at top and bottom edges. Check sizes of all kick, mid rail or trolley plates on Site before ordering.

O20.212 Sundries

a. Hat and coat hooks shall be acceptable to the Architect, with at least two fixing points.

b. Flush pulls, pull handles and drawer pulls shall be from accepted, suitably sized units, from the same range as the door hardware.

Materials

O20.213 Stainless Steel

a. All stainless steel shall be austenitic grade non-magnetic 1.4301 8CR/18NI minimum, to BS EN 10095 and BS EN 10051.

b. Bolting: Material for stainless steel bolts shall be type 1.4301 S15 stainless steel.

c. Bolt strength shall be equivalent to grade 4.6 bolts. Washers for stainless steel bolts shall be formed from type 1.4301 stainless steel.

d. Finishes to Stainless Steel Elements: Stainless steel ironmongery shall be satin stainless steel finished as specified in the Ironmongery Schedule and shall be consistent in colour and texture both individually and collectively. The accepted finish shall be established on the basis of reference samples provided to the Architect.

e. Door stiles and rails shall be morticed and adequately reinforced to receive hinges, strikes, locksets, closers, floor bolts and all other ironmongery items on the Ironmongery Schedule.

O20.214 Aluminium
a. Aluminium shall be HE9-TF alloy to BS EN 485 + A1.

b. Each exposed surface shall be hand polished, then anodised to BS EN 12373: Part 1, Grade AA15, 15 microns thick.

Finish

O20.215 Chrome Plating

a. Polished chrome plated steel finish shall be in accordance with BS EN 12540.

b. Back of house hinges generally shall have satin chrome plated steel finish as scheduled.

Installation

O20.216 Generally

a. Door hardware locations from finished floor level to centre-line of hardware to be as follows, unless noted otherwise:
   1). Lever handles/knobs: 1000mm.
   2). Push plate/pull handle: 1070mm.
   3). Cylinder pull: 1200mm.
   4). Provide ironmongery for each door in separate, clearly labelled packs.

O20.217 Hinges

a. Provide three butt hinges to fire doors, external doors and doors with closers, unless specified otherwise.

O20.218 Fixings

a. Supply all items of door ironmongery complete with matching screws to the type and length recommended by the manufacturer and suitable for fixing to wood or metal, as appropriate to suit the door leaf and frame. All other visible fixings to have countersunk heads.

O20.219 Installation

a. Ironmongery to be installed and checked for correct operation. Each item to be maintained and protected against damage by other trades.

b. Co-ordinate the ironmongery works with other trades and form holes, mortices, chases, etc; reinforce and prepare hollow constructions to receive ironmongery; provide wiring, conduits, accessories, etc. for electrical items; protect ironmongery during construction; remove fixed items before finishing or painting as required.

Completion

O20.220 Completion

a. On completion adjust, clean and lubricate all ironmongery in accordance with the manufacturer’s recommendations.

O20.221 Key Handover
a. At Practical Completion, account for and adequately label all keys.

b. Provide the Architect with an itemised schedule and retain a duplicate schedule as a receipt.

c. The master keys to be issued by the cylinder/key supplier direct to the Architect.

END OF SECTION
Q50 ARCHITECTURAL/ SUNDRY METALWORK

a. To be read in conjunction with Section A and other related sections of the Specification, Preliminaries and Contract Conditions.

Q50.100 PRODUCTS, SYSTEMS AND MATERIALS

Q50.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

Q50.102 Section Coverage:

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Metal trims.

2). Corner Protectors.

Q50.103 Particular Interfaces

a. Complete the Detailed Design of all interfaces with adjoining trades prior to commencement of manufacture.

b. Ensure that all interfaces are fully co-ordinated prior to commencement.

Metal Trims

Corner Protectors

Q50.104 TRM-371: Stainless Steel Corner Protector

a. Supplier: To be agreed.

b. Product: Stainless steel corner protectors.

c. Stainless steel grade: To be agreed.

d. Size and configuration: As shown on the Contract Drawings.

e. Fixing: To suit the application to the acceptance of the Architect.

Materials

Q50.105 Metalwork

a. Refer to Section Z11 of this Specification.

b. Determine suitable grades and thickness of materials.
Q50.200 MATERIALS AND PRODUCTS

Submittals

Q50.201 Response

a. Provide submittals in accordance with the requirements of the A Section of the Specification.

Samples and Quality Benchmarks

Q50.202 Pre-contract Samples

a. Not required.

Q50.203 Post Contract Samples

a. In accordance with the A Section, post contract samples of the following shall be provided:

1). 300mm length of each trim and corner guard type.

2). All visible fixings.

Q50.204 Benchmark Requirements

a. The following quality benchmarks shall be provided in locations to be agreed with the Architect, in accordance with the A Section:

1). An area determined by the Architect of each element of the works fully installed, completed and accepted by the Architect.

Performance Requirements

b. Comply with the general performance of the A Section and the following specific performance requirements.

Accuracy

Q50.205 Accuracy

a. Comply with the requirements of SANS 10155.

b. Unless stated otherwise accuracy to be to Degree of Accuracy II.

Structural

Q50.206 General

a. Refer to Section A.

Q50.207 Specific Dead Loads

a. Accommodate the loads detailed in SANS 10160 and the following dead loads without any reduction in performance:

1). Accommodate the component and final assembly dead load locally without causing deflections or movements that adversely affect any component.
2). The dead loads derived from any permanent fixtures or services attached to the surfaces of the works.

b. When calculating loads the worst combination to be considered.

**Q50.208 Specific Live Loads**

a. Accommodate the loads detailed in SANS 10160 and the following live loads without any reduction in performance:

1). All loads resulting from movements of the building structure and support structure.

2). Impact loads, or transferred impact loads, that occur during the service life of the works, without deterioration in performance and without sustaining non-repairable damage.

3). Loads imposed during replacement.

b. When calculating loads the worst combination shall be considered, taking account of the fact that the pressure coefficients at various locations may determine more than one design criterion.

**Q50.209 Deflections**

a. The works shall not deflect under loading in any way that is detrimental to any element of themselves or adjacent structural or building elements.

b. All components, couplings and fixings shall be capable of accommodating all of the above deflection without permanent distortion, deformation or failure.

c. The works shall accommodate differential structural movements arising from any loads imposed by adjacent structures.

d. The magnitude of the allowable deflections shall be reduced if they are detrimental to any part of the works, their support structure or internal finishes.

**Durability**

**Q50.210 General**

a. The performance criteria shall be satisfied for the full design life of the works, as stated in the Specification, provided always that the maintenance has been carried out as specified.

**Q50.211 Impact and Abrasion Resistance**

a. The works shall resist abrasion from agreed cleaning methods and maintenance systems without any noticeable change in surface appearance. Generally, surfaces shall be sufficiently hard (including glass coatings) to resist all reasonable impacts from hand-held objects.

b. The extent of any damage determined through testing shall be recorded and, where possible, quantified. Details shall be submitted to the Architect.

c. Details of tests shall be provided to demonstrate the performance of materials and finishes in resisting abrasion from pedestrian traffic (hands, rings, luggage, cloth, shoes, etc.) and any other abrasion resulting from adjacent traffic movements.

**Q50.212 Fixings**
a. Fixings shall meet the performance requirements.
b. All necessary fixings shall be installed for the works.
c. Direct contact between aluminium or aluminium alloys and treated timber shall be avoided, unless with the prior acceptance of the Architect.
d. Visible fixings shall be to match accepted samples.
e. Unless otherwise specified, the following basic requirements shall be adhered to:
   1). Rigidity: Only fixings which are suited to the likely stresses, movements and vibrations in use without allowing any wobble, creaks or deflection of any fixtures or fittings shall be used.
   2). Removability: Items that require accessibility or removal shall be fixed with bolts.
f. Refer also to Section Z20 of the Specification.

Joints

Q50.213 Generally

a. Movement joints shall be as shown on the Contract Drawings.
b. The works shall accommodate all movement of joints in a manner that does not compromise their integrity or appearance.

Fabrication

Q50.214 Metalwork Generally

a. Refer to Section Z11 of the Specification.
b. Fabrication to comply with SANS 2001 - CS1.
c. All visible cut ends shall be polished smooth with no crude machine cut visible.
d. Welded joints shall be ground and polished smooth.
e. Do not use sections that are heavily pitted or rusted.
f. Before fabricating, ensure that the surface condition of steel that is to be coated complies with requirements specified for cleaning.
g. Where shop or site welding is required it shall be:
   1). Metal arc method to SANS 9692, SANS 9956 to form fully fused joints with mechanical properties not less than those of the parent metal.
   2). All welders shall be coded welders in accordance with SANS 2001 - CS1.
   3). The contractor shall produce evidence acceptable to the Architect that welding procedures and welders have been tested in accordance with the requirements of American Welding Society Standard AWS D1.1.
h. Minimum welds to be 6mm continuous fillet welds.
i. Make cuts and holes neatly and accurately. Remove burrs, sharp edges and dross caused by flame cutting.

j. Protective coatings and finishes on joints shall be to the same standard as the main assemblies.

k. Site cutting shall not be permitted.

Q50.215 Tolerances

a. Tolerances for fabrication:

1). Deviations in panel length, width and diagonal dimension tolerances shall not exceed ±1mm.

2). The twist and warping shall not cause any point of the panel to be more than 0.5mm out of plane. The twist and warping shall not cause any point of the structural frame to be more than 2mm out of plane.

Workmanship

Q50.216 General

a. The works shall be installed in the correct position, within tolerance, and in the correct relationship to the building structure.

b. Protection shall remain in place until all the works are complete. All protective measures shall be replaced following any inspections by the Architect.

c. Acceptance shall be received from the Architect before drilling or cutting parts of the structure, other than where shown on the Shop Drawings/ Working Drawings.

d. Isolating tape, plastic washers, or other suitable means to prevent bi-metallic corrosion shall be provided between dissimilar metals, or between preservation treated timber and metal.

e. The works shall be square, regular to line, level and plane, with all junctions fitting to the stated tolerances.

Q50.217 Installation Tolerances

a. The works shall be erected in proper alignment in relation to established lines and grids shown on the Contract Drawings.

b. Joints: The width of any joint shall not deviate from the nominal width by more than ±1mm. Any variation shall be equally distributed with no sudden changes. The works shall be erected such that no joint is more than 1.5mm from a vertical plane. The cumulative slope between the same locations on any vertical plane shall not exceed 1 in 1000. The vertical plane of the works shall be within ±1.5mm of the theoretical position.

c. Alignment: Adjacent elements of the works shall not deviate from either their intended horizontal or vertical alignment by more than ±2mm.

d. Squareness: Any diagonal length across the panel shall not deviate by more than the lesser of ±3mm or ±0.075% of design dimension.

e. Bow: The centre section of the element shall not bow by more than the lesser of 3mm or 0.075% of the length of the element measured from a straight line between the ends of the element.
f. Straightness: Any surface of edge shall not deviate by more than ±2mm from a 2m straightedge placed against it in a direction parallel to the long axis of the element.

g. Flatness: Any surface shall not deviate by more than ±2mm from a 2m straightedge placed against it in any direction.

h. Twist: No section of the element may be twisted by more than 1° from the section at either end of the element.

**Handling and Storage**

**Q50.218 Handling and Storing Coated Steelwork**

a. Use methods and equipment that minimise chafing, chipping and other damage to coated components.

b. Ensure an adequate drying/curing period for each coat before handling.

c. Use suitable packings, lashings, lifting harnesses, nylon slings, rubber protected chains and chocks, etc.

d. Stack coated components clear of the ground, separated by timber chocks, so that ponding does not occur.

END OF SECTION
R10 SCREEDS AND TOPPINGS

a. Read in conjunction with Sections A and Z, other related sections of the Specification, the Preliminaries and Contract Conditions.

R10.100 PRODUCTS AND MATERIALS

Specification and Scope

R10.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

R10.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Bonded Cement Sand Screeds.

R10.103 Particular Requirements

a. The screed shall be applied in accordance with the requirements/recommendations of the epoxy floor manufacturer.

b. The guarantee requirement cited in Section N12 of this Specification shall regard the substrate, screed and epoxy floor finish as a single system and therefore this guarantee shall apply to the entire installation.

c. The approved Contractor shall complete the entire installation as described above.

Screeds

R10.104 SCR-111: Self-levelling Polymer Screed

a. The proprietary self-levelling polymer screed to be:

1). Supplier: Flowcrete, Tel: +27 (0) 31 461 3411.

2). Product: Isocrete self levelling renovation screed or acceptable equivalent.

3). Bonded construction with a minimum thickness of 3mm and a maximum thickness of 30mm as shown on the Contract Drawings.

4). With mix proportions as recommended by the manufacturer.

5). Strength: 35-50mpa.

6). Laid as recommended by the manufacturer by an approved licencee.
7). With a trowelled finish.

Reinforcement

R10.105 Reinforcement Requirements

a. Reinforcement in screed to be to SANS 1024 and of the following types:
   1). Ref.100 mesh to bonded screeds.
   2). Ref. 193 mesh, or in accordance with the Structural Engineers recommendations for un-bonded screeds.

Movement Joints

R10.106 Screed-primary Movement Joints

a. Location: To align with all main structural joints.

b. Type: To be agreed.

R10.107 Screed Perimeter Movement Joint

a. Location: At the edges of screeds against solid walls.

b. Type: To be agreed.

Materials

R10.108 Cement

a. Cement: CEM I Portland cement 42.5N to SANS 50197. or CEM IIA Portland Fly Ash Cement 32.5N.

R10.109 Fine Aggregate

a. Fine aggregate: To SANS 1083, with not more than 10% passing sieve size 150 microns.

b. Where a smooth finish is required, use a mixture of 4 parts crusher sand sieved as in a) and one part clean plaster sand.

R10.200 QUALITY AND WORKMANSHIP

Submittals

R10.201 Response

a. Provide submittals in accordance with the requirements of Section A of the Specification.

Samples and Quality Benchmarks

R10.202 Pre-Contract Samples

a. Not required.

R10.203 Post-Contract Samples
a. Movement joint and edge restraints, minimum 300mm long.

**R10.204 Benchmark Requirements**

a. Provide the following quality benchmarks:

1). First structural bay of each screed type, in location to be agreed.

**Accuracy**

**R10.205 Levels of Floor Screeds**

a. The permissible deviation in level of surface of screeds (allowing for thickness of coverings) and toppings from datum to be 5mm.

**R10.206 Flatness of Floor Screeds**

a. No sudden irregularities to occur. The variation in gap under a straightedge placed anywhere on the surface to be not more than the following:

1). Screeds to receive dust sealer: 5mm under a 3m straightedge.

2). Screeds to receive sheet or tile finishes bedded in adhesive.

   a). 5mm under a 3m straightedge.

   b). 2mm under a 1m straightedge.

3). Enclosed staircases: 2mm under a 1m straightedge.

**Structural Performance Requirements**

**R10.207 General**

a. All screeds are to withstand all movements of the structure under all design loads or combination of loads as specified in the Structural Engineer's specifications and Deflection/ Movement Reports, without any damage, cracking or breaking up of the screeding.

b. All screeds are to accommodate all structural expansion joints and construction control joints.

c. Expansion and movement joints shall accommodate the appropriate range of movement.

d. The Contractor to be responsible for determining the requirement for and location of movement joints, whether indicated on the Contract Drawings or not.

**Testing**

**R10.208 Impact and Strength**

a. Adhesion tests to be carried out over the area of screening works, all in accordance with the recommendations of the Cement and Concrete Institute.

b. Material to pass a strength test utilising a BRE screed tester.

c. Randomly select test positions at least 3 every 20m², corridors tested every 5m.

d. The maximum depth of penetrations not to exceed 3mm indentation.
Workmanship

R10.209 Workmanship

a. The screed not to be altered to accommodate other trades unless such work is clearly specified on the Contract Drawings.
   1). Do not add cement to the surface of screeds.
   2). Ensure that all screeds are thoroughly compacted.

Suitability of Bases

R10.210 Bonded Screeds

a. Bases to be flat enough to permit the specified levels and flatnesses of finished surfaces, considering the permissible minimum and maximum thicknesses of the screed.

b. Completely remove the mortar matrix from the surface of the slab to expose coarse aggregate over the entire area of the hardened base of the slab using abrasive blasting or, for in situ slabs only, pneumatic scabbling. Remove dust and debris.

c. Wet bases for several hours before laying screed. Remove free water, then brush in recommended bonding agent or cement slurry.

d. Lay screed while slurry is still wet to ensure a good bond.

Screeds

R10.211 Proprietary Screed Preparation and Installation

a. Mechanically scarify and chemically clean floor screed to remove dust.

b. Mix proprietary screeds in a concrete mixer.

c. The works to be laid by specialists who are trained and approved licensees of the proprietary additive manufacturer.

d. Cure screeds using polythene sheeting or as specified by the manufacturer.

e. All proprietary screeds to have current Agrément certificate.

Batching

R10.212 Batching Requirements

a. Ensure that proportions of mixes made with dense aggregates are specified by weight and are batched by weight. Volume batching only to be permitted on the basis of the previously established weight: volume relationship(s) of the particular materials, using accurate gauge boxes.

Mixing

R10.213 Mixing Requirements

a. Admixtures used are not to contain calcium chloride.
b. Water content of mixes to be the minimum necessary to achieve full compaction and low enough to prevent excessive water being brought to the surface during compaction.

c. Mix materials thoroughly to a uniform consistency. Mixes other than non-fines to be mixed in a suitable mechanical mixer.

d. Use material while sufficiently plastic for full compaction.

Adverse Weather

R10.214 Weather Requirements

a. Do not lay screeds unless their surface temperature is maintained above 5°C for not less than 4 days thereafter.

b. In hot weather reduce the time between operations with water retaining admixtures added to ensure that premature drying does not take place.

Joints in Screeds

R10.215 Joint Requirements

a. Screeds to be cast continuously, as far as possible without defined joints, using ‘wet screeds’ between strips or bays. The positions of bay joints, as shown on the Shop Drawings/ Working Drawings, to be confirmed and co-ordinated as follows.

1). Where the location of bay joints are not shown on the Contract Drawings, obtain acceptance from the Architect before starting work.

2). Forms, where applicable, to be square edged with surfaces securely fixed. Wet material to be compacted thoroughly at edges to give level, closely abutted joints with no lipping.

3). Alternatively, screeds to be cast continuously, bay joints being formed with proprietary dividing strips.

4). The structural movement joint covers to be fixed in accordance with the detailed Contract Drawings and floor plans, closely following the manufacturer’s written recommendations and installation guidelines.

5). Be responsible for the installation and performance of all floor interfaces and seek confirmation of movement and loading requirements.

6). Structural movement joints to be situated immediately over or cantilevered in relation to the structural joints in the slab.

7). Joints to be installed in lengths of 4 metres with the minimum length at the end of runs being at least 1 metre. At joins, joint covers to either be invisibly spliced or joint sections staggered such that the joint is continuously linked.

8). The horizontal width of the movement joint to be set at the time of installation, taking account of thermal expansion at the time of installation.

9). Movement joint covers to be affixed to the base (and upstands) by means of expanding bolt anchors at centres recommended by the movement joint manufacturer. All anchor bolts to be zinc plated.

10). Movement joint covers to be affixed such that the upper surface of the joint finishes flush with the top of adjacent floor finishes.
Timing

R10.216 General

a. All finishing operations to be carried out at optimum times in relation to the setting and hardening of the material. Surfaces not to be wetted to assist surface working. Cement not to be sprinkled onto surface.

On-Site Finishes

R10.217 Trowelled Finish to Receive Applied Floor Finishes

a. Screed to be floated to an even surface with no ridges or steps.

b. Screed to be hand or power trowelled to give a uniform smooth appearance, but not a polished surface. It shall be free from trowel marks and other blemishes and be suitable to receive the specified flooring material as per the Specification.

c. Adequately protect the surface from construction traffic.

d. If the surface of the screed is not suitable to receive the specified flooring material, make good by application of a smoothing compound.

Curing

R10.218 Curing Requirements

a. Immediately after laying, protect the screed surface from wind, draughts and strong sunlight.

b. As soon as the screed/ topping has set, cover with polythene sheeting for not less than 5 days.

Protection

R10.219 Protection

a. Protect finished screed from mechanical damage.

Storage of Materials

R10.220 Cement

a. Store in a weatherproof structure clear of the ground.

b. Do not store for more than six weeks before using.

c. Portable silos can be used for bulk storage of cement.

R10.221 Fine Aggregate

a. Store to avoid contamination.

END OF SECTION
R20 PLASTERED/ RENDERED/ ROUGHCAST COATINGS

a. Read in conjunction with Sections A and Z, other related sections of the Specification, the Preliminaries and Contract Conditions.

R20.100 PRODUCTS AND MATERIALS

Specification and Scope

R20.101 Descriptive Works

a. Complete the Detailed Design, manufacture, supply, install and warrant that the works comply with the visual intent shown on the Contract Drawings and criteria stated in the Specification.

b. Where no material, product or supplier is indicated in the Specification, propose suitable materials and systems prior to Contract award which comply with the visual intent and performance criteria stated and remain fully responsible for the Detailed Design of the works.

c. Where a particular material, product or supplier is indicated in the Specification, such material, product or supplier shall be deemed indicative representing the Architect’s design intent only. The Contractor may complete the installation using that material or product, or such other confirmed as acceptable by the Architect in writing, but shall remain fully responsible for the Detailed Design and performance of the works.

R20.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Cement sand renders.

R20.103 PLS-141: Cement Sand Plaster - To Receive Epoxy Wall Finish

a. Render coat(s) to be as follows.

1). The mix proportions of cement to sand to be 1 to 3 for dense, strong and smooth or moderately strong and porous backgrounds; or 1 to 4½ for backgrounds that are moderately weak and porous.

b. Thickness, excluding dubbing out, to be 12mm minimum, 20mm maximum. Maximum thickness for single coat 20mm.

c. Finish: Steel Trowel.

R20.104 PLS-143: Cement Sand Plaster - To Receive Tiled Wall Finish

a. Render coat(s) to be as follows.

1). The mix proportions of cement to sand to be 1 to 3½ - 4½ for dense, strong and smooth or moderately strong and porous backgrounds; or 1 to 4½ for backgrounds that are moderately weak and porous.

b. Thickness, excluding dubbing out, to be 12mm minimum, 15mm maximum. Maximum thickness for single coat 15mm.

c. Finish: Wood float.
1). Highly combed to receive mortar bedded tiles/ wood float finish to receive adhesive bedded tiles.

**Backings/ Beads/ Joints/ Features**

**R20.105 Beads and Stops**

a. Angle Beads and Plaster Stops:
   1). To comply with SANS 190.
   2). Material: galvanised expanded metal.
   3). Thickness: 0.5mm.

**Materials**

**R20.106 Cement**

a. Cement: CEM I Portland cement 42.5N to SANS 50197.

b. Masonry cement to SANS 50413 strength 12.5N

**R20.107 Plaster Sand**

a. Plaster sand to conform to SANS 1090 with a continuous grading from 1.18mm to 0.075mm.

**Preparation Materials**

**R20.108 PVA Bonding Agent**

a. Polyvinyl acetate emulsion to be only used in dry conditions, and as specified by the manufacturer.

**R20.109 PVA Sealer**

a. Sealer of polyvinyl acetate emulsion to be used as recommended by the coating material manufacturer.

**R20.200 QUALITY AND WORKMANSHIP**

**Submittals**

**R20.201 Response**

a. Provide submittals in accordance with the requirements of Section A of the Specification.

**Samples and Quality Benchmarks**

**R20.202 Pre-contract Samples**

a. Not required.

**R20.203 Control Samples (Post-contract)**

a. Provide the following control samples:
R20.204 **Benchmark Requirements**

a. Provide the following quality benchmarks:

1). First structural bay or 10m² of each type of coating, in location to be agreed.

**R20.205 Accuracy**

a. Plaster rendered backings to have maximum deviation under 2m straightedge of 3mm.

**R20.206 General**

a. All Coatings are to withstand all movements of the structure under all design loads or combination of loads as specified in the Structural Engineer’s specifications and Deflection/ Movement Reports, without any damage, cracking or breaking up.

b. All Coatings are to accommodate all structural expansion joints and construction control joints.

c. Expansion and movement joints shall accommodate the appropriate range of movement.

d. The Contractor to be responsible for determining the requirement for and location of movement joints, whether indicated on the Contract Drawings or not.

**R20.207 Specific Live Loads**

a. The works to be capable of accommodating the following live loads without any reduction in performance.

1). Horizontally applied loads acting on the surface of any component. The works to sustain safely, without reduction in performance and without permanent deformation to any component, a static 500N load applied horizontally through a square of 100mm sides on any part of the framing.

2). A horizontal line load applied to the works, due to the occupants, in accordance with SANS 10160.

**R20.208 Thermal Movement**

a. The service temperature range for components of the works to be taken as -10°C and +90°C.

b. Thermal movements shall not result in audible noise.

**R20.209 Moisture Movement**

a. Changes in moisture content of components shall not affect the works.

b. Expansion of absorbed or retained moisture caused by freezing shall not affect the works.
Workmanship

R20.210 Mixing of Materials
a. No admixtures containing calcium chloride to be used.
b. Mix materials thoroughly to a uniform consistency in a suitable mechanical mixer.
c. Use materials while sufficiently plastic to ensure full compaction.

R20.211 Background Preparation
a. Hack surfaces to provide a key and clean down.
b. Wet surfaces thoroughly before applying finishing plaster/render.
c. Apply a slush coat of 2:1 grout to concrete surfaces before plastering and allow to set.

R20.212 Application
a. Provide appropriate corrosion resistant bead stops at all external angles and stop ends unless specified otherwise.
b. All angles to be plumb, true and straight.
c. Plaster single surfaces in one operation.
d. Each coat to be applied firmly to achieve good adhesion in one continuous operation between angles and joints.
e. Form knife joints with arrised edges through full thickness at movement joints.
f. Allow each coat to dry out thoroughly to ensure that drying shrinkage is substantially complete before applying the next coat.

Finishes

R20.213 Smooth Finish
a. Finish with a steel trowel or float to produce a tight, matt, smooth surface with no hollows, abrupt changes of level or trowel marks.

R20.214 Wood Float Finish
a. Finish with a dry wood float as soon as wet sheen has disappeared from the surface to give an even overall texture.

Curing

R20.215 Drying Out
a. Prevent evaporation from the surface of external render for 5 days.
b. Dampen as required during this time by spraying with water.

Protection

R20.216 Protection
a. Protect newly applied external coatings against rain for the first 48 hours.
b. Protect edges and arrises from mechanical damage.

**Storage of Materials**

R20.217 Cement

a. Store in a weatherproof structure clear of the ground.
b. Do not store for more than six weeks before using.
c. Portable silos can be used for bulk storage of cement.

R20.218 Fine Aggregate

a. Store to avoid contamination.

R20.219 Gypsum Plaster

a. Store in a weatherproof and damp-proof structure clear of the ground.

END OF SECTION
S10 CERAMIC/ STONE/ MARBLE/ SLATE/ GLASS/ MOSAIC TILING

a. Read in conjunction with Sections A and Z, other related sections of the Specification, the Preliminaries and Contract Conditions.

S10.100 PRODUCTS, SYSTEMS AND MATERIALS

Specification and Scope

S10.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

S10.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Ceramic tiling.

Floor Expansion Joints

S10.103 FLA-511: Metal Expansion Joint

a. Heavy duty all-metal expansion joint systems.

1). Manufacturer: Migua - Powerbase Movement Joints, Tel: +27 (0) 21 386 2214.

2). Product: Migutrans FS 99/ , or acceptable equivalent.

3). Height: To be agreed.

4). Confirm anticipated total movement with the Structural Engineer.

5). Joints shall extend through finish and screed to substrate.

6). Fixing: As recommended by the manufacturer and to the acceptance of the Structural Engineer.

Wall Tiling

S10.104 Standards

a. Ceramic wall and floor tiles:

1). Generally: Comply with the requirements of SANS 1449.

2). Scratch resistance of surface (Mohs scale), min: Tile group A1 as cited and tested in SANS 1449.

4). Chemical resistance: Test proposed chemicals used in the cyclic cleaning of tiles in accordance with SANS 1449.

5). Stain resistance: Test in accordance with SANS 1449.

b. Design and installation of ceramic tiling: Comply with the requirements of SANS 10107.

S10.105 Wall Tiling Background Preparation

a. New Interior Rendered Walls.

1). Allow all new rendered walls to cure for at least 14 days. Ensure that the surfaces are clean and free of all traces of dust, loose particles and any other surface contaminants.

2). The rendering must be firmly attached to the substrate and must be integrally sound (no crumbling or cracking) and must be of a quality and consistency suitable for tiling. All defective areas must be removed and the floor made good before proceeding.

3). For woodfloated surfaces commence tiling but for steel floated surfaces apply a key to the surface using a latex admixture and cement slurry, applied in accordance with the manufacturer’s recommendations. The tiling must commence 4 – 6 hours after applying the keycoat.

4). Indicative Product: Tal Keycoat or acceptable equivalent.

S10.106 WLT-611: Glazed Ceramic Wall Tiling - Type 1

a. Manufacturer/ supplier: To be agreed.

b. Product: To be agreed.

c. Colour: Red.

d. Size(s): To be agreed.

e. Height: 2800mm above finished floor level.

f. Thickness: To be agreed.

1). The Contractor is to allow for a difference in the tile adhesive thickness, to ensure that tiles of differing thickness can be laid together to achieve the same finished level.

g. Background: Cement: sand render.

h. Bedding:

1). The sub-contractor is to obtain written acceptance of the proposed adhesive from the tile manufacturer, prior to any works proceeding.

2). Type: Minimum 5mm thin bed cement based powder adhesive in accordance with the tile manufacturer’s recommendations.

3). Manufacturer: Norcros SA (Pty) Ltd, Tel: +27 (0) 11 206 9700.

4). Product: Tal Goldstar 6, or acceptable equivalent.
5). **Mixing:**
   a). Mix thoroughly as recommended by the manufacturer.
   b). Mix ratio 5litres Tal Bond to 20kg adhesive.
   c). Application: All in accordance with the adhesive manufacturer’s recommendations and instructions.

6). **Corner protectors to be provided at positions shown on the tiling layouts.**

7). **Joint Width; To be agreed.**

i. **Grouting:**
   1). The sub-contractor is to obtain written acceptance of the proposed grout from the tile manufacturer, prior to any works proceeding.
   2). Type: Cement based powder grout in accordance with the tile manufacturer’s recommendations.
   3). Manufacturer: Norcros SA (Pty) Ltd, Tel: +27 (0) 11 206 9700
   4). Product: Tal Wall and Floor Grout, or acceptable equivalent.
   5). Colour: To be agreed.
   6). **Mixing:**
      a). Mix thoroughly as recommended by the manufacturer.
      b). Mix ratio 6litres Tal Bond to 20kg grout.
      c). Application: All in accordance with the grouting manufacturer’s recommendations and instructions.

### Wall Movement Joints

#### S10.107 Wall Tile Movement Joints

a. Intermediate movement joints to be provided at positions shown on the Contract Drawings.

1). **Type:** 3mm wide expanded closed cell polyethylene former with sealant.
   2). **Indicative Manufacturer:** Norcros SA (Pty) Ltd, Tel: +27 (0) 11 206 9700.
   3). **Joint former:** TAL Sealmaster Cord to suit application, or acceptable equivalent.
   4). **Indicative Sealant:** Tal Goldstar Sealmaster 1000, or acceptable equivalent.
   5). Colour: To be agreed.
   6). **Preparation and application to be as recommended by sealant manufacturer.**
   7). **Joints to extend through tiles and bedding to substrate.**

### Accessories
S10.108 FLA-311: Aluminium Straight Edge Joint Trim
a. Aluminium straight edge trims to edges and joins of floor and wall finishes.
b. Manufacturer: Kirk marketing, Tel: +27 (0) 11 444 1441.
c. Product: Aluminium straight edge trim for 5mm screed. Code: ASE060, or acceptable equivalent.
d. Size: 3mm sightline x 6mm height.
e. Finish: Natural anodized.
f. Fixing to be bedded into tile bedding to exact finished level of floor.

S10.109 TRM-613: Aluminium Straight Edge Trim
a. Aluminium straight edge trims to edges and joins of floor and wall finishes.
b. Manufacturer: Kirk marketing, Tel: +27 (0) 11 444 1441.
c. Product: Aluminium square edge trim. Code: ASE060, or acceptable equivalent.
d. Size: 3mm sightline.
e. Thickness: To suit wall finish as determined on site.
f. Finish: Natural anodized.
g. Fixing: As recommended by the manufacturer.

S10.110 TRM-615: Aluminium Square Edge Trim
a. Aluminium square edge trims to edges and joins of floor and wall finishes.
b. Manufacturer: Kirk marketing, Tel: +27 (0) 11 444 1441.
c. Product: Aluminium square edge trim for tiles 8 to 9mm thick. Code: ASQE100, or acceptable equivalent.
d. Size: 8mm sightline x 10mm depth.
e. Finish: Natural anodized.
f. Fixing to be bedded into tile bedding to exact finished level of floor.

Products

S10.111 Cement
a. Cement: CEM I Portland cement 42.5N to SANS 50197 or CEM IIA Portland Fly Ash Cement 32.5N.

S10.112 Fine Aggregate
a. For Plaster and mortar bedding: To SANS 1090.
b. For screed bedding: To SANS 1083.
c. Not more than 10% passing sieve size 150 microns.

S10.113 Mortar Bedding

a. The mortar bedding to be a proprietary epoxy resin based compound or proprietary latex based compound.

b. Tile mortar bedding compound to be accepted by the tile manufacturer and applied strictly in accordance with the mortar manufacturer’s written recommendations.

S10.114 Wall Tile Adhesive

a. The adhesive for wall tiles to be a proprietary thin bed adhesive, recommended in writing for the purpose by the tile manufacturer, and applied strictly in accordance with printed recommendations.

S10.115 Wall Tile Grout

a. Grout shall be a proprietary two part epoxy resin based compound with a water impervious and chemical resistant adhesive.

b. The grouting compound shall be accepted by the tile manufacturer and confirmed to the Architect by the Contractor.

Expansion/ Movement Joints

S10.116 Perimeter Expansion Joints

a. 6mm wide Joints shall extend through tiles and bedding to substrate.

b. Joints shall coincide with any movement joints left in the substrate.

S10.117 Proprietary Movement Joint

a. Material: To be agreed.

b. Size to be agreed.

c. Profile to be acceptable to the Architect.

d. Fixing shall be bedded in cement and sand/ screwed to plugs at 600mm centres, to exact finished level of floor.

S10.118 Sealant Movement Joints

a. Sealant movement joints shall be provided where necessary:

1). Colour: To be agreed.

2). Preparation and application shall be as per the Specification, Section Z22. Joints shall extend through tiles and bedding to substrate. Joints shall coincide with any movement joints left in the substrate.

Fabrication

S10.119 Tolerances

a. Tile sizes stated in the Specification are nominal and the actual sizes required to meet the joint sizes, etc. to be determined.
b. Tiles to be manufactured with the tolerance of ±0.5mm.

S10.120 Damage

a. Tiles that are chipped, scratched, damaged or have any other physical imperfections are not to be used in the works.

S10.200 QUALITY AND WORKMANSHIP

Submittals

S10.201 Response

a. Provide submittals in accordance with the requirements of Section A of the Specification.

Samples and Quality Benchmarks

S10.202 Pre-contract Control Samples

a. Not required.

S10.203 Post-contract Control Samples

a. Provide the following control samples:
   1). 300 x 300mm range of samples.
   2). Grout sample.
   3). Movement joint material, minimum 300mm.

S10.204 Benchmark Requirements

a. Provide the following quality benchmarks:
   1). First 10m² of each type, in location to be agreed.

Testing

S10.205 Test Requirements

a. Include for testing by an accredited independent testing specialist or provide independently certified test data to demonstrate compliance with the Specification.

S10.206 Impact Testing

a. Carry out impact tests to establish the soundness of all screeded substrates. Testing to include both light tap and heavy weight impact using 4kg, in compliance with the BRE screed tester. Alternative substrate testing methods may be put forward for consideration and acceptance by the Architect.

S10.207 Sealant Testing

a. Staining: Test in accordance with BS 3712: Part 2. Perform test on each type of tiling in contact with sealant.

b. Adhesion: Test elastomeric sealant for peel strength in accordance with BS 3712: Part 4.
Performance Requirements

S10.208 Performance Requirements

a. Comply with the general performance criteria of Section A, clause series 500 and the following specific performance requirements.

Structural

S10.209 General

a. Refer to Section A.

S10.210 Specific Movements

a. Detail, manufacture and install the works to accommodate all movements of the substrates without damage or any reduction in the performance of the works. The Contractor to be responsible for determining the requirement for and location of movement joints, whether indicated on the Contract Drawings or not.

b. Provide all necessary movement joints to accommodate the movements to which the tiling is expected to be subjected, whether indicated on the Contract Drawings or not.

c. Show all control joints on the Shop Drawings/ Working Drawings, subject to acceptance by the Architect.

d. Ensure that movement joint thicknesses are adequate.

e. Provide a method statement for the installation of all the works, taking into account movements of the structural slab including:
   1). Dimensional setting out and joints alignment.
   2). Floor services including trunking to be incorporated in the bedding build-up.
   3). Construction tolerances.
   4). Movement joints, bay joints and relief joints.
   5). Full adhesion.
   6). Full bed without hollows.
   7). Cracking to grouted joints not acceptable.

f. A full understanding of the behaviour of the building structure, its movements and its effects upon the works is required.

g. The works not to deflect under loading in any way that is detrimental to any element of the works or adjacent structural or building elements.

S10.211 Specific Dead Loads

a. Accommodate the following loadings without damage being caused or any reduction in performance:

   1). Dead loads: 3kN/m².
a. The works to be capable of accommodating the following live loads without any reduction in performance:

1). Imposed live loads: 5kN/m² + 1kN/m² (where partitions are located).
2). Point loads: 10kN.

Environmental

S10.213 Thermal Movement

a. The works to be capable of withstanding differential surface temperatures including those induced under a heating and cooling cycle without any progressive or permanent reduction in the specified performance. The thermal coefficients of the works and the adjoining structure to be established as the design caters for all thermal movement, including temperature range induced by underfloor heating and cooling pipework.

S10.214 Moisture Movement

a. The works to withstand the following movement without permanent deformation or any reduction in the specified performance:

1). Due to changes in the moisture content of its components, resulting from variations in the moisture content of the air. Refer also to BS 8297, BS 8298 and BS 8110: Part 2.
2). Due to drying shrinkage of building components, both short term and long term to BS 8297 and BS 8298.

Workmanship

S10.215 Background Suitability

a. Before the commencement of tiling the background and bases to be sufficiently flat to permit specified flatness of finished surfaces.

b. Form movement joints in scratch or floated coats over movement joints in backing.

c. In situ concrete shall be scrubbed with water containing detergent to complete removal of mould, oil, surface retarders and other materials incompatible with the bedding. It shall then be rinsed with clean water and allowed to dry, unless specified otherwise.

S10.216 Setting Out

a. Joints in floors to be parallel to the main axis of the space or specified features. Square tiles continuously in both directions. Rectangular tiles [stretcher] pattern.

b. Joints on walls to be truly horizontal, vertical and in alignment around corners.

c. Cut tiles to be kept to the minimum, as large as possible and in unobtrusive locations.

d. Ensure that movement joints in sub-structure are maintained in tile layout.

S10.217 Laying and Fixing

a. Comply with SANS 10107.

b. Cut tiles neatly and accurately.
c. Ensure that the adhesive is compatible with the background/ base, if recommended by the adhesive manufacturer prime first.

d. Fix tiles so that there is adhesion over the whole of the background/ base and tile backs.

e. Clean surplus bedding material from joints and face of tiles.

f. Allow no unintended colour/ shade variation within the tiles for use in each area/ room, permissible variegated tiles to be evenly distribute.

g. Before bedding material sets, make adjustments as necessary to give true, regular appearance to tiles and joints when viewed under final lighting conditions.

h. Make all cuts with a diamond tipped wet-saw and all exposed cut edges to receive an arris to match uncut tiles. Proprietary tile cutting machines can be used if acceptance is received from the Architect.

i. All tile to be bedded fully in accordance with the manufacturer’s instructions.

**S10.218 Thin Bed Adhesive Bedding**

a. Allowed background to dry out thoroughly.

b. Apply floated coat of adhesive and trowel to a ribbed profile using the recommended notched trowel.

c. Apply thin, even coat of adhesive to backs of dry tiles. Press tiles firmly onto bed adhesive with a twisting sliding action to give finished bedding thickness of 3mm.

**Finishing and Protection**

**S10.219 Finishing and Protection**

a. Tiles that are chipped, scratched, damaged or have any other physical imperfections to be replaced.

b. When all grouting has hardened wash down tiling and polish tiled areas with a dry cloth to remove grouting residue.

c. Protect corners and arrises against mechanical damage.

END OF SECTION
T60 SANITARY APPLIANCES/ FITTINGS

a. Read in conjunction with Sections A and Z, other related sections of the Specification, the Preliminaries and Contract Conditions.

T60.100 PRODUCTS, SYSTEMS AND MATERIALS

Specification and Scope

T60.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

T60.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). WC suites.

2). Urinals.

3). Washbasins and vanity units.

4). Showers.

Materials

T60.103 Generally

a. All fixtures to be free from imperfections, true to line, angles, curves and colours, smooth, watertight and complete in every respect.

b. All fixtures to be of vitreous ware shall be fired vitreous chinaware of the best quality, non-absorbent and burned so that the whole mass is thoroughly fused and vitrified, producing a material, white in colour, which when fractured shows a homogeneous mass, close grained and free from pores.

c. One manufacturer to supply all fixtures, unless specified otherwise.

T60.104 Sealant Pointing

a. Sealant to be silicone based to SANS 1305, Type B with fungicide.

T60.105 Particular Requirements

a. Flushing devices to have a minimum 2 year guarantee.
b. All concealed cisterns, flushing devices and flush plates shall be required to be installed in 115mm brick walls, 230mm brick walls and drywall partitions/ linings. Drywall and lining studs to be sufficiently braced to accommodate the service requirements of the elements.

c. All flushing devices shall be easily replaceable with spares available on site and be able to be installed without any special tools.

Products

WC and Urinals

T60.106 SAN-156: Vitreous China Eastern Pan

a. Vitreous china squat WC suite.

b. Manufacturer: To be agreed.

c. Product: To be agreed.

d. Material: Vitreous china.

e. Fixing: To be agreed.

f. Fittings:

1). Flush valve/ device: To be agreed.

2). Handshower set: To be agreed.

T60.107 SAN-167: Vitreous China Wall Hung WC Pan

a. White vitreous china wall hung WC Pan including seat and concealed cistern with actuator.

1). WC Pan:

a). Supplier: Italtile Commercial Division; Tel +27 (0) 10 271 2272.

b). Product: Laufen Pro A Wallhung WC Pan rimmless with niches; Ref: 8.2096.4.000.000.1, or acceptable equivalent.

i. Sealant: As described in section Z22.

1). Seat and lid:

i. Supplier: Italtile Commercial Division; Tel +27 (0) 10 271 2272.

ii. Product: Laufen PRO Universal seat ; Ref: 8.9395.9, or acceptable equivalent.

2). Concealed cistern and flush plate:

a). Supplier: Italtile Commercial Division; Tel +27 (0) 10 271 2272.

b). Cistern: Torino 74 Concealed Cistern for use with wall hung toilets - can be used in both single/ double skin brick walls; Ref: TVCC601901, or acceptable equivalent.

i. Flush Plate: Oli Slim 2 control plate Inox S/steel; Ref: TVP0057141CH.
**SAN-171: Vitreous China Wall Hung Paraplegic WC Pan**

a. White vitreous china wall hung WC pan with seat and concealed cistern with actuator.

1). WC Pan and Seat:
   a). Supplier: Italtile Commercial Division; Tel +27 (0) 10 271 2272.
   b). Product: Laufen Pro Liberty; Ref: 8.2196.0, or acceptable equivalent.
   i. Sealant: As described in section Z22.
   c). Seat and lid:
      i. Supplier: Italtile Commercial Division; Tel +27 (0) 10 271 2272.
      ii. Product: Laufen PRO Universal seat; Ref: 8.9395.9, or acceptable equivalent.

2). Concealed cistern and flush plate:
   a). Supplier: Italtile Commercial Division; Tel +27 (0) 10 271 2272.
   b). Cistern: Torino 74 Concealed Cistern for use with wall hung toilets - can be used in both single/ double skin brick walls; Ref: TVCC601901, or acceptable equivalent.
   i. Flush Plate: Oli Slim 2 control plate Inox S/steel; Ref: TVP0057141CH.

**SAN-213: Vitreous China Wall Hung Bowl Urinal**

a. White vitreous china wall hung urinal with trap and flush plate.

1). Urinal:
   a). Supplier: Duravit; Tel +27 (0) 11 555 1220.
   b). Product: Starck 3 Urinal, back entry; Ref: 0827250000, or acceptable equivalent.
   i. Fixing Screws: To be agreed.
      (a). Sealant: As described in section Z22.

2). Trap:
   a). Supplier: To be agreed.
   b). Product: To be agreed.

3). Installation Set and Flush Control/ Actuator:
   a). Manufacturer: Geberit Southern Africa (Pty) Ltd; Tel +27 (0) 11 444 5070.
   b). Installation Set: Geberit Installation Set with flush pipe, for urinal flush control, universal; Ref: 116.003.00.1, or acceptable equivalent.
SAN-245: Powder Coated Mild Steel Urinal Screen

a. Powder coated mild steel urinal screen with cover plate spot welded to it as shown on the Contract Drawings.

b. Size and configuration: As shown on the Contract Drawings.

c. Material: Mild steel.

d. Thickness: 2mm.

e. Finish:
   1). Type: Powder coated, Qualicoat Class 1 as in Section Z31.
   2). Colour: Charcoal.

f. Fixing: To suit the application and to the acceptance of the Architect.

SAN-341: Underslung Wash Hand Basin

a. Vitreous china underslung wash hand basin.
   1). Supplier: Duravit, Tel: +27 (0) 11 555 1220.
   2). Product: Durastyle 37CM; Ref: 0373370000, or acceptable equivalent.

SAN-346: Paraplegic Vitreous China Wall Hung Wash Hand Basin

a. White vitreous china paraplegic wall hung basin with mounting fixations, trap and waste.
   1). Basin with mounting fixations:
      a). Supplier: Italtile Commercial Division; Tel +27 (0) 10 271 2272.
      b). Basin: Laufen Pro B Washbasin 55 x 44cm; Ref: 8.1095.1.000.104.1, or acceptable equivalent.
         i. Mounting: To be agreed.
   2). Trap and Waste: To be agreed.

SAN-355: Stainless Steel Slophopper Sink

a. Stainless steel slophopper sink.
   1). Manufacturer: Franke, Tel +27 (0) 11 357 3300.
   2). Product: Franke wall mounted slophopper sink, 1.2mm grade 304 18/10 polished stainless steel, Ref: 207.0000.076, or acceptable equivalent.
      a). Complete with grid and stainless steel p trap.
      b). Stainless steel support brackets.

Mixers and Taps
SAN-754: Pillar Tap - Self-closing
a. Pillar tap.
   1). Manufacturer: Hansgrohe South Africa, Tel: +27 (0) 11 445 0000.

SAN-756: Paraplegic Basin Mixer
a. Extended bib tap.
   1). Supplier: Italtile Limited, Tel: +27 (0) 11 510 9000.
   2). Product: Idral Progressive Lever Operated Basin Mixer; Ref: TVID02058, or acceptable equivalent.

Showers

SAN-451: Shower
a. Manufacturer: To be agreed.
b. Product: To be agreed.
c. Size: As shown on the Contract Drawings.
d. Material: To be agreed.
e. Fixing: To be agreed.
f. Shower Door/ Curtain: To be agreed.
g. Fittings:
   1). Mixer Taps: To be agreed.
   2). Handset: To be agreed.
   3). Waste: To be agreed.
   4). Trap: To be agreed.

Accessories

SAN-811: Triple Toilet Roll Holder
a. Supplier: To be agreed.
b. Product: To be agreed.
c. Finish: To be agreed.

SAN-812: Double Toilet Roll Holder
a. Supplier: To be agreed.
b. Product: To be agreed.
c. Finish: To be agreed.

T60.119 SAN-813: Sanitiser Dispenser
  a. Supplier: To be agreed.
  b. Product: To be agreed.
  c. Finish: To be agreed.

T60.120 SAN-815: Soap Dispenser
  a. Supplier: To be agreed.
  b. Product: To be agreed.
  c. Finish: To be agreed.

T60.121 SAN-817: Hand Dryer
  a. Supplier: To be agreed.
  b. Product: To be agreed.
  c. Finish: To be agreed.

T60.122 SAN-819: Aluminium Coat Hook Mounted to Removable Panel
  a. Supplier: To be agreed.
  b. Product: To be agreed.
  c. Finish: To be agreed.

T60.123 SAN-821: Aluminium Bin
  a. Supplier: To be agreed.
  b. Product: To be agreed.
  c. Finish: To be agreed.

T60.124 SAN-823: Towel Dispenser
  a. Supplier: To be agreed.
  b. Product: To be agreed.
  c. Finish: To be agreed.

Disability Provisions

T60.125 SAN-711: Grab Rail
  a. Stainless steel, back rail for cistern.
     1). Supplier: To be agreed.
     2). Product: To be agreed.
SAN-713: Dogleg Grab Rail

a. Stainless steel, dog leg side rail.

1). Supplier: To be agreed.

2). Product: To be agreed.

Vanity Slab

SAN-885: Zimbabwe Granite Vanity Counter - Leathered

a. Granite vanity slab with mitred joint fascia on mild steel framework.

1). Vanity slab:
   a). Material: Granite top with eased and polished edges.
   b). Type: Zimbabwe black granite.
   c). Finish: Leathered finish.
   d). Size and configuration: As shown on the Contract Drawings.
   e). Thickness: 30mm.
   g). Cut outs: As shown on the Contract Drawings and factory precut.

2). Fascia:
   b). Size: 300mm.
   c). Thickness: As shown on the Contract Drawings.

3). Sealer:
   a). Manufacturer: Tile & Floor Care, Tel: +27 (0) 11 822 6901.

4). Framework:
   a). Size and configuration: As shown on the Contract Drawings.
   b). 50 x 50 x 3mm welded mild steel framework.
   c). All welds to be ground smooth.
   d). Finish: Primed to receive site decoration as shown on the Contract Drawings.

T60.200 QUALITY AND WORKMANSHIP
**Submittals**

**T60.201 Response**

a. Provide submittals in accordance with the requirements of Section A of the Specification.

**Samples and Quality Benchmarks**

**T60.202 Pre-contract Control Samples**

a. Not required.

**T60.203 Post-contact Control Samples**

a. Provide the following control samples:
   1). One of each appliance used.

**T60.204 Benchmark Requirements**

a. Provide the following quality benchmarks:
   1). First appliance of each type installed, in location to be agreed.

**Installation**

**T60.205 General**

a. Assemble and fix appliances and accessories so that surfaces designed to falls drain as intended.

b. Use non-ferrous or stainless steel fastenings unless otherwise specified.

c. Noggings, bearers, etc. required to support sanitary appliances and fittings to be accurately positioned and securely fixed.

d. On tiled backgrounds, other than splash backs, ensure that:
   1). Tiling is complete before fixing appliances.
   2). Fixings do not over stress tiles.

**T60.206 Appliances**

a. WC seats and lids to be fixed with nonferrous fixing bolts and to be stable when raised.

b. Bed wc suite to floor with 1:4 cement sand mortar mix.

c. Surround Squat type WC pan and trap in 100mm thick 15Mpa (class B) concrete.

d. Cisterns:
   1). Cistern operating components to be as recommended by the cistern manufacturer. The ball valve to match pressure of water supply.
   2). Fix cistern at the height recommended by the manufacturer unless otherwise specified or shown on the Contract Drawings.
3). Fix overflow pipe to falls and locate to give visible warning of discharge.

e. Fix taps securely, making a watertight seal with the appliance.

f. Place hot tap to left and cold tap to right as viewed by the user of the appliance.

g. Bed wastes/overflows in waterproof jointing compound and fix with a resilient washer between appliance and backnut.

**Protection**

**T60.207 Protection**

a. Leave protective coverings, tapes etc. on appliances during installation.

b. Protect completed installation from use, damage and the ingress of debris.

**Handover**

**T60.208 Handover**

a. Immediately before handover, remove protective coverings, tapes, etc. and check for damage and defects.

b. Test for satisfactory operation and replace all damaged or defective components/accessories.

**T60.209 Cleaning**

a. Flush out the whole installation and clean all fixtures and fittings immediately before handing over.

END OF SECTION
**U21 LIGHTING AND SMALL POWER**

a. Read in conjunction with Sections A and Z, other related sections of the Specification the Preliminaries and Contract Conditions.

**U21.100 PRODUCTS, SYSTEMS AND MATERIALS**

**Specification and Scope**

**U21.101 Prescriptive Works**

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

**U21.102 Section Coverage:**

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Lighting.

**U21.103 Lighting**

a. Refer to the Electrical Engineer's documentation.

**U21.104 EBS-111: Linear Lighting - 1500**

a. Manufacturer: Regent Lighting Solutions, Tel: +27 (0) 11 474 0171/2.

b. Product: Mini Linear 1500mm.

c. I224: Linear mini.

d. Total Length: 1500mm.

e. Mounting: Suspended (Includes set of ceiling cup).

f. Light Source: 35w/m.

g. Colour: Black.

**U21.105 EBS-112: Linear Lighting - 1200**

a. Manufacturer: Regent Lighting Solutions, Tel: +27 (0) 11 474 0171/2.

b. Product: Mini Linear 1200mm.

c. I224: Linear mini.

d. Total Length: 1200mm.
e. Mounting: Suspended (Includes set of ceiling cup).

f. Light Source: 35w/m.

g. Colour: Black.

**U21.200 QUALITY AND WORKMANSHIP**

**Submittals**

**U21.201 Tender Response**

a. Provide submittals in accordance with the requirements of Section A of the Specification.

**Samples**

**U21.202 Pre-contract Control Samples**

a. Not required.

**U21.203 Post-contract Control Samples**

a. Provide the following control samples:
   1). One sample of each component and accessory.

**Accuracy**

**U21.204 Installation Tolerances**

a. The work shall be fabricated and detailed in accordance with the following requirements:
   1). Installation tolerances for fencing:
      a). Vertical alignment: To dimensions specified ±15mm to agreed position.
      b). Horizontal alignment: ±15mm relative to agreed position.

**Installation**

**U21.205 Setting Out**

a. Set out:
   1). In straight lines or smoothly flowing curves as shown on the Contract Drawings.
   2). With correct fastenings and all components fixed.
   3). All conduit and fittings to be from only one manufacturer.

**U21.206 Regulations**

a. Comply with:
   1). Requirements of the Local Electricity Authority and with SANS 10142.
U21.207 Electricity Supply

a. Liaise with the Local Electricity Authority Electricity Board as necessary to confirm or determine:

1). The maximum demand of the installation.
2). The nature of the supply, its suitability for the installation and the type of earthing arrangement.
3). The location of the incoming supply.
4). Space requirements for the Board’s switches, fuses and meters.

U21.208 Arrangement of Circuits

a. Divide the installation into separately controlled circuitry to ensure compliance with SANS 10142.

U21.209 Builder’s Work

a. Comply with restrictions on the cutting of holes, notches, etc. and methods of attachment to the building fabric specified in Section Z15.

U21.210 Installation

a. Install, test and commission the electrical work in accordance with design and performance requirements, to provide a safe, well insulated, earth protected systems capable of supplying the anticipated maximum demand.

b. Installation work to be carried out by a Master electricians fully conversant with SANS 10142 and SANS 10198.

c. Fastenings, bushes, locknuts, glands, terminals, connectors, clips, clamps and all other minor accessories necessary to complete the installation to be types recommended for the purpose by relevant equipment, accessories, etc. manufacturer.

U21.211 Installing Conduit

a. Use maximum practical lengths to minimise number of joints. Form bends by machine and remove burrs from cut ends.

b. Use bends and/or junction boxes at changes of direction. Do not use elbows or tees of any sort without approval.

c. Fix securely with boxes fixed independently to conduit.

d. Use expansion couplings where conduit crosses movement joints in structure.

e. Make secure connections to boxes, trunking, etc. with screwed couplings for steel conduit and provide rubber bushes at open ends.

f. On steel conduit tightly screw all joints to ensure electrical continuity, with no thread showing.

g. Provide 2.5mm² continuous earth wire.

h. Provide draw wire for TV, PA, Data or telephone installation.

U21.212 Conduit passing through fire walls
a. Fix securely and seal with intumescent sealant.

**U21.213 Drainage Holes in Conduit**

a. Provide drainage holes to all lowest points in conduit installed externally and in locations where condensation may occur.

**U21.214 Cables in Trunking**

a. Support with pin racks or cleats at each floor level or at 5m vertical centres, whichever is less.

b. Provide and fix heat barriers at not more than 5m centres, whichever is less.

**U21.215 Cables in Roof Spaces**

a. Cable running across ceiling joists to be supported by fixing to timber battens nailed to joists.

**U21.216 Conductors in Conduit**

a. All wiring to be on the "looping-in" system.

b. Joints to be made only in accessible outlet boxes, switchboard or terminal boxes with approved connectors.

c. Clean each run by drawing swabs through prior to drawing in connectors.

**U21.217 Earthing and Bonding**

a. Connect the following to the main Earthing system using Earthing clamps or other approved means where appropriate:

1). Earthing terminals or bars in meter boxes and distribution boards.

2). Armouring of armoured cable.

3). Hot and cold water pipework including bonding to each other minimum of twice.

4). Metallic roofs, gutters, downpipes and waste water pipes.

5). Meter box and distribution board.

6). Minimum cross section of bonding straps/ cables:

   a). Earth bars to main earth: 10 mm².

   b). External bonding including downpipes, gutters, waste pipes, etc.:6 mm².

   c). Electric stoves: 4 mm².

   d). Water heaters: 4 mm².

   e). Socket outlets: 2.5 mm².

   f). Light fittings: 2.5 mm².

**U21.218 Fixing Electrical Accessories/ Equipment**
a. Position accurately and square to vertical and horizontal axes.

b. Where not shown otherwise, align adjacent accessories on the same vertical or horizontal axis as appropriate.

c. Where not shown otherwise, fix accessories/equipment at the following heights above finished floor level:

1). Socket outlets generally: 300mm above FFL.

2). Socket outlets to kitchen: 1.2m above FFL.

3). Light switches: 1.4m above FFL.

4). Wall lights: 2.2m above FFL.

Completion

U21.219 Inspection and Testing

a. Give not less than 24 hours notice before commencing tests.

b. In addition to items required to be inspected or tested, to SANS 10142, ensure that labels and signs required by the Regulations are securely fixed in the correct locations.

c. Tests to be witnessed by the Electrical Engineer.

U21.220 Documentation

a. Hand over to the Architect at Practical Completion:

1). Copies of manufacturers’ operating and maintenance instructions for all fittings and apparatus.

2). As-built drawings showing all circuits and their ratings and the locations of all fittings and apparatus.

END OF SECTION
W10 GENERAL GLAZING AND MIRRORS

a. Read in conjunction with Sections A and Z, other related sections of the Specification, the Preliminaries and Contract Conditions.

W10.100 PRODUCTS, SYSTEMS AND MATERIALS

W10.101 Descriptive Work

a. Complete the Detailed Design, manufacture, supply, install and warrant that the works complying with the visual intent shown on the Contract Drawings and criteria stated in the Specification.

b. Where no material, product or supplier is indicated in the Specification propose suitable materials and systems prior to Contract award which comply with the visual intent and performance criteria stated and remain fully responsible for the Detailed Design of the works.

c. Where a particular material, product or supplier is indicated in the Specification, such material, product or supplier shall be deemed indicative representing the Architect's design intent only. The Contractor may complete the installation using that material or product, or such other confirmed as acceptable by the Architect in writing, but shall remain fully responsible for the Detailed Design and performance of the works.

W10.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Mirrors.

Glass Generally

W10.103 Glass Generally

a. To be produced to SANS 50572 and SANS 1263.

b. Provide all mirrors from a single supplier unless agreed otherwise by the Architect.

Mirrors

W10.104 MIR-111: Angled Mirror

a. Angled mirror with frame, as shown on the Contract Drawings.

b. Size: 850 x 550.

c. Frame:

1). Material: To be agreed.

2). Finish/ colour: To be agreed.

d. Mirror:

1). Type: To be agreed.

2). Thickness: To be agreed.
3). Edge treatment: To be agreed.

 e. Fixing: To be agreed.

W10.105  **MIR-121: Framed Surface Mounted Mirror**

 a. Framed mirror, surface mounted, as shown on the Contract Drawings.

 b. Size: To be agreed.

 c. Frame:

 1). Material: Sheet metal.


  a). Powder coated, Qualicoat Class 1 as in Section Z31 of this Specification.

 d. Mirror:

 1). Type: To be agreed.

 2). Thickness: To be agreed.

 3). Edge treatment: To be agreed.

 e. Fixing: To be agreed.

W10.106  **MIR-151: Sheet Metal Mirror Cabinet**

 a. Sheet metal mirror cabinet, as shown on the Contract Drawings.

 b. Size and configuration: As shown on the Contract Drawings.

 c. Cabinet:

 1). Material: To be agreed.


 3). Colour: Black.

 d. Mirror:

 1). Type: To be agreed.

 2). Thickness: To be agreed.

 3). Edge treatment: To be agreed.

 e. Fixing: To be agreed.

W10.107  **MIR-131: Recessed Mirror Cabinet with Side Panel**

 a. Recessed mirror with side panel, frame, shelves and top lip, as shown on the Contract Drawings.

 b. Size and configuration: As shown on the Contract Drawings.
c. Mirror and side panel:
   1). Material: 1mm thick mild steel bent sheet metal door to take mirror glazing.
   2). Finish: Powder coated, Qualicoat Class 1 as in Section Z31 of this Specification.
   3). Colour: Black.

d. Frame:
   1). Material: 20 x 20 x 2mm thick mild steel SHS frame.
   2). Finish: Powder coated, Qualicoat Class 1 as in Section Z31 of this Specification.
   3). Colour: Black.

e. Mirror glazing:
   1). Type: To be agreed.
   2). Thickness: 6.4mm.
   3). Edge treatment: To be agreed.

f. Shelves:
   1). Cabinet shelves:
      a). Material: 1mm thick mild steel bent sheet metal fixed shelves.
      b). Finish: Powder coated, Qualicoat Class 1 as in Section Z31 of this Specification.
      c). Colour: Black.
   2). Bottom shelf:
      a). Material: 2mm thick mild steel bent sheet metal fixed shelf.
      b). Finish: Powder coated, Qualicoat Class 1 as in Section Z31 of this Specification.
      c). Colour: Black.

g. Top lip:
   1). Material: 1mm thick mild steel bent sheet metal lip.
   2). Finish: Powder coated, Qualicoat Class 1 as in Section Z31 of this Specification.
   3). Colour: Black.

h. Lighting: Angled LED strip light as shown on the Electrical Engineer's documentation.

i. Lock: Cylinder lock as shown on the Contract Drawings.

j. Fixing: As shown on the Contract Drawings.

**W10.200 QUALITY AND WORKMANSHIP**
Submittals

W10.201 Response
a. Provide submittals in accordance with the requirements of Section A of the Specification.

Samples and Quality Benchmarks

W10.202 Pre-contract Control Samples
a. Not required.

W10.203 Post-contract Control Samples
a. Provide the following control samples:
   1). Minimum 150 x 150mm of each type of mirror.

W10.204 Benchmark Requirements
a. Provide the following quality benchmarks:
   1). First completed section of each type in a location to be agreed with the Architect.

Installation

W10.205 Fixing Mirrors
a. Allow 3mm airspace behind in area of high humidity.
b. Fix with chromium plated mirror screws.
c. Provide compressible polyethylene sleeves and washers to isolate mirror from screw fixing.
d. Support mirrors larger than 1m² with additional clips to bottom edge.
e. Avoid distorting or stressing mirrors during fixing.

Cleaning

W10.206 Cleaning
a. Clean all glass immediately prior to handover.
b. Clean and polish both sides of all glass and mirrors on completion.

Protection

W10.207 Protection
a. Provide glazing completed adhesive stickers or whiting to indicate glazed areas prior to handover.
b. Do not use lime or alkaline materials.
c. Protect from harmful splashes, mechanical damage, scratching and weld spatter.
END OF SECTION
X10 PAINTING/ CLEAR FINISHING

a. Read in conjunction with Sections A and Z, other related sections of the Specification, the Preliminaries and Contract Conditions.

X10.100 PRODUCTS, SYSTEMS AND MATERIALS

Specification and Scope

X10.101 Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

X10.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Emulsion paints.

2). Enamel paints.

3). Roof paints.

Materials

b. All surfaces to be coated must be thoroughly cleaned and irregularities in the substrate made good.

X10.103 Source of Materials

a. Coating materials to be obtained from one source.

b. All materials used to be as recommended for the intended application.

X10.104 PNT-111: Emulsion to Internal Surfaces - Concrete, Cement Plaster and Brickwork

a. Before painting commences, all problems shall be repaired in accordance with the paint manufacturer’s recommendations.

b. Ensure that surfaces are dry, sound and clean.

c. Remove any hollow and soft/ underbound plaster and replaster. Remove dirt and loose particles.

d. Remove any oil, grease and other contaminants with Plascon Metalcare Aquasolv Degreaser (GR 1) working it well into affected areas with bristle broom or brush. Leave for 20 minutes to react, then rinse thoroughly with fresh water to remove all traces of Plascon Metalcare Aquasolv Degreaser (GR 1), using high pressure water jet or scrubbing with brush or broom. Allow to dry completely.
e. Remove fungi and algae by scrubbing with a solution of household bleach (3.5% sodium hypochlorite) - 1 part bleach to 2 parts water by volume. Leave for 1 hour, then brush off with a bristle brush. Rinse thoroughly with tap water to remove all traces of bleach and allow to dry.

f. Fill cracks and other surface defects with the appropriate Polycell filler, as per manufacturers recommendations.

g. Moisture content measured with a Doser Hygrometer (or equivalent) must not exceed the following limits before painting:
   1). Concrete, off-shutter, pre-cast: B4 scale - 5%.
   2). Cement plaster, brickwork, fibre-cement : B2 scale - 8 %.

h. 1st Coat primer:
   1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.
   2). Product: Professional Gypsum and Plaster Primer (PP700), or acceptable equivalent.
   3). 1No coat surface primer, spreading rate 8.8 m²/ litre.
   4). Recoating time 16hrs.

i. 2nd and 3rd Finishing coats:
   1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.
   2). Product: Professional Super Matt (PEM 900/ TSA), or acceptable equivalent.
   3). 2No coats, spreading rate 11.3 m²/ litre.
   4). To achieve a closed film and solid colour.
   5). Recoating time 1hr.

X10.105  PNT-121: Emulsion to Internal Surfaces - Foil Wrapped Insulation

a. Before painting commences, all problems shall be repaired in accordance with the paint manufacturer’s recommendations.

b. As the foil surface is non porous, lightly brush off dust, contaminants and any loose particles

c. Surfaces must be clean, sound and dry before painting.

d. 1st Coat primer:
   1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.
   2). Product Plascon Multi Surface Primer (WUP1), or acceptable equivalent.
   3). 1No coat surface primer, spreading rate 8.7 m²/ litre.
   4). Recoating time 4hrs.

e. 2nd and 3rd Finishing coats:
1. Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.

2. Product: Professional Super Matt (PEM 900/ TSA), or acceptable equivalent.

3. 2No coats, spreading rate 11.3 m²/ litre.

4. To achieve a closed film and solid colour.
   a). If white is used, three coats might be necessary to achieve obliteration.

5. Recoating time 1hr.

**X10.106 PNT-221: Waterbased Enamel to Internal Galvanized Mild Steel Pipes**

a. Before painting commences, all problems shall be repaired in accordance with the paint manufacturer's recommendations.

b. After a full site assessment has been conducted, select the appropriate surface preparation required as recommended by the manufacturer.

1). Galvanized iron in good condition: Apply Plascon Galvanised Iron Cleaner (GIC 1) to all bare galvanized areas by brush, broom or spray. Allow to react for one minute. Rinse off with tap water using medium hard bristle brooms or brushes to remove all surface contaminants. Check if surface is water-break free. If not, repeat the cleaning process. Allow to dry completely.

2). Sound previously painted surfaces - galvanized iron: Scrub entire area with Polycell Sugar Soap solution - 500g Polycell Sugar Soap Powder (501703) dissolved in 5 litres of water to remove chalkiness and surface contaminants. Rinse thoroughly with tap water and allow drying. Sand glossy material to provide a key. Remove dust.

c. 1st Coat primer:

1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.

2). Product: Plascosafe 18 Primer (EMS 18), or acceptable equivalent.

3). 1No coats, spreading rate 5.6 m²/ litre.

4). Recoating time 8hrs.

d. 2nd Coat undercoat:

1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.

2). Product: Professional All Purpose Undercoat (PU 800), or acceptable equivalent.

3). 1No coat surface primer, spreading rate 14.3 m²/ litre.

4). Recoating time 16hrs.

e. 3rd and 4th Finishing coats:

1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.

2). Product: Velvaglo Water Based (VLW/ TVW), or acceptable equivalent.

3). 2No coats, spreading rate 9.7 m²/ litre.
4). To achieve a closed film and solid colour.
   a). If white is used, three coats might be necessary to achieve obliteration.

5). Recoating time 4hrs.

X10.107 PNT-222: Waterbased Enamel to Internal Copper Pipes

a. Before painting commences, all problems shall be repaired in accordance with the paint manufacturer’s recommendations.

b. Abrade and clean entire surface using 'Scotch Brite' pads in conjunction with Plascon Aquasolv Degreaser (GR1) to emulsify surface contaminants.

c. Rinse thoroughly with tap water to remove all traces of Plascon Aquasolv Degreaser (GR 1).

d. Check if surface is water break-free. If not, repeat process.

e. 1st Coat undercoat:
   1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.
   2). Product: Epiwash Strontium Chromate Primer (AW255/ KAT508), or acceptable equivalent.
   3). 1No coats, spreading rate 9.6 m²/ litre.
   4). Apply as an overall undercoat and allow overnight drying.
   5). Recoating time 4hrs.

f. 2nd and 3rd Finishing coats:
   1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.
   2). Product: Velvaglo Water Based (VLW/ TVW), or acceptable equivalent.
   3). 2No coats, spreading rate 9.7 m²/ litre.
   4). To achieve a closed film and solid colour.
      a). If white is used, three coats might be necessary to achieve obliteration.
   5). Recoating time 4hrs.

X10.108 PNT-223: Waterbased Enamel to Internal Cast Iron Pipes

a. Before painting commences, all problems shall be repaired in accordance with the paint manufacturer’s recommendations.

b. After a full site assessment has been conducted, select the appropriate surface preparation required as recomended by the manufacturer.
1). General cleaning - unpainted surfaces: Surfaces must be clean, dry and rust free. Remove surface contaminants using Plascon Metalcare Aquasolv Degreaser (GR 1) in conjunction with bristle scrubbing brushes or brooms, alternatively Scotch Brite pads. Rinse thoroughly with tap water using medium bristle brooms, bristle scrubbing brushes or hydroblast to remove all traces of Plascon Metalcare Aquasolv Degreaser (GR 1) and achieve a water break-free surface. Dry surface rapidly to prevent flash rust formation.

2). Previously painted surfaces in sound condition: Clean previously painted surfaces using a scrubbing brush with Polycell Sugar Soap solution - 500g Polycell Sugar Soap Powder (501703) dissolved in 5 litres water to remove surface contaminants. Rinse with water to remove all traces of Sugar Soap and allow drying. Sand previously painted gloss surfaces to a matt finish and dustoff.

c. 1st Coat primer:
   1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.
   2). Product: Coastcote Etch Primer (SNK2), or acceptable equivalent.
   3). 1No coats, spreading rate 7.4 m²/ litre.
      a). Spot prime bare and repaired areas, allow 1 hour to dry.
      b). Conduct a small test area to check for compatibility with existing coating. If not compatible, the existing coating must be removed.
   4). Recoating time 1hr.

d. 2nd Coat undercoat:
   1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.
   2). Product: Professional All Purpose Undercoat (PU 800), or acceptable equivalent.
   3). 1No coat surface primer, spreading rate 14.3 m²/ litre.
   4). Recoating time 16hrs.

e. 2nd and 3rd Finishing coats:
   1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.
   2). Product: Velvaglo Water Based (VLW/ TVW), or acceptable equivalent.
   3). 2No coats, spreading rate 9.7 m²/ litre.
   4). To achieve a closed film and solid colour.
      a). If white is used, three coats might be necessary to achieve obliteration.
   5). Recoating time 4hrs.

X10.109 PNT-224: Waterbased Enamel to Internal PVC Pipes

a. Before painting commences, all problems shall be repaired in accordance with the paint manufacturer’s recommendations.

b. Surfaces must be clean, dry and sound.
c. Remove surface contaminants using Polycell Sugar Soap solution - 500g Polycell Sugar Soap Powder (501703) dissolved in 5 litres water. For stubborn contaminants use hot water in the above mix (Sugar Soap Powder) and emery paper cloth to provide a key. Rinse with tap water to remove all traces of sugar soap and allow drying.

d. 1st Coat primer:
   1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.
   2). Product: Plascon Multi Surface Primer (WUP1), or acceptable equivalent.
   3). 1 No coats, spreading rate 8.7 m²/ litre.
   4). Recoating time 4hrs.

e. 2nd and 3rd Finishing coats:
   1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.
   2). Product: Velvaglo Water Based (VLW/ TVW), or acceptable equivalent.
   3). 2 No coats, spreading rate 9.7 m²/ litre.
   4). To achieve a closed film and solid colour.
      a). If white is used, three coats might be necessary to achieve obliteration.
   5). Recoating time 4hrs.

X10.110 PNT-441: Acrylic Roof Paint to External Galvanised HVAC Ducting

a. Before painting commences, all problems shall be repaired in accordance with the paint manufacturer's recommendations.

b. Apply Plascon Galvanized Iron Cleaner (GIC 1) to all bare Galvanised areas by brush, broom or spray.

c. Allow to react for 1 minute. Rinse off with tap water using bristle brooms or brushes or Scotch Brite pads to remove all surface contaminants.

d. Check if surface is water break-free. If not, repeat process. Allow to dry completely.

e. 1st Coat undercoat:
   1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.
   2). Product: Plascosafe 18 Primer (EMS18), or acceptable equivalent.
   3). 2 No coats, spreading rate 5.6 m²/ litre.
   4). Recoating time 8hrs.

f. 2nd and 3rd Finishing coats:
   1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.
   2). Product: Nuroof Cool Acrylic Roof Paint (TRP), or acceptable equivalent.
   3). 2 No coats, spreading rate 8.5 m²/ litre, to achieve complete obliteration.
4). Recoating time 2hrs.

X10.111 PNT-455: Acrylic Roof Paint to External Galvanised Roof Sheeting

a. Before painting commences, all problems shall be repaired in accordance with the paint manufacturer’s recommendations.

b. After a full site assessment has been conducted, select the appropriate surface preparation required as recommended by the manufacturer.

1). Sound previously painted surfaces: Sugar soap cleaning (remove chalk and contaminants): Scrub entire area with bristle brooms or brushes using Polycell Sugar Soap - 500g Polycell Sugar Soap Powder (501703) dissolved in 5 litres water to remove chalkiness and surface contaminants. Rinse thoroughly with tap water and allow drying.

2). Galvanised iron in good condition: Apply Plascon Galvanised Iron Cleaner (GIC 1) to all bare galvanised areas by brush, broom or spray. Allow to react for 1 minute. Rinse off with tap water using bristle brooms or brushes or Scotch Brite pads to remove all surface contaminants. Check if the surface is water-break free. If not, repeat the cleaning process. Allow to dry completely.

c. Please Note: 1km from the coast or Industrial areas with acid rain and chemical fallout - if this specification is used in these areas then the Life Expectancy will be reduced to 1 year.

d. 1st Coat undercoat:

1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.

2). Product: Plascosafe 18 Primer (EMS18), or acceptable equivalent.

3). 1No coats, spreading rate 6.7 m²/ litre.

4). Apply as an overall undercoat and allow overnight drying.

5). Recoating time 8hrs.

e. 2nd and 3rd Finishing coats:

1). Manufacturer: Kansai Plascon (Pty) Ltd, Tel: +27 (0) 11 951 4500.

2). Product: Nuroof Cool Acrylic Roof Paint (TRP), or acceptable equivalent.

3). 2No coats, spreading rate 8.5 m²/ litre, to achieve complete obliteration.

4). Recoating time 2hrs.

X10.200 QUALITY AND WORKMANSHIP

Submittals

X10.201 Response

a. Provide submittals in accordance with the requirements of Section A of the Specification.

Samples and Quality Benchmarks

X10.202 Pre-contract Control Samples
a. Not required.

X10.203 Control Samples
a. Provide the following control samples:
   1). 300 x 300mm sample to specified substrate.

X10.204 Benchmark Requirements
a. Provide the following quality benchmarks:
   1). First 10m² of each type, in location to be agreed

Repair work to Walls

X10.205 Repairs to Cracks
a. Cracks 0.2mm to 2mm:
   1). Rake out with a scraped blade.
   2). Remove dust and debris.
   3). Fill with pure acrylic, paintable, flexible crack filler.

b. Cracks over 2mm:
   1). Open out with a carborundum disc into a V shape minimum 3mm wide.
   2). Remove dust and debris.
   3). Wet the crack and fill with damp 1:4 cement/sand mortar properly compacted into the cracks.

X10.206 Repairs to Mortar Joints
a. Scrape out unsound mortar.

b. Point solidly with 1:3 cement: sand mortar properly compacted into the joints.

X10.207 Repairs to Painted Wall Surface Coating
a. Remove loose paint with a sharp paint scraper or hand-held pneumatic engraving tools fitted with flat chisel heads.

b. Feather edges of tightly bonded paint with a rough to medium grit paper.

c. Build up paint covering flush with general surface area.

Preparation

X10.208 Preparation Generally
a. Materials used in preparation to be types recommended by their manufacturers and the coating manufacturer for the situation and surfaces being prepared.

b. Apply in strict accordance with the manufacturer’s specification.
c. Apply oil based stoppers/ fillers after priming. Apply water based stoppers/ fillers before priming unless recommended otherwise by manufacturer. Patch prime water based stoppers/ fillers when applied after priming.

d. Ensure that doors and opening windows, etc., are "eased" as necessary before coating. Prime any resulting bare areas.

e. Plastered surfaces and fibre cement boards to be washed down and allowed to dry completely.


g. All floors where painting is to be carried out to be swept clean, walls dusted down and unpainted surfaces protected.

X10.209 Efflorescence

a. Remove surface salts and other loose material with a stiff brush or coarse dry cloth.

b. Leave for 48 hours and repeat process if further efflorescence occurs.

c. Sand glossy surfaces to provide a key for finish.

X10.210 Ironmongery

a. Remove from surfaces to be coated and refix on completion. Do not remove hinges unless instructed to do so.

X10.211 Previously Painted Masonry/ Render

a. Ensure that surfaces are clean, wash down with sugar soap. Rinse with clean water and allow to dry.

b. Remove areas of unsound paint as recommended by the paint manufacturer.

c. Sand glossy areas to a matt finish.

d. Sand unsound areas back to a sound surface.

e. Make good cracks, allow to dry for 24 hours and sand to a smooth finish.

f. Remove any dust.

X10.212 Uncoated Masonry/ Render

a. Remove dirt, surface deposits, loose and flaking material with a stiff brush.

b. Fill holes and cracks flush with surface, rub down.

X10.213 Previously Painted Plaster

a. Ensure that surfaces are clean, wash down with sugar soap. Rinse with clean water and allow to dry.

b. Remove areas of unsound paint as recommended by the paint manufacturer.

c. Sand glossy areas to a matt finish.

d. Sand unsound areas back to a sound surface.
e. Make good cracks, allow to dry for 24 hours and sand to a smooth finish.
f. Remove any dust.

X10.214 Unpainted Plaster
a. Remove dirt and surface deposits with a stiff brush.
b. Rub down to remove nibs, trowel marks and plaster splashes.
c. Lightly rub over trowelled glossy plaster with worn abrasive paper.
d. Fill depressions, holes and cracks and lightly rub down flush with surface.

X10.215 Steel Generally
a. Wash with white spirit/degreaser to remove dirt and grease.
b. Surface preparation: Clean, disc sand and wire brush to remove rust and scale to ST2 of ISO 8501: Part 1.
c. Prime surfaces as soon as possible after blast cleaning, and in any case within four hours.

X10.216 Galvanised Surfaces
a. Wash with white spirit/degreaser to remove dirt and grease.
b. Rinse with clean water and repeat until a water break free surface is obtained.
c. If metal coating is defective obtain instructions before proceeding.

X10.217 Copper
a. Wash with white spirit/degreaser to remove dirt and grease.
b. Rinse with clean water and repeat until a water break free surface is obtained.
c. Rub down with fine abrasive paper and white spirit.

Coating

X10.218 Painting Generally
a. Operatives must be appropriately skilled and experienced in the use of specified materials and methods of application.
b. Do not use materials that show any bitiness when applied. Do not thin or intermix unless specified or recommended otherwise. If materials are found to have been thinned without authorization, the Architect may require the application of additional coats.
c. Apply priming as soon as possible on the same day as preparation is completed. Ensure that coats are of adequate thickness and suit surface porosity.
d. Adjacent coats of the same material must be of a different tint to ensure that each coat provides complete coverage.
e. Apply coatings to clean, dust free, suitably dry surfaces in dry atmospheric conditions and after any previous coats have hardened. Lightly abrade between coats as necessary.

f. Apply coatings evenly to give a smooth finish of uniform colour, free from brush marks, nibs, sags, runs and other defects. Cut in neatly and cleanly. Do not splash or mark adjacent surfaces.

g. Keep all surfaces clean and free from dust during coating and drying. Adequately protect completed work from damage.

Completion

X10.219 Completion

a. Ensure that opening lights and other moving parts move freely. Remove all masking tape and temporary coverings.

Protection

X10.220 Protection

a. Adequately protect all surfaces that are not to be coated.

b. Protect all surfaces from dust and damp.

c. Where doors are delivered to site in a finished condition, provide all necessary protection to the doors when applying coatings to the frames.

Storage

X10.221 Storage

a. Deliver the materials to Site in original packing, clearly marked with batch number.

b. Store materials in a clean, warm, dry, well-ventilated place. Keep in their original packing until conditioning commences.

END OF SECTION
Z11 METALWORK

a. To be read in conjunction with Section A, other related sections of the Specification, the Preliminaries and Contract Conditions.

Z11.100 MATERIALS AND FABRICATION

Metals

Z11.101 Components

a. The Detailed Design of sections, material thicknesses and the dimensions shown on the Contract Drawings to be maintained within specified tolerances.

b. All materials and components to be durable and to the minimum standards set out in the Specification, together with the relevant British Standards.

c. For each material or component, obtain the total quantity from the same supplier or manufacturer unless otherwise agreed with the Architect.

d. Protect all inaccessible steel against corrosion for the design life of the works.

e. All support systems to be of adequate thickness and strength, to meet the structural requirements and eliminate risk of distortion in finished surfaces.

f. Provide protection until handover to avoid any blemishes on the finished elements.

g. Finish exposed metalwork in accordance with the relevant British Standards. Unless otherwise specified, concealed items to be mill finished aluminium in internal conditions only, or hot dip galvanised steel in accordance with SANS 121. Treat cut edges so that the level of protection is maintained.

h. Take adequate measures to prevent bi-metallic corrosion between dissimilar metals and to isolate aluminium components from cementitious surfaces.

Z11.102 Mild Steel

a. All mild steelwork to comply with SANS 1200H and SANS 10120, unless stated otherwise.

b. Fabrication of steelwork to be in accordance with the Specification.

c. Check the fit for accuracy before and after making permanent connections in frames and other structural elements, which are assembled before delivery to Site.

d. Welding procedures to be such that distortion is reduced to a minimum and local distortion rendered negligible in the final fabrication.

e. No welds other than those shown on the Shop Drawings/ Working Drawings, even for temporary attachments or repairs, are acceptable unless agreed in advance by the Architect.

f. Vent holes in hollow sections to be sealed in a manner to prevent the ingress of moisture.

g. External visible lines and depressions caused by the internal welding of hollow section steelwork to be positioned in the works so as to be non-visible.

Z11.103 Aluminium
a. All aluminium work to comply with SANS 10120, unless stated otherwise.

b. Fabricate all extruded aluminium alloy members from the appropriate grade of aluminium alloy.

c. Unless specified otherwise, aluminium sheeting to be a minimum of 3mm thick.

d. Use only appropriate grades, strengths and thicknesses of aluminium to ensure that all structural and finishing requirements of the Specification are met. The wall thicknesses of aluminium extrusions to be sufficient to ensure their rigidity in the lengths required in the final installation.

e. All aluminium fixing brackets and cleats to be manufactured from the appropriate grade of alloy. If visible, finish to match the metal panels and framing members.

f. Protect exposed aluminium with low tack adhesive film during construction and prior to handover.

g. Aluminium sheets not to suffer bowing, dimpling, oil canning, sagging, pillowing, rippling, warp, abrupt transitions or other visible deformation or irregularity.

Z11.104 Stainless Steel

a. Unless otherwise specified, stainless steel to be austenitic and non-magnetic. Specific grade designations to be either as specified in the relevant sections of the Specification or, where not identified specifically, selected to meet the performance criteria specified for the particular element or components.

b. Stainless steel fasteners, bolts, screws, nuts and other fixings to be to SANS 1700. Select the property class of fastenings to meet the performance requirements specified.

c. Unless otherwise specified, welds to visible areas of stainless steel to be ground smooth to achieve a seamless surface. Remove heat tints using light abrasives, pickling paste, wire brushing or similar to achieve continuity with the specified finish. Areas difficult to access to be manually finished if necessary.

d. Minimise distortion due to thermal movement using jigs or other methods as appropriate during welding. Welding methods and consumables to be chosen as most appropriate to the type, thickness, shape and location of joints to meet the performance levels required and have mechanical properties at least equal to the original base metal. In addition, consumables to have an equal or superior corrosion resistance to the base metal being welded. All welding recommendations required to meet other relevant standards as specified also apply. Electrodes for manual metal arc welding to comply with SANS 1071.

e. Stress corrosion or cracking not to occur. Undertake necessary precautions in the fabrication and installation of stainless steel elements/materials, avoiding the simultaneous presence of any of the following:

1). Tensile stresses.

2). Residual stresses after cold working or welding.

3). Aggressive local environmental conditions.

4). Metal temperatures that in conjunction with the above may induce stress corrosion cracking.

f. Stainless steel castings:

1). To comply with SANS 1465.
2). To be of austenitic stainless steel and the casting alloy to be determined to meet the requirements of the Specification but to be equal or superior to Grade 1.4408 with respect to corrosion resistance.

3). To be manufactured using the lost wax process or such other process as may be proposed and accepted by the Architect.

4). Exposed feeder ports and die lines not acceptable in the finished castings.

5). The surface finish of the castings to be determined by the submission of samples for review and acceptance. Samples, once accepted, should be the standard required for all subsequent castings to be used in the works.

6). The surface roughness of the casting surface prior to any subsequent finishing process to be SCRATA A2 (Steel Castings Research and Trade Association) or better.

7). Make allowance for two post production finishing processes to be utilised. The processes to be agreed with the Architect and include blast finishes (including bead blasting) and electropolishing or acid pickling.

g. Stainless steel fixings and support brackets for natural stone cladding to comply with SANS 1700.

h. Stainless steel for wall ties and other components associated with masonry construction to comply with SANS 28.

i. Stainless steel to be protected where possible using appropriate adhesive film, to the film manufacturer’s written recommendations.

j. If stainless steel has not been protected by adhesive film, thoroughly clean prior to presentation to the Architect for acceptance.

**Z11.200 QUALITY AND WORKMANSHIP**

**Generally**

**Z11.201 Fabrication Generally**

a. Fabricate components carefully and accurately to ensure compliance with the Design and the Specification.

b. Do not permit contact between dissimilar metals in components that are to be fixed where moisture may be present or occur.

c. Finished components to be rigid and free from distortion, cracks, burrs and sharp arrises. Moving parts to move freely and without binding.

d. Unless specified otherwise, mitre corner junctions of identical sections.

**Z11.202 Cold Formed Work**

a. Use brake presses or cold rolling to produce accurate profiles with straight arrises.

**Z11.203 Adhesive Bonding**

a. Prepare surfaces of metals to receive adhesives by degreasing and abrading mechanically or chemically.

b. Use adhesives to manufacturer’s written recommendations.
Z11.204 Thermal Cutting of Steel
a. After cutting, grind off material that is liable to corrode.

Z11.205 Welding/Brazing Generally
a. Thoroughly clean surfaces to be joined.
b. Ensure accurate fit using clamps and jigs where practicable. Use tack welds only for temporary attachment.
c. Make joints with parent and filler metal fully bonded throughout with no inclusions, holes, porosity or cracks.
d. Prevent weld spatter falling on surfaces of materials that will be self-finished and visible in completed work.
e. Remove all traces of flux residue, slag and weld spatter.

Z11.206 Arc Welding
a. Arc welding in accordance with BS EN 1011.

Z11.207 Brazing
a. Brazing in accordance with BS EN 14324.

Z11.208 Finishing Welded/Brazed Joints
a. Visible butt joints in completed work to be smooth and flush with adjacent surfaces.
b. Visible fillet joints in completed work to be executed neatly. Grind smooth to be flush with adjacent surfaces.

Z11.209 Applying Coatings
a. Apply after fabrication is complete and all fixing holes have been drilled, unless otherwise specified.
b. Before applying coating, remove all paint, grease, flux, rust, burrs and sharp arrises.
c. Make good all defects that would show after application of coating and finish surfaces smooth.

END OF SECTION
Z15  HOLES/ CHASES/ RECESSES FOR SERVICES

a. To be read in conjunction with Section A, other related sections of the Specification, the Preliminaries and Contract Conditions.

Z15.100  GENERAL

Specification and Scope

Z15.101  Prescriptive Works

a. Supply, deliver, install and warrant that the works are in strict compliance with the materials and workmanship requirements of the Specification.

b. Where required to prepare drawings these shall be limited to final detailing of components, systems, etc. shown on the Contract Drawings, necessary to demonstrate their safe installation.

c. Where alternative products are offered by the Contractor and accepted by the Architect, provide full supporting documentation in respect of the complete system or installation.

Z15.102  Descriptive Works

a. Complete the Detailed Design, manufacture, supply, install and warrant that the works comply with the visual intent shown on the Contract Drawings and criteria stated in the Specification.

b. Where no material, product or supplier is indicated in the Specification, propose suitable materials and systems prior to Contract award which comply with the visual intent and performance criteria stated and remain fully responsible for the Detailed Design of the works.

c. Where a particular material, product or supplier is indicated in the Specification, such material, product or supplier shall be deemed indicative representing the Architect’s design intent only. The Contractor may complete the installation using that material or product, or such other confirmed as acceptable by the Architect in writing, but shall remain fully responsible for the Detailed Design and performance of the works.

Z15.103  Scope

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Sleeves.

2). Chases.

3). Holes.

4). Service ducts.

5). Access boxes.

Samples and Quality Benchmarks

Z15.104  Pre-Contract Control Samples

a. Provide the following control samples:
1). Samples of each component to be used.

**Z15.105 Post-Contract Control Samples**

a. Provide the following control samples.

1). Samples of each component to be used.

**Z15.106 Benchmark Requirements**

a. Provide the following quality benchmarks:

1). First completed section of each type in a location to be agreed with the Architect.

**Z15.200 MATERIALS/PRODUCTS**

**Z15.201 Service Sleeves**

a. Type: To be agreed.

b. Material: To be agreed.

c. Diameter: To be agreed.

**Z15.202 Fire Stopping**

a. Material to provide fire, smoke and air tight seals.

b. The material shall not shrink, crack or distort during curing.

**Z15.300 SITE INSTALLATION**

**Holes, Recesses and Chases**

**Z15.301 Holes, Recesses and Chases in Masonry and Concrete**

a. Locate all holes, recesses and chases to least affect the strength and stability of the wall, and to be of the smallest practicable size.

b. Holes must not exceed 300 mm square.

c. Chasing generally:

1). Fill cores of hollow units to be chased with 15MPa concrete.

2). Vertical chases must not be deeper than one third of the single leaf thickness.

3). Horizontal or raking chases must not be longer than 1m and not deeper than one sixth of the single leaf thickness.

4). Chases in 100mm thick walls shall be by means of power tools only.

d. Do not set chases or recesses back to back. Offset by a clear distance not less than 200mm.

e. Where sockets, etc., are shown on Working Drawings as nominally back to back, obtain instructions.
f. Do not cut until mortar is fully set, cut carefully and neatly, avoid spalling, cracking or other damage.

g. Do not cut chases with mechanical or hand impact tools.

Z15.302 Holes Recesses in Reinforced Concrete

a. Holes through bases, slabs and reinforced concrete to be carried out according to the instruction of the Architect.

b. Holes and recesses to be cast in using void formers.

c. Drill no hole larger than 10mm diameter without permission of the Architect.

Notches and Holes

Z15.303 Notches and Holes in Structural Timber

a. To be avoided whenever possible.

b. To be the minimum size to accommodate the service.

c. Holes to be on the neutral axis and drilled.

1). Diameter of hole not to be more than 0.25 depth of member. Vertical chases must not be deeper than one third of the single leaf thickness.

2). Spaced apart at not less than three times the diameter of the largest hole.

3). Located at between 0.25 and 0.4 of the span from the support.

Penetrations

Z15.304 Pipe Sleeves

a. Pipes passing through masonry or concrete are to be lagged with Kraft paper or polythene sheeting where not sleeved.

b. Sleeving Material: PVC pipe.

c. Sleeves to extend through full thickness of wall/floor and be positioned to give minimum clearance around service of 20mm or diameter of service, whichever is the least.

d. Sleeves, whether built in or installed in preformed holes, to be bedded solid.

e. Fill annular space between service prep and sleeve with fire resistant material.

Z15.305 Cable Penetrations

a. Seal cable trays all round with fire resistant material.

b. Seal inside trunking as it passes through the walls with fire resistant material.

END OF SECTION
Z20 FIXINGS/ ADHESIVES

a. Read in conjunction with Section A, other related sections of the Specification, the Preliminaries and Contract Conditions.

Z20.100 PRODUCTS AND MATERIALS

Materials

Z20.101 Fixing Generally

a. Fixings to be of sufficient strength, appropriate to their location, and at adequate positions so as to ensure the performance of the elements being attached.

b. The fixings to be suitable and used solely for the purposes intended by the manufacturer.

c. Unless otherwise specified, observe the following requirements:

1). Fixings to be selected such that adequate protection against any corrosion likely to occur in their position of use is provided for the service life specified.

2). Use fixings that are suited to the likely stresses, movements and vibrations in use.

3). Unless otherwise specified, fixings to be non-visible; where fixings are visible these shall match or suit the items being fixed or comply with the Contract Drawings.

4). Removable items that require accessibility or removal to be fixed with hidden screws and/or bolts, unless otherwise specified.

d. Generally, fixings within aluminium framing components to be non-visible, with the exception of capping pieces fixed to vertical mullions.

e. Galvanise and effectively weatherproof any steel sub-frame assemblies to avoid exposure to the external environment.

f. All fixings shall be tested in accordance with BS 5080: Parts 1 and 2 by an independent Testing Authority acceptable to the Architect.

Adhesives

Z20.102 Phenolic and Polyurethane Resins

a. To SANS 1349.

Z20.103 PVA Adhesives

a. To SANS 1348.

Z20.104 Solvent Based Contact Adhesive

Screws

Z20.105 Screw Fixings

a. Screws: To SANS 1171.
b. Washers and screw cups, where specified, to be of the same material as the screw.

Z20.106 Plugs Generally
a. Use proprietary types selected to suit the background, loads to be supported and conditions expected in use.

Z20.107 Packings Generally
a. Provide suitable, tight packings at fixing points to take up tolerances and prevent distortion.
b. Use non-compressible, rot-proof, non-corrodible materials positioned adjacent to fixing points.

Nails

Z20.108 Types of Nail
a. Nails to SANS 820.

Z20.109 Masonry Nails
a. Do not use without acceptance.

Bolts

Z20.110 Bolts
a. To SANS 1700 and SANS 646.

Z20.200 QUALITY AND WORKMANSHIP
Application

Z20.201 Adhesives
a. Surfaces to receive adhesive to be sound, unfrozen and free from dust, grease and any other contamination likely to affect bond. Where necessary, clean surfaces using methods and materials recommended by the adhesive manufacturer.
b. Surfaces to be sufficiently smooth and even to suit the gap-filling and bonding characteristics of the adhesive. Prepare as necessary.
c. Operatives to observe both the manufacturers' and statutory requirements for storage and safe usage of adhesives.
d. No adhesives to be used in unsuitable environmental conditions or beyond the manufacturer’s recommended maximum shelf life or open-pot time periods.
e. Adhesives to be applied using recommended spreaders/applicators to ensure correct coverage. Bring surfaces together within the recommended time period and apply pressure evenly over the full area of contact surfaces to ensure full bonding.
f. Remove surplus adhesive using methods and materials recommended by the adhesive manufacturer and without damage to affected surfaces.

Z20.202 Fixings
a. Carry out all necessary preparation work such as drilling, plugging, screwing, bolting, cutting for anchor bolts or sockets to be cast-in and for making good, including grouting-in of anchor bolts and fixings where necessary.

b. The method of fixing not to damage anything being fixed or anything receiving fixings.

c. Welding not permitted, unless accepted by the Architect.

d. Where fixing is through the finished article make sure that fastenings and plugs (if used) have ample penetration into the backing.

**Z20.203 Screw Fixings**

a. All screws to have clearance holes.

b. Screws of 8 gauge or more and all screws into hardwood to have pilot holes about half the diameter of the shank.

c. Before using brass, aluminium or other soft metal wood screws, pre-cut the thread with a matching steel wood screw.

d. Do not hammer screws unless specifically designed to be hammered.

e. Countersink screw heads not less than 2mm below timber surfaces that will be visible in the completed work, unless specified otherwise.

**Z20.204 Pelleting**

a. Countersink screw heads 6mm below timber surface and glue in grain-matched pellets not less than 6mm thick, cut from matching timber.

b. Finish off flush with face.

**Z20.205 Packings Generally**

a. Ensure that packings do not intrude into zones that are to be filled with sealants.

**Z20.206 Nail Fixing**

a. In joints, use not less than two nails and opposed skew nailing unless specified otherwise.

b. Drive nails fully in without splitting or crushing the material being fixed.

c. Punch nail heads below surfaces that will be visible in the completed work.

**Z20.207 Plugs Generally**

a. Locate plugs accurately in correctly sized holes in accordance with the manufacturer’s recommendations.

**Z20.208 Cartridge Operated Fixings**

a. Do not use without approval.

b. Fasteners, accessories and consumables to be types recommended by the tool manufacturer.

c. Operatives to be trained and certified as competent by tool manufacturer.
d. Ensure that operatives take full precautions against injury to themselves and others.

e. Apply zinc rich primer to heads of fasteners used externally, in external walls or in other locations subject to dampness.

f. Use top hat section plastic washers to isolate cartridge fired nails from stainless steel components fixed externally, in external walls or in other locations subject to dampness.

END OF SECTION
Z21  MORTARS

a. Read in conjunction with Section A, other related sections of the Specification, the Preliminaries and Contract Conditions.

Z21.100 PRODUCTS AND MATERIALS

Z21.101 Descriptive Work

a. Complete the Detailed Design, manufacture, supply, install and warrant that the works complying with the visual intent shown on the Contract Drawings and criteria stated in the Specification.

b. Where no material, product or supplier is indicated in the Specification, propose suitable materials and systems prior to Contract award which comply with the visual intent and performance criteria stated and remain fully responsible for the Detailed Design of the works.

c. Where a particular material, product or supplier is indicated in the Specification, such material, product or supplier shall be deemed indicative representing the Architect’s design intent only. The Contractor may complete the installation using that material or product, or such other confirmed as acceptable by the Architect in writing, but shall remain fully responsible for the Detailed Design and performance of the works.

Z21.102 Section Coverage

a. This section of the Specification, when read in conjunction with the Contract Drawings, provides particular requirements with respect to the following:

1). Mortar mixes.

Materials

Z21.103 Water

a. To be clean fresh water free from vegetable or organic matter, earth, clay, mineral salts, acid or alkaline substances.

b. The Contractor may be required to obtain a chemical analysis by an approved laboratory.

Z21.104 Cement

a. Cement: CEM I Portland cement 42.5N to SANS 50197 or CEM II Portland Fly Ash Cement 32.5N – no site blending of extenders is permitted.

b. Where the use of masonry cement is permitted, it shall comply with SANS 50413: type MC 12.5 or 22.5X.

Z21.105 Sand

a. To SANS 1090.

b. Sand for facework to be from one source, mix to ensure consistency of colour and texture.

Z21.106 Lime

a. To SANS 523 hydrated lime.
Z21.107 Admixtures
a. Use only admixtures that are specified and approved.
b. Do not use calcium chloride or admixtures containing calcium chloride.

Z21.200 QUALITY AND WORKMANSHIP

Testing
Z21.201 Mortar Testing
a. Testing of mortars to be carried out in accordance with SANS 5863 or to equal standards acceptable to the Architect.

Storage of Materials
Z21.202 Cement
a. Store in a weatherproof structure clear of the ground.
b. Do not store for more than six weeks before using.
c. Portable silos can be used for bulk storage of cement.

Z21.203 Lime
a. Store in a weatherproof and damproof structure clear of the ground.

Z21.204 Sand
a. Store to avoid contamination.

Z21.205 General
a. Keep mixing plant, tools and banker boards clean at all times.
b. Measure materials accurately by volume using clean gauge boxes. Proportions of mixes to be for dry sand making allowance for bulking if it is damp.
c. Mix ingredients thoroughly to a consistency suitable for the work and free from lumps. Mortars containing air-entraining admixtures to be mixed by machine, but not over mixed.
d. Use within two hours of mixing. Do not use after initial set has taken place. Do not retemper.

Z21.206 Cement/Sand Mortar Mix Proportions
a. To SANS 10164.
b. Class 1: 1:4 Cement: Sand: Highly stressed masonry, work below ground, severe exposure.
Z21.207  Masonry Cement/Sand Mortar Mix Proportions


Z21.208  Cement/ Lime/ Sand Mortar Mix Proportions


END OF SECTION
Z22 SEALANT JOINTS

a. Read in conjunction with Section A, other related sections of the Specification, the Preliminaries and Contract Conditions.

Z22.100 PRODUCTS AND MATERIALS

Types and Method

Z22.101 Generally

a. Sealant to be suitable for the purpose intended, and used strictly in accordance with the manufacturer’s instructions.

b. Sealant colour to be agreed with the Architect.

c. The chemical composition of the sealant and primers, where any, to be compatible with the joint substrate, and with adjacent surface treatments or building components with which they may come into contact.

d. Determine the appropriate hardness, compressibility or consistency of sealant in consultation with the manufacturer, considering the joint movement and exposure for the size of joint.

e. Sealant to have the lowest modulus of elasticity which is consistent with the degree of exposure to wear, abrasion and vandalism. Any sealant exposed to traffic to have strength and modulus sufficiently high to resist damage by traffic, including indentation.

f. Demonstrate to the satisfaction of the Architect that the sealant joints can accommodate and are compatible with any movements to which they may be subjected.

g. Do not use sealant likely to stain, discolour or bleed into adjacent building materials.

Sealant Types

Z22.102 Polysuphide

a. Polysuphide sealants to comply with SANS 110.

Z22.103 Polyurethane

a. Polyurethane sealants to comply with SANS 1077.

Z22.104 Silicone Rubber

a. Silicone rubber sealants to comply with SANS 1305.

Z22.105 Acrylic

a. Acrylic sealants to comply with SANS 11600.

Z22.200 SITE INSTALLATION

Workmanship

Z22.201 Suitability of Joint
a. Before commencing check that:
   1). Joint dimensions are within the limits specified for the sealant.
   2). Surfaces are undamaged.
   3). Preparatory work required has been completed prior to assembly of the joint.

Z22.202 Joint Preparation

a. Ensure that surfaces are firm, clean, dry and free from oil or grease.
b. Clean surfaces to which sealant must adhere using methods and materials recommended by the sealant manufacturer.
c. Remove all temporary coatings, tapes, loose material and other contaminants.
d. Keep joints clean until sealant is applied.
e. Backing strip, bond breaker and primer: to be as recommended by the sealant manufacturer.
f. Insert backing strip and/or bond breaker tape, leaving no gaps.
g. Mask adjacent surfaces.

Z22.203 Joint Fillers

a. Joint fillers, when placed in the joint, to provide a gap consistent with the required depth of sealant.
b. The cross section of sealant in the joint to be of 2:1 width to depth unless otherwise accepted.
c. Joint fillers to be as follows:
   1). Compatible with the sealant used and surrounding construction elements.
   2). Formed from closed cell foam.
   3). Non-adhering to cured sealant.

Z22.204 Sealant Application

a. Apply strictly in accordance with the manufacturer’s instructions.
b. Do not apply to damp surfaces.
c. Do not apply heat to joints.
d. Fill joints completely, leaving no gaps.
e. Sealant to be evenly applied without bubbles in joints.
f. Remove excess sealant and ensure that joints are neat and clean.
g. Tool sealant to form a neat, slightly concave profile using only liquids approved by the sealant manufacturer.
h. Protect until cured.

END OF SECTION
Z25 GLASS AND COATINGS

a. To be read in conjunction with Section A, other related sections of the Specification, the Preliminaries and Contract Conditions.

Z25.100 MATERIALS AND FABRICATION

Types of Glass

Z25.101 Glazing Generally

a. All glass types to be cut to accurate sizes with clean cut, arrised edges. Damage such as shark teeth, serration hackle, sharp flare, flake chips, rough chips, feathered edges, shells or other imperfections is not acceptable if detrimental to the visual and performance criteria of the glass. Glass delivered to Site to be of the required size. No cutting or nipping of glass allowed on Site. Variations in manufacture and performance of the glass not to affect its colour or appearance, while all glass of the same type to be visually consistent in appearance and colour at all times, having due regard to the direction and angle of view within manufacturing tolerances and the agreed range of samples or observations of previous installations of the same type of glass.

b. All glass to be of the type specified in the relevant SANS EN series range. The glazing to be carried out in accordance with the manufacturer’s recommendations.

c. All glass panes within frames to be installed to give the necessary edge cover and clearance to ensure a permanent and safe installation. Do not fix glass panes with damaged edges, including shelling and impact markings, into the building under any circumstances.

d. Provide a warranty from the glass manufacturer, which states that the glazing systems comply with the manufacturer’s requirements and which indicates the life expectancy of the glass, interlayers, spacers and other components.

e. Distortion to be kept to an absolute minimum with no local defects (such as tong marks) producing irregular reflections being allowed. All glass to be manufactured and processed in accordance with quality control procedures to SANS 9000 and be independently maintained.

f. Visual quality testing of float glass (jumbo sizes and stock size sheets) for dimensional requirements and visual defects to be in accordance with SANS 50572: Part 2.

g. Stresses in glazing: Ensure that no glass or glazing combination develops stresses that may lead to damage of glass, glazing materials, components and/or framing systems:

1). Conduct a thermal stress analysis and make due allowance for any thermally treated or edge working of annealed glass which may be required.

2). Take into account shading stresses that might occur from adjacent components, including solar shading devices.

h. The method of glazing adopted to take account of the manufacturing tolerances in the glass, thus minimising the effects of distortion resulting.

i. The glass to be replaceable without undue difficulty. Provide a method statement showing the method of removing damaged glass and any associated metal framework and of installing new components.
j. A highly uniform, low reflection and durable quality is required of any surface modified
glass. Such coatings to be neutral in colour, durable and sufficiently hard on exposed
surfaces to avoid damage. For the purposes of the Specification, neutral is defined
as a colour having no unacceptable hue and being capable of reflecting or refracting
light without chromatic aberration. Provide glass with a colour rendering index (Ra)
as specified, both for the transmittance and the reflected spectrum and provide
detailed reflected and transmitted spectrum data for the purpose of identifying/
anticipating the possible problems with colour reflection. Demonstrate this by
provision of full size samples of each glass type, which are to be viewed under
reproduction lighting conditions and accepted prior to material manufacture.

k. Provide all glass from a single supplier unless agreed otherwise by the Architect,
and provide certification proving the origin of the glass.

l. Ensure that glass does not contain impurities, which would detract in any way from
the performance of the glazing system.

m. All exposed glass edges to be ground and arrised.

n. All glass to be free from bubbles, smoke vanes, air holes, scratches or any other
visible defects, unless described as acceptable elsewhere in the Specification.

o. Mirror glass is not acceptable, unless described as acceptable elsewhere in the
Specification.

p. Where combinations of glass types are used in a unit, the least stringent criteria for
viewing to be used in accordance with the relevant standards.

q. Prior to placing an order for any glazing materials, obtain all necessary confirmation
and/or calculations in writing from the glass manufacturer on all aspects of the glazing
systems for review, as, but not limited to the following:

1). Ventilating and draining provisions of the glazing rebates.

2). Thickness of individual glass panes and of insulating glass units due to
consideration of the wind loadings specified.

3). Snow and access loads for horizontal/inclined glazing conditions with
consideration of the wind loadings specified.

4). Determination as to whether or not heat strengthening or toughening of glass
will be required.

5). Thickness and number of PVB interlayers (laminated glass).

6). Thermal and shading performance of insulating glass units.

7). Thermal safety of insulating glass units.

8). Hardness, location, shape and dimensions of setting blocks and glazing
gaskets.

9). Depth and width of glazing rebates.

10). Expansion, tolerances, glass bite and clearance to meet all specified
performance requirements.

Z25.102 Safety Glass
a. Select safety glass categories for use in critical locations as defined and recommended in the relevant parts of SANS 1263, as required to comply with the Building Regulations, Local Authority requirements and other relevant Health and Safety requirements. The selection of the glass type and thickness to be undertaken to meet the performance requirements of the Specification and to minimize the risk to persons both during construction and during the service life of the works. The risk of failure and the consequences of failure to be documented and prepared for review.

b. All safety glass to be marked with an internationally recognized symbol, marked and labelled in a consistent position on the glass, as agreed with the Architect. Safety glass to be in accordance with the relevant parts of SANS 10137 and SANS 1263 as applicable and meet the relevant requirements of SANS 10400 the Building Regulations for safety glass.

c. Test safety glass to meet the requirements of SANS 1263 as applicable.

d. Where it is necessary to meet the requirements of the Building Regulations and any other health and safety requirements, manifestation to be provided. Agree the type of manifestation with the Architect and provide samples for acceptance.

Z25.103 Annealed Glass

a. Unless otherwise specified and accepted in advance by the Architect, all sheet glass to be manufactured by the float process. Other sheet glass not acceptable without the prior written agreement of the Architect.

b. Untinted glass sheets to provide a clear, undistorted vision and reflection.

c. The tolerances on thickness to be as reproduced in SANS 50572.

d. The tolerances on cut sizes for different thicknesses of material to be as SANS 50572.

e. Visual quality testing of annealed glass for dimensional requirements and visual defects to be in accordance with SANS 50572.

Z25.104 Laminated Glass

a. Utilize expertise and experience for the selection of glass in order to comply with the performance requirements of the Specification.

b. Laminated glass to be in accordance with SANS 50572.

c. Laminated glass to consist of a number of sheets of flat glass with polyvinyl butyral (PVB) of not less than 0.375mm thick, or methyl metacrylate resin interleaving between each layer. The layers can be clear, translucent or coloured depending on the design intentions of the glazing. The glass may be annealed, heat strengthened, or heat soak toughened, as required to meet the performance requirements of the Specification.

d. The Contract Drawings to show the visual requirements of the Architect. Final selection of glass type and thickness of each layer, together with type, opacity, density and location of interlayer and coatings to be accepted by the Architect prior to ordering materials.

e. All glass to meet the colour and quality standards set by the Control Samples.

f. Seal laminated glass edges with materials compatible with the interlayer. Delamination of the laminated glass for any reason is not acceptable.

g. The bottom supported edges of laminated glass panes to be cut flush over the width of the pane to provide even distribution of vertical load to the setting blocks.
Z25.105 Toughened Glass

a. Justify the use of toughened glass by risk assessment and/or calculations, with the general aim of minimising its use.

b. All toughened glass to be heat soaked to DIN 18516: Part 4, paying particular attention to temperature and duration of treatment. Demonstrate that, despite temperature tolerances, the air temperature in all parts of the oven was maintained at or above 280°C for 8 hours. Provide detailed records of heat soaking for each batch prior to delivery to Site.

c. The glass to conform to the following requirements in the horizontal toughening process:

1). Maximum overall bow: 0.003mm per millimetre measured along the glass edge.

2). Maximum local bow: The maximum deviation for flatness from peak to trough not to exceed 0.3mm per 300mm or 0.15mm at the edge or 0.08mm in the middle.

3). Rollerwave: Size glass to provide for the consistent and horizontally aligned orientation of ripples throughout the Works. The maximum deviation for flatness from peak to trough not to exceed 0.08mm. In any event, state in the Tender submission proposals to control the extent of rollerwave, if any. Provide full size samples of all specified heat treated glass to signify the range of rollerwave throughout the Works, prior to commencing production of the glass.

4). Edge dip - 0.25mm maximum.

d. Exposed edge working to be flat ground with small ground arris and have a frosted appearance. Small shells and/or chips, exceeding a maximum diameter of 2mm, to be ground out prior to toughening.

e. The surface compressive stress to be demonstrated by non-destructive testing, to be controlled at the Works at >=120N/mm².

f. Cut all glass to accurate sizes and deliver to the Site in the required sizes. No on-Site cutting or nipping allowed. The glass to be clearly marked to show its intended final position and orientation.

g. Ensure that glass heat treatment requirements are satisfactory to meet wind, impact, thermal or other loads anticipated in the works. The manufacturer of the toughened glass to be made aware of its intended use in the construction. Carry out any drilling and notching with the agreement of the manufacturer of the toughened glass and prior to the toughening being carried out. All toughened glass to be tempered on a roller hearth furnace eliminating tong marks and to conform to SANS 1263 and SANS 10137.

h. Ensure that the toughening process does not produce iridescence, distortion, roll marks or ripples in the glass which are unacceptable to the Architect. Demonstrate such anticipated imperfections by the provision of samples prior to commencement of glass production. The Architect to examine the samples provided and advise what is acceptable and what is unacceptable. All glass produced for the works to comply with the acceptable samples as a minimum standard.

i. Prior to commencement of manufacture, advise the Architect of the glass supplier and the premises where fabrication and processing to be carried out. The Architect to be given the opportunity of visiting the glass manufacturer's premises during fabrication and/or processing.

j. Prior to installation of the toughened glass, demonstrate with documentary evidence that the glass has been heat soaked for the prescribed periods. Such evidence to include, as a minimum, the following:
1). Source of supply and evidence of batching.

2). Dates and records of toughening/heat soaking of all glass.

3). Certification that the glass meets the performance requirements of the Specification.

4). Records to include details of all units that failed during the heat soak test.

k. The toughening process not to create any stresses in the glass that are visible within the limits specified.

l. The toughening process not to affect the appearance of the coating.

m. No cooling jet marks to be visible on the finished surface of the toughened glass.

n. Any discolouration or distortion caused by the toughening process is unacceptable outside of roller wave distortion and glass bow specified.

o. Should it be considered that the glass panel configuration within the completed installation is susceptible to anisotropy, when viewed in polarised light, notify the Architect and submit proposals in the Tender to minimise this characteristic. Take all reasonable measures to control the toughening process so as to avoid the occurrence of anisotropy at the time of manufacture. Reject glass if it does not fall within the range of agreed samples; refer to SANS 50572.

p. Demonstrate that all necessary control has been taken to ensure that the effect of anisotropy in the manufactured glass has been controlled and minimized taking into account the thickness of glass and its orientation on the façade of the building. Glass will be rejected if it does not fall within the range of agreed samples. Any coatings applied to the glass must not increase the tendency to show the effects of anisotropy.

Z25.106 Heat Strengthened Glass

a. Unless otherwise specified, all heat strengthened glass to comply with the requirements of BS EN 1863.

b. Visual quality testing of heat strengthened glass for dimensional requirements and visual defects to be in accordance with BS EN 1863: Part 1.

c. When subjected to a fracture test in accordance with BS 6206 and BS EN 12600 as applicable, the fracture characteristics to be similar to annealed glass and therefore, heat strengthened glass not to be considered as a ‘safety’ glass. If heat strengthened glass is proposed for use in a situation, which requires a safety glazing material, it is to be laminated.

Z25.107 Wired Glass

a. Wired glass to comprise “polished wired glass” as defined in SANS 50572.

b. Glass to be annealed,

c. Glass to be of the thickness specified and, unless otherwise specified, with 1.3mm ‘Georgian’ wire embedded within the glass thickness.

d. Tolerances on wired glass thickness to be to the minimum specified in SANS 50572, length, breadth and squareness as specified in SANS 50572.

Z25.108 Fire Resistant Glass
a. Fire resisting glass to provide the fire ratings specified; test to BS 476: Parts 20 and 22 and classify as safety glass to SANS 1263.

b. Fire resisting glazing to incorporate fire rated beading and fixing methods to match the fire rating specified. Test, certify or assess as being equal to the relevant parts of BS 476.

c. Unless otherwise specified, wired glass not to be used. Glass to be clear, with fire resisting properties as specified above.

d. Submit technical/product information on all fire resisting glass proposed for review by the Architect. It is recognized that the glass will not necessarily meet the visual quality requirements set out in the Specification. Submit details of the visual quality and dimensional limits of any proposed fire resistant glass for review by the Architect.

e. Where insulation is specified in addition to stability/integrity, this to be in accordance with Building Regulations and tested to the relevant parts of BS 476.

**Z25.109 Curved Glass (Tolerances)**

a. The maximum variation in curved form to be ±4mm from the theoretical form.

b. The maximum variation in adjacent glass edges when installed to be 1mm per 1000mm.

c. The maximum difference between curved adjacent glass edges when installed to be 3mm.

d. All curved glass panels to be continuously curved from edge to edge for the full radius with no straight returns.

e. The maximum allowed deviation of the length and width of sheets to be ±4mm for dimensions up to and including 2000mm and ±4.5mm for dimensions over 2000mm.

f. The maximum allowed deviation of the diagonal dimension of any sheet to be ±7mm for dimensions over 2000mm.

g. The maximum allowed deviation of the top and bottom edges (i.e. the curved edges) measured on the face of the glass and perpendicularly to the curvature to be ±3mm.

**Coatings**

**Z25.110 Glass Coatings Generally**

a. Submit to the Architect detailed proposals in respect of coatings.

b. Surface coatings: A highly uniform, low reflection and durable quality is required of any surface modified glass. Such coatings to be consistent in colour, durable and sufficiently hard on exposed surfaces to avoid damage.

c. Body tinting:
   
   1). Provide evidence from the glass manufacturer that the correct body tinting has been incorporated into the materials at the appropriate stage, when this has been specified on the Contract Drawings.

   2). Provide evidence that the correct surface modified tinting has been applied by the glass manufacturer, where this has been specified on the Contract Drawings.

d. Ceramic frit coatings:
1). Tolerances for positioning and sizes of prints to comply with optical quality determined by viewing from a distance of 3000mm using daylight without direct sunlight or direct spotlight, perpendicularly to the glass, for no more than 10 seconds.

2). Apply smoothly and consistently over the whole, or part, of each glazed area as indicated on the Contract Drawings.

3). Fuse into the surface of the glass, thus providing a permanent layer (with the exception of the exposed internal surface).

4). The coatings to have similar sheen, chromaticity and luminosity, to give non-discernible colour difference when viewed by eye and illuminated by a standard light source, and to colour match. All ceramic fritting to be opaque and to a colour to be agreed with the Architect. Provide samples of at least 1200mm x 1200mm of each glass type.

e. Coatings/treatments/interlayers not to crack, disintegrate or corrode in any way under the extremes of conditions outlined in the Specification.

f. Advise the Architect, prior to commencement of the glass coating, the name of the supplier and applicator, together with the location of the premises where work to be carried out.

**Z25.111 High Performance Glass Coatings**

a. Panes of glass with high performance coatings to be examined for defects in accordance with BS EN 1096: Part 1, viewed from a distance of 3000mm from the outside face of the glazing, for both the main area and the edge area of the glass panes.

b. Acceptance criteria of coated glass defects for uniformity, stain, spots/pinholes, clusters and scratches to be in accordance with BS EN 1096: Part 1.

c. Where soft coatings are used in double glazed units, the glass to be edge stripped on the coating side to a width corresponding to the width of the spacer bar (complete with butyl strip) such that when the panes are sealed together no discolouration to the coating by the butyl strip occurs around the perimeter of the double glazed unit. The occurrence of a red or blue line around the perimeter of the glass panes to be deemed unacceptable.

d. Suitably protect glass panes where soft coatings are applied. Up until time of installation the double glazed unit and all handling of glass to be carried out using protective cotton or surgical gloves so as not to damage the surface of the coating with finger prints. After protection is removed from the coated glass panes, the panes to be installed into the double glazed units and sealed within the recommended time by the coating manufacturer, to avoid any atmospheric deformation of the surface.

e. Provide samples minimum 1200mm x 1200mm in size of any high performance coated glass types for review by the Architect.

**Unitised Systems**

**Z25.112 Double Glazed Units**

a. Unless otherwise specified, double glazed units to be hermetically sealed units complying with BS 5713 or BS EN 1279. Double glazed units to utilise panes of unequal thickness, unless specified otherwise. The outer pane to be thicker to minimize the effect of pillowing.
b. Spacers to be of adequate rigidity for their purpose, be continuous, with bent corners and have welded joints sealed to ensure the integrity of the seal and to provide a consistent moisture seal around the entire perimeter of the unit. Spacers to accommodate the seal and contain desiccant, allowing both to operate at maximum efficiency.

c. Spacers to separate glass panes and the units to have a mechanically applied primary polyisobutylene seal between glass and spacer. This to provide a continuous vapour-proof barrier to a minimum width of 1mm and a secondary two part silicone seal to the perimeter of the units to carry wind loads.

d. Visual inspection of the glass edges, edge seals and spacers to be unhindered, prior to glazing.

e. Drainage of water along edge seals not permitted.

f. All double glazed units to be assembled in controlled temperature and humidity conditions. Breather tubes to be used, if necessary, during manufacture and transportation. Remove and seal units prior to manufacture.

g. With regard to mechanically restrained glazing systems, the manufacturer to confirm the maximum compression allowable on the edge of the units.

h. State the maximum concavity and convexity that will occur under the ambient climatic conditions and barometer pressure differentials anticipated by the requirements of the Specification. Ensure that the double glazed units are flat (with a maximum deviation of 1/1000 at the centre of the glass pane when measured diagonally) when finally installed.

i. The bottom supported edges of laminated glass panes within vertical double glazed units to be ground flush over the width of the pane to provide even distribution of load to the setting blocks.

j. Double glazed units are to carry a test certificate/report carried out by an independent authority, showing compliance with BS EN 1279: Part 2.

**Structural Silicone Glazing**

**Z25.113 Type and Method**

**a. General:**

1). Be responsible for the structural silicone glazing based upon the Contract Drawings and the requirements of the Specification.

2). Be responsible for the final selection of materials, testing, fabrication, transportation and installation of the structural silicone glazing, all in accordance with SANS 10137 and/or other standards specified herein and submit samples for review by the Architect prior to manufacture.

3). The structural silicone glazing to be carried out in such a manner that will not compromise the integrity of the double glazed units’ edge seals and the specified warranties.

4). Structural silicone glazing application only to be carried out in an appropriate working environment. The environment to be strictly controlled in accordance with the manufacturer’s written instructions to maintain temperature, humidity, dust and dirt free conditions etc., in the working environment.

**b. Materials:**
1). Provide structural silicone adhesive, obtained from a single source, and apply strictly in accordance with the manufacturer’s written recommendations.

2). For marine, or similar, environments the structural silicone to be resistant to damage from algae or attack by birds.

c. Installation/Fabrication:

1). Structural silicone glazing application not to be carried out on-Site unless agreed otherwise with the Architect.

2). Provide documentation of the sealant manufacturer’s requirements for the particular substrate of the construction, including joint sizes, limitations and requirements for mixing, cleaning, surface preparation, priming and application.

3). Provide evidence that the sealant has been selected taking into account the sealant manufacturer’s recommendation as to use and compatibility with the contact surfaces.

4). Joint design to be in accordance with the sealant manufacturer’s written recommendations for glue-line and bite to glue-line ratio, taking into consideration the design wind pressures and panel sizes.

5). Provide details of tensometer and any other testing equipment as required.

6). Glazing procedures to include frame assembly, cleaning, priming (if necessary), gunning, tooling and frame handling after glazing and curing. Sealant not to be applied when the temperature is below 4°C and units not to be moved until the silicone has achieved a level of cure recommended by the silicone supplier.

7). Adopt silicone batching logging procedures to record all batches used, including batch manufacture date and arrival date of each batch at the fabrication works. The location of each structural silicone glazed panel to be individually located on As-built Drawings of the building, recording date and batch of structural silicone, with details of tests carried out to ensure that the highest quality of silicone is being used.

8). The structural silicone glazing to be recorded at the time of assembly and include identification marks of every panel by a unique number, readable from the inside of the building for the life of the building. Provide glazing records with information on each panel including silicone type, batch, date of application, glazier’s name and temperature and humidity measured inside the factory on the day of assembly.

9). Recommend a periodical maintenance regime for agreement with the Architect. This to be incorporated in the O&M manuals. Acceptance criteria to be consistent with the requirements of the testing criteria and as a minimum must be:

   a). A standard ‘peel test’ on any broken panels that require replacement.

   b). A close visual inspection, to be carried out externally from the cleaning apparatus, including application of hand pressure to verify continued adhesion. Carry out this exercise for 1% of the cladding, at a yearly frequency for the first 3 years, then at a frequency of 5 years following. The panels to be randomly selected around the elevations at varying heights.

   c). The sealant supplier or other qualified body to carry out tests.

Rooflights/Horizontal and Inclined Glazing
Z25.114 Type and Method

a. Horizontal glazing to be designed to satisfy the requirements of ACR(M) 001 and CWCT Technical Note No. 42 in addition to the ‘Health and Safety in Roof Work’ guidance book (G)33, Appendix 4, the HSE and CDM regulations and be manufactured only by a company registered to SANS 9001.

b. Glazing for rooflights or horizontal and inclined situations to be capable of accommodating the following live loads without any reduction in its performance:

1). All defined loads resulting from specified movements of the main structural frame during building use.

2). Point loads imposed on the glass framing members of 695N inwardly acting. Maintenance loads not to be carried by the glass infill panels.

3). Wind loads as defined by SANS 10160.

4). Loads imposed by snow as determined by SANS 10160.

5). Minimum working pressures on infill panels for hand cleaning operations as defined in SANS 10160.

6). The impact load of two persons falling on it during maintenance, cleaning and inspection operations. The glazing system to maintain its structural integrity and the glass and edge covering to have adequate thickness so that units do not ‘pop out’ of the frame under such impact. Should the outer layer of glass break, then the inner sheet glass to stay in place and support the operatives.

7). Large body impact tests by an accredited test organisation with certification produced to demonstrate compliance to an energy level of 1200J, when tested to prEN 1873.

8). When calculating loads on the glazing and structure, the worst combination of the above to be considered, taking account of the fact that the pressure coefficients at various locations may determine more than one design criterion.

END OF SECTION
Z30 METALWORK FINISHES

a. To be read in conjunction with Section A, other related sections of the Specification, the Preliminaries and Contract Conditions.

Z30.100 MATERIALS AND APPLICATION

Finishes

Z30.101 Appearance

a. All finishes to be stable, fade resistant and not affected by ultraviolet light. Provide data and samples for review by the Architect.

b. All finishes to be durable, of uniform texture and colour and be resilient to all known and/or specified environmental and pollution effects. This to include scratching, cigarette smoke and burns, etc. Submit data and samples for review by the Architect.

c. Minor scratches and blemishes to be repaired using the coating manufacturer’s recommended products and system, matching original finish for colour, texture and gloss. Repair coatings to be visually acceptable to the Architect. Provide confirmation that repair to the damaged finish complies in all respects to the requirements of the Specification. Guarantee in writing that the damaged or defective coating is satisfactory for the proposed remedial paint system. Employ an independent finishing consultant to carry out an inspection and any necessary tests and supply a full report to the Architect.

d. All finishes to be within the limits of the agreed samples and without irregularities or distortions. Fixings, stiffeners, etc. which are not intended to be visible to be treated so that there is no discontinuity in the finished surface appearance.

Z30.102 Surface Preparation of Steelwork

a. Surface preparation to remove all rust, scale and surface contamination to leave a surface equivalent in cleanliness to Sa 2.5 quality of Swedish standard SIS 05-59-00 (SANS 5767, SANS 5768, SANS 5769, SANS 5770 and SANS 5771). Achieve this by acid pickling, except where the presence of paint, oil, grease, welding slag, etc. renders this ineffective, and in all weld areas the steel to be locally blast-cleaned to Sa 2.5 quality of Swedish standard SIS 05-59-00 (SANS 5767, SANS 5768, SANS 5769, SANS 5770 and SANS 5771).

Finishes

Z30.103 Liquid Organic Coating

a. Aluminium alloy components to SANS 2063.

Z30.104 Plating of Surfaces

a. Cadmium/zinc plating of iron and steel surfaces to comply with SANS 2081 and SANS 2082.

b. Chromium plating to comply with SANS 27.

Z30.105 Galvanising Generally

a. To SANS 121.

b. Coating thicknesses to comply with SANS 121 to suit the requirements of the Specification.
c. Where galvanising is visible, the final finish is to be smooth, continuous, consistent and free from flux staining and other forms of staining. Coating weight to be consistent maintaining a uniform appearance throughout the service life of the Works.

Z30.106 Galvanised Self Finish Surfaces

a. Galvanised steelwork not to be painted.

b. Blast clean: Blast clean to SANS 5767, SANS 5768, SANS 5769, SANS 5770 and SANS 5771, Sa 2.5 where applied thickness of coating is greater than 86 microns.

c. Preparation: Edge grind, remove all grease, oil and varnish and any other surface contaminants, ensure that any oil or silicon based anti-weld spatter is removed, remove weld spatter, grind welds as required and fill pits and other surface imperfections that may cause the premature failure of the coating system.

d. Galvanising: The steelwork to be supplied to the galvaniser in a suitable condition to be acid pickled in dilute hydrochloric acid, passivated and then hot dip galvanised in accordance with the provisions of SANS 121.

e. Uniformity: Carry out galvanising in such a way as to maximise the smoothness and uniformity of the deposited coating. Only use double dipping where no alternative exists.

f. Touching-up is not allowed unless agreement is given by the Architect.

1). Where acceptance is given, use the Zilt-Stick system in accordance with the manufacturer’s current recommendations. Zilt-Stick is a self-fluxing and galvanising system, which is applied by hand. The stick is made up of a galvanising compound, which has a “foil” wrapping, and is rubbed over the affected area until completely covered. The black flux residue can be removed using a damp cloth.

2). The maximum size of an area of touch-up is to be determined by locating the point on the damaged surface that is furthest from an intact galvanised coating. If the distance from this point to the galvanising is in excess of 10mm, then the member to be re-galvanised or rejected.

3). Galvafroid or paint applied finishes are not permitted under any circumstances.

g. Refer to the recommendations of the Zinc Development Association for galvanising and zinc metal-spraying.

h. Immersion process to be discussed and agreed with the Architect and submitted for formal comment. This is to ensure that during the galvanising process drips are not allowed to run off fair-faced surfaces and thus disfigure them. Fair-faced surfaces are all those surfaces that will be visible in the completed Works. Agree location of all fair-faced surfaces with the Architect before application.

i. Breathing holes: Locate in unobtrusive places. Agree the location of these holes with the Architect and mark clearly on the Shop Drawings/ Working Drawings.

j. Distortion: Ensure that no distortion of fabricated elements occurs during galvanising. Advise the Architect on the possibility for distortion of the steelwork elements during the galvanising process to enable design modifications of components to be made before fabrication of these components

Z30.107 Galvanised Steelwork to be painted

a. Preparation: As recommended by the manufacturer of the applied coating system and to SANS 121.
Z30.108  Sprayed Metal Coatings

a.  To SANS 1391.

b.  Minimum coating thickness to comply with SANS 1391.

END OF SECTION
Z31 POWDER COATINGS

a. To be read in conjunction with other related sections of the Specification, the Preliminaries and Contract Conditions.

Z31.100 STANDARD DURABILITY POWDER COATINGS

Z31.101 General

a. Unless stated otherwise in the Specification section, the polyester powder coating for the works shall be in accordance with the following standards:

1). Qualicoat Class 1.
3). BS EN 13438 (galvanised steel substrates).
4). GSB International Quality Regulations - aluminium and steel.
5). British Board of Agrément (BBA).

b. Only materials, sourced from a reputable supplier and which are fit for purpose shall be used.

c. The final visual appearance of all powder coated elements and components shall be consistent and identical.

d. Extrusion alloys shall be grade EN AW-6063, EN AW-6060 or acceptable equivalent, and comply with BS EN 754: Parts 3-5 and BS EN 755: Parts 1-9.

e. Powder coating to sheet material shall be grade 1200/3103, and shall comply with BS EN 485 + A1, BS EN 515 and BS EN 573: Parts 1-3.

f. Base aluminium shall be suitable to receive the powder coating application.

g. Aluminium sheet shall be of a suitable temper and thickness to facilitate the stoving process without damage or reduction in performance and visual intent.

h. Comply with the relevant sections of the COSHH Regulations 2002, the Environmental Protection Act 1990 Part 1, the Management of Health and Safety at Work Regulations 1999 and the Construction (Design and Management) Regulations 2015.

Z31.102 Materials

a. Colour shall be as specified or selected by the Architect from the BS/ RAL range.

b. Colour shall remain consistent regardless of batch, as stated in BS 950: Part 1.

c. In order to achieve consistency of colour only use one batch per colour, spray apply, use regulated and automated equipment and use the minimum number of batches.

d. Provide a range of colour, including metallic, and finish quality samples prior to production for selection by the Architect. Samples shall demonstrate the range of anticipated finish and colour consistency acceptable to the Architect.

e. Local dry film thickness, applied to adjacent panels, shall not vary (maximum and minimum) by more than 20% unless otherwise agreed by the Architect following receipt of samples for review.
f. All coatings shall be consistent in terms of colour, quality and finish within the limits agreed in advance through samples provided and accepted.

g. Use only low tack protective tape applied in accordance with good practice and manufacturer’s recommendations for a maximum period of six months. If longer periods are required, remove and re-apply new tape.

**Z31.103 Workmanship**

a. All coatings shall have a current BBA Approval Certificate or acceptable equivalent.

b. Application of coatings shall be carried out as recommended by the Qualicoat scheme, BS EN 12206 and/or BS EN 13438.

c. All coating work shall be carried out at a single plant/ location using a single batch where possible. If multiple batching is required, notify the Architect and take measures necessary to comply with the Specification in terms of quality and consistency of colour and finish.

d. Keep the surfaces clean and as new until Practical Completion so as to maintain the warranty. This includes sufficient regimes in environments stipulated as Hostile (C4 and C5 as determined by BS EN ISO 12944), which can reduce cleaning periods from every twelve months to every three months for standard polyesters, depending on specific locality from the pollutant.

e. Damage rectification shall be carried out if it is repaired immediately and to the Architect’s satisfaction. Repairs shall be carried out at the point of manufacture under strictly controlled conditions and not on Site unless specifically agreed in advance with the Architect and colour retention, gloss retention and adhesion are guaranteed without detriment to the warranty.

f. In environments classified as Hostile (C4 and C5) environments, cut edges, drilled holes and mitres shall be sealed to avoid coating failure.

g. Agree in advance with the Architect any proposed pre-anodising.

**Z31.104 Testing**

a. Carry out tests or provide certified evidence of previous tests to satisfy the Architect that the following requirements have been achieved in relation to the works in accordance with the specified standards, quality and performance requirements:

1). Artificial weathering.

2). Natural Weathering, including chalking and colour/ gloss fastness shall be based on a one year Florida Testing regime.

3). Visual inspection, from a distance of not more than 1000mm to determine any failure as a result of exterior exposure.

4). Impact resistance.

5). Cupping, scratching, adhesion, flexibility, salt spray, humidity and film thickness in accordance with the Qualicoat scheme and BS EN 12206.

6). Permeability.

7). Mortar resistance.

8). Film thickness:
a). The minimum average film thickness at any point shall be 50 microns for aluminium and 60 microns for galvanised steel.

b). In hazardous environments, the minimum thickness shall be increased to 60-70 microns.

c). Certain colours may require an increase in the minimum film thickness to 80 microns to achieve the required colour intensity.

d). Seeding and double coating is not acceptable.

e). Ensure that the minimum film thicknesses are applied to non-significant, non-visible surfaces and secondary faces.

9). Gloss levels shall be maintained at 30% ±5% for matt finishes, 70% ±5% for satin finishes and 85% ±5% for gloss finishes when measured using a 60° gloss meter.

10). Coatings shall achieve Class 1 rating when tested in accordance with BS 476: Part 7.

11). Coatings shall achieve a Class 0 rating as defined under the Building Regulations.

12). Carry out tests on finished elements (extrusions and panels) which are a minimum size of 150mm x 75mm consisting of a flat coated/ significant surface, as defined in BS EN ISO 2064, using instrumental measurements.

13). Comply with the testing requirements of BS EN ISO 2064 and BS EN 13438.

14). Provide detailed reports confirming where and when tests were carried out, which coating system was tested (i.e., name of product, supplier, the precise colour reference, product code and precise batch reference) and confirmation that all tests were passed, or details of failures and extent of failure.

15). Should the Architect deem it necessary the Contractor shall appoint an independent testing authority to prove compliance with the Specification. Such a test shall comprise a minimum of three independent inspections, sampling procedures and plans as set out in BS 6001: Part 1 for general inspection level 2. An Acceptable Quality Level of 1% for each colour and finish to be installed shall be the minimum acceptable.

16). Independent Site inspections shall be carried out if the Architect is not satisfied with the test reports provided by the Contractor to confirm Specification compliance or otherwise. Such inspections shall comply with the requirements of BS 6001: Part 2, LQ (Limited Quality) (Pa = 10%) + 5% with each individual fabrication element being considered as an individual component for assessment purposes. For units that are finished in fewer than three production runs, inspections shall comply with the requirements of BS 6001: Part 2 to the same LQ.

17). Where elements delivered to Site are damaged or test reports have not been provided, the Contractor shall carry out an independent investigation of all finishes to all relevant elements. This investigation shall be carried out within the guidelines of BS 6001: Part 2, LQ (Limited Quality) (Pa = 10%) + 5%. For the purpose of this inspection, each section in the window curtain wall or other fabrication shall be taken as an individual component in assessing the overall batch number to allow the acceptance inspection laboratory to certify that the works comply with the Specification. For units that are finished in fewer than three production runs, acceptance inspections shall also be made using BS 6001: Part 2 to the same LQ.
Z31.200 SUPER DURABLE POWDER COATINGS

Z31.201 General

a. Unless stated otherwise in the Specification section, the polyester powder coating for the works shall be advanced super durable polyester coated in accordance with the following standards:

1). Qualicoat Class 2.
3). BS EN 13438 (galvanised steel substrates).
4). GSB International Quality Regulations - aluminium and steel.
5). British Board of Agrément (BBA).

b. Only materials sourced from a reputable supplier and which are fit for purpose shall be used.

c. The final visual appearance of all powder coated elements and components shall be consistent and identical.

d. Extrusion alloys shall be grade EN AW-6063, EN AW-6060 or acceptable equivalent, and comply with BS EN 754: Parts 3-5 and BS EN 755: Parts 1-9.

e. Powder coating to sheet material shall be grade 1200/3103, and comply with BS EN 485 + A1, BS EN 515 and BS EN 573: Parts 1-3.

f. Base aluminium shall be suitable to receive the powder coating application.

g. Aluminium sheet shall be of a suitable temper and thickness to facilitate the stoving process without damage or reduction in performance and visual intent.

h. Comply with the relevant sections of the COSHH Regulations 2002, the Environmental Protection Act 1990 Part 1, the Management of Health and Safety at Work Regulations 1999 and the Construction (Design and Management) Regulations 2015.

Z31.202 Materials

a. Colour shall be as specified or selected by the Architect from the BS/ RAL range.

b. Colour shall remain consistent regardless of batch, as stated in BS 950: Part 1.

c. In order to achieve consistency of colour only use one batch per colour, spray apply, use regulated and automated equipment and use the minimum number of batches.

d. Provide a range of colour, including metallic, and finish quality samples prior to production for selection by the Architect. Samples shall demonstrate the range of anticipated finish and colour consistency acceptable to the Architect.

e. Local dry film thickness, applied to adjacent panels, shall not vary (maximum and minimum) by more than 20% unless otherwise agreed by the Architect following receipt of samples for review.
f. All coatings shall be consistent in terms of colour, quality and finish within the limits agreed in advance through samples provided and accepted.

g. Use only low tack protective tape applied in accordance with good practice and manufacturer’s recommendations for a maximum period of six months. If longer periods are required, remove and re-apply new tape.

Z31.203 Workmanship

a. All coatings shall have a current BBA Approval Certificate or acceptable equivalent.

b. Application of coatings shall be carried out as recommended by the Qualicoat scheme, BS EN 12206 and/or BS EN 13438.

c. All coating work shall be carried out at a single plant/ location using a single batch where possible. If multiple batching is required, notify the Architect and take measures necessary to comply with the Specification in terms of quality and consistency of colour and finish.

d. Keep the surfaces clean and as new until Practical Completion so as to maintain the warranty. This includes sufficient regimes in environments stipulated as Hostile (C4 and C5 as determined by BS EN ISO 12944), which can reduce cleaning periods from every eighteen months in non-aggressive environments, (i.e. C1-C3 as determined by BS EN ISO 12944, only) to every three months for standard polyesters, depending on specific locality from the pollutant.

e. Damage rectification shall be carried out if it is repaired immediately and to the Architect's satisfaction. Repairs shall be carried out at the point of manufacture under strictly controlled conditions and not on Site unless specifically agreed in advance with the Architect and colour retention, gloss retention and adhesion are guaranteed without detriment to the warranty.

f. Agree in advance with the Architect any proposed pre-anodising.

g. Where pre-anodising is proposed as a method to promote strong adhesion, this shall be specifically notified to the Architect as part of the proposals/submittals process.

Z31.204 Testing

a. Carry out tests or provide certified evidence of previous tests to satisfy the Architect that the following requirements have been achieved in relation to the works in accordance with the specified standards, quality and performance requirements:

1). Artificial weathering.

2). Natural Weathering, including chalking and colour/gloss fastness shall be based on a one year Florida Testing regime.

3). Visual inspection, from a distance of not more than 1000mm to determine any failure as a result of exterior exposure.

4). Impact resistance.

5). Cupping, scratching, adhesion, flexibility, salt spray, humidity and film thickness in accordance with the Qualicoat scheme and BS EN 12206.

6). Permeability.

7). Mortar resistance.

8). Film thickness:
a). The minimum average film thickness at any point shall be 50 microns for aluminium and 60 microns for galvanised steel.

b). Where hazardous environments are involved, the minimum shall be increased to 60-70 microns.

c). Certain colours may require an increase in the minimum film thickness to 80 microns to achieve the required colour intensity.

d). Seeding and double coating is not acceptable.

e). Ensure that the minimum film thicknesses are applied to non-significant, non-visible surfaces and secondary faces.

9). Gloss levels shall be maintained at 30% ±5% for matt finishes, 70% ±5% for satin finishes and 85% ±5% for gloss finishes when measured using a 60° gloss meter.

10). Coatings shall achieve a Class 1 rating when tested in accordance with BS 476: Part 7.

11). Coatings shall achieve a Class 0 rating as defined under the Building Regulations.

12). Carry out tests on finished elements (extrusions and panels), which are a minimum size of 150mm x 75mm consisting of a flat coated/ significant surface, as defined in BS EN ISO 2064, on which to conduct instrumental measurements.

13). Comply with the testing requirements of BS EN ISO 2064 and BS EN 13438.

14). Provide detailed reports confirming where and when tests were carried out, which coating system was tested (i.e, name of product, supplier, the precise colour reference, product code and precise batch reference) and confirmation that all tests were passed, or details of failures and extent of failure.

15). Independent Site inspections shall be carried out if the Architect is not satisfied with the test reports provided by the Contractor to confirm Specification compliance or otherwise. Such inspections shall comply with the requirements of BS 6001: Part 2, LQ (Limited Quality) (Pa = 10%) + 5% with each individual fabrication element being considered as an individual component for assessment purposes. For units that are finished in fewer than three production runs, inspections shall comply with the requirements of BS 6001: Part 2 to the same LQ.

16). Where elements delivered to site are damaged or test reports have not been provided, the Contractor shall carry out an independent investigation of all finishes to all relevant elements. This investigation shall be carried out within the guidelines of BS 6001: Part 2, LQ (Limited Quality) (Pa = 10%) + 5%. For the purpose of this inspection, each section in the window curtain wall or other fabrication shall be taken as an individual component in assessing the overall batch number to allow the acceptance inspection laboratory to certify that the works comply with the Specification. For units that are finished in fewer than three production runs, acceptance inspections shall also be made using BS 6001: Part 2 to the same LQ.

17). Practical Completion will not be confirmed if any test report has not been received by the Architect.

END OF SECTION
<table>
<thead>
<tr>
<th>Keynote Code</th>
<th>Work Section in Laws</th>
<th>Page Number in Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRK***</td>
<td>Brick Walling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 Series</td>
<td>Solid Common Brick Walling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BRK-219</td>
<td>H10  37</td>
<td>115mm Clay Common Brick Wall - Plastered</td>
<td></td>
</tr>
<tr>
<td>BRK-231</td>
<td>H10  38</td>
<td>230mm Clay Common Brick Wall - Plastered</td>
<td></td>
</tr>
<tr>
<td>CLG***</td>
<td>Ceilings, Soffits and Bulkheads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400 Series</td>
<td>Demountable Suspended Tiled Ceilings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLG-411</td>
<td>M30  74</td>
<td>600 x 600mm Lay-in Vinyl Faced Ceiling Tiles</td>
<td></td>
</tr>
<tr>
<td>500 Series</td>
<td>Suspended Linear/ Cellular Ceilings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLG-541</td>
<td>M30  73</td>
<td>Suspended Linear Aluminium Ceiling</td>
<td></td>
</tr>
<tr>
<td>DRT***</td>
<td>Timber Doors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 Series</td>
<td>Solid Core Doors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRT-211</td>
<td>L21  50</td>
<td>Solid Core Interior Flush Single Doorset with Kickplate</td>
<td></td>
</tr>
<tr>
<td>DRT-213</td>
<td>L21  51</td>
<td>Solid Core Interior Flush Single Doorset with Kickplate and Pushplate</td>
<td></td>
</tr>
<tr>
<td>EBS***</td>
<td>Electrical Building Services - Architectural Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Series</td>
<td>Lighting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBS-111</td>
<td>U21  130</td>
<td>Linear Lighting - 1500</td>
<td></td>
</tr>
<tr>
<td>EBS-112</td>
<td>U21  130</td>
<td>Linear Lighting - 1200</td>
<td></td>
</tr>
<tr>
<td>FLA***</td>
<td>Flooring Accessories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>300 Series</td>
<td>Edge trims</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLA-311</td>
<td>S10  114</td>
<td>Aluminium Straight Edge Joint Trim</td>
<td></td>
</tr>
<tr>
<td>500 Series</td>
<td>Expansion Joints</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLA-511</td>
<td>S10  112</td>
<td>Metal Expansion Joint</td>
<td></td>
</tr>
<tr>
<td>FLF***</td>
<td>Floor Finishes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>700 Series</td>
<td>Jointless Floor Finishes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLF-741</td>
<td>N12  78</td>
<td>Epoxy Seamless Floor Finish with Infinity Curves and 150mm High Skirting – Colour 1</td>
<td></td>
</tr>
<tr>
<td>FLF-743</td>
<td>N12  79</td>
<td>Epoxy Floor Finish - Shower Stall</td>
<td></td>
</tr>
<tr>
<td>FXB***</td>
<td>Fixtures, Fittings and Equipment (FFE) - Bespoke</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 Series</td>
<td>Shelving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FXB-211</td>
<td>L60  57</td>
<td>Mild Steel Plate Metal Shelf</td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Series</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>FXB-213</td>
<td>L60</td>
<td>57</td>
<td>Mild Steel Plate Metal Shelf - Paraplegic Bathroom</td>
</tr>
<tr>
<td>FXB-511</td>
<td>L60</td>
<td>57</td>
<td>Custom Built Joinery Item</td>
</tr>
<tr>
<td>FXT-***</td>
<td>Fixtures, Fittings and Equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Series</td>
<td>Cloakroom/ Changeroom Furniture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FXT-131</td>
<td>L61</td>
<td>59</td>
<td>Change Room Bench</td>
</tr>
<tr>
<td>ICC-***</td>
<td>In-situ Concrete Construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Series</td>
<td>Reinforced Concrete Slab</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICC-121</td>
<td>F10</td>
<td>36</td>
<td>Existing Concrete Slab to Engineers Detail</td>
</tr>
<tr>
<td>MAC-***</td>
<td>Masonry Accessories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Series</td>
<td>Restraints, Ties and Support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAC-132</td>
<td>H40</td>
<td>45</td>
<td>Wall Starter/ Connectors</td>
</tr>
<tr>
<td>MAC-162</td>
<td>H40</td>
<td>45</td>
<td>Angle Cleat Head Restraint</td>
</tr>
<tr>
<td>MAC-164</td>
<td>H40</td>
<td>46</td>
<td>Debonded Internal Head Restraint</td>
</tr>
<tr>
<td>MAC-168</td>
<td>H40</td>
<td>46</td>
<td>Soft Joint at Top of Wall</td>
</tr>
<tr>
<td>400 Series</td>
<td>Bed Joint Reinforcement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAC-412</td>
<td>H40</td>
<td>46</td>
<td>Bed Joint Reinforcement</td>
</tr>
<tr>
<td>450 Series</td>
<td>Masonry Movement Joints</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAC-452</td>
<td>H40</td>
<td>47</td>
<td>Movement Joints with Sealant</td>
</tr>
<tr>
<td>MIR-**</td>
<td>Mirrors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Series</td>
<td>Mirror</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIR-111</td>
<td>W10</td>
<td>135</td>
<td>Angled Mirror</td>
</tr>
<tr>
<td>MIR-121</td>
<td>W10</td>
<td>136</td>
<td>Framed Surface Mounted Mirror</td>
</tr>
<tr>
<td>MIR-131</td>
<td>W10</td>
<td>136</td>
<td>Recessed Mirror Cabinet with Side Panel</td>
</tr>
<tr>
<td>MIR-151</td>
<td>W10</td>
<td>136</td>
<td>Sheet Metal Mirror Cabinet</td>
</tr>
<tr>
<td>PAN-***</td>
<td>Panel and Cubicles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Series</td>
<td>Cubicles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAN-141</td>
<td>M20</td>
<td>65</td>
<td>Prefabricated Toilet Cubicle with Removable Panel</td>
</tr>
<tr>
<td>PLS-**</td>
<td>Plaster Coatings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Series</td>
<td>Plaster Finish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLS-141</td>
<td>R20</td>
<td>107</td>
<td>Cement Sand Plaster - To Receive Epoxy Wall Finish</td>
</tr>
<tr>
<td>PLS-143</td>
<td>R20</td>
<td>107</td>
<td>Cement Sand Plaster - To Receive Tiled Wall Finish</td>
</tr>
<tr>
<td>PNT-***</td>
<td>Paint Finishes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Series</td>
<td>Emulsions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNT-111</td>
<td>X10</td>
<td>139</td>
<td>Emulsion to Internal Surfaces - Concrete, Cement Plaster and Brickwork</td>
</tr>
<tr>
<td>PNT-121</td>
<td>X10</td>
<td>140</td>
<td>Emulsion to Internal Surfaces - Foil Wrapped Insulation</td>
</tr>
<tr>
<td>200 Series</td>
<td>Enamels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNT-221</td>
<td>X10</td>
<td>141</td>
<td>Waterbased Enamel to Internal Galvanized Mild Steel Pipes</td>
</tr>
<tr>
<td>PNT-222</td>
<td>X10</td>
<td>142</td>
<td>Waterbased Enamel to Internal Copper Pipes</td>
</tr>
<tr>
<td>Code</td>
<td>Type</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>--------------</td>
<td>------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>PNT-223</td>
<td>X10 142</td>
<td>Waterbased Enamel to Internal Cast Iron Pipes</td>
<td></td>
</tr>
<tr>
<td>PNT-224</td>
<td>X10 143</td>
<td>Waterbased Enamel to Internal PVC Pipes</td>
<td></td>
</tr>
<tr>
<td><strong>400 Series</strong></td>
<td></td>
<td>Protective Paints</td>
<td></td>
</tr>
<tr>
<td>PNT-441</td>
<td>X10 144</td>
<td>Acrylic Roof Paint to External Galvanised HVAC Ducting</td>
<td></td>
</tr>
<tr>
<td>PNT-451</td>
<td>N12 80</td>
<td>Epoxy Wall Coating</td>
<td></td>
</tr>
<tr>
<td>PNT-455</td>
<td>X10 144</td>
<td>Acrylic Roof Paint to External Galvanised Roof Sheeting</td>
<td></td>
</tr>
<tr>
<td><strong>SAN</strong>*</td>
<td></td>
<td>Sanitary Appliances/ Fittings</td>
<td></td>
</tr>
<tr>
<td><strong>100 Series</strong></td>
<td></td>
<td>Toilet Suite</td>
<td></td>
</tr>
<tr>
<td>SAN-156</td>
<td>T60 122</td>
<td>Vitreous China Eastern Pan</td>
<td></td>
</tr>
<tr>
<td>SAN-167</td>
<td>T60 122</td>
<td>Vitreous China Wall Hung WC Pan</td>
<td></td>
</tr>
<tr>
<td>SAN-171</td>
<td>T60 122</td>
<td>Vitreous China Wall Hung Paraplegic WC Pan</td>
<td></td>
</tr>
<tr>
<td><strong>200 Series</strong></td>
<td></td>
<td>Urinal</td>
<td></td>
</tr>
<tr>
<td>SAN-213</td>
<td>T60 123</td>
<td>Vitreous China Wall Hung Bowl Urinal</td>
<td></td>
</tr>
<tr>
<td>SAN-245</td>
<td>T60 123</td>
<td>Powder Coated Mild Steel Urinal Screen</td>
<td></td>
</tr>
<tr>
<td><strong>300 Series</strong></td>
<td></td>
<td>Basins and Sinks</td>
<td></td>
</tr>
<tr>
<td>SAN-341</td>
<td>T60 124</td>
<td>Underslung Wash Hand Basin</td>
<td></td>
</tr>
<tr>
<td>SAN-346</td>
<td>T60 124</td>
<td>Paraplegic Vitreous China Wall Hung Wash Hand Basin</td>
<td></td>
</tr>
<tr>
<td>SAN-355</td>
<td>T60 124</td>
<td>Stainless Steel Slophopper Sink</td>
<td></td>
</tr>
<tr>
<td><strong>400 Series</strong></td>
<td></td>
<td>Shower</td>
<td></td>
</tr>
<tr>
<td>SAN-451</td>
<td>T60 125</td>
<td>Shower</td>
<td></td>
</tr>
<tr>
<td><strong>700 Series</strong></td>
<td></td>
<td>Disability Provisions</td>
<td></td>
</tr>
<tr>
<td>SAN-711</td>
<td>T60 126</td>
<td>Grab Rail</td>
<td></td>
</tr>
<tr>
<td>SAN-713</td>
<td>T60 126</td>
<td>Dogleg Grab Rail</td>
<td></td>
</tr>
<tr>
<td><strong>750 Series</strong></td>
<td></td>
<td>Taps and Mixers</td>
<td></td>
</tr>
<tr>
<td>SAN-754</td>
<td>T60 124</td>
<td>Pillar Tap - Self-closing</td>
<td></td>
</tr>
<tr>
<td>SAN-756</td>
<td>T60 125</td>
<td>Paraplegic Basin Mixer</td>
<td></td>
</tr>
<tr>
<td><strong>800 Series</strong></td>
<td></td>
<td>Accessories</td>
<td></td>
</tr>
<tr>
<td>SAN-811</td>
<td>T60 125</td>
<td>Triple Toilet Roll Holder</td>
<td></td>
</tr>
<tr>
<td>SAN-812</td>
<td>T60 125</td>
<td>Double Toilet Roll Holder</td>
<td></td>
</tr>
<tr>
<td>SAN-813</td>
<td>T60 125</td>
<td>Sanitiser Dispenser</td>
<td></td>
</tr>
<tr>
<td>SAN-815</td>
<td>T60 126</td>
<td>Soap Dispenser</td>
<td></td>
</tr>
<tr>
<td>SAN-817</td>
<td>T60 126</td>
<td>Hand Dryer</td>
<td></td>
</tr>
<tr>
<td>SAN-819</td>
<td>T60 126</td>
<td>Aluminium Coat Hook Mounted to Removable Panel</td>
<td></td>
</tr>
<tr>
<td>SAN-821</td>
<td>T60 126</td>
<td>Aluminium Bin</td>
<td></td>
</tr>
<tr>
<td>SAN-823</td>
<td>T60 126</td>
<td>Towel Dispenser</td>
<td></td>
</tr>
<tr>
<td>SAN-885</td>
<td>T60 126</td>
<td>Zimbabwe Granite Vanity Counter - Leathered</td>
<td></td>
</tr>
<tr>
<td><strong>SCR</strong>*</td>
<td></td>
<td>Screeds</td>
<td></td>
</tr>
<tr>
<td><strong>100 Series</strong></td>
<td></td>
<td>Bonded Levelling Screed</td>
<td></td>
</tr>
<tr>
<td>SCR-111</td>
<td>R10 101</td>
<td>Self-levelling Polymer Screed</td>
<td></td>
</tr>
<tr>
<td><strong>SGN</strong>*</td>
<td></td>
<td>Signage</td>
<td></td>
</tr>
<tr>
<td>Series</td>
<td>Code</td>
<td>Code Length</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td>-------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td><strong>300 Series</strong></td>
<td></td>
<td></td>
<td>Non-Illuminated Signage</td>
</tr>
<tr>
<td>SGN-311</td>
<td>O10</td>
<td>84</td>
<td>Female WC Signage</td>
</tr>
<tr>
<td>SGN-312</td>
<td>O10</td>
<td>85</td>
<td>Male WC Signage</td>
</tr>
<tr>
<td>SGN-315</td>
<td>O10</td>
<td>85</td>
<td>Paraplegic WC Signage</td>
</tr>
<tr>
<td>SGN-316</td>
<td>O10</td>
<td>86</td>
<td>Baby Change Room Signage</td>
</tr>
<tr>
<td>SGN-317</td>
<td>O10</td>
<td>86</td>
<td>Toilet Signage</td>
</tr>
<tr>
<td>SGN-319</td>
<td>O10</td>
<td>87</td>
<td>Hoarding Signage</td>
</tr>
</tbody>
</table>

**Skirtings**

<table>
<thead>
<tr>
<th>Series</th>
<th>Code</th>
<th>Code Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SKR.</strong>*</td>
<td></td>
<td></td>
<td>Skirtings</td>
</tr>
<tr>
<td><strong>400 Series</strong></td>
<td></td>
<td></td>
<td>Trowel Applied Skirting</td>
</tr>
<tr>
<td>SKR-421</td>
<td>N12</td>
<td>80</td>
<td>Epoxy Coved Skirting</td>
</tr>
</tbody>
</table>

**Trims**

<table>
<thead>
<tr>
<th>Series</th>
<th>Code</th>
<th>Code Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>300 Series</strong></td>
<td></td>
<td></td>
<td>Corner Protectors</td>
</tr>
<tr>
<td>TRM-371</td>
<td>Q50</td>
<td>95</td>
<td>Stainless Steel Corner Protector</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Series</th>
<th>Code</th>
<th>Code Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>600 Series</strong></td>
<td></td>
<td></td>
<td>Unframed Isolated Metal Trims</td>
</tr>
<tr>
<td>TRM-613</td>
<td>S10</td>
<td>115</td>
<td>Aluminium Straight Edge Trim</td>
</tr>
<tr>
<td>TRM-615</td>
<td>S10</td>
<td>115</td>
<td>Aluminium Square Edge Trim</td>
</tr>
</tbody>
</table>

**Wall Tiling**

<table>
<thead>
<tr>
<th>Series</th>
<th>Code</th>
<th>Code Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>600 Series</strong></td>
<td></td>
<td></td>
<td>Ceramic Wall Tiling</td>
</tr>
<tr>
<td>WLT-611</td>
<td>S10</td>
<td>113</td>
<td>Glazed Ceramic Wall Tiling - Type 1</td>
</tr>
</tbody>
</table>
DETAILED TECHNICAL SPECIFICATION

ELECTRICAL INSTALLATIONS

THE REFURBISHMENT PROJECT FOR ABLUTIONS (ORTIA)

Priority Six Ablutions C1, F3, E3, P2, D2 & H1

PROJECT NUMBER – J000064

04 OCTOBER 2019

ELECTRICAL INSTALLATIONS
TECHNICAL SPECIFICATION

The refurbishment project for ablutions (ORTIA) - Priority Six Ablutions
INDEX

<table>
<thead>
<tr>
<th>SPECIFICATION FOR ELECTRICAL WORK</th>
<th>PAGE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PART 1 - GENERAL</td>
<td>2</td>
</tr>
<tr>
<td>PART 2: INSTALLATION DETAILS</td>
<td>10</td>
</tr>
<tr>
<td>PART 4: BILLS OF QUANTITIES</td>
<td>14</td>
</tr>
<tr>
<td>PART 5: ELECTRICAL WORK MATERIAL SCHEDULE</td>
<td>15</td>
</tr>
<tr>
<td>PARTICULARS OF ELECTRICAL CONTRACTOR</td>
<td>16</td>
</tr>
<tr>
<td>PART 6: DRAWINGS</td>
<td>16</td>
</tr>
</tbody>
</table>
SPECIFICATION FOR ELECTRICAL WORK

PART 1 - GENERAL

CONTENTS

1 TESTS..........................................................................................................................2
2 MAINTENANCE OF INSTALLATIONS ........................................................................2
3 REGULATIONS..............................................................................................................2
4 NOTICES AND FEES ..................................................................................................2
5 SCHEDULE OF FITTINGS...........................................................................................2
6 QUALITY OF MATERIALS.........................................................................................2
7 CONDUIT AND ACCESSORIES...............................................................................3
8 CONDUIT IN ROOF SPACES....................................................................................4
9 SURFACE MOUNTED CONDUIT .................................................................................4
10 CONDUIT IN CONCRETE SLABS ............................................................................4
11 FLEXIBLE CONNECTIONS FOR CONNECTING UP OF STOVES, MACHINES, ETC. 5
12 WIRING.....................................................................................................................5
13 SWITCHES AND SOCKET OUTLETS ......................................................................6
14 SWITCHGEAR............................................................................................................6
15 SWITCHBOARDS......................................................................................................6
16 WORKMANSHIP AND STAFF................................................................................6
17 VERIFICATION AND CERTIFICATION OF ELECTRICAL INSTALLATION
   (CERTIFICATE OF COMPLIANCE AND TEST REPORT)..............................................6
18 EARTHING OF INSTALLATION ..............................................................................7
19 MOUNTING AND POSITIONING OF LUMINAIRES..............................................8
PART 1 - GENERAL

1 TESTS

After completion of the works and before practical completion is achieved, a full test will be carried out on the installation for a period of sufficient duration to determine the satisfactory working thereof. During this period the installations will be inspected and the Contractor shall make good, to the satisfaction of the Principle Agent/Electrical Engineer or the employer, any defects which may arise.

The Contractor shall provide all instruments and equipment required for testing and any water, power and fuel required for the commissioning and testing of the installations at completion.

2 MAINTENANCE OF INSTALLATIONS

With effect from the date of the Practical completion Certificate the Contractor shall at his own expense undertake the regular servicing of the installation during the maintenance period and shall make all adjustments necessary for the correct operation thereof.

If during the said period the installations is not in working order for any reason for which the Contractor is responsible, or if the installations develops defects, he shall immediately upon being notified thereof take steps to remedy the defects and make any necessary adjustments.

Should such stoppages however be so frequent as to become troublesome, or should the installations otherwise prove unsatisfactory during the said period the Contractor shall, if called upon by the Principle Agent/Electrical Engineer or the Employer, at his own expense replace the whole of the installations or such parts thereof as the Principal Agent/Electrical Engineer or the Employer may deem necessary with apparatus specified by the Principal Agent/Electrical Engineer or the Employer.

3 REGULATIONS

The installation shall be erected and tested in accordance with the Acts and Regulations as indicated in the scope of works

4 NOTICES AND FEES

The Contractor shall give all notices required by and pay all necessary fees, including any inspection fees, which may be due to the local Supply Authority.

On production of the official account, only the net amount of the fee charged by the Supply Authority for connection of the installation to the supply mains, will be refunded to the Contractor by the Employer.

5 SCHEDULE OF FITTINGS

In all instances where schedule of light, socket outlet and power points are attached to or included on the drawings, these schedules are to be regarded as forming part of the specification.

6 QUALITY OF MATERIALS

Only materials of first class quality shall be used and all materials shall be subject to the approval of the Employer. Departmental specifications for various materials to be used on this Contract are attached to and form part of this specification.

Wherever applicable the material is to comply with the relevant South African Bureau of Standards, specifications, or to IEC Specifications, where no SANS Specifications exist.

Materials wherever possible, must be of South African manufacture.
7 CONDUIT AND ACCESSORIES

The type of conduit and accessories required for the service, i.e. whether the conduit and accessories shall be of the screwed type, plain-end type or of the non-metallic type and whether metallic conduit shall be black enameled or galvanized, is specified in Part 2 of this specification.

Unless other methods of installation are specified for certain circuits, the installation shall be in conduit throughout. No open wiring in roof spaces or elsewhere will be permitted.

The conduit and conduit accessories shall comply fully with the applicable SANS specifications as set out below and the conduit shall bear the mark of approval of the South African Bureau of Standards.

a) Screwed metallic conduit and accessories: SANS 61386-1 and 21.

b) Plain-end metallic conduit and accessories: SANS 61386-1 and 21.

c) Non-metallic conduit and accessories: SANS 61386-1 and 21.

All conduit fittings except couplings, shall be of the inspection type. Where cast metal conduit accessories are used, these shall be of malleable iron. Zinc base fittings will not be allowed.

Bushes used for metallic conduit shall be brass and shall be provided in addition to locknuts at all points where the conduit terminates at switchboards, switch-boxes, draw-boxes, etc.

Draw-boxes are to be provided in accordance with the “Wiring Code” and wherever necessary to facilitate easy wiring.

For light and socket outlet circuits, the conduit used shall have an external diameter of 20mm. In all other instances the sizes of conduit shall be in accordance with the “Wiring Code” for the specified number and size of conductors, unless otherwise directed in part 2 of this specification or indicated on the drawings.

Only one manufactured type of conduit and conduit accessories will be permitted throughout the installation.

Running joints in screwed conduit are to be avoided as far as possible and all conduit systems shall be set or bent to the required angles. The use of normal bends must be kept to a minimum with exception of larger diameter conduits where the use of such bends is essential.

All metallic conduit shall be manufactured of mild steel with a minimum thickness of 1,2mm for plain-end conduit and 1,6mm in respect of screwed conduit.

Under no circumstances will conduit having a wall thickness of less than 1,6mm be allowed in screed laid on top of concrete slabs.

Bending and setting of conduit must be done with special bending apparatus manufactured for the purpose and which are obtainable from the manufacturers of the conduit systems. Damage to conduit resulting from the use of incorrect bending apparatus or methods applied must on indication by the Department’s inspectorate staff, be completely removed and rectified and any wiring already drawn into such damaged conduits must be completely renewed at the Contractor’s expense.

Conduit and conduit accessories used for flame-proof or explosion proof installations and for the suspension of luminaires as well as all load bearing conduit shall in all instances be of the metallic screwed type.

All conduit and accessories used in areas within 50 km of the coast shall be galvanized to SANS 32 and SANS 121.

Tenderers must ensure that general approval of the proposed conduit system to be used is obtained from the local electricity supply authority prior to the submission of their tender. Under no circumstances will consideration be given by the Department to any claim submitted by the Contractor, which may result from a lack of knowledge in regard to the supply authority’s requirements.
8  CONDUIT IN ROOF SPACES

Conduit in roof spaces shall be installed parallel or at right angles to the roof members and shall be secured at intervals not exceeding 1.5m by means of saddles screwed to the roof timbers.

Nail or crampets will not be allowed.

Where non-metallic conduit has been specified for a particular service, the conduit shall be supported and fixed with saddles with a maximum spacing of 450 mm. The Contractor shall supply and install all additional supporting timbers in the roof space as required.

Under flat roofs, in false ceilings or where there is less than 0.9m of clearance, or should the ceilings be insulated with glass wool or other insulating material, the conduit shall be installed in such a manner as to allow for all wiring to be executed from below the ceilings.

Conduit runs from distribution boards shall, where possible terminate in fabricated sheet steel draw-boxes installed directly above or in close proximity to the boards.

9  SURFACE MOUNTED CONDUIT

Wherever possible, the conduit installation is to be concealed in the building work; however, where unavoidable or otherwise specified under Part 2 of the specification, conduit installed on the surface must be plumbed or levelled and only straight lengths shall be used.

The use of inspection bends is to be avoided and instead the conduit shall be set uniformly and inspection coupling used where necessary.

No threads will be permitted to show when the conduit installation is complete, except where running couplings have been employed.

Running couplings are only to be used where unavoidable, and shall be fitted with a sliced couplings as a lock nut.

Conduit is to be run on approved spaced saddles rigidly secured to the walls.

Alternatively, fittings, tees, boxes, couplings etc., are to be cut into the surface to allow the conduit to fit flush against the surface. Conduit is to be bedded into any wall irregularities to avoid gaps between the surface and the conduit.

Crossing of conduits is to be avoided, however, should it be necessary purpose-made metal boxes are to be provided at the junction. The finish of the boxes and positioning shall be in keeping with the general layout.

Where several conduits are installed side by side, they shall be evenly spaced and grouped under one purpose-made saddle.

Distribution boards, draw-boxes, industrial switches and socket outlets etc., shall be neatly recessed into the surface to avoid double sets.

In situations where there are no ceilings the conduits are to be run along the wall plates and the beams.

Painting of surface conduit shall match the colour of the adjacent wall finishes.

Only approved plugging materials such as aluminium inserts, fibre plugs, plastic plugs, etc., and round-head screws shall be used for fixing saddles, switches, socket outlets, etc., to walls, wood plugs and the plugging in joints in brick walls are not acceptable.

10  CONDUIT IN CONCRETE SLABS

In order not to delay building operations the Contractor must ensure that all conduits and other electrical
equipment which are to be cast in the concrete columns and slabs are installed in good time.

The Contractor shall have a representative in attendance at all times when the casting of concrete takes place.

Draw-boxes, expansion joint boxes and round conduit boxes are to be provided where necessary. Sharp bends of any nature will not be allowed in concrete slabs.

Draw and/or inspection boxes shall be grouped under one common cover plate, and must preferable be installed in passages or male toilets.

All boxes, etc., are to be securely fixed to the shuttering to prevent displacement when concrete is cast. The conduit shall be supported and secured at regular intervals and installed as close as possible to the neutral axis of concrete slabs and/or beams.

Before any concrete slabs are cast, all conduit droppers to switchboards shall be neatly spaced and rigidly fixed.

11 FLEXIBLE CONNECTIONS FOR CONNECTING UP OF STOVES, MACHINES, ETC.

Flexible tubing connections shall be of galvanised steel construction, and in damp situations of the plastic sheathed galvanised steel type. Other types may only be used subject to the prior approval of the Department's site electrical representative.

Connectors for coupling onto the flexible tubing shall be of the gland or screw-in types, manufactured of either brass or cadmium or zinc plated mild steel, and the connectors after having been fixed onto the tubing, shall be durable and mechanically sound.

Aluminium and zinc alloy connectors will not be acceptable.

12 WIRING:

Except where otherwise specified in Part 2 of this specification, wiring shall be carried out in conduit throughout. Only one circuit per conduit will be permitted.

No wiring shall be drawn into conduit until the conduit installation has been completed and all conduit ends provided with bushes. All conduits to be clear of moisture and debris before wiring is commenced.

Unless otherwise specified in Part 2 of this specification or indicated on the service drawings, the wiring of the installation shall be carried out in accordance with the “Wiring Code”. Further to the requirements concerning the installation of earth conductors to certain light points as set out in the “Wiring Code”, it is a specific requirement of this document that where plain-end metallic conduit or non-metallic conduit has been used, earth conductors must be provided and drawn into the conduit with the main conductors to all points, including all luminaires and switches throughout the installation.

Wiring for lighting circuits is to be carried out with 1,5mm² conductors and a 1,5mm²-earth conductor. For socket outlet circuits the wiring shall comprise 4mm² conductors and a 2,5mm²-earth conductor. In certain instances, as will be directed in Part 2 of this specification, the sizes of the aforementioned conductors may be increased for specified circuits. Sizes of conductors to be drawn into conduit in all other instances, such as feeders to distribution boards, power points etc., shall be as specified elsewhere in this specification or indicated on the drawings. Sizes of conductors not specified must be determined in accordance with the “Wiring Code”.

The loop-in system shall be followed throughout, and no joints of any description will be permitted.

The wiring shall be done in PVC insulated 600/1000 V grade cable to SANS 1507.

Where cable ends connect onto switches, luminaires etc., the end strands must be neatly and tightly twisted together and firmly secured. Cutting away of wire strands of any cable will not be allowed.
13 SWITCHES AND SOCKET OUTLETS

All switches and switch-socket outlet combination units shall conform to the Department Quality Specifications, which form part of this specification.

No other than 16 A 3 pin sockets are to be used, unless other special purpose types are distinctly specified or shown on the drawings.

All light switches shall be installed at 1,4m above finished floor level and all socket outlets as directed in the Schedule of Fittings which forms part of this specification or alternatively the height of socket outlets may be indicated on the drawings.

14 SWITCHGEAR

Switchgear, which includes circuit breakers, iron-clad switches, interlocked switch-socket outlet units, contactors, time switches, etc., is to be in accordance with the Departmental Quality Specifications which form part of this specification and shall be equal and similar in quality to such brands as may be specified.

For uniform appearance of switchboards, only one approved make of each of the different classes of switchgear mentioned in the Quality Specifications shall be used throughout the installations.

15 SWITCHBOARDS

All boards shall be in accordance with the types as specified, be constructed according to the detail or type drawings and must be approved by the Employer before installation.

In all instances where provision is to be made on boards for the supply authority’s main switch and/or metering equipment the contractor must ensure that all requirements of the authorities concerned in this respect are met.

Any construction or standard type aboard proposed, as an alternative to that specified must have the prior approval of the Employer.

All busbars, wiring, terminals, etc., are to be adequately insulated and all wiring is to enter the switchgear from the back of the board. The switchgear shall be mounted within the boards to give a flush front panel. Cable and boxes and other ancillary equipment must be provided where required.

Clearly engraved labels are to be mounted on or below every switch. The working of the labels in English, is to be according to the lay-out drawings or as directed by the Electrical Engineer and must be confirmed on site. Flush mounted boards to be installed with the top of the board 2,0m above the finished floor level.

16 WORKMANSHIP AND STAFF

Except in the case of electrical installations supplied by a single-phase electricity supply at the point of supply, an accredited person shall exercise general control over all electrical installation work being carried out.

The workmanship shall be of the highest grade and to the satisfaction of the Employer.

All inferior work shall, on indication by the Employer’s inspecting officers, immediately be removed and rectified by and at the expense of the Contractor.

17 VERIFICATION AND CERTIFICATION OF ELECTRICAL INSTALLATION (CERTIFICATE OF COMPLIANCE AND TEST REPORT)

On completion of the service, a certificate of compliance must be issued to the Principal Agent/Electrical Engineer or Employer in terms of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) in the format as set out in SANS 10142-1 & 2.
EARTHING OF INSTALLATION

Main earthing

The type of main earthing must be as required by the supply authority if other than the Employer, and in any event as directed by the Principal Agent/Electrical Engineer, who may require additional earthing to meet test standards.

Where required an earth mat shall be provided, the minimum size, unless otherwise specified, being 1.0m x 1.0m and consisting of 4mm diameter hard-drawn bare copper wires at 250mm centres, brazed at all intersections.

Alternatively or additionally earth rods or trench earths may be required as specified or directed by the Electrical Engineer.

Installations shall be effectively earthed in accordance with the “Wiring Code” and to the requirements of the supply authority. All earth conductors shall be stranded copper with or without green PVC installation.

Connection from the main earth bar on the main board must be made to the cold water main, the incoming service earth conductor, if any and the earth mat or other local electrode by means of 12mm x 1.60 mm² solid copper strapping or 16 mm² stranded (not solid) bare copper wire or such conductor as the Department’s representative may direct. Main earth copper strapping where installed below 3m from ground level, must be run in 20 mm diameter conduit securely fixed to the walls.

All other hot and cold water pipes shall be connected with 12mm x 0.8mm perforated for solid copper strapping (not conductors) to the nearest switchboard. The strapping shall be fixed to the pipework with brass nuts and bolts and against walls with brass screws at 150-mm centres. In all cases where metal water pipes, down pipes, flues, etc., are positioned within 1.6m of switchboards an earth connection consisting of copper strapping shall be installed between the pipework and the board. In vertical building ducts accommodating both metal water pipes and electrical cables, all the pipes shall be earthed at each distribution board.

Roofs, gutters and down pipes

Where service connections consist of overhead conductors, all metal parts of roofs, gutters and down pipes shall be earthed. One bare 10mm² copper conductor shall be installed over the full length of the ceiling void, fixed to the top purlin and connected to the main earth conductor and each switchboard. The roof and gutters shall be connected at 15m intervals to this conductor by means of 12mm X 0.8mm copper strapping (not conductors) and galvanised bolts and nuts. Self-tapping screws are not acceptable.

Where service connections consist of underground supplies, the above requirements are not applicable.

Sub-distribution boards

A separate earth connection shall be supplied between the earth busbar in each sub-distribution board and the earth busbar in the Main Switchboard. These connections shall consist of a bare or insulated stranded copper conductors installed along the same routes as the supply cables or in the same conduit as the supply conductors. Alternatively armoured cables with earth continuity conductors included in the armouring may be utilised where specified or approved.

Sub-circuits

The earth conductors of fall sub-circuits shall be connected to the earth busbar in the supply board in accordance with SANS 10142.

Ring Mains

Common earth conductors may be used where various circuits are installed in the same wire way in accordance with SANS 10142. In such instances the sizes of earth conductors shall be equivalent to that of the largest current carrying conductor installed in the wire way, alternatively the size of the conductor shall be as directed by the Engineer. Earth conductors for individual circuits branching from the ring main shall by connected to the common earth conductor with T-ferrules or soldered. The common earth shall
Non-metallic Conduit

Where non-metallic conduit is specified or allowed, the installation shall comply with the Department's standard quality specification for "conduit and conduit accessories".

Standard copper earth conductors shall be installed in the conduits and fixed securely to all metal appliances and equipment, including metal switch boxes, socket-outlet boxes, draw-boxes, switchboards, luminaires, etc. The securing of earth conductors by means of self-threading screws will not be permitted.

Flexible Conduit

An earth conductor shall be installed in all non-metal flexible conduit. This earth conductor shall not be installed externally to the flexible conduit but within the conduit with the other conductors. The earth conductor shall be connected to the earth terminals at both ends of the circuit.

Connection

Under no circumstances shall any connection points, bolts, screws, etc., used for earthing be utilised for any other purpose. It will be the responsibility of the Contractor to supply and fit earth terminals or clamps on equipment and materials that must be earthed where these are not provided.

Unless earth conductors are connected to proper terminals, the end shall be tinned and lugged.

19 MOUNTING AND POSITIONING OF LUMINAIRES

The Contractor is to note that in the case of board and acoustic tile ceilings, i.e. as opposed to concrete slabs, close co-operation with the building contractor is necessary to ensure that as far as possible the luminaires are symmetrically positioned with regard to the ceiling pattern.

The layout of the luminaires as indicated on the drawings must be adhered to as far as possible and must be confirmed with the Department’s representative.

Fluorescent luminaires installed against concrete ceilings shall be screwed to the outlet boxes and in addition 2 x 6mm expansion or other approved type fixing bolts are to be provided. The bolts are to be ¾ of the length of the luminaires apart.

Fluorescent luminaires to be mounted on board ceilings shall be secured by means of two 40mm x No. 10 round head screws and washers. The luminaires shall also be bonded to the circuit conduit by means of locknuts and brass bushes. The fixing screws are to be placed ¾ of the length of the fitting apart.

Earth conductors must be drawn in with the circuit wiring and connected to the earthing terminal of all fluorescent luminaires as well as other luminaires exposed to the weather in accordance with the "Wiring Code".

Incandescent luminaires are to be screwed directly to outlet boxes in concrete slabs. Against board ceilings the luminaires shall be secured to the brandering or joists by means of two 40mm x No. 8 round head screws.
PART 2: INSTALLATION DETAILS

[Omit which is not applicable. Clauses 1 to 10 of Part 2 are standard clauses (which should not be altered) and must be inserted in the document in the order as set out.]

CONTENTS

1 CABLE SLEEVE PIPES
2 NOTICES
3 ELECTRICAL EQUIPMENT
4 DRAWINGS
5 BALANCING OF LOAD
6 SERVICE CONDITIONS
7 SWITCHES AND SOCKET OUTLETS
8 LIGHT FITTINGS AND LAMPS
9 EARTHING AND BONDING
10 MAINTENANCE OF ELECTRICAL SUPPLY
11 EXTENT OF WORK
12 SUPPLY AND CONNECTION
13 CONDUIT AND WIRING
PART 2: INSTALLATION DETAILS

1 CABLE SLEEVE PIPES

Where cables cross under roadways, other services and where cables enter buildings, the cables shall be installed in earthenware or high-density polyethylene pipes.

The ends of all sleeves shall be sealed with a non-hardening watertight compound after the installation of cables. All sleeves intended for future use shall likewise be sealed.

2 NOTICES

The Contractor shall issue all notices and make the necessary arrangements with Supply Authorities, the Postmaster-General, and S.A. Transport Services, Provincial or National Road Authorities and other authorities as may be required with respect to the installation.

3 ELECTRICAL EQUIPMENT

All equipment and fittings supplied must be in accordance with the attached quality specification (Part 3 of this document), suitable for the relevant supply voltage, and frequency and must be approved by the Employers Electrical Engineer.

4 DRAWINGS

The drawings generally show the scope and extent of the proposed work and shall not be held as showing every minute detail of the work to be executed.

The position of power points, switches and light points that may be influenced by built-in furniture must be established on site, prior to these items being built in.

5 BALANCING OF LOAD

The Contractor is required to balance the load as equally as possible over the multiphase supply.

6 SERVICE CONDITIONS

All plant shall be designed for the climatic conditions appertaining to the service.

7 SWITCHES AND SOCKET OUTLETS

The installation of switches and socket outlets must conform to clause 13 of Part 1 of this specification.

8 LIGHT FITTINGS AND LAMPS

The installation and mounting of luminaires must conform to clause 19 of Part 1 of this specification.

All fittings to be supplied by the Contractor shall have the approval of the Employer.

The light fittings must be of the type specified in the Schedule of Light Fittings.

9 EARTHING AND BONDING

The Contractor will be responsible for all earthing and bonding of the building and installation. The earthing and bonding is to be carried out strictly as described in clause 18 of Part 1 of this specification and to the satisfaction of the Employer/s Electrical Engineer.
10 **MAINTENANCE OF ELECTRICAL SUPPLY**

All interruptions of the electrical supply that may be necessary for the execution of the work, will be subject to prior arrangement between the Contractor and the Client and the Employer's Electrical Engineer.

11 **EXTENT OF WORK**

The work covered by this contract comprises the complete electrical installation, in working order, as shown on the drawings and as per this specification, including the supply and installation of all fittings and also the installation of such equipment supplied by the Employer.

12 **SUPPLY AND CONNECTION**

The supply will be at 400/230 Volt 50Hz.

13 **CONDUIT AND WIRING**

Conduit and conduit accessories shall be black enameled/galvanized screwed conduit or black enameled/galvanized plain end conduit in accordance with SANS 61386.

All conduits, regardless of the system employed, shall be installed strictly as described in the applicable paragraphs of clauses 4 to 8 of Part 1 of the specification. Wiring of the installation shall be carried out as directed in clause 9 part 1 of this specification.

Where plain end conduit is offered all switches and light fittings must be supplied with a permanent earth terminal for the connection of the earth wire.

Lugs held by switch fixing screws or self tapping screws will not be acceptable.

**PART 3: ADDITIONAL REQUIREMENTS OR SPECIFICATIONS NOT COVERED IN QUALITY SPECIFICATIONS ABOVE**

**LED LIGHTS**

All Light fittings installed for this project is to be of the LED type, unless otherwise stated.

The following international standard specifications and South-African Bureau of Standards shall apply to the LED luminaire specification:

- **SANS 475** Luminaires for interior lighting, street lighting and floodlighting – Performance and requirements
- **SANS 10114-1** Interior lighting part 1: Artificial lighting of interiors
- **SANS 10114-2** Interior lighting part 2: Emergency lighting
- **SANS 60598-1** Luminaires part 1: General requirements and tests
- **SANS 60598-2.1** Luminaires part 2: Particular requirements section 1 – Fixed general purpose luminaires.
- **SANS 60598-2.2** Luminaires part 2: Particular requirements section 2 – Recessed luminaires.
- **SANS 60598-2.3** Luminaires part 2: Particular requirements section 3 – Luminaires for road and street lighting.
- **SANS 60598-2.5** Luminaires part 2: Particular requirements section 5 – Flood lighting.
SANS 61347-1 to 13 Lamp control gear
SANS 62031 LED modules for general lighting – Safety specifications
SANS 62384 DC or AC supplied electronic control gear for LED modules – Performance requirements.
SANS 62560 Self-ballasted LED lamps for general lighting services with supply voltages > 50V – Safety specification.
SANS 62612 Self-ballasted LED lamps for general lighting services with supply voltages > 50V – Performance requirements
EN 55015 Limits and methods of measurement of radio disturbance of electrical lighting or equipment.
EN 61000-3.2 Electromagnetic compatibility (EMC) limits for harmonic current emissions.
EN 61000-3.3 Electromagnetic compatibility (EMC) limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems.
EN 61547 Equipment for general lighting purposes: EMC immunity requirements.
IEC-EN 62471 Photo biological safety of lamps and lamp systems for LEDs
IES LM-79-08 Approved method: Electrical and photometric measurement of solid-state lighting products.
IES LM-80 Approved method: Measuring lumen maintenance of LED light sources.

General requirements:

The luminaire shall be suitable for operation with mid-power LEDs. **Note that no LED tubes are allowed to be used.**

The luminaire shall be suitable for operation on a 230V single phase 50Hz mains supply.

Power factor capacitors shall be supplied to correct the power factor to at least 0.95 of higher.

The luminaire shall be marked with identification labels stating the brand name and model and shall bear the SANS approval mark.

The driver shall comply with IEC 61347-1 and IEC 61347-2B as applicable and shall be suitable for operation on 230V ±10%, 50Hz single phase system and it must be insured that harmonics filter is provided as per SANS 61000-3-2. The drivers and LED circuitry shall be protected against lighting and power surges. Suitable surge arrestors with a 10kA rating shall be provided for indoor installations and 20kA for outdoor installations.

Colour rendering (Ra) shall be not less than 80 and lumen depreciation of not more than 30% L70 at 50 000 hours @ Tq 25°C. Colour temperature of the LED lamp shall be 4000K, unless otherwise stated.

Thermal requirements:

The luminaire must be able to withstand an ambient temperature of 35°C. Storage temperature of this luminaire should be able to handle -40°C < T < 60°C.

To this end internal electrical and mechanical components shall not be allowed to exceed their maximum temperature ratings of 75°C. Test reports from an independent authorised testing facility proving this requirement shall be made available on request.
Noise requirements:

The noise level emitted from the luminaire shall be kept as low as possible. Drivers/electronic components shall therefore fully comply with the latest edition of SANS 55015.
PART 4: BILLS OF QUANTITIES

Electrical, mechanical and/or any other engineering work must be measured by the quantity surveyor and must be prepared in accordance with the latest edition of the Standard System of Measuring Building Work.

No additional provision for Preliminaries may be included in the engineering sections of the bills of quantities.

Bills of Quantities are included in part C2.2 of the tender document.
PART 5: ELECTRICAL WORK MATERIAL SCHEDULE

The Contractor shall complete the following schedules and submit them to the Electrical Engineer within 21 days of the date of the acceptance of the tender.

The schedules will be scrutinised by the Electrical Engineer and should any material offered not comply with the requirements contained in the specification, the Contractor will be required to supply material in accordance with the contract at no additional cost.

**NB:** Only one manufacturer's name to be inserted for each item.

<table>
<thead>
<tr>
<th>Item</th>
<th>Material</th>
<th>Make or trade name</th>
<th>Country of origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Distribution boards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Circuit breakers 1P, 2P, 3P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>On load isolators without trips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Contactors 1P, 2P, 3P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Earth leakage relays 1 &amp; 3 phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>H.R.C. fuse switches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Kilowatt hour meter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Current transformers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Voltmeter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Maximum demand ammeter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Daylight sensitive switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Time switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Conduit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Conduit boxes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Power skirting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Surface switches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Watertight switches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>16A flush socket outlets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>16A surface socket outlets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>16A watertight socket outlets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Fluorescent luminaires</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Type A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type D</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Bulkhead fittings: Type F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Spherical fittings: Type G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>4 plate stove</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>Convection heater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Fan heater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Fans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>Clocks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>PVCA cable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>Cable trays</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PARTICULARS OF ELECTRICAL CONTRACTOR

Note to consultants

Please ensure that DPW -22(EC) Particulars of electrical contractor is inserted in main tender document.

PART 6: DRAWINGS

NOTE TO CONSULTANTS

List all drawings
# SCHEDULE A: DETAILS OF CONTRACTOR AND/OR SUB-CONTRACTOR

Details on this page MUST be completed fully. Incomplete forms shall render the offer invalid. *(N/A to be stated if not applicable).*

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered name of company/enterprise</td>
<td></td>
</tr>
<tr>
<td>CIPRO Registration number</td>
<td></td>
</tr>
<tr>
<td>VAT registration number</td>
<td></td>
</tr>
<tr>
<td>UIF registration number</td>
<td></td>
</tr>
<tr>
<td>Official telephone number</td>
<td></td>
</tr>
<tr>
<td>Official fax number</td>
<td></td>
</tr>
<tr>
<td>E-mail Address</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical Address</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Official Postal Address</td>
<td>Code</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Director / Member (1)</th>
<th>Full Names and Surname</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Position in company/enterprise</td>
</tr>
<tr>
<td>ID No.</td>
<td>Income Tax No.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Director / Member (2)</th>
<th>Full Names and Surname</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Position in company/enterprise</td>
</tr>
<tr>
<td>ID No.</td>
<td>Income Tax No.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Director / Member (3)</th>
<th>Full Names and Surname</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Position in company/enterprise</td>
</tr>
<tr>
<td>ID No.</td>
<td>Income Tax No.</td>
</tr>
</tbody>
</table>

**SIGNED ON BEHALF OF TENDERER:**  

..........................................................
SCHEDULE B: DEVIATIONS AND QUALIFICATIONS BY TENDERER

The Tenderer shall record any deviations or qualifications to the requirements of the tender documents in this Returnable Schedule. Alternatively, a tenderer may state such deviations and qualifications in a covering letter attached to his tender and reference such letter in this schedule.

If no deviations or qualifications are made, the schedule hereunder is to be marked **NIL** and signed by the Tenderer.

<table>
<thead>
<tr>
<th>PAGE</th>
<th>CLAUSE OR ITEM</th>
<th>DEVIATION OR QUALIFICATION</th>
</tr>
</thead>
</table>

Number of sheets appended by the tenderer to this Schedule ....................... (If nil, enter NIL).

**SIGNED ON BEHALF OF TENDERER:** ..........................................................
### SCHEDULE C: RECORD OF ADDENDA TO TENDER DOCUMENTS

We confirm that the following communications received from the Employer before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer:

<table>
<thead>
<tr>
<th>Date</th>
<th>Title or Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
</tr>
</tbody>
</table>

Attach additional pages if more space is required.

Signed

Date

Name

Position

Tenderer
SCHEDULE D: REFERENCES AND VITAL INFORMATION

1. CLIENT REFERENCES OF CURRENT AND PREVIOUS CONTRACTS

Please provide references from three clients with similar requirements as the Client (one reference may be from the Client’s department or division). These references are to demonstrate your ability to fulfil the Client’s requirements and your ability to maintain satisfied customers.

*(Please mark blocks with ‘x’ where appropriate)*

<table>
<thead>
<tr>
<th>Name of Client/Company (1)</th>
<th>Contract period (in months)</th>
<th>Ongoing</th>
<th>Completed</th>
<th>Value of Contract (per month)</th>
<th>Type of business rendered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
<td>Full Name</td>
<td></td>
<td></td>
<td>Tel no.</td>
<td>Alternative Tel no.</td>
</tr>
<tr>
<td></td>
<td>Tel no.</td>
<td></td>
<td></td>
<td>Fax no.</td>
<td>E-mail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Client/Company (2)</th>
<th>Contract period (in months)</th>
<th>Ongoing</th>
<th>Completed</th>
<th>Value of Contract (per month)</th>
<th>Type of business rendered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
<td>Full Name</td>
<td></td>
<td></td>
<td>Tel no.</td>
<td>Alternative Tel no.</td>
</tr>
<tr>
<td></td>
<td>Tel no.</td>
<td></td>
<td></td>
<td>Fax no.</td>
<td>E-mail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Client/Company (3)</th>
<th>Contract period (in months)</th>
<th>Ongoing</th>
<th>Completed</th>
<th>Value of Contract (per month)</th>
<th>Type of business rendered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
<td>Full Name</td>
<td></td>
<td></td>
<td>Tel no.</td>
<td>Alternative Tel no.</td>
</tr>
<tr>
<td></td>
<td>Tel no.</td>
<td></td>
<td></td>
<td>Fax no.</td>
<td>E-mail</td>
</tr>
</tbody>
</table>
## 2. LIST OF CURRENT/PREVIOUS SUPPLIERS - CONTRACTOR AND/ OR SUB-CONTRACTOR

<table>
<thead>
<tr>
<th>Name of Supplier/Company (1)</th>
<th>Description of Commodity</th>
<th>Value of commodities supplied (per month)</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
<td></td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative Tel no.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-mail</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Supplier/Company (2)</th>
<th>Description of Commodity</th>
<th>Value of commodities supplied (per month)</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
<td></td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative Tel no.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-mail</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Supplier/Company (3)</th>
<th>Description of Commodity</th>
<th>Value of commodities supplied (per month)</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
<td></td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative Tel no.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-mail</td>
<td></td>
</tr>
</tbody>
</table>
The tenderer shall state below what workshop facilities will be available for this Contract.

Address of Workshop

Number of Artisans Normally Employed by Firm

Number of Technically Qualified Persons Employed

Signed on behalf of tenderer:
Proposed Sub-contractors

We notify you that it is our intention to employ the following Sub-contractors for normal work in this contract.

Acceptance of this tender shall not be construed as approval of all or any of the listed subcontractors. Should any of the subcontractors not be approved subsequent to acceptance of the tender, this shall in no way invalidate this tender, and the tendered unit rates for the various items of work shall remain final and binding, even in the event of a subcontractor not listed below being approved by the Engineer.

<table>
<thead>
<tr>
<th>SUB-CONTRACTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category/type</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

TOTAL (Excluding VAT)

Number of sheets appended by the tenderer to this Schedule ....................... (If nil, enter NIL).

SIGNED ON BEHALF OF TENDERER: .................................................................
SCHEDULE G: DETAILS OF CONTRACTOR AND/ OR SUB-CONTRACTOR’S PROPOSED SITE MANAGER/ SUPERVISOR’S EXPERIENCE FOR THIS CONTRACT

Tenderers shall set out in the Schedule hereunder details of the Site Manager’s experience in work of a similar nature to that for which their Tender is submitted.

Failure to complete this Schedule may result in the Tender not being considered.

<table>
<thead>
<tr>
<th>SITE MANAGER/SUPERVISOR</th>
<th>NAME: ..................................................................</th>
<th>NQF LEVEL:...........</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRACT &amp; CLIENT</td>
<td>NATURE OF WORK</td>
<td>POSITION HELD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Number of sheets appended by the tenderer to this Schedule ....................... (If nil, enter NIL).

SIGNED ON BEHALF OF THE TENDERER: ..............................................
SCHEDULE H: REGISTRATION WITH RELEVANT PROFESSIONAL BODIES/ INSTITUTIONS

<table>
<thead>
<tr>
<th>Name of Company/ Person</th>
<th>Professional Body</th>
<th>Registration No.</th>
<th>Date Joined</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SIGNED ON BEHALF OF THE TENDERER: ..............................................
DETAILED TECHNICAL SPECIFICATION

MECHANICAL VENTILATION SYSTEMS

THE REFURBISHMENT PROJECT FOR ABLUTIONS & THE STATE PROTOCOL CORRIDOR AT O.R TAMBO INTERNATIONAL AIRPORT

Priority Six Ablutions C1, F3, E3, P2, D2 & H1

PROJECT NUMBER – J000064

04 OCTOBER 2019

MECHANICAL VENTILATION INSTALLATIONS
TECHNICAL SPECIFICATION
TABLE OF CONTENTS

1. TENDER INFORMATION .............................................................................................................. 3
2. GENERAL SPECIFICATION ....................................................................................................... 4
  2.1. GENERAL TECHNICAL SPECIFICATION DOCUMENTS ......................................................... 4
  2.2. PROJECT SPECIFIC GENERAL SPECIFICATION .............................................................. 4
  2.1.1. SCOPE OF WORK ........................................................................................................... 4
  2.1.2. PROGRAMME ............................................................................................................... 4
  2.1.3. DRAWINGS .................................................................................................................. 5
  2.1.4. TRADE NAMES AND ALTERNATIVES ........................................................................... 8
3. DETAILED TECHNICAL SPECIFICATION ............................................................................... 9
  3.1. PROFESSIONAL REQUIREMENTS ....................................................................................... 9
  3.2. SCOPE OF WORKS ............................................................................................................ 9
3.3. DESIGN APPROACH: MECHANICAL VENTILATION INSTALLATION ................................ 12
4. SITE DETAILS AND OPERATING CONDITIONS .................................................................. 14
  4.1. DESIGN AMBIENT CONDITIONS ...................................................................................... 14
  4.2. MINIMUM ABLUTION OPERATING CONDITIONS .......................................................... 14
5. SITE VISIT ................................................................................................................................ 15
6. TEMPORARY OFFICES ............................................................................................................ 16
7. AREAS REQUIRING SPECIAL ATTENTION ........................................................................... 17
  7.1. GENERAL ........................................................................................................................... 17
  7.2. FINISHING & TIDYING ..................................................................................................... 17
  7.3. CONSTRUCTION METHODS ............................................................................................. 17
  7.4. BURGLAR BARS ............................................................................................................... 18
  7.5. PAINTING ......................................................................................................................... 18
8. COMPLETION, GAURANTEES & MAINTENANCE ................................................................. 19
  8.1. TESTING ............................................................................................................................ 19
  8.2. END USER TRAINING ....................................................................................................... 19
  8.3. OPERATING AND MAINTENANCE MANUALS ................................................................. 20
  8.4. COMMISSIONING PROGRAMME ........................................................................................ 20
  8.5. GUARANTEE AND MAINTENANCE .................................................................................. 21
  8.6. WARRANTIES ..................................................................................................................... 21
  8.7. DEFECTS LIABILITY ......................................................................................................... 22
  8.8. CONTRACTOR'S FAILURE TO CARRY OUT INSTRUCTIONS .......................................... 23
9. SCHEDULE OF MAJOR EQUIPMENT PERFORMANCE REQUIREMENT ..................... 24
10. ANNEXURE A – TENDERER'S RETURNABLE SCHEDULES (Schedules to be completed in full) ................................................................................................................................. 25

*Compulsory: Returnable Schedules must be completed and returned with the priced BoQ.
1. TENDER INFORMATION

1. Preliminary and General items are to be priced in the bills of quantities (BoQ), attached.
2. Completion date is as per the principal contract programme.
3. The price shall be fixed for the duration of the project and shall be quoted in South African Rand.
4. These specifications are for mechanical ventilation equipment installations.

Tenderers to note:

Prices must be based on the Mechanical Consultant’s preferred equipment. Tenderers who wish to propose alternative equipment must then submit a separate priced BoQ in addition to the BoQ with the Mechanical Consultant’s preferred equipment. The Mechanical Consultant has also listed the acceptable alternative equipment on specific equipment supply (e.g. equipment brand name, etc) as listed in this Detailed Technical Specification.
2. GENERAL SPECIFICATION

2.1. GENERAL TECHNICAL SPECIFICATION DOCUMENTS
The General Technical Specifications, which form part of these Tender Documents, are presented in a separate document.

The submission of a tender will confirm that the Mechanical Ventilation sub-Contractor (To be referred to as ‘sub-Contractor’) has read the abovementioned document.

2.2. PROJECT SPECIFIC GENERAL SPECIFICATION

2.1.1. SCOPE OF WORK

2.1.1.1. Scope of work covered under this tender shall be for the supply of the necessary equipment, transport, installation, rigging, erection, testing & commissioning and handing over to the client in an operating condition of the systems as described hereunder. The actual extent of work vis-à-vis the distribution system shall be as indicated in the Tender drawings, bill of quantities and this detailed technical specification.

2.1.1.2. Minor Builder’s Work has been included in this contract as enabling works for the installations. All other work, as later herein specified as being specifically excluded from this contract, shall be carried out by others in accordance with the details provided by The Engineer or the sub-Contractor as applicable and as provided herein.

2.1.2. PROGRAMME

* Please note: The dates below are indicative only and tenderers shall be provided with a construction programme.

2.1.2.1. The Installations are to be implemented to a programme defined in conjunction with the client body and distributed to all concerned parties including the sub-Contractor.

2.1.2.2. The entire Installations must be commissioned, tested and Taken Over by the Employer.

2.1.2.3. The sub-Contractor will be notified of the success of his Tender within TWENTY-EIGHT days after the Tender closing date. Thereupon the sub-Contractor shall IMMEDIATELY put the work in hand, notwithstanding the fact that no official Subcontract will by this time have been entered into. During the period prior to the signing of an official sub-Contract, but during which the work must in terms of the above be proceeded with, the work will be administered by the Mechanical Engineer as if, in fact, such document had already been in force.
2.1.2.4. The sub-Contractor shall be required within TWO WEEKS after acceptance of his Tender, submit to The Engineer for his approval a Programme showing the order in which the Works will be executed. Such Programme shall show the times for the preparation of all drawings, ordering and delivery times promised by the suppliers for all manufactured items, installation times and the programmed dates for testing and commissioning.

2.1.2.5. The Programme shall be prepared in consultation with the Principal Contractor and the execution of the Works shall be programmed so as to keep pace with the Building Programme. The sub-Contractor shall submit TWO copies of his Programme to The Engineer for approval and after approval by The Engineer in writing the sub-Contractor shall supply copies to the Principal Contractor. After submission to and approval by The Engineer of such Programme, the sub-Contractor shall adhere to the order of procedure and method stated therein unless he obtains the written permission of The Engineer to vary such order or method. The submission to and approval by The Engineer of such Programme shall not relieve the sub-Contractor of any of his duties or responsibilities under the sub-Contract.

2.1.2.6. The times required for the submission of Drawings, pursuant to Clauses 2.1.2.4 and 2.1.2.5 hereof, are as follows:

<table>
<thead>
<tr>
<th>Type of Document</th>
<th>Time Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Builder's Work Drawings</td>
<td>within TWO WEEKS</td>
</tr>
<tr>
<td>Shop Drawings and Equipment Submittals</td>
<td>within ONE WEEK</td>
</tr>
</tbody>
</table>

2.1.3. **DRAWINGS**

2.1.3.1. **Document Transmittal**

The Dropbox Document Transmittal platform is a formal process used by this Project to transmit documents to other Project Engineers and Sub-contractors. The Engineer shall officially issue Construction Drawings, Site instructions, Technical specifications, Payment certificates and Drawing Registers through this online portal. Since this platform is a contractual document transmittal platform, the upload of an email notification to the recipient shall serve as receipt of the documents described in the drawing transmittal notification.

Other forms of transmittals may be used and shall be approved by the Project Managers. These forms may be file transfer platforms such as Skydrive, Accellion, e-mail, CD delivery/collection, etc.
2.1.3.2. **Tender Drawings**

The following drawings have been issued with this Tender, kindly refer to Annexure (Tender Drawing Register)

2.1.3.3. **Architectural and Structural Drawings**

The sub-Contractor shall ensure that he is in possession of all information required for the installation of the Works and shall, if necessary, obtain copies of all relevant Architectural and Structural Drawings from the Architect and Structural Engineer.

2.1.3.4. **Builder’s Work Drawings**

All Builder’s Work and work to be carried out by others in accordance with the Specification has been indicated on the Tender Drawings. The sub-Contractor shall check, approve, add to or alter such drawings as may be necessary to suit the equipment offered by him, and accepted by The Engineer, within the time stipulated in Clause 1.2.2.6 hereof from date of acceptance of this Tender and shall submit to The Engineer in duplicate any revision which shall be made to such Drawings.

Such Builder’s Work Drawings shall indicate the location and extent of all foundations, bases, openings, timber frames and all other Builder’s Work and the capacities and/or dimensions of all electrical and condensate water drain points and dimensions for all water drainage connections and any other work to be provided by others for the Works, as detailed in this Specification.

The Drawings shall be drawn to scale and in sufficient detail to enable the Builder to execute the work without any misunderstanding.

Within a reasonable period after receiving such Drawings, The Engineer shall signify his approval, or otherwise, and one signed copy of the approved Drawing shall be returned to the sub-Contractor.

When approved, the following number of copies of each such Drawing shall be delivered to each of the following:

- Quantity Surveyor: 1 copy
- Principal Contractor/ Project Manager: 2 copies
- Architect: 1 copy
- Structural Engineer: 1 copy
- Mechanical Engineer: 1 copy
2.1.3.5. **Shop Drawings**

The sub-Contractor shall submit to The Engineer, for approval within the time stipulated in Clause 1.2.2.6 hereof duplicate copies of all Shop Drawings as required for the manufacture and installation of the Works or as The Engineer may reasonably require.

Within a reasonable period after receiving such Drawings, The Engineer shall signify his approval, or otherwise, in writing and one signed copy of each approved Drawing shall be returned to the sub-Contractor.

The sub-Contractor shall not, unless otherwise directed by The Engineer, in writing, commence with any work prior to the approval of the relative Shop Drawings. Work installed prior to the approval of Shop Drawings shall be liable to rejection by The Engineer and removal and/or replacement by the sub-Contractor, at his cost, if it is considered by The Engineer to deviate from the Specification.

Drawings approved as above described shall not be departed from except as authorized by The Engineer. The approval shall be limited to check conformity with the design requirements and shall not relieve the Tenderer of responsibility for Co-ordination or Installation fit. For particular information required on shop drawings, please refer to Annexure, Standard Operating Procedure (SOP 012) for shop drawing approvals, included in these Technical Specifications.

The Engineer shall have the right at all reasonable times, to inspect at the factory of the sub-Contractor, all Drawings of any portion of the Works.

2.1.3.6. **Mistakes in Drawings**

Any expense resulting from an error or omission in or from delay in delivery of the drawings, shall be borne by the sub-Contractor.

The sub-Contractor shall be responsible for any discrepancies, errors, or omissions in the Drawings and other particulars supplied by him, whether such Drawings and particulars have been approved by The Engineer or not, provided that such discrepancies, errors, or omissions are not due to inaccurate information or particulars furnished in writing to the sub-Contractor by The Engineer or the Architect. The Employer shall be responsible for Drawings and information supplied in writing by The Engineer or the Architect and for the details of special work by either of them.
2.1.4. TRADE NAMES AND ALTERNATIVES

2.1.4.1. No trade names are mentioned in these documents. Contractors are required to propose equipment supplied by reputable manufacturers. The equipment supplied remains the responsibility of the contractor until warranties/guaranties are met in full (by the contractor and his preferred equipment supplier).

2.1.4.2. The tenderer is advised to offer the installation strictly in accordance with this Technical Specifications. Equipment offered shall be taken to fulfill the requirements of the Tender drawings, BoQ, General Technical Specification and this Detailed Technical Specification.

2.1.4.3. All equipment or material which the sub-Contractor represents, to be of the required quality and characteristics for the purpose intended, shall be permitted subject to all of the following requirements.

i) It is not the intent of these Specifications to have the sub-Contractor seek acceptance from The Engineer for the various interchangeable items of different manufacturers that are offered by the sub-Contractor. It is the intent of these Specifications that alternative materials for major items of equipment, herein specified, be acceptable to The Engineer.

ii) The burden of proof as to the quality and suitability of proposed equipment shall be upon the sub-Contractor and the sub-Contractor shall furnish all information necessary as required by The Engineer at no additional cost to the Employer.

iii) There shall be no substitution for any accepted equipment, materials, component, design, or fabrication unless and until the proposed substitute has received written acceptance of The Engineer. The Engineer may require the removal of any substitute or unaccepted item which is installed by the sub-Contractor without the written acceptance of The Engineer. All financial benefits accruing from the substitute equipment, materials, components, design, or fabrication shall be for the sub-Contractor's cost.

iv) Where use of the sub-Contractor's proposed materials or equipment involves redesign of or changes to other parts of the work, the cost and the time required to affect such redesign or changes shall be considered in evaluating the suitability of the proposed materials or equipment. No additional cost will be paid by the Employer as a result of the sub-Contractor's proposed materials or equipment.

v) No test or action relating to the acceptance of substitute materials shall be made until the request for substitutions is made in writing by the sub-Contractor, accompanied by the complete data as to the equality of the materials proposed. Such request shall be in ample time to permit approval without delaying the work.

vi) Whenever classifications, rating, or other certification by a body, such as UL, NEMA, or SABS, is part of the Specification for any material, Proposals for use of alternative materials shall be accompanied by reports from the listed or equivalent independent testing laboratory indicating compliance with Specification requirements.

vii) The sub-Contractor shall reasonably demonstrate that an adequate supply of materials, repair parts, and specialties of its own design and manufacture, as well as materials, repair parts, and the specialty parts of the Suppliers, will be available promptly as the need by The Engineer may arise.

viii) The cost of all testing required to prove the quality of the material proposed shall be borne by the sub-Contractor.

2.1.4.4. It shall be understood that specifying materials, components, and/or equipment in this Specification shall not relieve the sub-Contractor from its responsibility to produce the product in accordance with the Contractual requirements.

2.1.4.5. The sub-Contractor shall submit data showing that the proposed materials or equipment meets the requirements stipulated in the Specifications.
3. **DETAILED TECHNICAL SPECIFICATION**

3.1. **PROFESSIONAL REQUIREMENTS**

To ensure acceptable standards of delivery all tenders must comply with the following criteria:

1. The bidder must be registered with the Contractor’s Industry Development Board (CIDB) in the Mechanical Engineering (ME) category
2. Proof of registration with professional body / bodies e.g.:
   a. Electrical Contractors Board (ECB),
   b. SARACCA (South African Refrigeration and Air-conditioning Contractors Association,

if a prospective bidder is compliant to specific ISO standards, proof of such certification needs to be provided, e.g. Management System Standards (ISO 9001, ISO 14001), Occupational Health And Safety Management Standard (ISO 18001 / OHSAS 18001), etc. (this is however a non-mandatory requirement). Further membership of any other technical governing bodies or applicable institutes may be provided.

3.2. **SCOPE OF WORKS**

3.2.1 The Subcontractor shall allow for complete Design Co-ordination, Supply, Delivery, Installation, Testing, Commissioning, and Handing over, in working order, of the specified Installations as a complete working system without any further Material or Labour being required.

3.2.2 Tenderer must acquaint himself with all contract conditions and be satisfied as to the nature and extent of the works and no claim for additional costs or for extension of time under this Contract will be allowed on the grounds of insufficient information.

3.2.3 The drawings issued with Tender Specification indicate design criteria, which will remain unchanged; however, second fix co-ordination may affect the reticulation indicated on Tender Drawings.

3.2.4 Specialists shall install the installations and Workshop Drawings, Programme, and Instructions must be issued to the Main Contractor and Mechanical Consultant for approval, before any erection work commences.

3.2.5 The following approvals apply to this Contract:

- The Authority having jurisdiction
- The Local Municipality
- Mechanical Engineering Consultants

3.2.6 Three (3) complete operating manuals shall be submitted to the Mechanical Consultant with “as-built” Drawings.

- System Description
• Detailed Equipment Description
• Operating Instructions
• Trouble Analysis Procedures
• Preventative Maintenance Schedules
• Maintenance Instructions for each item of Equipment
• Recommended Spare Parts List and Price List
• Service and maintenance contract for the following year
• Emergency contact details

3.2.7 The Subcontractor shall add to, or omit from, or vary the work, only on the written authority of the Main Contractor.

3.2.8 The Subcontractor shall provide for the thorough tuition of appointed staff of the Employers with regard to the operating and maintenance of the Installation and Systems.

3.2.9 Prior to commencing site work, the Subcontractor shall make sure that the measurements shown on the detail Drawings correspond to already built work for which detail is given.

3.2.10 The Subcontractor shall guarantee to the Employer, the Material, Apparatus and Workmanship for a period of TWELVE (12) months. The guarantee shall be valid for a period starting on the date when the Certificate of Practical completion for the whole Contract is issued. The Contractor shall cede to the Employer any equipment guarantee, which extends beyond the TWELVE (12) month period. This guarantee is in addition to the Employer’s Common Law Right and in no way constrains or vitiates these said Rights.

3.2.11 All Rates, Prices and Amounts shall exclude VAT.

3.2.12 Testing of the System after completion shall be carried out in the presence and to the satisfaction of the Main Contractor and the Mechanical Consultant.

3.2.13 The Subcontractor shall set out the work and be responsible and liable for the correct setting out, establishing Centre Lines, Levels, Gradients and the like, carry out the works in close collaboration with other Contractors, and co-operated to the fullest extent with all parties under the direction of the Principle Contractor and be aware that various disciplines will be working simultaneously on this Project, and make himself thoroughly acquainted with the extent and nature of the work specified and the condition affecting it’s execution the means of access and all matters which may influence this Contract.

3.2.14 Any method of fixed and supporting must be submitted to the Structural Engineer for his approval prior to being used on site.

3.2.15 The Subcontractor shall furnish Samples as may be asked for. Orders for materials or special articles required shall be placed as early as possible and the Contractor shall be held responsible for any delays in the delivery of such goods.

3.2.16 Two (2) copies of Shop Drawings shall be submitted for approval. The approval is limited to check conformity with the design requirements and shall not relieve the Tenderer of responsibility for Co-ordination or Installation fit.

3.2.17 All materials and equipment specified under Trade Names, Catalogues, or References should either be exactly as described, or, in the opinion of the Mechanical Ventilation Consultant of equal quality specification and mass in all respects to those described.

3.2.18 All Scaffolding shall be supplied by the Subcontractor and shall in all respects meet the approval of the Health and Safety Act and relevant Regulations/SABS Codes of
Practice; the Subcontractor is to take full responsibility for the unloading, storage, hoisting and security of all his materials and equipment. Storage of materials etc is to be confined to a specific portion of the site and shall be at the sole discretion of the appointed Site Coordinator/Project Manager. All rubbish accumulated during the works and all superfluous materials not required for the completion of the Contract must be carted away at the Tenderer’s cost.

3.2.19 The Subcontractor has to prepare a programme. Tenderer is advised to study the Programme to ensure that they are fully acquainted with the commencement / completion dates and the sequence in which the work is to be carried out. The Subcontractor will agree with the Project Manager as to the date on which he is to commence and submission of a Tender will be regarded as a guarantee that the Tenderer can commence accordingly.

3.2.20 Testing of the system on completion will be done in the presence of the Main Contractor.

3.2.21 Final commissioning will be witnessed by Mechanical Consultant and will only be approved if system is to satisfaction of Mechanical Consultant.

3.3.2. Mechanical Ventilation Installations:

Ventilation shall be provided to the following areas:

- All priority six ablution/toilet areas namely C1, P2, E3, F3, D2, H1

The sub-Contractor shall ensure that he is conversant with the layouts of the ablutions and of other services before he commences with any work on them.

Any challenges that the sub-Contractor may experience during the contract period must be timeously discussed with The Engineer.

All the work shall be carried out in full conformance with these project specifications.
3.3. DESIGN APPROACH: MECHANICAL VENTILATION INSTALLATION

3.3.1. Design Codes for Mechanical Ventilation Installations

Units shall be designed and constructed to meet the following standards:

Unless otherwise specified further in this specification, the following standard specifications (Including amendments) of the organizations indicated shall form part of this specification. The following National Acts/Regulations, Codes of Practice and approval bodies will also be applicable.

- SABS 1125-1977; Room air conditioners
- SABS 0140-1978; Identification colour marking
- SABS 0147-1992; Refrigerating systems including associated with air conditioning systems.
- SABS 0173-1980; The installation, testing and balancing of air-conditioning duct work.
- SABS 1238-1979; Air-conditioning ductwork.
- SABS 1424-1987; Filters for air-conditioning and general ventilation.
- ANSI/ASHRAE 51, ASHRAE 15, ASHRAE 52.1 & EN779
- ANSI Standard 221.47
- CGA, ETLC, CSA or UL/ULC certified for prewired equipment
- NRCA Standard for Roof Curbs
- NFPA 90A for flame and smoke spread for adhesives
- ASHRAE 90.1 - Standard for energy efficient design of new buildings.
- ARI Standard 410
- HVAC equipment shall be designed to conform to ASHRAE 15 (latest revision).
- SANS 1850:2012 - Restaurant Association of South Africa

3.3.2 Ventilated Areas

Priority Six Ablution Areas – C1, E3, F3, D2, H1 & P2

The ablutions shall be ventilated by mechanical extract systems. Ducted fan systems shall extract foul air and discharge it outside, to the atmosphere at high level.

Extraction shall be at a rate of 20 air changes per hour for the ablutions. No heating or cooling has been allowed for.

Ventilation Standards (SANS 10400-O:2011)

The design indoor environmental conditions are as follows:

<table>
<thead>
<tr>
<th>VENTILATION STANDARDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ablution facilities</td>
</tr>
</tbody>
</table>

All materials, equipment brand names, equipment sizes/capacities shall be strictly to the Engineer’s approval. The installation of non-approved equipment shall result in rejection of the installations and neither the Client nor the Engineer shall be responsible for any material/financial losses incurred by the contractor.

3.3.3 Mechanical Extraction Ductwork

- Ductwork (General Technical Specification)
The refurbishment project for ablutions (ORTIA) - Priority Six Ablutions

- All duct systems shall be constructed of galvanized sheet metal, or as deemed appropriate by The Engineer based on the application requirements. No fiberglass duct board shall be permitted.
- All medium- and high-pressure ductwork systems shall be pressure-tested and installed in accordance with the current SMACNA standards.
- All ductwork shall NOT be externally insulated except where mentioned.
- Where possible, all air terminal connections shall be hard-connected with sheet metal ductwork.
- All mechanical extraction equipment shall be isolated from the ductwork system with flexible duct connectors to minimize the transmittance of vibration.
- The entire mechanical extraction system shall be balanced to extract the air quantities as required in various ablation areas to maintain the specified ventilation conditions. The final extraction of air quantity through each disc valve shall be recorded and submitted to The Engineer for approval.

b) Sound Attenuation: Purpose made attenuators shall be used where necessary on extraction systems to ensure that the noise levels specified are achieved.

**SARACCA table to be used for duct manufacturing and installation**

<table>
<thead>
<tr>
<th>Category</th>
<th>Longest Side L/S mm</th>
<th>Semi Perimeter</th>
<th>Minimum Thickness mm</th>
<th>Maximum Spacing Between Joint mm</th>
<th>Maximum Spacing Between Stiffener mm</th>
<th>Joint Type</th>
<th>Type of Intermediate Stiffener</th>
<th>Maximum Spacing Between Hangers mm</th>
<th>Hanger Rod Dia mm</th>
<th>Hanger Angle mm</th>
<th>Measured Sheet Metal Mass Kg/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Up to 750</td>
<td>&lt;1150</td>
<td>0.6</td>
<td>2400</td>
<td>2400</td>
<td>S&amp;D</td>
<td>Note 1</td>
<td>2400</td>
<td>6</td>
<td>40 x 2</td>
<td>4.9</td>
</tr>
<tr>
<td>2</td>
<td>&gt; 750</td>
<td>&gt; 1150</td>
<td>0.6</td>
<td>2400</td>
<td>2400</td>
<td>Note 2</td>
<td>Note 2 Slit on Flange</td>
<td>2400</td>
<td>6</td>
<td>40 x 2</td>
<td>4.9</td>
</tr>
<tr>
<td>3</td>
<td>751 to 1350</td>
<td>2400</td>
<td>1.0</td>
<td>1500</td>
<td>1500</td>
<td>Note 2</td>
<td>Note 2 Slit on Flange</td>
<td>2400</td>
<td>8</td>
<td>40 x 3</td>
<td>6.5</td>
</tr>
<tr>
<td>4</td>
<td>1351 to 2100</td>
<td>1500</td>
<td>1.0</td>
<td>1500</td>
<td>1500</td>
<td>Note 2</td>
<td>Note 2 Slit on Flange</td>
<td>3000</td>
<td>8</td>
<td>40 x 6</td>
<td>8.12</td>
</tr>
<tr>
<td>5</td>
<td>&gt; 2100</td>
<td>1500</td>
<td>1.2</td>
<td>1500</td>
<td>1500</td>
<td>Note 3</td>
<td>Angle or Flange or Mezz Flange and Tie Rods</td>
<td>3000</td>
<td>10</td>
<td>40 x 6</td>
<td>9.75</td>
</tr>
</tbody>
</table>

**Notes:**
1. Sheet Stiffening: Either cross breaking, beading or pleating of longest side to be applied on all ducting where duct dimension is over 550mm
2. Slide on Flanges: Up to 1350mm - 25mm flange, 1351-2100mm 35mm flange > 2100mm 35mm Flange, and tie rod or mild steel 40 x 40 angle
3. Stiffener: Inverted V strip or equal stiffener fixed on duct side to prevent panels vibrating and sagging (tie rods where necessary to prevent drumming, vibration and sagging)
4. SITE DETAILS AND OPERATING CONDITIONS

4.1. DESIGN AMBIENT CONDITIONS

Altitude 1700m (Kempton Park, Gauteng Province)
Electrical Supply 240 volt, 1 phase 50 cycle
            380 volt, 3 phase 50 cycle, 4 wire

4.2. MINIMUM ABLUTION OPERATING CONDITIONS

All equipment will be suitable for operation in the environment in which they are to be located. As a minimum, equipment etc. will be suitable for operation at full capacity under the following conditions:

- Height above sea level not exceeding 100m;
- Air cooling at an average temperature over 24 hours not exceeding 45°C dry bulb;
- Maximum conditions of 45°C dry bulb and 50 %relative humidity;
- Minimum conditions of -10°C dry bulb and 100 % relative humidity;
- Protection of all equipment exposed to atmosphere/ambient to EN 60529 - IP 65.
5. **SITE VISIT**

Bidders shall be requested to visit the site before bidding, so as to acquaint themselves with prevailing conditions and dimensions. A COMPULSORY SITE VISIT IS REQUIRED.
6. TEMPORARY OFFICES

The sub-Contractor need not provide offices for the Resident Engineer. In the absence of any specific requirements, the Engineer requires merely that the sub-Contractor have suitable offices on site in which site meetings may be held.
7. AREAS REQUIRING SPECIAL ATTENTION

7.1. GENERAL

7.1.1. Setting out of works

The sub-Contractor shall set out the work and be responsible and liable for the correct setting out, establishing Centre Lines, Levels, Gradients and the like, carry out the works in close collaboration with other Contractors, and co-operated to the fullest extent with all parties under the direction of the Principal Contractor and be aware that various disciplines will be working simultaneously on this Project, and make himself thoroughly acquainted with the extent and nature of the work specified and the condition affecting its execution, the means of access and all matters which may influence this Contract.

7.1.2. Samples

The sub-Contractor shall furnish Samples as may be asked for. Orders for materials or special articles required shall be placed as early as possible and the Contractor shall be held responsible for any delays in the delivery of such goods.

7.2. FINISHING & TIDYING

Progressive and systematic finishing and tidying will form an essential part of this contract. Under no circumstances shall spoil, rubble, materials, equipment or unfinished operations be allowed to accumulate unnecessarily and in the event of this occurring the Engineer shall have the right to withhold payment for as long as necessary in respect of the relevant works in the area(s) concerned.

7.3. CONSTRUCTION METHODS

a) Construction shall be carried out in accordance with the Expanded Public Works Programme (EPWP) guidelines that are aimed at infrastructure and services development coupled with creation of employment and skills training.

b) Labour-based or labour-intensive construction may be defined as the economically efficient employment of as much labour as is technically feasible to produce as high a standard of construction as demanded by the specification and allowed by the funding available. In other words, projects based on labour-intensive principles aim at devoting the feasible proportion of projects costs to unskilled, semi-skilled and skilled labour without jeopardizing the technical quality of the product demanded by the specification.

c) Labour-based methods of construction result in the creation of a significant increase in employment opportunities per unit of expenditure. The intensive employment of labour achieves value for money through innovative techniques of work and management. In particular (i) as far as possible, payment of wages for labour is related to production output: a reasonable “task” is set, upon completion of which the labourer may go home and (ii) employment is either on a daily/casual/temporary basis or in the form of a short-term monthly contract. It is useful to think of labour-based methods as the effective substitution of labour for equipment in construction. This is done in such a way that there is neither an increase in economic cost nor a decrease in quality.

d) The following regulations must be adhered to so as to ensure that the construction methods used are labour-intensive.

   i. The remuneration to local labour for hourly-rated employees and/or daily-based work shall be in accordance with the prevailing gazetted rates.
ii. The name, identification number, task performed and hours worked per day for each labourer shall be recorded by the sub-Contractor. These records shall be submitted to the Engineer together with each payment certificate.

e) Bidders are encouraged to utilize the services of locally based sub-Contractors.

7.4. BURGLAR BARS

Burglar bars shall be installed at each external ventilation exhaust louvre which penetrates the facade of the complex.

The bars shall not be less than 15mm round bars, spaced at 125mm centres in both directions and welded into a frame. They are to be hot dipped galvanized after manufacture.

The burglar bar frame should be built into the masonry structures. Alternatively they can be bolted into the masonry structure (independent of any connecting ductwork) and the bolt heads tack welded to ensure they cannot be easily removed. The area of the tack weld is to be touched up with cold galvanizing paint.

A written confirmation that all openings in all the air conditioning and ventilation systems have been protected by the specified burglar bars will be required from the ventilation sub-Contractor. This certificate is to be provided at the beneficial occupation stage.

7.5. PAINTING

The installation, shall be painted in accordance with an approved colour code. Such painting shall be only necessary to those items which would normally be visible when serviced, all mild steel or other components which would otherwise suffer corrosion if unpainted, however, shall be painted with two coats of rust-proof paint whether such components are normally visible or note. Items which are factory painted need not be repainted other than any making good which may be necessary.
8. COMPLETION, GAURANTEES & MAINTENANCE

8.1. TESTING

A Testing and Commissioning Notice shall be sent out to the Engineer accompanied with the test procedure 2 weeks prior to the scheduled Testing and Commissioning date.

All Equipment used for Testing and Commissioning shall have a Valid Calibration Certificate which must be placed on the test report. On completion, the installation shall be balanced, set and tested to establish the capacity and performance within the ablation. All such tests shall be recorded and typed copies of all test recordings shall be included within the operating manuals later specified herein. The test reports shall set out the procedure, data and instrument readings obtained as compared with the required capacities and the manufacturer’s name plate rating where applicable.

All performance figures obtained during testing and commissioning must be within ±10% of the specified performance figures given in the Tender drawings and Technical specification.

8.2. END USER TRAINING

Upon completion of all works and all tests, the contractor shall furnish necessary operator’s labor and helpers for operating the entire installation for a period not less than two weeks of ten hours each to enable the owner’s staff get acquainted with the operation of the system. During this period the contractor shall train the owner’s personnel in the operation, adjustment and maintenance of all equipment installed.
8.3. OPERATING AND MAINTENANCE MANUALS

Three instruction manuals shall be provided for the new equipment. Each manual shall comprise of the following sections, bound in a vinyl plastic covered folder with the name of the project typewritten on a card inserted into a clear plastic covered cardholder on the front cover and spine and shall be handed to the Client on completion of the installation.

- Index
- Description of Systems and Equipment (as installed)
- Operation of Equipment (as installed)
- Commissioning Data (Signed off by Engineer)
- Inspection and Maintenance Instructions (in schedule form setting out each item, the description and frequency of maintenance operations required).
- Operating Instructions (Running checklist and frequency of servicing, Safety precautions to be taken, Manual and automatic operation, Operator's duties, service instructions, Pre-start checklist for each system, Starting and stopping procedures)
- Spare Parts (list of spare parts to be supplied, as later specified herein, with detailed description of each part, make, model and part number and supplier's name and address)
- Descriptive literature (for all items and equipment)
- As-Built drawings in hardcopy and Autocad 2010 version electronic format (of the ablutions as installed to include abulation layout drawings, control and wiring diagrams and schematic piping diagrams).

8.4. COMMISSIONING PROGRAMME

The sub-Contractor shall adhere to the Client's programme for the installation, but shall ensure that his commissioning programme makes allowance for the following requirements:

i. At the date of Beneficial Occupation, ALL systems shall be operating and the ventilation system is fully operational, balanced, tested, commissioned, approved by The Engineer and handed over by that date.
8.5. **GUARANTEE AND MAINTENANCE**

The entire mechanical ventilation system installation shall be subject to a guarantee and servicing of **12 months from the Beneficial Occupation date**, or from the date of the Taking-Over certificate as state below.

Expendables for the maintenance period must be included in the contract price. Other minor expendables shall also be included. The sub-Contractor shall be entirely responsible for carrying out regular inspections at intervals not greater than 1 month.

A detailed inspection and service log book with check sheets showing all functions to be carried out at each inspection and service, is to be kept on site for all service activity and must be countersigned by a manager or facilities personnel as client representative. The equipment shall be services and maintained in strict accordance to the equipment manufacturer's recommended intervals and service item list. The sub-Contractor shall draw-up and submit the INSPECTION & SERVICE SCHEDULE to the Engineer for their approval. The Service Schedule shall include for regularity of maintenance, service items at those intervals and recommended spare parts list. This schedule must be submitted 2 months before equipment handover and approved by the Engineer latest 3 weeks before scheduled handover of installations.

8.6. **WARRANTIES**

7.6.1 **Taking-Over Certificate**

When the whole of the Works have been substantially completed and have satisfactorily passed any Tests on Completion prescribed by the Contract, the sub-Contractor may give a notice to that effect to The Engineer, with a copy to the Employer, accompanied by a written undertaking to finish with due expedition any outstanding work during the Defects Liability Period. Such notice and undertaking shall be deemed to be a request by the sub-Contractor for The Engineer to issue a Taking-Over Certificate in respect of the Works. The Engineer shall, within 21 days of the date of delivery of such notice, either issue to the sub-Contractor with a copy to the Employer, a Taking-Over Certificate, stating the date on which, in his opinion, the Works were substantially completed in accordance with the Contract, or give instructions in writing to the sub-Contractor specifying all the work which, in The Engineer’s opinion, is required to be done by the sub-Contractor before the issue of such Certificate.

The Engineer shall also notify the sub-Contractor of any defects in the Works affecting substantial completion that may appear after such instructions and before completion of the Works specified therein. The sub-Contractor shall be entitled to receive such Taking-Over Certificate within 21 days of completion, to the satisfaction of the Architect, of the Works so specified and remediing any defects so notified.

7.6.2 **Taking Over of Sections or Parts**

Similarly, in accordance with the procedure set out in Sub-Clause 7.1, the sub-Contractor may request and The Engineer shall issue a Taking-Over Certificate in respect of:

a) any substantial part of the Permanent Works which has been both completed to the satisfaction of The Engineer and, otherwise than as provided for in the Contract, occupied or used by the Employer, or

b) any part of the Permanent Works which the Employer has elected to occupy or use prior to completion (where such prior occupation or use is not provided for in the Contract or has not been agreed by the sub-Contractor as a temporary measure).
7.6.3 Substantial Completion of Parts

If any part of the Permanent Works has been substantially completed and has satisfactorily passed any Tests on Completion prescribed by the Contract, The Engineer may issue a Taking-Over Certificate in respect of that part of the Permanent Works before completion of the whole of the Works and, upon the issue of such Certificate, the sub-Contractor shall be deemed to have undertaken to complete with due expedition any outstanding work in that part of the Permanent Works during the Defects Liability Period.

7.6.4 Surfaces Requiring Reinstatement

Provided that a Taking-Over Certificate given in respect of any Section or part of the Permanent Works before completion of the whole of the Works shall not be deemed to certify completion of any ground, roof or surfaces requiring reinstatement unless such Taking-Over Certificate shall expressly so state.

8.7 DEFECTS LIABILITY

7.7.1 Defects Liability Period

In these Conditions the expression "Defects Liability Period" shall mean the defects liability period calculated from:

a) the date of completion of the Works certified by The Engineer in accordance with Clause 8, or
b) in the event of more than one certificate having been issued by The Engineer under Clause 8, the respective dates so certified, and in relation to the Defects Liability Period the expression "the Works" shall be construed accordingly.

The defects liability period for this contract shall however be not less than 12 calendar months from the date of certification by The Engineer.

7.7.2 Completion of Outstanding Work and Remedying Defects

During the Defects liability period, the sub-Contractor shall:

a) complete any minor works, if any, outstanding on the date stated in the Taking-Over Certificate as soon as practicable after such date, and
b) execute all such work of amendment, reconstruction, and Remedying defects, shrinkages or other faults as The Engineer may, during the Defects Liability Period or within 14 days after its expiration, as a result of an inspection made by or on behalf of The Engineer prior to its expiration, instruct the sub-Contractor to execute.

The expiration of the Defects Liability Period shall not exonerate the sub-Contractor from any further liabilities arising at Law.

7.7.3 Cost of Remedying Defects

All work referred to in Sub-Clause 7.7.2 shall be executed by the sub-Contractor at his own cost if the necessity thereof is, in the opinion of the Architect, due to:

a) the use of materials or workmanship not in accordance with the Contract,
b) where the sub-Contractor is responsible for the design of part of the Permanent Works, any fault in such design, or
c) the neglect or failure on the part of the sub-Contractor to comply with any obligation, expressed or implied, on the sub-Contractor's part under the Contract,

If, in the opinion of The Engineer, such necessity is due to any other cause, he shall determine an addition to the Contract Price and shall notify the sub-Contractor accordingly, with a copy to the Employer.
8.8. **CONTRACTOR’S FAILURE TO CARRY OUT INSTRUCTIONS**

In case of default on the part of the sub-Contractor in carrying out such instruction within a reasonable time, the Employer shall be entitled to employ and pay other persons to carry out the same and if such work is work which, in the opinion of The Engineer, the sub-Contractor was liable to do at his own cost under the Contract, then all costs consequent thereon or incidental thereto shall, after due consultation with the Employer and the sub-Contractor, be determined by The Engineer and shall be recoverable from the sub-Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the sub-Contractor and The Engineer shall notify the sub-Contractor accordingly, with a copy to the Employer.
9. SCHEDULE OF MAJOR EQUIPMENT PERFORMANCE REQUIREMENT

9.1 MECHANICAL VENTILATION SYSTEMS

Refer to BoQ and Tender drawings
10. ANNEXURE A – TENDERER’S RETURNABLE SCHEDULES

(SCHEDULES TO BE COMPLETED IN FULL)

IMPORTANT NOTE:
If it is intended to sub-contract more than 25% of the work, the BBBEE rating of the sub-contractor must be equal or better than that of the bidding contractor.
### SCHEDULE A: DETAILS OF CONTRACTOR AND/ OR MECHANICAL VENTILATION SUB-CONTRACTOR

*Details on this page MUST be completed fully. Incomplete forms shall render the offer invalid. (N/A to be stated if not applicable).*

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered name of company/enterprise</td>
<td></td>
</tr>
<tr>
<td>CIPRO Registration number</td>
<td></td>
</tr>
<tr>
<td>VAT registration number</td>
<td></td>
</tr>
<tr>
<td>UIF registration number</td>
<td></td>
</tr>
<tr>
<td>Official telephone number</td>
<td></td>
</tr>
<tr>
<td>Official fax number</td>
<td></td>
</tr>
<tr>
<td>E-mail Address</td>
<td></td>
</tr>
<tr>
<td>Physical Address</td>
<td></td>
</tr>
<tr>
<td>Official Postal Address</td>
<td>Code</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Full Names and Surname</th>
<th>Position in company/ enterprise</th>
<th>ID No.</th>
<th>Income Tax No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director / Member (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Director / Member (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Director / Member (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SIGNED ON BEHALF OF TENDERER:** .................................................................

Page 26 of 34

The refurbishment project for ablutions (ORTIA) - Priority Six Ablutions
SCHEDULE B: DEVIATIONS AND QUALIFICATIONS BY TENDERER

The Tenderer shall record any deviations or qualifications to the requirements of the tender documents in this Returnable Schedule. Alternatively, a tenderer may state such deviations and qualifications in a covering letter attached to his tender and reference such letter in this schedule.

If no deviations or qualifications are made, the schedule hereunder is to be marked **NIL** and signed by the Tenderer.

<table>
<thead>
<tr>
<th>PAGE</th>
<th>CLAUSE OR ITEM</th>
<th>DEVIATION OR QUALIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of sheets appended by the tenderer to this Schedule ....................... (If nil, enter NIL).

**SIGNED ON BEHALF OF TENDERER:** .................................................................
SCHEDULE C: RECORD OF ADDENDA TO TENDER DOCUMENTS

We confirm that the following communications received from the Employer before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer:

<table>
<thead>
<tr>
<th>Date</th>
<th>Title or Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
</tr>
</tbody>
</table>

Attach additional pages if more space is required.

Signed ____________________________ Date ____________________________

Name ____________________________ Position ____________________________

Tenderer ____________________________________________________________________
**SCHEDULE D: REFERENCES AND VITAL INFORMATION**

1. **CLIENT REFERENCES OF CURRENT AND PREVIOUS CONTRACTS**
   Please provide references from three clients with similar requirements as the Client (one reference may be from the Client’s department or division). These references are to demonstrate your ability to fulfill the Client’s requirements and your ability to maintain satisfied customers.

   *(Please mark blocks with ‘x’ where appropriate)*

<table>
<thead>
<tr>
<th>Name of Client/Company (1)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract period (in months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value of Contract (per month)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of business rendered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact</td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td>Tel no.</td>
<td></td>
<td>Alternative Tel no.</td>
</tr>
<tr>
<td>Fax no.</td>
<td></td>
<td>E-mail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Client/Company (2)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract period (in months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value of Contract (per month)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of business rendered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact</td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td>Tel no.</td>
<td></td>
<td>Alternative Tel no.</td>
</tr>
<tr>
<td>Fax no.</td>
<td></td>
<td>E-mail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Client/Company (3)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract period (in months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value of Contract (per month)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of business rendered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact</td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td>Tel no.</td>
<td></td>
<td>Alternative Tel no.</td>
</tr>
<tr>
<td>Fax no.</td>
<td></td>
<td>E-mail</td>
</tr>
</tbody>
</table>
## 2. LIST OF CURRENT/PREVIOUS SUPPLIERS - CONTRACTOR AND/ OR SUB-CONTRACTOR

<table>
<thead>
<tr>
<th>Name of Supplier/Company (1)</th>
<th>Description of Commodity</th>
<th>Value of commodities supplied (per month)</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
<td>Full Name</td>
<td>Tel no. (          )</td>
<td>Alternative Tel no.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax no. (          )</td>
<td>E-mail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Supplier/Company (2)</th>
<th>Description of Commodity</th>
<th>Value of commodities supplied (per month)</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
<td>Full Name</td>
<td>Tel no. (          )</td>
<td>Alternative Tel no.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax no. (          )</td>
<td>E-mail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Supplier/Company (3)</th>
<th>Description of Commodity</th>
<th>Value of commodities supplied (per month)</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
<td>Full Name</td>
<td>Tel no. (          )</td>
<td>Alternative Tel no.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax no. (          )</td>
<td>E-mail</td>
</tr>
</tbody>
</table>
**SCHEDULE E: DETAILS OF CONTRACTOR AND/OR SUB-CONTRACTOR’S WORKSHOP FACILITIES & EQUIPMENTS**

The tenderer shall state below what workshop facilities will be available for this Contract.

<table>
<thead>
<tr>
<th>Address of Workshop</th>
<th>Number of Artisans Normally Employed by Firm</th>
<th>Number of Technically Qualified Persons Employed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SIGNED ON BEHALF OF TENDERER:**

..........................................................
SCHEDULE F: SCHEDULE OF PROPOSED SPECIALISTS SERVICE PROVIDERS OR ALTERNATIVES

Proposed Sub-contractors

We notify you that it is our intention to employ the following Sub-contractors for normal work in this contract.

Acceptance of this tender shall not be construed as approval of all or any of the listed subcontractors. Should any of the subcontractors not be approved subsequent to acceptance of the tender, this shall in no way invalidate this tender, and the tendered unit rates for the various items of work shall remain final and binding, even in the event of a subcontractor not listed below being approved by the Engineer.

<table>
<thead>
<tr>
<th>SUB-CONTRACTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category/type</td>
</tr>
</tbody>
</table>

| TOTAL (Excluding VAT) |

Number of sheets appended by the tenderer to this Schedule ...................... (If nil, enter NIL).

SIGNED ON BEHALF OF TENDERER: .................................................................
SCHEDULE G: DETAILS OF CONTRACTOR AND/ OR SUB-
CONTRACTOR’S PROPOSED SITE MANAGER/ SUPERVISOR’S 
EXPERIENCE FOR THIS CONTRACT

Tenderers shall set out in the Schedule hereunder details of the Site Manager’s experience in work of 
a similar nature to that for which their Tender is submitted.

Failure to complete this Schedule may result in the Tender not being considered.

<table>
<thead>
<tr>
<th>SITE MANAGER/SUPERVISOR</th>
<th>NAME: .............................................. NQF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LEVEL ..................................................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONTRACT &amp; CLIENT</th>
<th>NATURE OF WORK</th>
<th>POSITION HELD</th>
<th>VALUE OF WORK</th>
<th>YEAR COMPLETED</th>
</tr>
</thead>
</table>

Number of sheets appended by the tenderer to this Schedule ................. (If nil, enter NIL).

SIGNED ON BEHALF OF THE TENDERER: ..............................................
### SCHEDULE H: REGISTRATION WITH RELEVANT PROFESSIONAL BODIES/ INSTITUTIONS

<table>
<thead>
<tr>
<th>Name of Company/ Person</th>
<th>Professional Body</th>
<th>Registration No.</th>
<th>Date Joined</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SIGNED ON BEHALF OF THE TENDERER: …………………………………….
DETAILED TECHNICAL SPECIFICATION

FIRE PROTECTION SERVICES

THE REFURBISHMENT PROJECT FOR ABLUTIONS (ORTIA)

Priority Six Ablutions C1, F3, E3, P2, D2 & H1

PROJECT NUMBER – J000064

04 OCTOBER 2019

FIRE PROTECTION INSTALLATIONS
TECHNICAL SPECIFICATION
TABLE OF CONTENTS

1. TENDER INFORMATION .................................................................................................................. 3
2. GENERAL SPECIFICATION ........................................................................................................... 4
   2.1. GENERAL TECHNICAL SPECIFICATION DOCUMENTS .......................................................... 4
   2.2. PROJECT SPECIFIC GENERAL SPECIFICATION ................................................................. 4
   2.2.1 SCOPE OF WORK ............................................................................................................... 4
   2.2.2 PROGRAMME ..................................................................................................................... 4
   2.2.3 DRAWINGS ......................................................................................................................... 5
2.5 TRADE NAMES AND ALTERNATIVES ....................................................................................... 8
3. DETAILED TECHNICAL SPECIFICATION ................................................................................... 10
   3.1. PROFESSIONAL REQUIREMENTS ....................................................................................... 10
   3.2. SCOPE OF WORKS ............................................................................................................... 10
   3.3. DESIGN APPROACH: FIRE PROTECTION ......................................................................... 13
   3.4. GENERAL SYSTEM PIPE WORK AND FITTINGS ............................................................... 14
   3.5 AUTOMATIC SPRINKLER SYSTEMS ...................................................................................... 15
   3.5.1 Automatic Sprinkler Systems Remedial Works ................................................................. 15
   3.5.2 For the Priority Six Ablutions D2, E3, P2, F3, H1, C1 ......................................................... 15
   3.6 FIRE & EVACUATION SIGNAGE ............................................................................................ 16
4. SITE DETAILS AND OPERATING CONDITIONS ......................................................................... 18
   4.1. ABLUTION DESIGN AMBIENT CONDITIONS ..................................................................... 18
   4.2. MINIMUM ABLUTION OPERATING CONDITIONS ............................................................. 18
5. SITE VISIT ................................................................................................................................... 19
6. TEMPORARY OFFICES ................................................................................................................... 20
7. AREAS REQUIRING SPECIAL ATTENTION ................................................................................. 21
   7.1. GENERAL ............................................................................................................................ 21
   7.2. FINISHING & TIDYING ....................................................................................................... 21
   7.3. CONSTRUCTION METHODS ............................................................................................... 21
   7.4. PAINTING ............................................................................................................................ 22
8. COMPLETION, GUARANTEES & MAINTENANCE ....................................................................... 23
   8.1. TESTING .............................................................................................................................. 23
   8.2. END USER TRAINING ......................................................................................................... 23
   8.3. OPERATING AND MAINTENANCE MANUALS .................................................................... 24
   8.4. COMMISSIONING PROGRAMME ........................................................................................ 24
   8.5. GUARANTEE AND MAINTENANCE .................................................................................. 25
   8.6. WARRANTIES ......................................................................................................................... 25
   8.7 DEFECTS LIABILITY .............................................................................................................. 26
   8.8 CONTRACTOR’S FAILURE TO CARRY OUT INSTRUCTIONS ........................................... 27
9. SCHEDULE OF MAJOR EQUIPMENT PERFORMANCE REQUIREMENT ....................................... 28
10. ANNEXURE A – TENDERER’S RETURNABLE SCHEDULES (Schedules to be completed in full) .... 29

*Compulsory: Returnable Schedules must be completed and returned with the priced BoQ.
1. **TENDER INFORMATION**

1. Preliminary and General items are to be priced in the bills of quantities (BoQ), attached.
2. Completion date is as per the principal contract programme.
3. The price shall be fixed for the duration of the project and shall be quoted in South African Rand.
4. These specifications are for fire equipment, fire and evacuation signage's installations.

**Tenderers to note:**

Prices must be based on the Fire Consultant's preferred equipment. Tenderers who wish to propose alternative equipment must then submit a separate priced BoQ in addition to the BoQ with the Fire Consultant's preferred equipment. The Fire Consultant has also listed the acceptable alternative equipment on specific equipment supply (e.g. fire equipment brand name, etc) as listed in this Detailed Technical Specification.
2. GENERAL SPECIFICATION

2.1. GENERAL TECHNICAL SPECIFICATION DOCUMENTS
The General Technical Specifications, which form part of these Tender Documents, are presented in a separate document.

The submission of a tender will confirm that the Fire Protection sub-Contractor (To be referred to as ‘sub-Contractor’) has read the abovementioned document.

2.2. PROJECT SPECIFIC GENERAL SPECIFICATION

2.2.1 SCOPE OF WORK

2.2.2.1 Scope of work covered under this tender shall be for the supply of the necessary equipment, transport, installation, rigging, erection, testing & commissioning and handing over to the client in an operating condition of the systems as described hereunder. The actual extent of work vis-à-vis the distribution system shall be as indicated in the Tender drawings, bill of quantities and this detailed technical specification.

2.2.2.2 Minor Builder’s Work has been included in this contract as enabling works for the installations. All other work, as later herein specified as being specifically excluded from this contract, shall be carried out by others in accordance with the details provided by The Engineer or the sub-Contractor as applicable and as provided herein.

2.2.2 PROGRAMME

* Please note: The dates below are indicative only and tenderers shall be provided with a construction programme.

2.2.2.1 The Installations are to be implemented to a programme defined in conjunction with the client body and distributed to all concerned parties including the sub-Contractor.

2.2.2.2 The entire Installations must be commissioned, tested and Taken Over by the Employer.

2.2.2.3 The sub-Contractor will be notified of the success of his Tender within TWENTY-EIGHT days after the Tender closing date. Thereupon the sub-Contractor shall IMMEDIATELY put the work in hand, notwithstanding the fact that no official Subcontract will by this time have been entered into. During the period prior to the signing of an official sub-Contract, but during which the work must in terms of the above be proceeded with, the work will be administered by the Mechanical Engineer as if, in fact, such document had already been in force.
2.2.2.4 The sub-Contractor shall be required within TWO WEEKS after acceptance of his Tender, submit to The Engineer for his approval a Programme showing the order in which the Works will be executed. Such Programme shall show the times for the preparation of all drawings, ordering and delivery times promised by the suppliers for all manufactured items, installation times and the programmed dates for testing and commissioning.

2.2.2.5 The Programme shall be prepared in consultation with the Principal Contractor and the execution of the Works shall be programmed so as to keep pace with the Building Programme. The sub-Contractor shall submit TWO copies of his Programme to The Engineer for approval and after approval by The Engineer in writing the sub-Contractor shall supply copies to the Principal Contractor. After submission to and approval by The Engineer of such Programme, the sub-Contractor shall adhere to the order of procedure and method stated therein unless he obtains the written permission of The Engineer to vary such order or method. The submission to and approval by The Engineer of such Programme shall not relieve the sub-Contractor of any of his duties or responsibilities under the sub-Contract.

2.2.2.6 The times required for the submission of Drawings, pursuant to Clauses 2.1.2.4 and 2.1.2.5 hereof, are as follows:

<table>
<thead>
<tr>
<th>Drawings</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Builder's Work Drawings</td>
<td>within TWO WEEKS</td>
</tr>
<tr>
<td>Shop Drawings and Equipment Submittals</td>
<td>within ONE WEEK</td>
</tr>
</tbody>
</table>

2.2.3 DRAWINGS

2.2.4.1 Document Transmittal

The Dropbox Document Transmittal platform is a formal process used by this Project to transmit documents to other Project Engineers and Sub-contractors. The Engineer shall officially issue Construction Drawings, Site instruction, Technical specifications, Payment certificates and Drawing Registers through this online portal. Since this platform is a contractual document transmittal platform, the upload of an email notification to the recipient shall serve as receipt of the documents described in the drawing transmittal notification.

Other forms of transmittals may be used and shall be approved by the Project Managers. These forms may be file transfer platforms such as Skydrive, Accellion, e-mail, CD delivery/collection, etc.
2.2.4.2 Tender Drawings

The following drawings have been issued with this Tender, kindly refer to Annexure (Tender Drawing Register)

2.2.4.3 Architectural and Structural Drawings

The sub-Contractor shall ensure that he is in possession of all information required for the installation of the Works and shall, if necessary, obtain copies of all relevant Architectural and Structural Drawings from the Architect and Structural Engineer.

2.2.4.4 Builder’s Work Drawings

All Builder’s Work and work to be carried out by others in accordance with the Specification has been indicated on the Tender Drawings. The sub-Contractor shall check, approve, add to or alter such drawings as may be necessary to suit the equipment offered by him, and accepted by The Engineer, within the time stipulated in Clause 1.2.2.6 hereof from date of acceptance of this Tender and shall submit to The Engineer in duplicate any revision which shall be made to such Drawings.

Such Builder’s Work Drawings shall indicate the location and extent of all foundations, bases, openings, timber frames and all other Builder’s Work and the capacities and/or dimensions of all electrical and condensate water drain points and dimensions for all water drainage connections and any other work to be provided by others for the Works, as detailed in this Specification.

The Drawings shall be drawn to scale and in sufficient detail to enable the Builder to execute the work without any misunderstanding.

Within a reasonable period after receiving such Drawings, The Engineer shall signify his approval, or otherwise, and one signed copy of the approved Drawing shall be returned to the sub-Contractor.

When approved, the following number of copies of each such Drawing shall be delivered to each of the following:

- Quantity Surveyor: 1 copy
- Principal Contractor/ Project Manager: 2 copies
- Architect: 1 copy
- Structural Engineer: 1 copy
- Fire Engineer: 1 copy
2.3 **Shop Drawings**

The sub-Contractor shall submit to The Engineer, for approval within the time stipulated in Clause 1.2.2.6 hereof duplicate copies of all Shop Drawings as required for the manufacture and installation of the Works or as The Engineer may reasonably require.

Within a reasonable period after receiving such Drawings, The Engineer shall signify his approval, or otherwise, in writing and one signed copy of each approved Drawing shall be returned to the sub-Contractor.

The sub-Contractor shall not, unless otherwise directed by The Engineer, in writing, commence with any work prior to the approval of the relative Shop Drawings. Work installed prior to the approval of Shop Drawings shall be liable to rejection by The Engineer and removal and/or replacement by the sub-Contractor, at his cost, if it is considered by The Engineer to deviate from the Specification.

Drawings approved as above described shall not be departed from except as authorized by The Engineer. The approval shall be limited to check conformity with the design requirements and shall not relieve the Tenderer of responsibility for Co-ordination or Installation fit. For particular information required on shop drawings, please refer to Annexure, Standard Operating Procedure (SOP 012) for shop drawing approvals, included in these Technical Specifications.

The Engineer shall have the right at all reasonable times, to inspect at the factory of the sub-Contractor, all Drawings of any portion of the Works.

2.4 **Mistakes in Drawings**

Any expense resulting from an error or omission in or from delay in delivery of the drawings, shall be borne by the sub-Contractor.

The sub-Contractor shall be responsible for any discrepancies, errors, or omissions in the Drawings and other particulars supplied by him, whether such Drawings and particulars have been approved by The Engineer or not, provided that such discrepancies, errors, or omissions are not due to inaccurate information or particulars furnished in writing to the sub-Contractor by The Engineer or the Architect. The Employer shall be responsible for Drawings and information supplied in writing by The Engineer or the Architect and for the details of special work by either of them.
2.5 TRADE NAMES AND ALTERNATIVES

2.5.1 No trade names are mentioned in these documents. Contractors are required to propose equipment supplied by reputable manufacturers. The equipment supplied remains the responsibility of the contractor until warranties/guaranties are met in full (by the contractor and his preferred equipment supplier).

2.5.2 The tenderer is advised to offer the installation strictly in accordance with this Technical Specification. Equipment offered shall be taken to fulfill the requirements of the Tender drawings, BoQ, General Technical Specification and this Detailed Technical Specification.

2.5.2.1 All equipment or material which the sub-Contractor represents, to be of the required quality and characteristics for the purpose intended, shall be permitted subject to all of the following requirements.

   i) It is not the intent of these Specifications to have the sub-Contractor seek acceptance from The Engineer for the various interchangeable items of different manufacturers that are offered by the sub-Contractor. It is the intent of these Specifications that alternative materials for major items of equipment, herein specified, be acceptable to The Engineer.

   ii) The burden of proof as to the quality and suitability of proposed equipment shall be upon the sub-Contractor and the sub-Contractor shall furnish all information necessary as required by The Engineer at no additional cost to the Employer.

   iii) There shall be no substitution for any accepted equipment, materials, component, design, or fabrication unless and until the proposed substitute has received written acceptance of The Engineer. The Engineer may require the removal of any substitute or unaccepted item which is installed by the sub-Contractor without the written acceptance of The Engineer. All financial benefits accruing from the substitute equipment, materials, components, design, or fabrication shall be for the sub-Contractor's cost.

   iv) Where use of the sub-Contractor's proposed materials or equipment involves redesign of or changes to other parts of the work, the cost and the time required to affect such redesign or changes shall be considered in evaluating the suitability of the proposed materials or equipment. No additional cost will be paid by the Employer as a result of the sub-Contractor's proposed materials or equipment.

   v) No test or action relating to the acceptance of substitute materials shall be made until the request for substitutions is made in writing by the sub-Contractor, accompanied by the complete data as to the equality of the materials proposed. Such request shall be in ample time to permit approval without delaying the work.

   vi) Whenever classifications, rating, or other certification by a body, such as UL, NEMA, or SABS, is part of the Specification for any material, Proposals for use of alternative materials shall be accompanied by reports from the listed or equivalent independent testing laboratory indicating compliance with Specification requirements.

   vii) The sub-Contractor shall reasonably demonstrate that an adequate supply of materials, repair parts, and specialties of its own design and manufacture, as well as materials, repair parts, and the specialty parts of the Suppliers, will be available promptly as the need by The Engineer may arise.

   viii) The cost of all testing required to prove the quality of the material proposed shall be borne by the sub-Contractor.

2.5.2.2 It shall be understood that specifying materials, components, and/or equipment in this Specification shall not relieve the sub-Contractor from its responsibility to produce the product in accordance with the Contractual requirements.
2.5.2.3 The sub-Contractor shall submit data showing that the proposed materials or equipment meets the requirements stipulated in the Specifications.
3. DETAILED TECHNICAL SPECIFICATION

3.1. PROFESSIONAL REQUIREMENTS

To ensure acceptable standards of delivery all tenders must comply with the following criteria:

1. The bidder must be registered with the Contractor’s Industry Development Board (CIDB) in the Mechanical Engineering (ME) category.
2. Proof of registration with professional body / bodies e.g.:
   a. Electrical Contractors Board (ECB),
3. SAQCC for Fire extinguishers, Fire hose reels, and Fire detection,

if a prospective bidder is compliant to specific ISO standards, proof of such certification needs to be provided, e.g. Management System Standards (ISO 9001, ISO 14001), Occupational Health And Safety Management Standard (ISO 18001 / OHSAS 18001), etc. (this is however a non-mandatory requirement). Further membership of any other technical governing bodies or applicable institutes may be provided.

3.2. SCOPE OF WORKS

3.2.1 The Subcontractor shall allow for complete Design Co-ordination, Supply, Delivery, Installation, Testing, Commissioning, and Handing over, in working order, of the specified Installations as a complete working system without any further Material or Labour being required.

3.2.2 Tenderer must acquaint himself with all contract conditions and be satisfied as to the nature and extent of the works and no claim for additional costs or for extension of time under this Contract will be allowed on the grounds of insufficient information.

3.2.3 The drawings issued with Tender Specification indicate design criteria, which will remain unchanged; however, second fix co-ordination may affect the reticulation indicated on Tender Drawings.

3.2.4 Specialists shall install the installations and Workshop Drawings, Programme, and Instructions must be issued to the Main Contractor and Fire Consultant for approval, before any erection work commences.

3.2.5 The following approvals apply to this Contract:

- The Authority having jurisdiction
- The Local Municipality
- Fire Consultants

3.2.6 Three (3) complete operating manuals shall be submitted to the Fire Consultant with “as-built” Drawings.

- System Description
- Detailed Equipment Description
- Operating Instructions
- Trouble Analysis Procedures
- Preventative Maintenance Schedules
- Maintenance Instructions for each item of Equipment
- Recommended Spare Parts List and Price List
- Service and maintenance contract for the following year
- Emergency contact details

3.2.7 The Subcontractor shall add to, or omit from, or vary the work, only on the written authority of the Main Contractor.

3.2.8 The Subcontractor shall provide for the thorough tuition of appointed staff of the Employers with regard to the operating and maintenance of the Installation and Systems.

3.2.9 Prior to commencing site work, the Subcontractor shall make sure that the measurements shown on the detail Drawings correspond to already built work for which detail is given.

3.2.10 The Subcontractor shall guarantee to the Employer, the Material, Apparatus and Workmanship for a period of TWELVE (12) months. The guarantee shall be valid for a period starting on the date when the Certificate of Practical completion for the whole Contract is issued. The Contractor shall cede to the Employer any equipment guarantee, which extends beyond the TWELVE (12) month period. This guarantee is in addition to the Employer’s Common Law Right and in no way constrains or vitiates these said Rights.

3.2.11 All Rates, Prices and Amounts shall exclude VAT.

3.2.12 Testing of the System after completion shall be carried out in the presence and to the satisfaction of the Main Contractor and the Fire Consultant.

3.2.13 The Subcontractor shall set out the work and be responsible and liable for the correct setting out, establishing Centre Lines, Levels, Gradients and the like, carry out the works in close collaboration with other Contractors, and co-operated to the fullest extent with all parties under the direction of the Principle Contractor and be aware that various disciplines will be working simultaneously on this Project, and make himself thoroughly acquainted with the extent and nature of the work specified and the condition affecting it’s execution the means of access and all matters which may influence this Contract.

3.2.14 Any method of fixed and supporting must be submitted to the Structural Engineer for his approval prior to being used on site.

3.2.15 The Subcontractor shall furnish Samples as may be asked for. Orders for materials or special articles required shall be placed as early as possible and the Contractor shall be held responsible for any delays in the delivery of such goods.

3.2.16 Two (2) copies of Shop Drawings shall be submitted for approval. The approval is limited to check conformity with the design requirements and shall not relieve the Tenderer of responsibility for Co-ordination or Installation fit.

3.2.17 All materials and equipment specified under Trade Names, Catalogues, or References should either be exactly as described, or, in the opinion of the Fire Protection Consultant of equal quality specification and mass in all respects to those described.

3.2.18 All Scaffolding shall be supplied by the Subcontractor and shall in all respects meet the approval of the Health and Safety Act and relevant Regulations/SABS Codes of...
Practice; the Subcontractor is to take full responsibility for the unloading, storage, hoisting and security of all his materials and equipment. Storage of materials etc is to be confined to a specific portion of the site and shall be at the sole discretion of the appointed Site Coordinator/Project Manager. All rubbish accumulated during the works and all superfluous materials not required for the completion of the Contract must be carted away at the Tenderer's cost.

3.2.19 The Subcontractor has to prepare a programme. Tenderer is advised to study the Programme to ensure that they are fully acquainted with the commencement / completion dates and the sequence in which the work is to be carried out. The Subcontractor will agree with the Project Manager as to the date on which he is to commence and submission of a Tender will be regarded as a guarantee that the Tenderer can commence accordingly.

3.2.20 Testing of the system on completion will be done in the presence of the Main Contractor.

3.2.21 Final commissioning will be witnessed by Fire Consultant and will only be approved if system is to satisfaction of Fire Consultant.

3.3.2. Fire Protection Installations:

The general fire protection measures to the development shall consist mainly of the following:

- Adequate water supplies for sprinkler system,
- Adequate sprinkler heads in each of the priority six ablutions,

The sub-Contractor shall ensure that he is conversant with the layouts of the ablutions and of other services before he commences with any work on them.

Any challenges that the sub-Contractor may experience during the contract period must be timeously discussed with The Engineer.

All the work shall be carried out in full conformance with these project specifications.
3.3. **DESIGN APPROACH: FIRE PROTECTION**

3.3.1. **Design Codes for Fire Protection Service Installations**

Units shall be designed and constructed to meet the following standards:

Unless otherwise specified further in this specification, the following standard specifications (Including amendments) of the organizations indicated shall form part of this specification. The installations shall comply in all aspects of the Fire Rational Design as approved by Local Authority. The following National Acts/Regulations, Codes of Practice and approval bodies will also be applicable.

a) Ekurhuleni Metropolitan Municipality
b) Client Requirements (ACSA)
c) The National Building Regulations (Act 103 of 1977)
e) SANS 10400-T: 2011 – Fire Protection
f) SANS 10400-W: 2011 – Fire Installation
g) SANS 10287 -Fire Sprinkler Systems
h) SANS 1186-1 Standard signs and general requirements
i) SANS 1186-2 Self-luminous signs
j) SANS 1186-3 Internally illuminated signs
k) SANS 1186-4 Retro-reflective signs
l) SANS 1186-4 Retro-reflective signs
m) SANS 1186-5 Photoluminescent signs
n) Occupational Safety Act.
o) ASIB Rules and Regulations.
p) SANS 10142 – The Wiring of Premises
q) SANS 2001-DP2 or SANS 2001-DP6
s) Local Authority Water Requirements
t) CGA, ETLC, CSA or UL/ULC certified for prewired equipment
3.4. GENERAL SYSTEM PIPE WORK AND FITTINGS

All Pipe work above ground shall be Black S.A.B.S. 62/BS 1387, medium quality.

All Pipe work laid below ground shall be Black S.A.B.S. 62/BS 1387, heavy quality, or uPVC Class 16.

Under ground or imbedded pipe work must be suitably clad with “Denso” tape or equivalent. Hemp must be applied when sealing all threaded pipe joints. Ends of piping shall be reamed before screwing and fitting. All steel pipe sizes specified are ‘ID’ (Internal Diameter – Nominal Bore) and ‘OD’ (Outside Diameter). Class 6 HDPE applies for Hose Reel supplies.

Screwed Pipe fittings up to 150 mm are to be Cast Iron or Malleable Cast Iron and will be threaded in accordance with S.A.B.S. 11O9-1/BS 21(ISO-R7), so as to make a metal joint where jointing material is used.

Galvanised steel pipes and fittings to be galvanised in accordance with SABS 763. All fittings will also comply with the requirements of SABS 62-1 to all medium pipe sizes.

Welded sections of Pipe will have Flange / Klambon Coupling joints at suitable intervals to facilitate removal.

All threaded Pipe joints are to be made with Hemp covered with two (2) layers of PTFE Tape.

Ends of Pipe shall be reamed before screwing and fitting.

All exposed pipe work to be painted with one coat primer and two coats gloss enamel paint one coat on site or workshop and final coat after installation.

All pipes will be adequately secured and neat.

Maximum distance between pipe supports:

<table>
<thead>
<tr>
<th>Pipe nominal bore (mm)</th>
<th>Maximum support spacing (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>32</td>
<td>2000</td>
</tr>
<tr>
<td>40</td>
<td>2100</td>
</tr>
<tr>
<td>50</td>
<td>2400</td>
</tr>
<tr>
<td>65</td>
<td>2700</td>
</tr>
<tr>
<td>80</td>
<td>3000</td>
</tr>
</tbody>
</table>

Distance between pipe supports:

<table>
<thead>
<tr>
<th>Nominal pipe diameter (mm)</th>
<th>Maximum spacing (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 65</td>
<td>4</td>
</tr>
<tr>
<td>65 – 100</td>
<td>6.1</td>
</tr>
<tr>
<td>100 - 250</td>
<td>6.5</td>
</tr>
<tr>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Angle iron brackets between purlins or trapeze to be as per table below:

<table>
<thead>
<tr>
<th>Size mm</th>
<th>1900</th>
<th>2400</th>
<th>2800</th>
<th>3300</th>
<th>3700</th>
<th>4200</th>
<th>4700</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>65x50x5</td>
<td>65x50x5</td>
<td>75x50x6</td>
<td>70x70x6</td>
<td>100x65x7</td>
<td>100x65x7</td>
<td>100x65x7</td>
</tr>
<tr>
<td>100</td>
<td>75x50x6</td>
<td>75x50x6</td>
<td>75x50x6</td>
<td>70x70x6</td>
<td>100x65x7</td>
<td>100x65x7</td>
<td>100x65x7</td>
</tr>
<tr>
<td>150</td>
<td>75x50x6</td>
<td>100x65x8</td>
<td>100x75x8</td>
<td>100x65x7</td>
<td>100x65x7</td>
<td>100x65x10</td>
<td>100x75x10</td>
</tr>
</tbody>
</table>
3.5 AUTOMATIC SPRINKLER SYSTEMS

SANS 10400 Part T4.4 states that:

“Any building shall be divided into divisions of an area not more than that given in column 2, 3 or 4 of Table 3, as the case may be, and such divisions shall be separated effectively from each other by division separating elements...”

Table 3 then continues to limit the maximum division area for occupancy uses in a building such as this one to be:

<table>
<thead>
<tr>
<th>Occupancy</th>
<th>Maximum division area m²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No fixed automatic fire extinguishment installation</td>
</tr>
<tr>
<td></td>
<td>1 Storey</td>
</tr>
<tr>
<td>*E1, *E2, *E3</td>
<td>1250</td>
</tr>
<tr>
<td>E4</td>
<td>250</td>
</tr>
<tr>
<td>A2, B2, B3, C1, C2, G1</td>
<td>5000</td>
</tr>
<tr>
<td>A4, A5, D3, J3, J4</td>
<td>No limit</td>
</tr>
<tr>
<td>All other occupancies</td>
<td>2500</td>
</tr>
</tbody>
</table>

*The maximum division area on any storey, and all such divisions, shall be interconnected.

From the table above, Automatic Sprinkler Systems are required for the priority six ablutions at the airport. Furthermore, sprinklers are required in the following occupancies:

1. In any building that exceeds 30 m in height, except where such building is exclusively of an occupancy classified as G1 or H3 where the division size is not greater than 500m². The airport buildings are less than 30m high.

2. In any basement storey which exceeds 500m² in floor area.

3.5.1 Automatic Sprinkler Systems Remedial Works

The following remedial works shall be carried out in the different sections in order to ensure compliance with fire regulations as well as the ASIB:

3.5.2 For the Priority Six Ablutions D2, E3, P2, F3, H1, C1

i. All sprinkler heads in the ablutions (particularly the damaged and/or with minor paint coat) shall be replaced,

ii. Corrosion protection measures shall be taken to prevent further rusting on all piping,

iii. Dry pendant sprinklers, 15mm dia. nominal bore quartzoid bulb type sprinklers with temperature rating of 68°C at 7.5mm/min design density, to be used.

iv. All sprinklers that are out of rule shall be relocated. Additional heads shall be added in order to ensure the installations are compliant with SANS 10287 and ASIB rules,
v. A selection of at least 6 sprinklers shall be removed, labelled from the areas they are taken from and submitted for a test, the resultant report must then be submitted to the recognised authority. Should any sprinkler fail to operate within its predetermined limits all sprinklers within the installation must be replaced. ASIB 10th Edition requires that all sprinklers of 20 years of age must be tested

vi. Sprinkler heads shall be installed in all areas without sprinkler protection such as baby rooms, disabled ablutions and sluice rooms.

3.6 FIRE & EVACUATION SIGNAGE

All firefighting equipment will be clearly indicated by means of photoluminescent (glow-in-the-dark) symbolic signs.

All signs to comply to comply with SANS 10400-T: 2011 Section 4.29 and SANS 1186 Part 1 to 5.

A photoluminescent sign shall comply with the requirements of sections 4.1, 4.2, 4.3 and 4.4 of SANS 1186-1.

PICTOGRAM'S

Pictogram design must comply with SANS Codes of Practice and International accepted standards. The pictogram size, design and colour must be submitted for approval by the Fire Consultant before manufacture and installation.

GENERAL REQUIREMENTS

All signage will be fitted by use of screws, raw bolts, steel nails or suspended steel cable/chains. No adhesives or double-sided tape will be permitted.

Should the Contractor wish to use multipurpose silicon adhesive written application with sample and specification of product must be submitted for approval by the Fire Consultant prior to installation.

All signage must be neatly fitted plumb. No substandard workmanship will be accepted.

NB: All signs to be framed in natural anodised aluminium.

GENERAL DESCRIPTION

Dimensions of pictograms shall be as per Table 5 of SANS 1186-1. Standard signage (without frame) sizes are as follows:

For occupancy G1 areas

190mm x 190mm.
190mm x 380mm.
190mm x 570mm.
190mm x 760mm.

Signage may be single sided or double sided suspended. Signage provided with frames shall be manufactured of natural anodised aluminium.

COLOUR

The colour of the sign shall be as given in SANS 1186-1.

EVACUATION SIGNS
Evacuation signage will be green on white or slight variation of white in the case of photo luminescent type sign due to restrictions of the photo luminescent product.

FIRE EQUIPMENT SIGNS

Fire equipment signage will be red on white or slight variation of white in the case of photo luminescent type sign due to restrictions of the photo luminescent product.
4. SITE DETAILS AND OPERATING CONDITIONS

4.1. ABLUTION DESIGN AMBIENT CONDITIONS

- **Altitude**: 1700m (Kempton Park, Gauteng Province)
- **Electrical Supply**: 240 volt, 1 phase 50 cycle
  
- 380 volt, 3 phase 50 cycle, 4 wire

4.2. MINIMUM ABLUTION OPERATING CONDITIONS

All equipment will be suitable for operation in the environment in which they are to be located. As a minimum, all equipment etc. will be suitable for operation at full capacity under the following conditions:

- Height above sea level not exceeding 100m;
- Air cooling at an average temperature over 24 hours not exceeding 45°C dry bulb;
- Maximum conditions of 45°C dry bulb and 50 %relative humidity;
- Minimum conditions of -10°C dry bulb and 100 % relative humidity;
- Protection of all equipment exposed to atmosphere/ambient to EN 60529 - IP 65.
5. **SITE VISIT**

Bidders shall be requested to visit the site before bidding, so as to acquaint themselves with prevailing conditions and dimensions. A COMPULSORY SITE VISIT IS REQUIRED.
6. TEMPORARY OFFICES

The sub-Contractor need not provide offices for the Resident Engineer. In the absence of any specific requirements, the Engineer requires merely that the sub-Contractor have suitable offices on site in which site meetings may be held.
7. AREAS REQUIRING SPECIAL ATTENTION

7.1. GENERAL

7.1.1. Setting out of works

The sub-Contractor shall set out the work and be responsible and liable for the correct setting out, establishing Centre Lines, Levels, Gradients and the like, carry out the works in close collaboration with other Contractors, and co-operated to the fullest extent with all parties under the direction of the Principal Contractor and be aware that various disciplines will be working simultaneously on this Project, and make himself thoroughly acquainted with the extent and nature of the work specified and the condition affecting its execution, the means of access and all matters which may influence this Contract.

7.1.2. Samples

The sub-Contractor shall furnish Samples as may be asked for. Orders for materials or special articles required shall be placed as early as possible and the Contractor shall be held responsible for any delays in the delivery of such goods.

7.2. FINISHING & TIDYING

Progressive and systematic finishing and tidying will form an essential part of this contract. Under no circumstances shall spoil, rubble, materials, equipment or unfinished operations be allowed to accumulate unnecessarily and in the event of this occurring the Engineer shall have the right to withhold payment for as long as necessary in respect of the relevant works in the area(s) concerned.

7.3. CONSTRUCTION METHODS

a) Construction shall be carried out in accordance with the Expanded Public Works Programme (EPWP) guidelines that are aimed at infrastructure and services development coupled with creation of employment and skills training.

b) Labour-based or labour-intensive construction may be defined as the economically efficient employment of as much labour as is technically feasible to produce as high a standard of construction as demanded by the specification and allowed by the funding available. In other words, projects based on labour-intensive principles aim at devoting the feasible proportion of projects costs to unskilled, semi-skilled and skilled labour without jeopardizing the technical quality of the product demanded by the specification.

c) Labour-based methods of construction result in the creation of a significant increase in employment opportunities per unit of expenditure. The intensive employment of labour achieves value for money through innovative techniques of work and management. In particular (i) as far as possible, payment of wages for labour is related to production output: a reasonable “task” is set, upon completion of which the labourer may go home and (ii) employment is either on a daily/casual/temporary basis or in the form of a short-term monthly contract. It is useful to think of labour-based methods as the effective substitution of labour for equipment in construction. This is done in such a way that there is neither an increase in economic cost nor a decrease in quality.

d) The following regulations must be adhered to so as to ensure that the construction methods used are labour-intensive.

   i. The remuneration to local labour for hourly-rated employees and/or daily-based work shall be in accordance with the prevailing gazetted rates.
ii. The name, identification number, task performed and hours worked per day for each labourer shall be recorded by the sub-Contractor. These records shall be submitted to the Engineer together with each payment certificate.

e) Bidders are encouraged to utilize the services of locally based sub-Contractors.

7.4. PAINTING

The installation, shall be painted in accordance with an approved colour code. Such painting shall be only necessary to those items which would normally be visible when serviced, all mild steel or other components which would otherwise suffer corrosion if unpainted, however, shall be painted with two coats of rust-proof paint whether such components are normally visible or not. Items which are factory painted need not be repainted other than any making good which may be necessary.
8. COMPLETION, GAURANTEES & MAINTENANCE

8.1. TESTING

A Testing and Commissioning Notice shall be sent out to the Engineer accompanied with the test procedure 2 weeks prior to the scheduled Testing and Commissioning date.

All Equipment used for Testing and Commissioning shall have a Valid Calibration Certificate which must be placed on the test report. On completion, the installation shall be balanced, set and tested to establish the capacity and performance within the ablation. All such tests shall be recorded and typed copies of all test recordings shall be included within the operating manuals later specified herein. The test reports shall set out the procedure, data and instrument readings obtained as compared with the required capacities and the manufacturer’s name plate rating where applicable.

All performance figures obtained during testing and commissioning must be within ±10% of the specified performance figures given in the Tender drawings and Technical specification.

8.2. END USER TRAINING

Upon completion of all works and all tests, the contractor shall furnish necessary operator’s labor and helpers for operating the entire installation for a period not less than two weeks of ten hours each to enable the owner’s staff get acquainted with the operation of the system. During this period the contractor shall train the owner’s personnel in the operation, adjustment and maintenance of all equipment installed.
8.3. OPERATING AND MAINTENANCE MANUALS

Three instruction manuals shall be provided for the new equipment. Each manual shall comprise of the following sections, bound in a vinyl plastic covered folder with the name of the project typewritten on a card inserted into a clear plastic covered cardholder on the front cover and spine and shall be handed to the Client on completion of the installation.

- Index
- Description of Systems and Equipment (as installed)
- Operation of Equipment (as installed)
- Commissioning Data (Signed off by Engineer)
- Inspection and Maintenance Instructions (in schedule form setting out each item, the description and frequency of maintenance operations required).
- Operating Instructions (Running checklist and frequency of servicing, Safety precautions to be taken, Manual and automatic operation, Operator's duties, Lubricating oils and service instructions, Pre-start checklist for each system, Starting and stopping procedures)
- Spare Parts (list of spare parts to be supplied, as later specified herein, with detailed description of each part, make, model and part number and supplier's name and address)
- Descriptive literature (for all items and equipment)
- As-Built drawings in hardcopy and Autocad 2010 version electronic format (of the ablutions as installed to include ablation layout drawings, control and wiring diagrams and schematic piping diagrams).

8.4. COMMISSIONING PROGRAMME

The sub-Contractor shall adhere to the Client’s programme for the installation, but shall ensure that his commissioning programme makes allowance for the following requirements:

i. At the date of Beneficial Occupation, **ALL** systems shall be operating and the sprinkler system is fully operational, balanced, tested, commissioned, approved by The Engineer and handed over by that date.
8.5. GUARANTEE AND MAINTENANCE

The entire fire sprinkler system installation shall be subject to a guarantee and servicing of 12 months from the Beneficial Occupation date, or from the date of the Taking-Over certificate as state below.

Expendables for the maintenance period must be included in the contract price. Other minor expendables shall also be included. The sub-Contractor shall be entirely responsible for carrying out regular inspections at intervals not greater than 1 month.

A detailed inspection and service log book with check sheets showing all functions to be carried out at each inspection and service, is to be kept on site for all service activity and must be countersigned by a manager or facilities personnel as client representative. The equipment shall be services and maintained in strict accordance to the equipment manufacturer’s recommended intervals and service item list. The sub-Contractor shall draw-up and submit the INSPECTION & SERVICE SCHEDULE to the Engineer for their approval. The Service Schedule shall include for regularity of maintenance, service items at those intervals and recommended spare parts list. This schedule must be submitted 2 months before equipment handover and approved by the Engineer latest 3 weeks before scheduled handover of installations.

8.6. WARRANTIES

8.6.1 Taking-Over Certificate

When the whole of the Works have been substantially completed and have satisfactorily passed any Tests on Completion prescribed by the Contract, the sub-Contractor may give a notice to that effect to The Engineer, with a copy to the Employer, accompanied by a written undertaking to finish with due expedition any outstanding work during the Defects Liability Period. Such notice and undertaking shall be deemed to be a request by the sub-Contractor for The Engineer to issue a Taking-Over Certificate in respect of the Works. The Engineer shall, within 21 days of the date of delivery of such notice, either issue to the sub-Contractor with a copy to the Employer, a Taking-Over Certificate, stating the date on which, in his opinion, the Works were substantially completed in accordance with the Contract, or give instructions in writing to the sub-Contractor specifying all the work which, in The Engineer’s opinion, is required to be done by the sub-Contractor before the issue of such Certificate.

The Engineer shall also notify the sub-Contractor of any defects in the Works affecting substantial completion that may appear after such instructions and before completion of the Works specified therein. The sub-Contractor shall be entitled to receive such Taking-Over Certificate within 21 days of completion, to the satisfaction of the Architect, of the Works so specified and remedying any defects so notified.

8.6.2 Taking Over of Sections or Parts

Similarly, in accordance with the procedure set out in Sub-Clause 7.1, the sub-Contractor may request and The Engineer shall issue a Taking-Over Certificate in respect of:

a) any substantial part of the Permanent Works which has been both completed to the satisfaction of The Engineer and, otherwise than as provided for in the Contract, occupied or used by the Employer, or

b) any part of the Permanent Works which the Employer has elected to occupy or use prior to completion (where such prior occupation or use is not provided for in the Contract or has not been agreed by the sub-Contractor as a temporary measure).
8.6.3 Substantial Completion of Parts

If any part of the Permanent Works has been substantially completed and has satisfactorily passed any Tests on Completion prescribed by the Contract, The Engineer may issue a Taking-Over Certificate in respect of that part of the Permanent Works before completion of the whole of the Works and, upon the issue of such Certificate, the sub-Contractor shall be deemed to have undertaken to complete with due expedition any outstanding work in that part of the Permanent Works during the Defects Liability Period.

8.6.4 Surfaces Requiring Reinstatement

Provided that a Taking-Over Certificate given in respect of any Section or part of the Permanent Works before completion of the whole of the Works shall not be deemed to certify completion of any ground, roof or surfaces requiring reinstatement unless such Taking-Over Certificate shall expressly so state.

8.7 DEFECTS LIABILITY

8.7.1 Defects Liability Period

In these Conditions the expression "Defects Liability Period" shall mean the defects liability period calculated from:

a) the date of completion of the Works certified by The Engineer in accordance with Clause 8, or
b) in the event of more than one certificate having been issued by The Engineer under Clause 8, the respective dates so certified, and in relation to the Defects Liability Period the expression "the Works" shall be construed accordingly.

The defects liability period for this contract shall however be not less than 12 calendar months from the date of certification by The Engineer.

8.7.2 Completion of Outstanding Work and Remedying Defects

During the Defects liability period, the sub-Contractor shall:

a) complete any minor works, if any, outstanding on the date stated in the Taking-Over Certificate as soon as practicable after such date, and
b) execute all such work of amendment, reconstruction, and Remedying defects, shrinkages or other faults as The Engineer may, during the Defects Liability Period or within 14 days after its expiration, as a result of an inspection made by or on behalf of The Engineer prior to its expiration, instruct the sub-Contractor to execute.

The expiration of the Defects Liability Period shall not exonerate the sub-Contractor from any further liabilities arising at Law.

8.7.3 Cost of Remedying Defects

All work referred to in Sub-Clause 7.7.2 shall be executed by the sub-Contractor at his own cost if the necessity thereof is, in the opinion of the Architect, due to:

a) the use of materials, or workmanship not in accordance with the Contract,
b) where the sub-Contractor is responsible for the design of part of the Permanent Works, any fault in such design, or
c) the neglect or failure on the part of the sub-Contractor to comply with any obligation, expressed or implied, on the sub-Contractor's part under the Contract,

If, in the opinion of The Engineer, such necessity is due to any other cause, he shall determine an addition to the Contract Price and shall notify the sub-Contractor accordingly, with a copy to the Employer.
8.8 CONTRACTOR’S FAILURE TO CARRY OUT INSTRUCTIONS

In case of default on the part of the sub-Contractor in carrying out such instruction within a reasonable time, the Employer shall be entitled to employ and pay other persons to carry out the same and if such work is work which, in the opinion of The Engineer, the sub-Contractor was liable to do at his own cost under the Contract, then all costs consequent thereon or incidental thereto shall, after due consultation with the Employer and the sub-Contractor, be determined by The Engineer and shall be recoverable from the sub-Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the sub-Contractor and The Engineer shall notify the sub-Contractor accordingly, with a copy to the Employer.
9. SCHEDULE OF MAJOR EQUIPMENT PERFORMANCE REQUIREMENT

9.1 FIRE PROTECTION SERVICES

Refer to BoQ and Tender drawings
10. **ANNEXURE A – TENDERER’S RETURNABLE SCHEDULES**

* (SCHEDULES TO BE COMPLETED IN FULL) 

**IMPORTANT NOTE:**
If it is intended to sub-contract more than 25% of the work, the BBBEE rating of the sub-contractor must be equal or better than that of the bidding contractor.
## SCHEDULE A: DETAILS OF CONTRACTOR AND / OR FIRE SUB-CONTRACTOR

*Details on this page MUST be completed fully. Incomplete forms shall render the offer invalid. (N/A to be stated if not applicable).*

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered name of company/enterprise</td>
<td></td>
</tr>
<tr>
<td>CIPRO Registration number</td>
<td></td>
</tr>
<tr>
<td>VAT registration number</td>
<td></td>
</tr>
<tr>
<td>UIF registration number</td>
<td></td>
</tr>
<tr>
<td>Official telephone number</td>
<td>(        )</td>
</tr>
<tr>
<td>Official fax number</td>
<td>(        )</td>
</tr>
<tr>
<td>E-mail Address</td>
<td></td>
</tr>
<tr>
<td>Physical Address</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Code</td>
</tr>
<tr>
<td>Official Postal Address</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Code</td>
</tr>
<tr>
<td>Director / Member (1)</td>
<td></td>
</tr>
<tr>
<td>Full Names and Surname</td>
<td></td>
</tr>
<tr>
<td>Position in company / enterprise</td>
<td></td>
</tr>
<tr>
<td>ID No.</td>
<td>Income Tax No.</td>
</tr>
<tr>
<td>Director / Member (2)</td>
<td></td>
</tr>
<tr>
<td>Full Names and Surname</td>
<td></td>
</tr>
<tr>
<td>Position in company / enterprise</td>
<td></td>
</tr>
<tr>
<td>ID No.</td>
<td>Income Tax No.</td>
</tr>
<tr>
<td>Director / Member (3)</td>
<td></td>
</tr>
<tr>
<td>Full Names and Surname</td>
<td></td>
</tr>
<tr>
<td>Position in company / enterprise</td>
<td></td>
</tr>
<tr>
<td>ID No.</td>
<td>Income Tax No.</td>
</tr>
</tbody>
</table>

**SIGNED ON BEHALF OF TENDERER:** ..........................
SCHEDULE B: DEVIANATIONS AND QUALIFICATIONS BY TENDERER

The Tenderer shall record any deviations or qualifications to the requirements of the tender documents in this Returnable Schedule. Alternatively, a tenderer may state such deviations and qualifications in a covering letter attached to his tender and reference such letter in this schedule.

If no deviations or qualifications are made, the schedule hereunder is to be marked **NIL** and signed by the Tenderer.

<table>
<thead>
<tr>
<th>PAGE</th>
<th>CLAUSE OR ITEM</th>
<th>DEVIATION OR QUALIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of sheets appended by the tenderer to this Schedule ..................... (If nil, enter NIL).

**SIGNED ON BEHALF OF TENDERER:** ..........................................................
## SCHEDULE C: RECORD OF ADDENDA TO TENDER DOCUMENTS

We confirm that the following communications received from the Employer before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer:

<table>
<thead>
<tr>
<th>Date</th>
<th>Title or Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
</tr>
</tbody>
</table>

Attach additional pages if more space is required.

Signed ___________________________  Date ___________________________

Name ___________________________  Position ___________________________

Tenderer

---
### SCHEDULE D: REFERENCES AND VITAL INFORMATION

1. **CLIENT REFERENCES OF CURRENT AND PREVIOUS CONTRACTS**

Please provide references from three clients with similar requirements as the Client (one reference may be from the Client’s department or division). These references are to demonstrate your ability to fulfill the Client’s requirements and your ability to maintain satisfied customers.

(Please mark blocks with ‘x’ where appropriate)

<table>
<thead>
<tr>
<th>Name of Client/Company (1)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract period (in months)</td>
<td></td>
<td><strong>Ongoing</strong></td>
</tr>
<tr>
<td>Value of Contract (per month)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of business rendered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact</td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td>Tel no.</td>
<td></td>
<td>Alternative Tel no.</td>
</tr>
<tr>
<td>Fax no.</td>
<td></td>
<td>E-mail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Client/Company (2)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract period (in months)</td>
<td></td>
<td><strong>Ongoing</strong></td>
</tr>
<tr>
<td>Value of Contract (per month)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of business rendered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact</td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td>Tel no.</td>
<td></td>
<td>Alternative Tel no.</td>
</tr>
<tr>
<td>Fax no.</td>
<td></td>
<td>E-mail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Client/Company (3)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract period (in months)</td>
<td></td>
<td><strong>Ongoing</strong></td>
</tr>
<tr>
<td>Value of Contract (per month)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of business rendered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact</td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td>Tel no.</td>
<td></td>
<td>Alternative Tel no.</td>
</tr>
<tr>
<td>Fax no.</td>
<td></td>
<td>E-mail</td>
</tr>
</tbody>
</table>
2. LIST OF CURRENT/PREVIOUS SUPPLIERS - CONTRACTOR AND/ OR SUB-CONTRACTOR

<table>
<thead>
<tr>
<th>Name of Supplier/Company (1)</th>
<th>Description of Commodity</th>
<th>Value of commodities supplied (per month)</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Contact</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative Tel no.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-mail</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Supplier/Company (2)</th>
<th>Description of Commodity</th>
<th>Value of commodities supplied (per month)</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Contact</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative Tel no.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-mail</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Supplier/Company (3)</th>
<th>Description of Commodity</th>
<th>Value of commodities supplied (per month)</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Contact</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative Tel no.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-mail</td>
<td></td>
</tr>
</tbody>
</table>
**SCHEDULE E: DETAILS OF CONTRACTOR AND/OR FIRE SUB-CONTRACTOR’S WORKSHOP FACILITIES & EQUIPMENTS**

The tenderer shall state below what workshop facilities will be available for this Contract.

<table>
<thead>
<tr>
<th>Address of Workshop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Artisans Normally Employed by Firm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Technically Qualified Persons Employed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**SIGNED ON BEHALF OF TENDERER:**
SCHEDULE F: SCHEDULE OF PROPOSED SPECIALISTS SERVICE PROVIDERS OR ALTERNATIVES

Proposed Sub-contractors

We notify you that it is our intention to employ the following Sub-contractors for normal work in this contract.

Acceptance of this tender shall not be construed as approval of all or any of the listed subcontractors. Should any of the subcontractors not be approved subsequent to acceptance of the tender, this shall in no way invalidate this tender, and the tendered unit rates for the various items of work shall remain final and binding, even in the event of a subcontractor not listed below being approved by the Engineer.

<table>
<thead>
<tr>
<th>SUB-CONTRACTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category/type</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

TOTAL (Excluding VAT)

Number of sheets appended by the tenderer to this Schedule ....................... (If nil, enter NIL).

SIGNED ON BEHALF OF TENDERER: .............................................................
Tenderers shall set out in the Schedule hereunder details of the Site Manager’s experience in work of a similar nature to that for which their Tender is submitted.

Failure to complete this Schedule may result in the Tender not being considered.

<table>
<thead>
<tr>
<th>SITE MANAGER/SUPERVISOR</th>
<th>NAME: .................................................... NQF LEVEL...........</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRACT &amp; CLIENT</td>
<td>NATURE OF WORK</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of sheets appended by the tenderer to this Schedule ....................... (If nil, enter NIL).

SIGNED ON BEHALF OF THE TENDERER: ..............................................
### SCHEDULE H: REGISTRATION WITH RELEVANT PROFESSIONAL BODIES/ INSTITUTIONS

<table>
<thead>
<tr>
<th>Name of Company/ Person</th>
<th>Professional Body</th>
<th>Registration No.</th>
<th>Date Joined</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SIGNED ON BEHALF OF THE TENDERER:** ........................................
DETAILED TECHNICAL SPECIFICATION

FIRE DETECTION INSTALLATIONS

THE REFURBISHMENT PROJECT FOR ABLUTIONS (ORTIA)
Priority Six Ablutions C1, F3, E3, P2, D2 & H1

PROJECT NUMBER – J000064

Prepared by:

04 OCTOBER  2019

FIRE DETECTION
TECHNICAL SPECIFICATION
# TABLE OF CONTENTS

1. **FIRE DETECTION - DETAILED TECHNICAL SPECIFICATION** .......................................................... 4
   1.1 DESIGN STANDARDS AND APPROVALS ................................................................. 4
   1.2 DESIGN INTENT OVERVIEW ................................................................................... 4
   1.3 ELECTRICAL ............................................................................................................ 8
   1.4 SITE DETAILS AND OPERATING CONDITIONS ....................................................... 12
      1.4.1 DESIGN AMBIENT CONDITIONS ..................................................................... 12
      1.4.2 MINIMUM OPERATING CONDITIONS ...........................................................(12)
2. **SITE VISIT** .................................................................................................................. 13
3. **TEMPORARY OFFICES** ............................................................................................... 14
4. **AREAS REQUIRING SPECIAL ATTENTION** ................................................................. 15
   4.1 GENERAL ............................................................................................................... 15
   4.2 FINISHING & TIDYING ......................................................................................... 15
   4.3 CONSTRUCTION METHODS .................................................................................. 15
   4.4 PAINTING ............................................................................................................... 16
5. **COMPLETION, GURANTEES & MAINTENANCE** ......................................................... 17
   5.1 TESTING ................................................................................................................. 17
   5.2 END USER TRAINING ............................................................................................ 17
   5.3 OPERATING AND MAINTENANCE MANUALS ....................................................... 18
   5.4 COMMISSIONING PROGRAMME ............................................................................ 19
5.5 GUARANTEE AND MAINTENANCE

5.6 WARRANTIES

5.7 DEFECTS LIABILITY

5.8 CONTRACTOR’S FAILURE TO CARRY OUT INSTRUCTIONS

6. *APPENDIX A – INTEGRATED FIRE ALARM, PUBLIC ADDRESS & VOICE EVACUATION SYSTEM: TENDERERS’ RETURNABLE SCHEDULES
1. FIRE DETECTION - DETAILED TECHNICAL SPECIFICATION

1.1 DESIGN STANDARDS AND APPROVALS

Units shall be designed and constructed to meet the following standards:

Unless otherwise specified further in this specification, the following standard specifications (Including amendments) of the organizations indicated shall form part of this specification. The installations shall comply in all aspects of the Fire Rational Design as approved by Local Authority and also to this detailed technical specification. The following National Acts/Regulations, Codes of Practice and approval bodies will also be applicable.

a) End User Requirements (ACSA)
b) South African National Standards (SANS), e.g.
   • SANS 10139 - Fire Detection & Alarm Systems for Buildings, System Design, Installation and Servicing,
   • SANS 10142 - The Wiring of Premises
   • SANS 10400-O: 2011 - Lighting and ventilation.
   • SANS 10400-T: 2011 - Fire Protection
   • SANS 10400 - The application of the National Building Regulations Local Authority’s codes and by-laws
c) Life Safety Code based on NFPA 101
d) Local Authority – Emergency Services requirements for rational fire design
f) EN 12101 - Smoke control systems.
j) Occupational Health and Safety Act (No. 85 of 1993)
k) National Building Regulations.

Any reference to EN54 or BS5445 or BS5839 shall be replaced with SANS 10139 and SANS 322. NFPA 2001 shall only be referred to if all the above standards and specifications are silent about an aspect.

1.2 DESIGN INTENT OVERVIEW

The fire detection installation shall be as per Tender Drawings. The contractor shall check with the manufacturers and ensure that the system offered is not obsolete.

Circuit breakers feeding life safety equipment to be labelled accordingly “LIFE SAFETY EQUIPMENT – DO NOT SWITCH OFF”

1.2.1 Smoke Detectors

a) The fire detection installation shall consist of smoke detectors to be installed in the ceiling void.
   The following analogue addressable point fire sensors shall be available. They shall conform fully to their product standards shown and carry approval certificates to these standards issued by the Loss Prevention Certification Board (LPCB) in the UK or an equivalent European national testing laboratory.
   • Multisensor optical smoke and heat detector. Product standards EN54-5 and EN54-7.
   • Dual sensor optical smoke and heat detector. Product standards EN54-5 and EN54-7.
   • Optical smoke detector. Product standard EN54-5.
b) All detectors shall have a unique address set using high integrity sealed dipswitches.
c) Smoke detectors shall have not less than four sensitivity levels that can be selected as part of the site configuration data. The default sensitivity level shall be between 2% and 3% obscuration per metre. Heat detectors shall have not less than four sensitivity levels that can be selected as part of the site configuration data.

d) Every detector must have the facility to optionally verify the validity of an alarm condition over a 20 second period, before initiating an alarm signal. The alarm verification function shall be enabled or disabled, on a device by device basis, from the control panel as part of the site configuration data.

e) Detectors shall be monitored for contamination and the system shall adjust their alarm thresholds to compensate for contamination over time. When the alarm threshold can no longer be adjusted the panel shall indicate a "maintenance required" signal for the particular detector. This must be separate to a "pre-alarm" signal. The use of a combined signal for "pre-alarm/maintenance" is not acceptable.

f) Detectors shall plug into separate mounting bases with a twist-lock action. The bases shall be fitted with corrosion resistant connector springs and terminal screws with captive clamping plates. The terminals shall be sufficiently large and robust to reliably connect 2.5mm diameter MICC cables. Detector line continuity shall be maintained when a detector is removed from its base.

g) There shall be a facility on the mounting base for attaching a label indicating the address of that detector. A similar facility shall be available on the detector, enabling the fitting of a label indicating its address. When the detector is fitted to its base, both the detector and base address labels shall be visible, and aligned adjacent to each other.

h) In the case of smoke detectors smoke entry points must be protected against insect ingress by corrosion resistant mesh.

i) All detectors shall possess a self-test feature that checks the ability of a detector to effect an alarm at the control panel through the communications protocol. In the case of optical smoke detectors they must also test the correct functioning of the smoke chamber and smoke sensors. On triggering a self-test a healthy detector transmits back smoke and thermal values in excess of the recommended fire alarm threshold. In the case of optical smoke detectors this must be done by increasing the brightness of the transmitter LED until it is sufficient to simulate the effect of light scatter in a smoke filled chamber.

j) The detectors self-test feature shall be triggered automatically from the control panel not less than once every 24 hours. It shall also be possible to trigger a self-test of a detector manually from the control panel. The control panel will recognise detector tests as such and will not raise an alarm, but if the detector fails to communicate fire level reading then the panel shall raise a "self-test fail" condition for that detector.

k) Multisensor detectors shall combine both smoke and heat sensor responses to determine an overall fire condition. It shall also be software selectable to operate as a dual sensing device with independent smoke and heat detectors in a single device. The multisensor shall have a single loop address. The smoke and thermal element states must however be reported independently to the control panel.

l) Dual sensor optical/heat detectors shall operate as two distinct detectors, one heat and one smoke. They shall have a single loop address but the smoke and thermal element states must be reported independently to the control panel. When a fire alarm is generated from the dual sensor detector the control panel shall be aware which element, smoke or heat, is responsible for the alarm and be able to trigger different output activations and alarm sequences for each. It shall be possible to disable the smoke and heat sensing components of the detector independently of one another. It shall also be possible to configure the dual detector so that both heat only detection is available in day time mode (no smoke detection) but both heat and smoke sensing are available in night time mode.
1.2.2 Electronic Loop Sounders and Becons

a) Electronic loop sounders shall comply with EN54-3 and be certified by LPCB or a European equivalent.

b) Loop sounders and beacons shall be powered directly from the device address loops without the need for additional wiring or power. They shall each have their own device address and can be switched on individually by program control from the control panel as an alarm output.

c) All loop sounders shall be able to produce at least three alarm tone types, continuous, intermittent and two-tone. These alarm tones shall comply with the frequency requirements of BS5839 Pt 1 and applicable local standards. The alarm tones shall be individually selectable by program control from the control panel. All beacons shall have a light output at least equivalent to a 1 Joule red lens xenon element beacon with a flash frequency of 1.1 seconds.
d) In order to minimise the number of installation points and to provide cost effective sound and light output to BS5839 Pt 1 there shall be several versions and combinations of loop sounders and beacons available, all with compatible tones.

- Sounder bases shall enable the installation of an addressable loop sounder and a detector at a single fixing point. The detector and sounder shall operate as two individual devices and have their own addresses. Up to 60 sounder bases shall be supported powered on a 1km length loop cable of at least 1.5mm2 diameter. The sound output of the sounder base shall be at least 90dBA at 1 metre. A variant with a visual alarm shall also be available allowing up to 40 per loop.

- Room sounders are unobtrusive and suit small areas and bedrooms. Up to 60 room sounders shall be supported powered on a 1km length loop cable of at least 1.5mm2 diameter. The sound output of the room sounder shall be at least 90dBA at 1 metre.

- Room beacons are unobtrusive and up to 60 per loop shall be supported.

- Horn sounders have sufficiently high sound output to be used in general open area coverage. Up to 40 horn sounders shall be supported per loop with a sound output of at least 100dBA at 1 metre. Versions with an integral beacon shall be available with up to 25 per loop. Weatherproof variants shall also be available.

e) All loop sounders and beacons shall have the facility to connect a 24V power supply feed to provide power in cases where design requirements exceed the number of devices that can be powered directly from the loop.

f) All loop sounders shall have a self-test diagnostic feature which is automatically triggered by the routine alarm tests carried out from the control panel. The sounder self-test shall take place when the sounder is activated in an alarm test. A built in microphone circuit shall detect the presence of the physical sound produced by the sounder. If no physical sound is detected by the microphone then a fault condition is raised for that sounder. If the sound is detected then the sounder has passed the test and no action is taken.
1.2.3 Input and Output Devices

a) Input and output devices shall comply with EN54-18. Each input and output device shall have its own address, such that specific input triggers can be used to control individual output activations.

b) Interface units shall monitor a single voltage free contact and signal to the control panel when the contact is closed. The interface unit shall monitor the input circuit wiring for short circuit and open circuit faults and report these if detected. The interface unit activation shall be configurable at the control panel as a fire alarm, sprinkler activation, fault, and security alert or non-fire event.

c) Zone interface units shall power and monitor a zone circuit of conventional type (non-addressable) fire detectors and call points. They shall also be capable of monitoring intrinsically safe detectors and call points through suitable power limiting safety barriers. The conventional zone circuit shall monitor for activation of fire detectors and call points which will cause a fire event to be generated by the interface unit. Open and short circuit faults are also monitored and reported if present. The zone interface unit shall be powered by the address loop and have an option for connection of an external power supply.

d) Relay units shall provide single pole, voltage free, and change over contacts for control purposes such as door release or emergency shutdown of equipment. The switch rating shall be at least 1A at 30V DC.

e) Alarm circuit units shall provide two monitored sounder outputs suitable for each switching and driving a circuit of electronic sounders or alarm bells. Power for the alarm devices shall be from 24V input to the alarm circuit unit which will be switched to supply the alarm devices on activation.

f) Mains relay units shall provide double pole voltage free change over contacts suitable for turning on or shutting down local mains supplies to equipment such as extract fans or dampers. Normally open and normally closed contacts shall be provided as standard. The contacts shall be rated at least 5A at 250V AC and 1A at 60V DC. The mains relay unit shall be entirely powered by the address loop without need for an external power supply. It shall incorporate a test switch by which it can be activated and reset without accessing the control panel.

g) It shall be possible to mount input and output devices as standalone units in a single enclosure or to house them in larger enclosures to construct multi-way input and output units. In particular the interface units, relay units, conventional zone interface units and mains relay units shall all be suitable for mounting on a standard DIN 35 fixing rail. These units shall clip directly onto and off the DIN 35 rail for ease of configuration and maintenance and the terminals shall all be presented for easy access when rail mounted.

1.3 ELECTRICAL

1.3.1 Electrical

All electrical work shall be done in accordance with the latest wiring regulations and SABS codes.

The sub-Contractor will be responsible for:

a) The supply and installation of all the field wiring, control and switchboards associated with his installation.

b) The supply and installation of all cable trays and conduits required to undertake the field wiring.
c) Supplying and installing the required equipment for the control panels specified.

d) The wiring of interlocks to other equipment

e) The supply and installation of any control equipment, such as individual thermostats that are required, including all wiring to and from such equipment.

f) The Fire Detection System shall be Maestro compatible

The Electrical Contractor will be responsible for:

a) The supply and installation of the main incoming supply cable/s to control panels, and for making off of these cables to the incoming side of the main isolator.

b) The provision of a separately protected electrical supply to each independent FIRE DETECTION & EVACUATION Item of equipment.

c) General Electrical installations Standards

i) Conduit and Accessories

The conduit and conduit accessories shall comply fully with the applicable SABS specifications as set out below and the conduit shall bear the mark of approval of the South African Bureau of Standards.

- Screwed metallic conduit and accessories: SABS 1065, parts 1 and 2.
- Plain-end metallic conduit and accessories: SABS 1065, parts 1 and 2.
- Non-metallic conduit and accessories: SABS 950.

All conduit fittings except couplings shall be of the inspection type. Where cast metal conduit accessories are used, these shall be of malleable iron. Zinc base fittings will not be allowed.

Bushes used for metallic conduit shall be brass and shall be provided in addition to locknuts at all points where the conduit terminates at switchboards, switch-boxes, draw-boxes, etc.

Draw-boxes are to be provided in accordance with the Wiring Code and wherever necessary to facilitate easy wiring.

The conduit used shall have an external diameter of 25mm. In all other instances the sizes of conduit shall be in accordance with the “Wiring Code” for the specified number and size of conductors.

Only one manufactured type of conduit and conduit accessories will be permitted throughout the installation.
Running joints in screwed conduit are to be avoided as far as possible and all conduit systems shall be set or bent to the required angles. The use of normal bends must be kept to a minimum with exception of larger diameter conduits where the uses of such bends are essential.

All metallic conduits shall be manufactured of mild steel with a minimum thickness of 1.2mm for plain-end conduit and 1.5mm in respect of screwed conduit.

ii) Conduit in Roof Spaces

Conduit in roof spaces shall be installed parallel or at right angles to the roof members and shall be secured at intervals not exceeding 1.5m by means of saddles screwed to the roof timbers.

Nails or crampets will not be allowed. Where non-metallic conduit has been specified for a particular service, the conduit shall be supported and fixed with saddles with a maximum spacing of 450mm. The Contractor shall supply and install all additional supporting timbers in the roof space as required.

Under flat roofs, in false ceilings or where there is less than 0.9m of clearance, or should the ceilings be insulated with glass wool or other insulating material, the conduit shall be installed in such a manner as to allow for all wiring to be executed from below the ceilings.

Conduit runs from distribution boards shall, where possible, terminate in fabricated sheet steel draw-boxes installed directly above or in close proximity to the boards.

iii) Surface Mounted Conduit

Wherever possible, the conduit installation is to be concealed in the building work, however, where unavoidable or otherwise specified under Part 2 of the specification, conduit installed on the surface must be plumbed or leveled and only straight lengths shall be used.

The use of inspection bends is to be avoided and instead the conduit shall be set uniformly and inspection couplings used where necessary.

No threads will be permitted to show when the conduit installation is complete, except where running couplings have been employed.

Running couplings are only to be used where unavoidable, and shall be fitted with sliced couplings as a lock-nut.

Conduit is to be run on approved spaced saddles rigidly secured to the walls,

Alternatively, fittings, tees, boxes, couplings etc., are to be cut into the surface to allow the conduit to fit flush against the surface, Conduit is to be bedded into any wall irregularities to avoid gaps between the surface and the conduit.

Crossing of conduits is to be avoided, however, should it be necessary purpose-made metal boxes are to be provided at the junction. The finish of the boxes and positioning shall be in keeping with the general layout.

Where several conduits are installed side by side, they shall be evenly spaced and grouped under one purpose-made saddle.

Distribution boards, draw-boxes, industrial switches and socket outlets etc. shall be neatly recessed into the surface to avoid double sets.

In situations where there are no ceilings the conduits are to be run along the wall plates and the beams.

Painting of surface conduit shall match the colour of the adjacent wall finishes.

Only approved plugging materials such as aluminium inserts, fibre plugs, plastic plugs, etc. and
round-head screws shall be used for fixing saddles, switches, socket outlets, etc. to walls, wood plugs and the plugging in joints in brick walls are not acceptable.

iv) Conduit in Concrete Slabs

In order not to delay building operations the Contractor must ensure that all conduits and other electrical equipment which are to be cast in the concrete columns and slabs are installed in good time.

The Contractor shall have a Representative in attendance at all times when the casting of concrete takes place.

Draw-boxes, expansion joint boxes and round conduit boxes are to be provided where necessary. Sharp bends of any nature will not be allowed in concrete slabs.

Draw and/or inspection boxes shall be grouped under one common cover plate, and must preferably be installed in passages or male toilets.

All boxes, etc., are to be securely fixed to the shuttering to prevent displacement when concrete is cast. The conduit shall be supported and secured at regular intervals and installed as close as possible to the neutral axis of concrete slabs and/or beams.

Before any concrete slab is cast, all conduit droppers to switchboards shall be neatly spaced and rigidly fixed.

v) Wiring

Except where otherwise specified in Section B of this specification, wiring shall be carried out in conduit throughout. Only one circuit per conduit will be permitted.

No wiring shall be drawn into conduit until the conduit installation has been completed and all conduit ends provided with bushes. All conduits to be clear of moisture and debris before wiring is commenced.

The wiring of the installation shall be carried out in accordance with the "Wiring Code". Further to the requirements concerning the installation of earth conductors to certain light points as set out in the "Wiring Code" it is a specific requirement of this document that where plain-end metallic conduit or non-metallic conduit has been used, earth conductors must be provided and drawn into the conduit with the main conductors to all points, including all luminaires and switches throughout the installation.
1.4 SITE DETAILS AND OPERATING CONDITIONS

1.4.1 DESIGN AMBIENT CONDITIONS

Altitude 1 700m (Kempton Park, Gauteng Province)

Electrical Supply 240 volt, 1 phase 50 cycle
380Vt, 3 phase 50 cycle, 4 wire

1.4.2 MINIMUM OPERATING CONDITIONS

All items will be suitable for operation in the environment in which they are to be located. As a minimum, all equipment etc. will be suitable for operation at full capacity under the following conditions:

- Height above sea level not exceeding 1800m;
- Motor Air cooling at an average temperature over 24 hours not exceeding 40°C dry bulb;
- Maximum conditions of 80°C dry bulb and 50 %relative humidity;
- Minimum conditions of -10°C dry bulb and 100 % relative humidity;
- Protection of all equipment exposed to atmosphere/ambient to EN 60529 - IP 65.
2. **SITE VISIT**

The Airport Buildings are existing. Bidders can visit the site before bidding, so as to acquaint themselves with prevailing conditions and dimensions. A **COMPULSORY SITE VISIT SHALL BE REQUIRED**.
3. **TEMPORARY OFFICES**

The sub-Contractor need not provide offices for the Resident Engineer. In the absence of any specific requirements, the Engineer requires merely that the sub-Contractor have suitable offices on site in which site meetings may be held.
4. AREAS REQUIRING SPECIAL ATTENTION

4.1 GENERAL

4.1.1 Setting out of works

The sub-Contractor shall set out the work and be responsible and liable for the correct setting out, establishing Centre Lines, Levels, Gradients and the like, carry out the works in close collaboration with other Contractors, and co-operated to the fullest extent with all parties under the direction of the Principal Contractor and be aware that various disciplines will be working simultaneously on this Project, and make himself thoroughly acquainted with the extent and nature of the work specified and the condition affecting its execution, the means of access and all matters which may influence this Contract.

4.1.2 Samples

The sub-Contractor shall furnish Samples as may be asked for. Orders for materials or special articles required shall be placed as early as possible and the Contractor shall be held responsible for any delays in the delivery of such goods.

4.2 FINISHING & TIDYING

Progressive and systematic finishing and tidying will form an essential part of this contract. Under no circumstances shall spoil, rubble, materials, equipment or unfinished operations be allowed to accumulate unnecessarily and in the event of this occurring the Engineer shall have the right to withhold payment for as long as necessary in respect of the relevant works in the area(s) concerned.

4.3 CONSTRUCTION METHODS

a) Construction shall be carried out in accordance with the Expanded Public Works Programme (EPWP) guidelines that are aimed at infrastructure and services development coupled with creation of employment and skills training.

b) Labour-based or labour-intensive construction may be defined as the economically efficient employment of as much labour as is technically feasible to a produce as high a standard of construction as demanded by the specification and allowed by the funding available. In other words, projects based on labour-intensive principles aim at devoting the highest feasible proportion of projects costs to unskilled, semi-skilled and skilled labour without jeopardizing the technical quality of the product demanded by the specification.

c) Labour-based methods of construction result in the creation of a significant increase in employment opportunities per unit of expenditure. The intensive employment of labour achieves value for money through innovative techniques of work and management. In particular (i) as far as possible, payment of wages for labour is related to production output: a reasonable “task” is set, upon completion of which the labourer may go home and (ii) employment is either on a daily/casual/temporary basis or in the form of a short-term monthly contract. It is useful to think of labour-based methods as the effective substitution of labour for equipment in construction. This is done in such a way that there is neither an increase in economic cost nor a decrease in quality.

d) The following regulations must be adhered to so as to ensure that the construction methods used are labour-intensive.
   i. The remuneration to local labour for hourly-rated employees and/or daily-based work shall be in accordance with the prevailing gazetted rates.
ii. The name, identification number, task performed and hours worked per day for each labourer shall be recorded by the sub-Contractor. These records shall be submitted to the Engineer together with each payment certificate.

e) Bidders are encouraged to utilize the services of locally based sub-Contractors.

4.4 PAINTING

One (1) coat of Self-Etching Primer as undercoat and protective coating. Exposed pipe work and fittings will be applied with two coats of Enamel Paint approved by The Engineer.

Items which are factory painted need not be repainted other than any making good which may be necessary. All equipment requiring painting shall be correctly prepared and painted with two coats of enamel gloss after one coat of suitable rust-proof primer and an undercoat.
5. COMPLETION, GAURANTEES & MAINTENANCE

5.1 TESTING

A Testing and Commissioning Notice shall be sent out to the Engineer accompanied with the test procedure 2 weeks prior to the scheduled Testing and Commissioning date.

All Equipment used for Testing and Commissioning shall have a Valid Calibration Certificate which must be placed on the test report. All tests shall be recorded and typed copies of all test recordings shall be included within the operating manuals later. The test reports shall set out the procedure, data and instrument readings obtained as compared with the required capacities and the manufacturer’s name plate rating where applicable. All this data and approvals must be forwarded to the Engineer and Main Contractor for approval.

The complete system shall be tested and commissioned according to the requirements of SANS 10139 and the following shall be supplied by the installer:

- A completion certificate certifying that the complete installation is according to SANS 10139 shall be supplied by the installer.
- A log book in which all events, including fire alarm signals, faults signals, system tests and maintenance visits can be recorded.

5.2 END USER TRAINING

Upon completion of all works and all tests, the contractor shall furnish necessary operator’s labor and helpers for operating the entire installation for a period not less than two weeks of ten hours each to enable the owner’s staff get acquainted with the operation of the system. During this period the contractor shall train the owners personnel in the operation, adjustment and maintenance of all equipment installed.
5.3 OPERATING AND MAINTENANCE MANUALS

Three instruction manuals shall be provided for the new installations. Each manual shall comprise of the following sections, bound in a vinyl plastic covered folder with the name of the project type written on a card inserted into a clear plastic covered cardholder on the front cover and spine and shall be handed to the Client on completion of the installation. Editable soft copies of all aforementioned information, O & M Manuals (word format) and “as-built drawings” (dwg format) shall be submitted together with the O&M manuals. No PDF, Bitmap, Jpeg, or any such un-editable formats shall be accepted. A complete set of “as built” drawings of the contract, in a form acceptable to the Engineer. No drawings shall be smaller than A4 size. Large drawings shall be reduced to A3 or A4 size for inclusion in the manuals provided they remain legible.

- Index
- Description of Systems and Equipment (as installed)
- Operation of Equipment (as installed)
- Equipment (a schedule list to include description, make, model number and supplier’s name and address).
- Commissioning Data (Singed off by Engineer)
- Inspection and Maintenance Instructions (in schedule form setting out each item, the description and frequency of maintenance operations required).
- Operating Instructions (running checklist and frequency of servicing, Safety precautions to be taken, Manual and automatic operation, Operator's duties, service instructions, Pre-start checklist for each system, Starting and stopping procedures)
- Spare Parts (list of spare parts to be supplied, as later specified herein, with detailed description of each part, make, model and part number and supplier’s name and address)
- Descriptive literature (for all items and equipment)
- As-Built drawings in hardcopy and Autocad 2010 version electronic format (of ablutions as installed to include ablation layout drawings, control and wiring diagrams and schematic piping diagrams).
- A complete list of all equipment containing the following information:
  - Name of the equipment (or description thereof)
  - Serial numbers of equipment.
  - Type number of equipment.
  - Manufacturer of equipment.
  - Equivalent replacement model of equipment (where applicable).
  - Names, addresses, telephone and facsimile numbers of firms supplying equipment.

- A complete and comprehensive description of the operation of the system and of each individual piece of equipment.
- A complete and comprehensive description of the maintenance of the system and of each individual piece of equipment in respect of daily, weekly, monthly or annual maintenance.
- Advanced technical information of the system may also be bound into the Maintenance Manuals as additional information. Any literature not in the English language, shall have the English translation attached.
- Manufacturers’ Catalogues
• Complete design information containing at least:
  o Types of detectors and other devices and their specifications.
• A full description of the system providing information similar to that shown in the table below.

<table>
<thead>
<tr>
<th>SYSTEM DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name of system</strong></td>
</tr>
<tr>
<td><strong>Device</strong></td>
</tr>
<tr>
<td>Detectors</td>
</tr>
<tr>
<td>Cables</td>
</tr>
<tr>
<td>Class of wiring system</td>
</tr>
<tr>
<td>Link to the fire brigade</td>
</tr>
<tr>
<td>Links to other systems</td>
</tr>
</tbody>
</table>

• A complete list of all the devices of the system providing at least the information indicated in the table below.

<table>
<thead>
<tr>
<th>LIST OF DEVICES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name of system</strong></td>
</tr>
<tr>
<td><strong>Device no.</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

5.4 COMMISSIONING PROGRAMME

The sub-Contractor shall adhere to the Main Programme for the installation, but shall ensure that his commissioning programme makes allowance for the following requirements:

i. At the date of Beneficial Occupation, **ALL** systems shall be operating and the fire detection systems and equipment are fully operational, balanced, tested, commissioned, approved by The Engineer and handed over by that date.

5.5 GUARANTEE AND MAINTENANCE

The entire Fire Protection installations shall be subject to a guarantee and servicing of **12 months from the Beneficial Occupation date**, or from the date of the Taking-Over certificate as state below.

Expendables such as filters for the maintenance period must be included in the contract price. Other minor expendables shall also be included. The sub-Contractor shall be entirely responsible for carrying
out regular inspections at intervals not greater than 1 month.

A detailed inspection and service log book with check sheets showing all functions to be carried out at each inspection and service, is to be kept on site for all service activity and must be countersigned by a manager or facilities personnel as client representative. The equipment shall be services and maintained in strict accordance to the equipment manufacturer’s recommended intervals and service item list. The sub-Contractor shall draw-up and submit the INSPECTION & SERVICE SCHEDULE to the Engineer for their approval. The Service Schedule shall include for regularity of maintenance, service items at those intervals and recommended spare parts list. This schedule must be submitted 2 months before equipment handover and approved by the Engineer latest 3 weeks before scheduled handover of installations.

5.6 WARRANTIES

5.6.1 Taking-Over Certificate

When the whole of the Works have been substantially completed and have satisfactorily passed any Tests on Completion prescribed by the Contract, the sub-Contractor may give a notice to that effect to The Engineer, with a copy to the Employer, accompanied by a written undertaking to finish with due expedition any outstanding work during the Defects Liability Period. Such notice and undertaking shall be deemed to be a request by the sub-Contractor for The Engineer to issue a Taking-Over Certificate in respect of the Works. The Engineer shall, within 21 days of the date of delivery of such notice, either issue to the sub-Contractor with a copy to the Employer, a Taking-Over Certificate, stating the date on which, in his opinion, the Works were substantially completed in accordance with the Contract, or give instructions in writing to the sub-Contractor specifying all the work which, in The Engineer’s opinion, is required to be done by the sub-Contractor before the issue of such Certificate.

The Engineer shall also notify the sub-Contractor of any defects in the Works affecting substantial completion that may appear after such instructions and before completion of the Works specified therein. The sub-Contractor shall be entitled to receive such Taking-Over Certificate within 21 days of completion, to the satisfaction of the Architect, of the Works so specified and remedying any defects so notified.

5.6.2 Taking Over of Sections or Parts

Similarly, in accordance with the procedure set out in Sub-Clause 7.1, the sub-Contractor may request and The Engineer shall issue a Taking-Over Certificate in respect of:

a) any substantial part of the Permanent Works which has been both completed to the satisfaction of The Engineer and, otherwise than as provided for in the Contract, occupied or used by the Employer, or
b) any part of the Permanent Works which the Employer has elected to occupy or use prior to completion (where such prior occupation or use is not provided for in the Contract or has not been agreed by the sub-Contractor as a temporary measure).

5.6.3 Substantial Completion of Parts

If any part of the Permanent Works has been substantially completed and has satisfactorily passed any Tests on Completion prescribed by the Contract, The Engineer may issue a Taking-Over Certificate in respect of that part of the Permanent Works before completion of the whole of the Works and, upon the issue of such Certificate, the sub-Contractor shall be deemed to have undertaken to complete with due expedition any outstanding work in that part of the Permanent Works during the Defects Liability Period.

5.6.4 Surfaces Requiring Reinstatement

Provided that a Taking-Over Certificate given in respect of any Section or part of the Permanent Works before completion of the whole of the Works shall not be deemed to certify completion of any
5.7 DEFECTS LIABILITY

5.7.1 Defects Liability Period

In these Conditions the expression "Defects Liability Period" shall mean the defects liability period calculated from:

a) the date of completion of the Works certified by The Engineer in accordance with Clause 8, or
b) in the event of more than one certificate having been issued by The Engineer under Clause 8, the respective dates so certified, and in relation to the Defects Liability Period the expression "the Works" shall be construed accordingly.

The defects liability period for this contract shall however be not less than 12 calendar months from the date of certification by The Engineer.

5.7.2 Completion of Outstanding Work and Remedying Defects

During the Defects liability period, the sub-Contractor shall:

a) complete any minor works, if any, outstanding on the date stated in the Taking-Over Certificate as soon as practicable after such date, and
b) execute all such work of amendment, reconstruction, and Remedying defects, shrinkages or other faults as The Engineer may, during the Defects Liability Period or within 14 days after its expiration, as a result of an inspection made by or on behalf of The Engineer prior to its expiration, instruct the sub-Contractor to execute.

The expiration of the Defects Liability Period shall not exonerate the sub-Contractor from any further liabilities arising at Law.

5.7.3 Cost of Remedying Defects

All work referred to in Sub-Clause 7.7.2 shall be executed by the sub-Contractor at his own cost if the necessity thereof is, in the opinion of the Architect, due to:

a) the use of materials or workmanship not in accordance with the Contract,
b) where the sub-Contractor is responsible for the design of part of the Permanent Works, any fault in such design, or
c) the neglect or failure on the part of the sub-Contractor to comply with any obligation, expressed or implied, on the sub-Contractor’s part under the Contract,

If, in the opinion of The Engineer, such necessity is due to any other cause, he shall determine an addition to the Contract Price and shall notify the sub-Contractor accordingly, with a copy to the Employer.

5.8 CONTRACTOR’S FAILURE TO CARRY OUT INSTRUCTIONS

In case of default on the part of the sub-Contractor in carrying out such instruction within a reasonable time, the Employer shall be entitled to employ and pay other persons to carry out the same and if such work is work which, in the opinion of The Engineer, the sub-Contractor was liable to do at his own cost under the Contract, then all costs consequent thereon or incidental thereto shall, after due consultation with the Employer and the sub-Contractor, be determined by The Engineer and shall be recoverable from the sub-Contractor by the Employer, and may be deducted by the Employer.
from any monies due or to become due to the sub-Contractor and The Engineer shall notify the sub-Contractor accordingly, with a copy to the Employer.
6. **APPENDIX A – INTEGRATED FIRE ALARM, PUBLIC ADDRESS & VOICE EVACUATION SYSTEM: TENDERERS’ RETURNABLE SCHEDULES**

(*Schedules to be completed in full)

In addition to Appendix A, the following returnables are compulsory.

6.1 **Tender Document**

This tender document to be submitted with all Bills and Contracts signed and completed in full.

6.2 **Company Profile**

Complete, up to date company profile to be submitted with the tender documentation.

6.4 **B-BBEE Certificate**

Complete, up to date company BBBEE Certificate to be submitted with the tender documentation.

6.5 **SAQCC Fire Membership**

Complete, up to date SAQCC membership to be submitted with the tender documentation.

6.6 **Company Resources for this project**

Complete company resources for this project to be submitted with the tender documentation.

6.7 **Company experience**

List of current projects as well as projects completed over past 5 years to be submitted with the tender documentation.

6.8 **Similar projects completed**

Reference of similar projects completed by company in last 5 years to be submitted with the tender documentation.

6.9 **Letters of Good Standing**
Letters of Good Standing to be submitted with the tender documentation.
### SCHEDULE A: DETAILS OF CONTRACTOR AND/ OR FIRE SUB-CONTRACTOR

Details on this page MUST be completed fully. Incomplete forms shall render the offer invalid.

(N/A to be stated if not applicable).

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered name of company/enterprise</td>
<td></td>
</tr>
<tr>
<td>CIPRO Registration number</td>
<td></td>
</tr>
<tr>
<td>VAT registration number</td>
<td></td>
</tr>
<tr>
<td>UIF registration number</td>
<td></td>
</tr>
<tr>
<td>Official telephone number</td>
<td>(        )</td>
</tr>
<tr>
<td>Official fax number</td>
<td>(        )</td>
</tr>
<tr>
<td>E-mail Address</td>
<td></td>
</tr>
<tr>
<td>Physical Address</td>
<td>Code</td>
</tr>
<tr>
<td>Official Postal Address</td>
<td>Code</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Director / Member (1)</th>
<th>Full Names and Surname</th>
<th>Position in company/ enterprise</th>
<th>ID No.</th>
<th>Income Tax No.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Director / Member (2)</th>
<th>Full Names and Surname</th>
<th>Position in company/ enterprise</th>
<th>ID No.</th>
<th>Income Tax No.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Director / Member (3)</th>
<th>Full Names and Surname</th>
<th>Position in company/ enterprise</th>
<th>ID No.</th>
<th>Income Tax No.</th>
</tr>
</thead>
</table>

**SIGNED ON BEHALF OF TENDERER:** ..........................................................
The Tenderer shall record any deviations or qualifications to the requirements of the tender documents in this Returnable Schedule. Alternatively, a tenderer may state such deviations and qualifications in a covering letter attached to his tender and reference such letter in this schedule.

If no deviations or qualifications are made, the schedule hereunder is to be marked **NIL** and signed by the Tenderer.

<table>
<thead>
<tr>
<th>PAGE</th>
<th>CLAUSE OR ITEM</th>
<th>DEVIATION OR QUALIFICATION</th>
</tr>
</thead>
</table>

Number of sheets appended by the tenderer to this Schedule .......................... (If nil, enter NIL).

**SIGNED ON BEHALF OF TENDERER:** ..........................
### SCHEDULE C: RECORD OF ADDENDA TO TENDER DOCUMENTS

We confirm that the following communications received from the Employer before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer:

<table>
<thead>
<tr>
<th>Date</th>
<th>Title or Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
</tr>
</tbody>
</table>

Attach additional pages if more space is required.

Signed ___________________________ Date ___________________________

Name ___________________________ Position ___________________________

Tenderer ........................................................................................................
SCHEDULE D: REFERENCES AND VITAL INFORMATION

1. CLIENT REFERENCES OF CURRENT AND PREVIOUS CONTRACTS

Please provide references from three clients with similar requirements as the Client (one reference may be from the Client’s department or division). These references are to demonstrate your ability to fulfill the Client’s requirements and your ability to maintain satisfied customers.

*(Please mark blocks with ‘x’ where appropriate)*

<table>
<thead>
<tr>
<th>Name of Client/Company (1)</th>
<th>Contract period (in months)</th>
<th>Value of Contract (per month)</th>
<th>Type of business rendered</th>
<th>Contact</th>
<th>Full Name</th>
<th>Tel no.</th>
<th>Alternative Tel no.</th>
<th>Fax no.</th>
<th>E-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Client/Company (2)</th>
<th>Contract period (in months)</th>
<th>Value of Contract (per month)</th>
<th>Type of business rendered</th>
<th>Contact</th>
<th>Full Name</th>
<th>Tel no.</th>
<th>Alternative Tel no.</th>
<th>Fax no.</th>
<th>E-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Client/Company (3)</th>
<th>Contract period (in months)</th>
<th>Value of Contract (per month)</th>
<th>Type of business rendered</th>
<th>Contact</th>
<th>Full Name</th>
<th>Tel no.</th>
<th>Alternative Tel no.</th>
<th>Fax no.</th>
<th>E-mail</th>
</tr>
</thead>
</table>
2. LIST OF CURRENT/PREVIOUS SUPPLIERS - CONTRACTOR AND/ OR SUB-CONTRACTOR

<table>
<thead>
<tr>
<th>Name of Supplier/Company (1)</th>
<th>Description of Commodity</th>
<th>Value of commodities supplied (per month)</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Contact</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative Tel no.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-mail</td>
<td></td>
</tr>
<tr>
<td>Name of Supplier/Company (2)</td>
<td>Description of Commodity</td>
<td>Value of commodities supplied (per month)</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contact</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative Tel no.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-mail</td>
<td></td>
</tr>
<tr>
<td>Name of Supplier/Company (3)</td>
<td>Description of Commodity</td>
<td>Value of commodities supplied (per month)</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contact</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Full Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tel no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternative Tel no.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax no. ( )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-mail</td>
<td></td>
</tr>
</tbody>
</table>
## SCHEDULE E: DETAILS OF CONTRACTOR AND/OR FIRE SUB-CONTRACTOR’S WORKSHOP FACILITIES & EQUIPMENTS

The tenderer shall state below what workshop facilities will be available for this Contract.

Address of Workshop  

Number of Artisans Normally Employed by Firm  

Number of Technically Qualified Persons Employed  

Signed on behalf of tenderer:  

-------------------------
SCHEDULE F: SCHEDULE OF PROPOSED SPECIALISTS SERVICE PROVIDERS OR ALTERNATIVES

Proposed Sub-contractors

We notify you that it is our intention to employ the following Sub-contractors for normal work in this contract.

Acceptance of this tender shall not be construed as approval of any of the listed subcontractors. Should any of the subcontractors not be approved subsequent to acceptance of the tender, this shall in no way invalidate this tender, and the tendered unit rates for the various items of work shall remain final and binding, even in the event of a subcontractor not listed below being approved by the Engineer.

<table>
<thead>
<tr>
<th>SUB-CONTRACTORS</th>
<th>Sub-contractor Name/Address/Contact Person/Phone/Fax/Details Of Organisation/Firm Experience</th>
<th>Items of work (pay items) to be undertaken by the Subcontractor</th>
<th>Estimated Cost of Work (Rand)</th>
</tr>
</thead>
</table>

Total (Excluding VAT)

Number of sheets appended by the tenderer to this Schedule ....................... (If nil, enter NIL).

Signed on behalf of tenderer: .................................................................
SCHEDULE G: DETAILS OF CONTRACTOR AND/ OR FIRE SUB-CONTRACTOR’S PROPOSED SITE MANAGER/ SUPERVISOR’S EXPERIENCE FOR THIS CONTRACT

Tenderers shall set out in the Schedule hereunder details of the Site Manager’s experience in work of a similar nature to that for which their Tender is submitted.

Failure to complete this Schedule may result in the Tender not being considered.

<table>
<thead>
<tr>
<th>SITE MANAGER/SUPERVISOR</th>
<th>NAME: ................................................................. NQF LEVEL ..........</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRACT &amp; CLIENT</td>
<td>NATURE OF WORK</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of sheets appended by the tenderer to this Schedule ..................... (If nil, enter NIL).

SIGNED ON BEHALF OF THE TENDERER: ........................................
### SCHEDULE H: REGISTRATION WITH RELEVANT PROFESSIONAL BODIES/INSTITUTIONS

<table>
<thead>
<tr>
<th>Name of Company/Person</th>
<th>Professional Body</th>
<th>Registration No.</th>
<th>Date Joined</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SIGNED ON BEHALF OF THE TENDERER: ........................................
1. The notes on the Architect’s drawings take precedence, if there are any discrepancies noted between the wet services spec and the drawings, these must be immediately brought to the attention of the Principal Agent/Construction Project Manager.

2. For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades.

3. Notes PLUMBING (As per Part P of SANS) All plumbing installation by a registered Plumber.

4. Provide Class A HDPE pipe as per SABS 62 and 509 to be used as an in feed pipe (external). Internally SABS approved class 12.50 or similar approved.

5. All water feed pipes shall be chiselled 30mm into brickwork wall and make use of a mesh before plastering the wall.

6. GEYSER INSTALLATION (As per Part XA of SANS) All plumbing installation by a registered Plumber and geyser to comply with SANS 1307)

7. DRAINAGE (As per Part P of SANS) 3. Provide a 50mm diameter vent pipe to the drainage system duly fixed to wall

8. 35mm diameter and under shall be seamless copper coloured class 16 pipes jointed with "Fast-fuse" heat welded thermoplastic or brass compression fittings as designed for use with copper pipes as stated. Pipes shall be firmly fixed to walls etc with coloured nylon snap-in pipe clips with provision for accommodating thermal movement and jointed and fixed strictly in accordance with the manufacturer’s instructions.

9. 70mm diameter and over shall be class 12 pipes jointed with cast iron "Supraclamp" running joints. Fusion welded bends, once or twice mitred as necessary, and tees shall be factory manufactured. Fusion welded bends and tees shall include jointing to pipes with PVC rubber ring double Z joint couplers.

10. Reducers shall include jointing to pipes with PVC rubber ring double Z joint couplers and reducers shall be of sufficient overall length to accommodate same. All pipes shall be jointed and fixed strictly in accordance with the manufacturer's instructions. All pipe diameters are nominal external.

11. Pipes shall rest on solid ground and, where necessary, pockets of sufficient size shall be cut around joints to enable the jointing to be properly performed or, alternatively, pipes shall be bedded full length on and including unreinforced concrete laid in a semi dry state immediately before pipes are laid.

12. HDPE pipes and fittings, sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings. Soil, waste and vent pipes and fittings shall be solvent weld jointed.

13. HDPE pressure pipes and fittings: Pipes for water supply shall be of the class stated. Pipes of 50mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be HDPE with similar push-in type joints.

14. Contractor to take note of invert levels as well as falls as indicated on the drawings.

15. All products to be utilised on site must bear the SABS sign of approval.

16. Contractor to ensure that testing of the system is done before signing of practical completion milestone. Contractor to be on standby during defects liability period in the event of systems failure.
## Annexure C5.7  
(normative - 2015)

### Alpha-numeric associated with the Contractor Grading Designations

**Table G1: Contractor grading designations and associated parameters**

<table>
<thead>
<tr>
<th>Contractor Grading Designation</th>
<th>Tender Value Range designation</th>
<th>Maximum value of contract that a contractor is considered capable of performing (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1(class of construction works)</td>
<td>1</td>
<td>500 000</td>
</tr>
<tr>
<td>2(class of construction works)</td>
<td>2</td>
<td>1000 000</td>
</tr>
<tr>
<td>3(class of construction works)</td>
<td>3</td>
<td>3 000 000</td>
</tr>
<tr>
<td>4(class of construction works)</td>
<td>4</td>
<td>6 000 000</td>
</tr>
<tr>
<td>5(class of construction works)</td>
<td>5</td>
<td>10 000 000</td>
</tr>
<tr>
<td>6(class of construction works)</td>
<td>6</td>
<td>20 000 000</td>
</tr>
<tr>
<td>7(class of construction works)</td>
<td>7</td>
<td>60 000 000</td>
</tr>
<tr>
<td>8(class of construction works)</td>
<td>8</td>
<td>200 000 000</td>
</tr>
<tr>
<td>9(class of construction works)</td>
<td>9</td>
<td>No limit</td>
</tr>
</tbody>
</table>
Table G2: Classes of construction work

<table>
<thead>
<tr>
<th>Description</th>
<th>Designation</th>
<th>Definition</th>
<th>Work types</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil engineering works</td>
<td>CE</td>
<td>Construction works that are primarily concerned with materials such as steel,</td>
<td>Water, sewerage, roads, railways, harbours and transport, urban development</td>
<td>Structures such as a cooling tower, bridge, culvert, dam, grand stand,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>concrete, earth and rock and their application in the development, extension,</td>
<td>and municipal services</td>
<td>road, railway, reservoir, runway, swimming pool, silo or tunnel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>installation, maintenance, removal, renovation, alteration, or dismantling</td>
<td></td>
<td>The results of operations such as dredging, earthworks, and geotechnical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>of building and engineering infrastructure</td>
<td></td>
<td>processes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical engineering</td>
<td>EP</td>
<td>Construction works that are primarily concerned with development, extension,</td>
<td>Electrical power generation, transmission, control and distribution</td>
<td>Power generation</td>
</tr>
<tr>
<td>works (Infrastructure)</td>
<td></td>
<td>installation, removal, renovation, alteration or dismantling of engineering</td>
<td>equipment and systems.</td>
<td>Street and area lighting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>infrastructure: a) relating to the generation, transmission and distribution</td>
<td></td>
<td>Substations and protection systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>of electricity; or b) which cannot be classified as EB.</td>
<td></td>
<td>Township reticulations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Transmission Lines</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Supervisory control and data acquisition systems</td>
</tr>
<tr>
<td>Electrical engineering</td>
<td>EB</td>
<td>Construction works that are primarily concerned with the installation,</td>
<td>All electrical equipment forming an integral and permanent part of</td>
<td>Electrical installations in buildings</td>
</tr>
<tr>
<td>works (buildings)</td>
<td></td>
<td>extension, modification or repair of electrical installations in or on any</td>
<td>buildings and/or structures, including any wiring, cable jointing and</td>
<td>Electrical reticulations within a plot of land (erf) or building site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>premises used for the transmission of electricity from a point of control</td>
<td>laying and electrical overhead line construction</td>
<td>Standby plant and uninterrupted power supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to a point of consumption, including any article forming part of such an</td>
<td></td>
<td>Verification and certification of electrical installations on premises</td>
</tr>
<tr>
<td></td>
<td></td>
<td>installation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General building works</td>
<td>GB</td>
<td>Construction works that: a) are primarily concerned with the development, extension, installation, renewal, renovation, alteration, or dismantling of a permanent shelter for its occupants or contents; or b) cannot be categorised in terms of the definitions provided for civil engineering works, electrical engineering works, mechanical engineering works, or specialist works.</td>
<td>Buildings and ancillary works other than those categorised as being: a) civil engineering works; b) electrical engineering works; c) mechanical engineering works; or d) specialist works.</td>
<td>Buildings for domestic, industrial, institutional or commercial occupancies Car ports Fences other than classified as SS Stores Walls</td>
</tr>
<tr>
<td>Description</td>
<td>Designation</td>
<td>Definition</td>
<td>Work types</td>
<td>Examples</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Mechanical engineering works</td>
<td>ME</td>
<td>Construction works that are primarily concerned with the development, extension, installation, removal, alteration, renewal of engineering infrastructure for gas transmission and distribution, solid waste disposal, heating, ventilation and cooling, chemical works, metallurgical works, manufacturing, food processing and, materials handling</td>
<td>Machine systems including those relating to the environment of building interiors.</td>
<td>Air-conditioning and mechanical ventilation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>a) gas transmission and distribution systems</td>
<td>Boiler installations and steam distribution</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>b) pipelines</td>
<td>Central heating</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>c) solid waste disposal</td>
<td>Centralised hot water generation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>d) materials handling, lifting machinery, heating, ventilation and cooling, pumps,</td>
<td>Cranes and hoists</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>e) continuous process systems</td>
<td>Dust and sawdust extraction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>f) chemical works, metallurgical works, manufacturing, food processing such as</td>
<td>Compressed air, gas and vacuum installations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>that in concentrator machinery and apparatus, oil and gas wells, smelters,</td>
<td>Conveying and materials handling installations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>cyanide plants, acid plants, metallurgical machinery, equipment and apparatus,</td>
<td>Continuous process systems involving chemical works, metallurgical works, oil and gas wells, acid plants, metallurgical machinery, equipment and apparatus, and works necessary for the beneficiation of metals, minerals, rocks, petroleum and organic substances and other chemical processes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>and works necessary for the beneficiation of metals, minerals, rocks, rocks,</td>
<td>Kitchen equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>petroleum and organic substances or other chemical processes.</td>
<td>Laundry equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lift installations and escalators</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Refrigeration and cold rooms</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Waste handling systems (including compactors)</td>
</tr>
<tr>
<td>Specialist works</td>
<td>SB</td>
<td></td>
<td></td>
<td>The extension, installation, repair, maintenance or renewal, or removal, or asphalt</td>
</tr>
<tr>
<td></td>
<td>SC</td>
<td></td>
<td></td>
<td>The development, extension, installation, removal, and dismantling, as relevant, associated with building excavations, shaft sinking and lateral earth support</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td></td>
<td></td>
<td>The development, extension, installation, repair, removal, or alteration of corrosion</td>
</tr>
<tr>
<td></td>
<td>SE</td>
<td></td>
<td></td>
<td>protection systems (cathodic, anodic and electrolytic)</td>
</tr>
<tr>
<td></td>
<td>SF</td>
<td></td>
<td></td>
<td>Demolition of buildings and engineering infrastructure and blasting</td>
</tr>
<tr>
<td></td>
<td>SG</td>
<td>A subset of construction works identified and defined by the Board that involves specialist capabilities for its execution</td>
<td>The development, extension, installation, repair, removal, renovation, alteration or dismantling of fire prevention and protection infrastructure (drencher and sprinkler systems and fire installation)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SH</td>
<td></td>
<td></td>
<td>The development, extension, installation, maintenance, renewal. removal, alteration or dismantling, as relevant, of landscaping, irrigation and horticultural works</td>
</tr>
<tr>
<td>SI</td>
<td>The development, extension, installation, repair, maintenance, renewal, removal, renovation, alteration or, dismantling of lifts, escalators, travellators and hoisting machinery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SJ</td>
<td>The development, installation, removal, or dismantling, as relevant, of piles and other specialized foundations for buildings and structures</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Part T1: Tendering Procedures

#### Description | Designation | Definition | Work types | Examples |
--- | --- | --- | --- | --- |
| | SK | A subset of construction works identified and defined by the Board that involves specialist capabilities for its execution | The installation, renewal, removal, alteration or dismantling, as relevant, road markings and signage |  |
| | SL | Timber buildings and structures | The development, extension, installation, renewal, removal, renovation, alteration or dismantling of structural steelwork and scaffolding |  |
| | SM | | The extension, installation, repair, maintenance, renewal, removal, renovation or alteration, as relevant, of the waterproofing of basements, roofs and walls using specialist systems. |  |
| | SN | | The development, extension, installation, renewal, removal, alteration or dismantling or demolition of water installations and soil and waste water drainage associated with buildings (wet services, plumbing) |  |
| | SO | | The development, extension, installation, repair, removal, alteration, dismantling or demolition of precast concrete or steel fencing |  |

---

T1 - 36

Tender Ref No [Insert Tender Ref No here]
INSURANCE CLAUSES FOR CAPEX PROJECTS

The insurance clauses in this document should be extracted and attached to tender documents and to contracts.

SECTION A: DEFINITIONS

Landside refers to:

- Areas of the airport before the security points; and
- The restricted area beyond the security points but, within the perimeter of gatehouses, passenger terminals and cargo buildings.

Airside refers to:

- The Apron / maneuvering areas; and
- Area within the airside boundary/perimeter fence, excluding the internal areas of the passenger terminals, perimeter gatehouses and cargo buildings.
SECTION B: INSURANCE CLAUSES

1. Insurance requirements for PROJECTS with a value below R50 million on the LANDSIDE
   • Projects with a value below R50 million are automatically covered under an ACSA umbrella insurance.
   • But please note that details of all projects with a value below R50 million, and with a duration that exceeds 36 months should be forwarded to ACSA Treasury as soon as the contractor is awarded as these projects are not automatically covered under an ACSA umbrella insurance.

1.1 Contract Works
   • With regards to contract works claims, the contractor/consultant is responsible for a deductible (excess) of R250 000;
   • Contractors / consultants should re-insure the deductible.

1.2 Public Liability
   • In the event of a claim against the contractor / consultant for 3rd party property damage, the contractor / consultant will be responsible for a deductible (excess) of R275 000;
   • In the event of a claim against the contractor / consultant for removal of lateral support, the contractor / consultant will be responsible for a deductible (excess) of R500 000;
   • Contractors / consultants should re-insure the deductibles.

1.3 Professional Indemnity
   • All consultants are responsible for Professional Indemnity cover of R5 million
   • Contractors who have a material design element, excluding typical P & G related work, as part of their scope, are responsible for Professional Indemnity cover of R5 million;
   • In the event of a claim above R5 million, the ACSA PI cover will kick in for the amount in excess of R5 million;
   • Proof of cover in the form of a certificate of insurance should be provided to ACSA before a contract is signed between ACSA and the contractor and/or consultant.
2. Insurance requirements for PROJECTS with a value below R50 million on the AIRSIDE

- Projects with a value below R50 million are automatically covered under an ACSA umbrella insurance.
- But please note that details of all projects with a value below R50 million, and with duration that exceeds 36 months should be forwarded to ACSA Treasury as soon as the contractor is awarded as these projects are not automatically covered under an ACSA umbrella insurance.

2.1 Contract Works

- With regards to contract works claims, the contractor / consultant is responsible for a deductible (excess) of R250 000;
- Contractors / consultants should re-insure the deductible.
- Proof of cover in the form of a certificate of insurance should be provided to ACSA before a contract is signed between ACSA and the contractor and/or consultant.

2.2 Public Liability

- In the event of a claim brought against the contractor / consultant for 3rd party property damage, the contractor / consultant will be responsible for a deductible (excess) of R525 000;
- In the event of a claim brought against the contractor / consultant for removal of lateral support, the contractor / consultant will be responsible for a deductible (excess) of R750 000;
- In the event of a claim brought against the contractor / consultant for damage to aircraft, the contractor / consultant will be responsible for a deductible (excess) of R750 000;
- Contractors / consultants should re-insure the deductibles.
- Proof of cover in the form of a certificate of insurance should be provided to ACSA before a contract is signed between ACSA and the contractor and/or consultant.

2.3 Professional Indemnity

- All consultants are responsible for Professional Indemnity cover of R5 million;
- Contractors who have a material design element, excluding typical P & G related work, as part of their scope, are responsible for a Professional Indemnity cover of R5 million;
- In the event of a claim above R5 million, the ACSA PI cover will kick in for the amount in excess of R5 million;
- Proof of cover in the form of a certificate of insurance should be provided to ACSA before a contract is signed between ACSA and the contractor and/or consultant.
3. Insurance requirements for PROJECTS with a value above R50 million but below R1 billion on the LANDSIDE

- Projects with a value of more R50 million are not automatically covered under the construction policies. A separate quote is provided by insurers per project. Details of all projects with a value above R50 million should be forwarded to ACSA Treasury as soon as the contractor is awarded.

3.1 Contract Works

With regards to contract works claims, the contractor / consultant is responsible for the following deductibles:

- All Civil Work and Earthworks – R300 000 deductible (excess);
- All other claims – R300 000 deductible (excess);
- Other property insured – R700 000 deductible (excess);
- Contractors / consultants should re-insure the deductibles.

3.2 Public Liability

- In the event of a claim brought against the contractor / consultant for 3rd party property damage, the contractor / consultant will be responsible for a deductible (excess) of R275 000;
- In the event of a claim brought against the contractor / consultant for removal of lateral support, the contractor / consultant will be responsible for a deductible (excess) of R500 000;
- Contractors / consultants should re-insure the deductibles.

3.3 Professional Indemnity

- All consultants are responsible for Professional Indemnity cover of R10 million;
- Contractors who have a material design element, excluding typical P & G related work, as part of their scope, are responsible for a Professional Indemnity cover of R10 million;
- In the event of a claim above R10 million, the ACSA PI cover will kick in for the amount in excess of R10 million;
- Proof of cover in the form of a certificate of insurance should be provided to ACSA before a contract is signed between ACSA and the contractor and/or consultant.
4. Insurance requirements for PROJECTS with a value above R50 million but below R1 billion on the AIRSIDE

- Projects with a value of more R50 million are not automatically covered under the construction policies. A separate quote is provided by insurers per project. Details of all projects with a value above R50 million should be forwarded to ACSA Treasury as soon as the contractor is awarded.

4.1 Contract Works

With regards to contract works claims, the contractor / consultant is responsible for the following deductibles:

- All Civil Work and Earthworks excluding Runways – R300 000 deductible (excess);
- Runway Rehabilitation – R300 000 deductible (excess);
- New Runway Construction – R700 000 deductible (excess);
- All other claims – R300 000 deductible (excess);
- Other property insured – R700 000 deductible (excess);
- Contractors / consultants should re-insure the deductibles.

4.2 Public Liability

- In the event of a claim brought against the contractor / consultant for 3rd party property damage, the contractor / consultant will be responsible for a deductible (excess) of R1 025 000;
- In the event of a claim brought against the contractor / consultant for removal of lateral support, the contractor / consultant will be responsible for a deductible (excess) of R1 250 000;
- In the event of a claim for damage to aircraft, the contractor / consultant will be responsible for a deductible (excess) of R1 250 000;
- Contractors / consultants should re-insure the deductibles.

4.3 Professional Indemnity

- All consultants are responsible for Professional Indemnity cover of R10 million;
- Contractors who have a material design element, excluding typical P & G related work, as part of their scope, are responsible for a Professional Indemnity cover of R10 million;
• In the event of a claim above R10 million, the ACSA PI cover will kick in for the amount in excess of R10 million;
• Proof of cover in the form of a certificate of insurance should be provided to ACSA before a contract is signed between ACSA and the contractor and/or consultant.
O.R. Tambo Toilet Facilities Upgrades – Phase 1

Project Specific Health and Safety Specification

28 October 2019

Final

Prepared for: Airports Company South Africa (ACSA)
### Project Name:
O.R. Tambo Toilet Facilities Upgrades – Phase 1

### Report Title:
Site Specific Health and Safety Specification

### Report Status
Final

### Client:
Airports Company South Africa (ACSA)

### Client Representative:
Siphokuhle Dingiswayo (CSM Engineering)

### Prepared By:
Nemai Consulting

<table>
<thead>
<tr>
<th>Phone</th>
<th>Address</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>+27 11 781 1730</td>
<td>147 Bram Fischer Drive, FERNDALE, 2194</td>
<td><a href="mailto:www@nemai.co.za">www@nemai.co.za</a></td>
</tr>
<tr>
<td>+27 11 781 1730</td>
<td>P.O. Box 1673, SUNNINGHILL, 2157</td>
<td><a href="mailto:temperances@nemai.co.za">temperances@nemai.co.za</a></td>
</tr>
</tbody>
</table>

### Report Reference:
60309  R-PRO-REP|20150622

### Authorisation

<table>
<thead>
<tr>
<th>Author:</th>
<th>Name</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author:</td>
<td>T. Sebele</td>
<td></td>
<td>2019/10/28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reviewed By:</th>
<th>Name</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reviewed By:</td>
<td>C. Chidley</td>
<td></td>
<td>20191029</td>
</tr>
</tbody>
</table>

This Document is Confidential Intellectual Property of Nemai Consulting (PTY) Ltd.
© copyright and all other rights reserved by Nemai Consulting (PTY) Ltd.
This document may only be used for its intended purpose
## Amendments Page

<table>
<thead>
<tr>
<th>Date:</th>
<th>Nature of Amendment</th>
<th>Amendment Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019/10/28</td>
<td>Final</td>
<td>0</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

1. **PROJECT DESCRIPTION** .................................................. 3

2. **SITE DETAILS** ............................................................. 3

3. **INTRODUCTION** .......................................................... 3

4. **DEFINITIONS** ............................................................. 4

5. **OMISSIONS FROM THIS SITE-SPECIFIC HEALTH AND SAFETY SPECIFICATION** ................................................. 5

6. **OHS RESPONSIBILITIES** .................................................. 5

   6.1. The Employer’s Responsibilities .................................. 5

   6.2. The Designer’s Responsibilities: ................................. 6

   6.3. The Contractor(s) Responsibilities ............................... 7

   7.4 General Duties of Employee’s at work: ......................... 8

7. **GENERAL HEALTH AND SAFETY PROVISIONS** ................. 8


   7.2. Appointments .......................................................... 9

   7.3. Health and Safety Organogram .................................... 10

   7.4. General management of health and safety ..................... 11

   7.5. Health and Safety Committees ..................................... 11

   7.6. Construction Work Permit .......................................... 12

   7.7. Notification of Commencement of Construction Work ........ 12

   7.8. Management and Supervision of Construction Work ........ 12

   7.9. The Contractor’s Management Staff’s Competency Requirements ................................................................. 13

   7.10. Risk Assessment ....................................................... 14

   7.11. Legislation ............................................................. 16

   7.12. Sub-Contractors ....................................................... 17

   7.13. Copy of OHS Act ....................................................... 17


   7.15. Letter of Good Standing ............................................. 19

   7.16. Health and Safety File .............................................. 19

   7.17. Induction and Training .............................................. 20

   7.18. Health and Safety Audits, Monitoring and Reporting ....... 21
7.19. Housekeeping 21
7.20. Demolition 21
7.21. Scaffolding 22
7.22. Construction Vehicles and Mobile Plant 22
7.23. Electrical Installations 22
7.24. Permit to Work 23
7.25. Stacking and storage 23
7.26. Fire prevention and protection 24
7.27. Welfare Facilities 24
7.28. Occupational Health and Safety Signage and Work Area Demarcation 25
7.29. Reporting and Investigation of Incidents and Occupational Diseases 25
7.30. Portable Electrical Equipment 26
7.31. Confined Space Work 27
7.32. Personal Protective Equipment (PPE) 27
7.33. Health and Hygiene 27
7.34. Access Control and Security 27
7.35. Hours of Work 28
7.36. Change Management 28
7.37. Public Safety 28
7.38. Monthly Report and Site Meeting 28
7.39. Employer Actions to Stop Work 29
7.40. Categories of Contractor Violations 30
7.41. Sanctions for Contractor Violations 30
7.42. Health and Safety File Submission to Client on Project Completion 30

ANNEXURES:
Annexure A: Mandatory Agreement
Annexure B: Baseline Risk Assessment
1. PROJECT DESCRIPTION

Airports Company South Africa’s intention is to provide the best toilet facilities possible for all its users. In a bid to achieve this, massive refurbishments/upgrades will take place at the O.R. Tambo International Airport with CSM Engineering as the appointed Project Managers and Nemai Consulting appointed to fulﬁl the Safety Agent function.

It is important to point out that, the works will be implemented while the airport is in operation and it is an objective of the Project team to ensure that the operations of the airport and passenger experience are not negatively affected during the construction period.

The overall scope of work entails:

- Complete demolition and removal of all existing internal toilet construction (i.e. partitions, walls, doors, sanitary fittings, ﬁnishes, etc.);
- Complete refurbishment of toilets in accordance with New Toilet Layout;
- Installation of new sanitary ﬁttings, urinals, urinary screen, plumbing etc.;
- Installation of new toilet partitions and doors;
- Installation of new ceilings;
- Installation of new ﬂoor and wall ﬁnishes;
- Installation of new Electrical, Mechanical and Fire Protection items; and
- Wet Services related work to piping, services, etc.

The location of the works and access are as per the block numbers below:

- C3, E3, H1, F3, D2 and P2 Ablutions.

2. SITE DETAILS

The O. R. Tambo International Airport, 1 Jones Rd, Kempton Park, Johannesburg, 1632, Gauteng Province, South Africa.

3. INTRODUCTION

This document serves as the Site-Speciﬁc Health and Safety Specification (SSHSS) for the project, containing all the health and safety requirements pertaining to the toilet refurbishments planned for the project so as to ensure health and safety of affected persons.

The Health and Safety Specification is prepared to discharge the Employer’s responsibilities in terms of the Occupational Health and Safety Act, Act No. 85 of 1993 (OHS Act) and the attendant regulations. The most noteworthy of these regulations are the new Construction Regulations (GNR 10113 of 07 February 2014), the General

4. DEFINITIONS

Apart from the definitions set out in the OHS Act and the accompanying Regulations, the following definitions apply:

**Employer:** The Client is seen as the employer for whom construction work is performed.

**Engineer:** A competent person appointed by the Employer to supervise and monitor construction on their behalf.

**Site:** The area in the possession of the Contractor for the construction of the works. Where there is no demarcated boundary it will include all adjacent areas, which are reasonably required for the activities for the Contractor, and approved for such use by the Engineer.

**Designer:**
- A competent person who:
  - Prepares a design;
  - Checks and approves a design;
  - Arranges for a person at work under his or her control to prepare a design, including an employee of that person where he or she is an Employer; or
  - Designs temporary work, including its components
- An architect or engineer contributing to, or having overall responsibility for a design;
- A building services engineer designing details for fixed plant;
- A surveyor specifying articles or drawing up specifications;
- A contractor carrying out design work as part of a design and building project; or
- An interior Designer, shop fitter or landscape architect.

**Agent:** Any competent person who acts as a representative for the Employer.

**Contractor:** An employer, as defined in Section 1 of the OHS Act who performs construction work and is appointed by the Employer to be in overall control and management of a part of or the whole of a construction site.

**Sub-Contractor:** An employer, as defined in Section 1 of the OHS Act, who performs construction work and is appointed by the Contractor.
5. OMISSIONS FROM THIS SITE-SPECIFIC HEALTH AND SAFETY SPECIFICATION

By drawing up this Site-Specific Health and Safety Specification (SSHSS) the Airport Company South Africa has endeavoured to address the most critical aspects relating to relevant Health and Safety issues in order to assist the contractor in adequately providing for the health and safety of employees on site.

Should the ACSA not have addressed all Health and Safety aspects pertaining to the work that is tendered for, the contractor needs to include it in the Health and Safety Plan and inform the ACSA of such issues when submitting the tender.

6. OHS RESPONSIBILITIES

6.1. The Employer’s Responsibilities

In terms of Regulation 5 of the Construction Regulations the Employer (i.e. the Client) is responsible for *inter alia* the following:

- Preparing a Baseline Risk Assessment for an intended construction work project;
- Preparing a documented site-specific Health and Safety Specification for the intended construction work based on the Baseline Risk Assessment, and provide any Contractor who is making a bid or appointed to perform construction work for the Employer with the same;
- Provide the Designer with the Health and Safety Specification and to ensure that the Designer takes it into consideration during the design stage;
- Must ensure that potential Contractors to be appointed have made adequate provision for the cost of health and safety measures and has the necessary competencies and resources to carry out the construction work safely;
- Taking necessary steps to ensure co-operation between all Contractors appointed to ensure compliance with the Construction Regulations;
- Ensuring before any work commences on site that every Contractor is registered with the compensation fund or with a licensed compensation insurer and is in good standing with the compensation fund or with a licensed compensation insurer;
- To appoint every Contractor in writing for the project or part thereof on the construction site;
- Discussing and negotiating with the Contractor the contents of the Health and Safety Plan and thereafter finally approve the Health and Safety Plan for implementation;
- Ensuring that a copy of the Contractor’s Health and Safety Plan is available on request to an employee, inspector or Contractor.
- Taking reasonable steps to ensure that each Contractor’s Health and Safety Plan is implemented and maintained on the construction site: Provided that
the steps taken shall include periodic audits at intervals mutually agreed upon between the Employer and Contractor, but at least once every 30 days;

- To ensure a copy of the Health and Safety Audit Report is issued to the Contractor within seven days after the audit;
- To stop any Contractor from executing a construction activity which poses a threat to the health and safety of persons which is not in accordance with the Employer’s Health and Safety Specifications and the Contractor’s Health and Safety Plan for the site; and
- Where changes are brought about to the design or construction work, make sufficient health and safety information and appropriate resources available to the Contractor to execute the work safely.

6.2. The Designer’s Responsibilities:

In terms of Regulation 6 of the Construction Regulations the Designer of a structure is responsible for _inter alia_ the following:

- Ensure that the applicable safety standards incorporated into the Regulations under Section 44 of the Act are complied with in the design;
- Take into consideration the Health and Safety Specification submitted by the Employer;
- Before the contract is put out on tender, make available in a report to the Employer:
  - i. All relevant health and safety information about the design of the relevant structure that may affect the pricing of the construction work;
  - ii. The geotechnical-science aspects, where appropriate; and
  - iii. The loading that the structure is designed to withstand.
- Inform the Employer in writing of any known or anticipated dangers of hazards relating to the construction work, and make available all relevant information required for the safe execution of the work upon being designed or when the design is subsequently altered;
- Refrain from including anything in the design of the structure necessitating the use of dangerous procedures or materials hazardous to the health and safety of persons, which can be avoided by modifying the design or by substituting materials;
- Take into account the hazards relating to any subsequent maintenance of the relevant structure and must make provision in the design for that work to be performed to minimise the risk;
- When mandated by the Employer to do so, carry out the necessary inspections at appropriate stages to verify that the construction of the relevant structure is carried out in accordance with the design: provided that if the Designer is not so mandated, the Employer’s appointed Agent in this regard is responsible to carry out such inspections;
- When mandated as contemplated above, stop any Contractor from executing any construction work which is not in accordance with the relevant design’s health and safety aspects: provided that if the Designer is not so mandated, the
Employer’s appointed Agent in that regard must stop that contractor from executing that construction work;

• When mandated as contemplated above, in his or her final inspection of the completed structure in accordance with the National Building Regulations, include the health and safety aspects of the structure as far as is reasonably practicable, declare the structure safe for use, and issue a completion certificate to the Employer and a copy thereof to the Contractor; and

• Take cognisance of the ergonomic design principles during the design stage, in order to minimize ergonomic related hazards in all phases of the life cycle of the structure.

The Designer will be required to provide proof in writing that he/ she has taken this health and safety specification into consideration during for the finalisation of the Designs.

The Designer will further be required to ensure all design drawings issued for construction are signed off by the relevant responsible and competent designer prior to issuing such. Also, a Design Report as referred to above must accompany all Designs being issued.

Where changes are brought about to the design the Designer shall inform the Client, Client’s Engineer/ Project Manager and Health and Safety Agent thereof to verify that the Contractor has sufficient health and safety information and appropriate resources available to execute the work safely.

6.3. The Contractor(s) Responsibilities

In terms of Regulation 7 of the Construction Regulations the Contractor and Sub-Contractor are responsible for inter alia the following:

• Providing and demonstrating to the Employer a suitable and sufficiently documented and coherent site-specific Health and Safety Plan, based on the Employer’s documented Health and Safety Specifications contemplated in Regulation 5 (1) (b), which shall be applied from the date of commencement of and for the duration of the construction work and which must be reviewed and updated by the Contractor as work progresses;

• Ensure that a copy of his or her Health and Safety Plan, as well as the Sub-Contractor’s Health and Safety Plan, is available on request to an employee, an inspector, a Contractor, the Employer or the Employer’s Agent;

• Hand over a consolidated Health and Safety File to the Employer upon completion of the construction work and must in addition to the documentation referred to in Construction Regulation 7, sub regulation (2)(b), include a record of all drawings, designs, materials used and other similar information concerning the completed structure;

• Ensure that all his employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3 (Construction Regulations 2014);
• No Contractor may allow or permit any employee or person to enter any site, unless that employee or person has undergone health and safety induction training pertaining to the hazards prevalent on site at the time of entry;
• Must ensure all visitors to a construction site undergo health and safety induction pertaining to the hazards prevalent on the site and must ensure that such visitors have the necessary personal protective equipment.

Sub-Contractors who are making a bid for construction work are required to make provision for the cost of health and safety requirements set out in these Specifications and in the OHS Act and accompanying Regulations. In addition, the aforesaid Sub-Contractors shall submit a declaration indicating that they have the necessary competencies and resources to carry out the work safely.

Note that compliance to these Health and Safety Specifications does not absolve the Contractor to comply with the minimum legal requirements in terms of the OHS Act, Construction Regulations or any other applicable Regulations or amendments thereto.

7.4 General Duties of Employee’s at work:
In terms of Section 14 of the OHS Act, every employee shall at work:

a) take reasonable care for the health and safety of himself and of other persons who may be affected by his acts or omissions;

b) as regards any duty or requirement imposed on his employer or any other person by this Act, co-operate with such employer or person to enable that duty or requirement to be performed or complied with;

c) carry out any lawful order given to him, and obey the health and safety rules and procedures laid down by his employer or by anyone authorized thereto by his employer, in the interest of health or safety;

d) if any situation which is unsafe or unhealthy comes to his attention, as soon as practicable report such situation to his employer or to the health and safety representative for his workplace or section thereof, as the case may be, who shall report it to the employer; and

e) if he is involved in any incident which may affect his health or which has caused an injury to himself, report such incident to his employer or to anyone authorized thereto by the employer, or to his health and safety representative, as soon as practicable but not later than the end of the particular shift during which the incident occurred, unless the circumstances were such that the reporting of the incident was not possible, in which case he shall report the incident as soon as practicable thereafter.

7. GENERAL HEALTH AND SAFETY PROVISIONS

This section of the document provides the general health and safety requirements imposed on the Contractor for the construction work to be performed. Note that
although these provisions do not provide an all-inclusive interpretation and repetition of the applicable sections of the OHS Act and accompanying Regulations, the Contractor is obligated to comply with the aforementioned legislation in full.

7.1. Occupational Health and Safety Policy

The Contractor and all its appointed subcontractors shall have a Health and Safety Policy signed off by its Chief Executive Officer (OHS Act 16(1)) Appointee. This Policy shall be eligible for reviews at intervals not longer than 4 years.

7.2. Appointments

The following appointments (where applicable), as required by the Occupational Health and Safety Act, General Safety Regulations and Construction Regulations, will be made in writing by the Contractor:

- Construction Manager (Regulation 8(1));
- Assistant Construction Manager (Regulation 8(2));
- Construction Health and Safety Officer/ Manager (Regulation 8(5));
- Construction work supervisor (Regulation 8(7));
- Subordinate construction work supervisor (Regulation 8(8));
- Safety Representative (OHS Act 17);
- First aid attendant (General Safety Regulations 3);
- Risk assessor (Regulation 9(1));
- Fall Protection Plan Developer (Regulation 10(1)a);
- Demolition Work Supervisor (Regulation 14(1));
- Scaffolding Supervisor (Regulation 16 (1));
- Scaffolding Erector (Regulation 16);
- Scaffolding Inspector (Regulation 16);
- Operators of construction vehicles and mobile plant (Regulation 23(1)d);
- Hazardous Substance Supervisor (Regulation 25);
- Housekeeping Supervisor (Regulation 27);
- Stacking and Storage Supervisor (Regulation 28(a) and General Safety Regulation 8(1));
- Fire Equipment Inspector (Regulation 29(h));
- Ladder Inspector (GSR 13A);
- Hand tool Inspector (OHS Act 9);
- Principal Contractor (Contractor) (Regulation 5(1)k);
- Contractor (Regulation 7(1)c(v));
- Client Agent (Regulation 5(5)); and
- Any other appointments which may become relevant for the execution of the works.

The Contractor shall ensure that the employees appointed in the above positions are competent. An organogram with the candidates to be appointed in the above positions must be included in the Health and Safety Plan and submitted to the Employer.
All persons appointed in the above-mentioned positions must complete a register for each appointment. Details for the frequency of completion of each register are included in Table 1.

**Table 1: Register Frequency**

<table>
<thead>
<tr>
<th>Supervisor</th>
<th>Completion Frequency</th>
<th>Reporting Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Officer</td>
<td>On-going</td>
<td>Monthly Safety Report</td>
</tr>
<tr>
<td>Health and Safety Representative</td>
<td>Monthly</td>
<td>Register</td>
</tr>
<tr>
<td>Risk Assessor</td>
<td>On-going</td>
<td>Continuous RA form</td>
</tr>
<tr>
<td>Demolition Work Supervisor</td>
<td>Daily</td>
<td>Register</td>
</tr>
<tr>
<td>Portable Electrical Equipment Inspector</td>
<td>Daily</td>
<td>Register</td>
</tr>
<tr>
<td>Construction Vehicle and Mobile Plant Inspector</td>
<td>Daily</td>
<td>Register</td>
</tr>
<tr>
<td>Hand tool inspector</td>
<td>Weekly</td>
<td>Register</td>
</tr>
<tr>
<td>Ladder Inspector</td>
<td>Monthly</td>
<td>Register</td>
</tr>
<tr>
<td>Fire Equipment Inspector</td>
<td>Monthly</td>
<td>Register</td>
</tr>
<tr>
<td>First Aid Attendant</td>
<td>Monthly</td>
<td>Inventory Register</td>
</tr>
<tr>
<td>Scaffolding Inspector</td>
<td>Daily</td>
<td>Register</td>
</tr>
<tr>
<td>Stacking and storage supervisor</td>
<td>On-going</td>
<td>Register</td>
</tr>
<tr>
<td>Electrical Installations</td>
<td>Weekly</td>
<td>Register</td>
</tr>
<tr>
<td>Earth Leakages</td>
<td>Monthly</td>
<td>Register</td>
</tr>
<tr>
<td>Ergonomics</td>
<td>Monthly</td>
<td>Register</td>
</tr>
<tr>
<td>Hazardous Substances</td>
<td>Monthly</td>
<td>Register</td>
</tr>
<tr>
<td>Public Safety (i.e. Passengers)</td>
<td>Daily</td>
<td>Register</td>
</tr>
</tbody>
</table>

All registers must be kept in the Health and Safety File on site.

7.3. **Health and Safety Organogram**

The Contractor shall submit an organogram, outlining the health and safety site management structure including those of the Sub-Contractors. In cases where appointments have not been made, the organogram shall reflect the intended positions, and the names shall be filled in as and when the appointments are made. The organogram shall be updated whenever there are any changes in the site management structure and/or personnel. A copy shall be attached to the Health and Safety Plan.

Further a copy of the latest relevant organogram must be approved and signed off by the Construction Manager and displayed on the site notice board. The organogram shall be reviewed and updated whenever the relevant appointments change.
7.4. General management of health and safety

The person legally responsible for ensuring that the provisions of the Occupational Health and Safety Act and Regulations of 1993 are implemented on behalf of the Employer is the Chief Executive Officer (CEO) of the appointed Contractor.

The necessary enforcement measures to assure the health and safety of employees are affected through a chain of command structure.

The CEO must ensure that a health and safety management system is in place to give effect to the provisions of the Act and the Regulations.

In order to ensure that the above-mentioned management system is affective the following must be implemented:

1. A detailed Process Flow must be drawn up to determine all the inputs and outputs for each activity to be performed during the project, which will ensure that the subsequent risk assessment done is very thorough and detailed.
2. Objectives and targets must be determined for the mitigation of each risk.
3. Procedures and work instructions must be drawn up for each task to be done during the project.
4. Every worker must be inducted and given training for their particular job and carry proof of induction on their person.
5. On a daily basis supervisors and managers must meet with employees and brief them on the job for the day regarding the specific risks to be encountered during their work as well as the mitigation measures and safe working methods for those risks.
6. Every Contractor’s employees must be issued with the required PPE and must be identifiable.

7.5. Health and Safety Committees

(OHS Act, Section 19)

Provided that two or more safety representatives have been designated, the Contractor shall ensure that one or more safety committees are established and that Health and Safety Committee meetings are held at least monthly and that minutes are kept on record. Meetings must be convened and chaired by the Contractor’s construction supervisor. All of the Contractor’s and Sub-Contractors’ responsible persons and Health and Safety Representatives shall attend the monthly Health and Safety Committee meetings.

Sub-Contractors shall also have their own internal Health and Safety Committees as required in terms of the Occupational Health and Safety Act 85 of 1993, and copies of their agendas and minutes of their meetings shall be forwarded to the Contractor on a monthly basis. Copies of all Health and Safety Committees’ agendas and minutes are to be kept in the project Health and Safety File. The dates scheduled for the
Contractor’s monthly meetings must be submitted to the Employer, the Engineer and the appointed Safety Agent in advance.

7.6. Construction Work Permit

*(Construction Regulations, Regulation 3)*

A client who intends to have construction work carried out, must at least 30 days before that work is to be carried out apply to the Department of Labour’s provincial director in writing for a construction work permit to perform construction work if the intended construction work starts from the 7th of August 2018 and will-

1. Exceed 365 days and will involve more than 3600-person days of construction work; or
2. The tender value limit is grade 7, 8 or 9 of the Construction Industry Development Board (CIDB) grading.

Note: If the project value is above R40 million a construction work permit will be applied for from the Department of Labour as contemplated in Construction Regulation 3(1).

7.7. Notification of Commencement of Construction Work

*(Construction Regulations, Regulation 4)*

The Contractor shall prior to carrying out any construction work other than work contemplate in Construction Regulation 3, notify the provincial director of the Department of Labour in writing 7 days prior to commencement of the work if the following work is involved:

- Excavation work;
- Working at height where there is a risk of falling;
- The demolition of a structure; or
- The use of explosives to perform construction work.

Proof of notification shall be kept on site, available for inspection by inspectors, the Employer, the Employer’s Agent or employees.

Note: It is estimated that the first phase of the project will not exceed R40 million, the Contractor will therefore be required to notify the Department of Labour prior to commencement of construction work as per Construction Regulation 4.

7.8. Management and Supervision of Construction Work

*(Construction Regulations, Regulation 8)*

The Contractor shall in writing appoint one full-time competent person as the construction manager with the duty of managing all the construction work on a single site, including the duty of ensuring occupational health and safety compliance, and in
the absence of the construction manager an alternate must be appointed by the Contractor.

The Contractor must upon having considered the size of the project, in writing appoint one or more assistant construction managers for different sections thereof: provided that the designation of any such person does not relieve the construction manager of any personal accountability for failing in his or her management duties in terms of the regulations.

A construction manager must in writing appoint construction supervisors responsible for construction activities and ensuring occupational health and safety compliance on the construction site.

The Contractor must upon having considered the size of the project, in writing appoint one or more competent employees for different sections thereof to assist the construction supervisor. Every assistant construction supervisor shall to the extent clearly defined by the Contractor in the letter of appointment, the same duties as the construction supervisor: provided that the designation of any such employee does not relieve the construction supervisor of any personal accountability for failing in his or her supervisory duties in terms of the Construction Regulations.

The Contractor shall appoint at least one full-time Construction Health and Safety Officer or Manager (CHSO/M) who shall be registered as such (i.e. CHSM) with the South African Council for the Construction and Project Management Professions (SACPCMP). No Acknowledgement Letters nor other forms of proof of application for CHSO or CHSM registration will be accepted other than actual valid and in good standing registration certificates.

The CHSO / CHSM may not be removed or replaced without the approval of the Client representative and CHSA, nor may the site be left unattended for more than 1 day without adequate, competent cover. The Client representative and CHSA may also give instruction for the replacement of the contractor/sub-contractor CHSO, should they fail to meet all obligations that fall within their scope of services.

7.9. The Contractor’s Management Staff’s Competency Requirements

Curriculum Vitae, training certificates and proof of experience of key health and safety personnel shall be submitted with the health and safety plan for approval. Health and safety competency assessments may be conducted by the Construction Health and Safety Agent on CHSO / CHSM before site establishment.

The certified training requirements of key health and safety personnel shall include, but will not be limited to, the following:
Table 1: Management Staff Training and Competency Requirements

<table>
<thead>
<tr>
<th>Position</th>
<th>Legal Liability*</th>
<th>Incident Investigation*</th>
<th>HIRA*</th>
<th>Conducting PTO’s &amp; DSTI’s</th>
<th>Project H&amp;S Induction</th>
<th>NADSAM / SAMTRAC/ NEBOSCH or Equivalent*</th>
<th>SACPCMP CHSO / CHSM Registration</th>
<th>Emergency Coordination Training*</th>
<th>Relevant Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Manager (OHS 16(2))</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Construction Manager (CR 8(1))</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Assistant Construction Manager(s) (CR 8(2))</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Construction Supervisors (CR 8(7))</td>
<td>Y</td>
<td></td>
<td>Y</td>
<td></td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Assistant Construction Supervisors (CR 8(7))</td>
<td>Y</td>
<td></td>
<td>Y</td>
<td></td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Construction Health and Safety Manager/ Officer (CHSM/CHSO)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

Items marked with an * refers to Certified Training.

7.10. Risk Assessment

(Construction Regulations, Regulation 9)

A project specific Baseline Risk Assessment has been developed and attached to this Health and Safety Specification under Annexure B. The Contractor shall keep a copy of this Baseline Risk Assessment available in his Health and Safety File and shall communicate it to all his employees to work on the project, with signed communication registers kept. This Baseline Risk Assessment forms part of this Health and Safety Specification and compliance is therefore required in terms of the control measures provided therein. The Contractor shall however implement further task specific control measures as identified and captured in his task specific risk assessments.

The Contractor shall before the commencement of any construction work and during construction work, develop a risk assessment procedure to be performed by a competent person/s (appointed in writing). The risk assessment procedure shall form part of the Health and Safety Plan to be applied on the site and shall include at least-

(a) The identification of the risks and hazards to which persons may be exposed

(b) The analysis and evaluation of the risks and hazards identified based on a documented method;
(c) A documented plan and applicable safe work procedures to mitigate, reduce or control the risks and hazards that have been identified;

(d) A monitoring plan; and

(e) A review plan.

In order to ensure compliance with the Construction Regulations the Contractor will be required to undertake three forms of risk assessments, namely:

1) Task specific risk assessment:

Before the undertaking of construction work the Contractor is required to undertake a task specific risk assessment for each and every task to be undertaken. The task specific risk assessments must include any risk or hazard that people, vehicles, machinery and facilities may be exposed to during construction. Mitigation measures for the identified risks must be defined during the assessment. The task specific risk assessment and mitigation measures must be periodically reviewed during the construction work to ensure that it remains relevant.

2) Issue based risk assessments:

If methods and procedures are varied during the construction period, the Contractor will be required to undertake a separate risk assessment. Examples of when a separate risk assessment will be undertaken are as follows:

- New machinery is brought onto site,
- Incidents or near misses occur,
- Designs or layouts are amended, or
- Type of work changes.

3) Continuous risk assessment:

In order to maintain a safe and risk-free environment continuous risk assessment (e.g. Daily Safety Task Instructions (DSTIs) or Mini Risk Assessments) must be undertaken on a daily basis for all activities undertaken by each work team.

The Contractor shall ensure all his employees and his Sub-Contractors are informed, instructed and trained by a competent person regarding any hazard and the related work procedures and or control measures before any work commences, and thereafter at the times determined in the risk assessment monitoring and review plan of the relevant site.

The Contractor shall ensure copies of the relevant risk assessments and safe work procedures are always available on the construction site.

The Contractor shall ensure risk assessments are reviewed:

- Where changes are affected to the design and or construction that result in a change to the risk profile; or
- When an incident has occurred.
After all risks have been identified, the Contractor is required to analyse the risks identified by determining the risk probability, severity and frequency.

The Contractor will be required to keep an updated Risk Matrix available showing all risk assessments prepared, approved (date), amended (date) and date communicated.

The person or group of people appointed to undertake the risk assessment must be competent. Activity specific risk assessments should be undertaken by a combination of appointed competent person’s representative of not only the Safety Department but also Construction Department (i.e. Site Engineer’s, Construction Manager and Supervisors). This means that the person must have the knowledge, training, experience and qualifications specific to the work or task being performed.

Apart from the risks identified by the Contractor, the following risks should also be considered in the risk assessments and effective mitigation and control measures needs to be developed for each activity’s risks based on the Contractor’s proposed work methodology.

Ensure that safe work procedures and work instructions as well as emergency procedures are prepared for all identified risks.

The Contractor shall implement a formal Risk Assessment review and approval procedure and ensure all risk assessments are first approved in writing prior to issue to site. The Contractor shall ensure that all Sub-Contractor risk assessments are reviewed and approved in writing through his Risk Assessment review and approval procedure, prior to such activities being undertaken on site.

7.11. **Legislation**

The Contractor is required to adhere to at all times and have available the following Legislation on site for this project:

- Occupational Health and Safety Act, 1993
- General Safety Regulations
- General Administrative Regulations
- Construction Regulations, 2014
- Driven Machinery Regulations
- Noise Induced Hearing Loss Regulations
- Environmental Regulations for Workplaces
- Asbestos Regulations
- Lead Regulations
- Facilities Regulations
- Hazardous Chemical Substances Regulations
- General Machinery Regulations
- Electrical Installation Regulations
- Electrical Machinery Regulations
• National Road Traffic Act, 1996
• Relevant Municipal By-laws
• Applicable South African National Standards (SANS)
• Applicable international standards

It is the duty of the Contractor and contractor to ensure that they are familiar with the necessary SHE legislation required.

The Contractor shall compile a legal register listing all applicable legislation and standards that may have an impact on the scope of work that they are performing on the construction project.

7.12. Sub-Contractors

(Construction Regulations, Regulation 7)

In accordance with Regulation 7(1)c, a Contractor shall undertake *inter alia* the following with regard to Sub-Contractors:

(a) Provide any Sub-Contractor who is making a bid or appointed to perform construction work for the Contractor, with the relevant sections of the Health and Safety Specifications contemplated in Regulation 5(1)(b);

(b) Take reasonable steps to ensure that each Sub-Contractor’s Health and Safety Plan contemplated in sub-regulation 2(a) is implemented and maintained on the construction site: Provided that the steps taken shall include periodic audits at intervals mutually agreed upon between the Contractor and Sub-Contractor(s), but at least once every month;

(c) Stop any Sub-Contractor from executing construction work, which is not in accordance with, the Contractor’s and/or Sub-Contractor’s Health and Safety Plan for the site or which poses a threat to the health and safety of persons;

(d) Ensure that every Sub-Contractor is registered and in good standing with the compensation fund or with a licensed compensation insurer prior to work commencing on site;

(e) Ensure that potential Sub-Contractors submitting tenders have made provision for the cost of health and safety measures during the construction process; and

(f) Ensure all his employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the prescribed format.

The Contractor (i.e. mandator) must ensure for the completion of an OHS Act Section 37(2) agreement as well as a Construction Regulation 7(1)c(v) Appointment when appointing a Sub-Contractor (i.e. mandatory). Each Sub-Contractor’s Health and Safety File also needs to be reviewed and approved in writing by the Contractor prior to such Sub-Contractor commencing work on site.

7.13. Copy of OHS Act

(General Administrative Regulations, Regulation 4)
Each Contractor or Sub-Contractor with 5 or more employees shall have a copy of the latest revision of the Occupational Health and Safety Act, Act No. 85 of 1993 and Regulations available at its site office at the site.

The Contractor and its appointed Sub-Contractors will have a copy of the Basic Conditions of Employment Act (1977) and amendments thereto, displayed at a conspicuous location on site. The same applies to any other legislative display requirements.


*(General Safety Regulations, Regulation 2)*

In case of injury or emergency the Contractor shall take all reasonable steps that are necessary under the circumstances, to ensure that persons at work receive prompt first aid treatment.

The Contractor shall, in the instance where more than 5 employees are employed at the site, provide a first aid box or boxes at or near the workplace, which shall be available and accessible.

The first aid box shall contain suitable first aid equipment, which includes at least the first aid equipment listed in the Annexure of the General Safety Regulations.

Where more than 10 employees are employed at the site, the Contractor shall take steps to ensure that for every group of up to 50 employees at the site, at least one person is readily available during normal working hours, who is in possession of a valid certificate of competency in first aid.

The Contractor shall prepare a detailed Emergency Procedure, prior to commencement of work on site and it shall be included in, and form part of, the Health and Safety Plan. The procedure shall be updated whenever changes occur and it shall detail the emergency response plans. The Emergency Procedures shall not be limited to, but shall include, the following key elements:

- List of key competent personnel on site;
- Details of the nearest emergency services, including their physical addresses and phone numbers;
- Actions or steps to be taken in the event of each specific type of emergency;
- Information on hazardous materials/situations that may be encountered on site.

The purpose of the Emergency Procedure includes:

- To generate, enforce and give effect to rules or guidelines that protect human health and property;
- To provide for efficient reaction to emergency situations; and
- To designate key personnel to participate in the emergency procedure.

Emergency Procedures shall include, but shall not be limited to, fire, spills, accidents to employees, use of hazardous substances, fires, bomb threats, structural collapse...
incidents and major incidents/accidents. A contact list of all service providers (fire department, ambulance, police, etc.) must be maintained and be readily available to site personnel at all times i.e. it must be located and displayed at the site office.

A copy of the ACSA Emergency procedure must be acquired from the ACSA Safety Department and communicated to employees.

7.15. **Letter of Good Standing**

*(Construction Regulations, Regulation 5(1)j)*

The Contractor shall provide a letter of good standing with the compensation fund or with a licensed compensation insurer to the Employer, prior to work commencing on site. He will further be required to ensure a valid letter of good standing for himself, and all of his Sub-Contractors, is always available on the site throughout the construction project phase. He shall further develop, display and keep updated a table capturing its own as well as all its subcontractor’s validity dates of their Compensation Insurance Letters available.

7.16. **Health and Safety File**

*(Construction Regulations, Regulation 7 (1) & (2))*

The Contractor shall ensure that a Health and Safety File, which shall include all documentation required in terms of the provisions of the OHS Act and the accompanying Regulations, is opened and kept on site and made available to an inspector from the Department of Labour, the Employer, the Employer’s Agent or Sub-Contractor upon request.

At minimum the following must be included in the Health and Safety file:

- Health and Safety Plan;
- Copy of the Construction Work Permit issued by the Department of Labour;
- Letter of good standing from the compensation insurer;
- Appointment letters, proof of competency and organogram;
- Emergency Plan and Procedures;
- Emergency contact numbers;
- Permit to Work Procedure, making provision for Electrical and Mechanical Lockout;
- Demolition Work Plan;
- Proof of training;
- Risk Assessments;
- Method Statements and Safe Work Procedures;
- Checklists and Registers;
- Proof of inductions;
- Medical Assessment Records;
- PPE records;
- Construction design drawings and alterations;
• Specifications of materials used;
• Site Rules;
• Material Safety Data Sheets (MSDSs); and
• Particulars of Sub-Contractors.

The Contractor shall hand over a consolidated Health and Safety File to the Employer on completion of the construction work.

7.17. **Induction and Training**

*(Construction Regulations, Regulation 7(5))*

The Contractor shall ensure that all employees are informed, instructed and trained by a competent person regarding any hazard and the related work procedures before any work commences, and thereafter at such times as may be determined in the risk assessment. The Contractor shall prepare an induction manual which shall be submitted to the CHSA for review and comment before communication. Further, the Contractor shall undergo ACSA’s induction offered by the ACSA Safety department.

The Contractor shall not allow any employee to enter the site unless that employee has undergone health and safety induction training pertaining to the hazards prevalent on the site at the time of entry.

The Contractor shall ensure that all contractor visitors to the site undergo health and safety induction pertaining to the hazards prevalent on the site and shall be provided with the necessary personal protective equipment: Provided that where visits are made only to the site office which is not in direct contact with the construction work activities, those health and safety instructions and the provision of personal protective equipment may not apply.

Each employee must carry proof of induction on him/herself at all times while on the airport construction site.

The Contractor shall prepare and implement a Training Register making provision for all required training for each employee e.g., SHE Representative, First Aid, etc.

The following information must form part of the general induction of employees on the project:

• Health and Safety Policy;
• Health and Safety File;
• Site Rules (also incorporate ACSA site rules);
• Emergency Plan and Procedures;
• Baseline Risk Assessment;
• Permit to Work Procedure; and
• Any further relevant documentation e.g. Activity Specific Risk Assessments; etc.
Regular relevant awareness training will be conducted through toolbox talks and DSTIs.

Part of the induction training material and continuous awareness to be communicated is that no person is allowed to tamper with any airport equipment, switches, valves, etc. unless authorised.

7.18. Health and Safety Audits, Monitoring and Reporting

The Safety Agent shall conduct unannounced weekly inspections and scheduled monthly Health and Safety Audits of the construction work as well as the administration of the health and safety file.

The Contractor is obligated to conduct similar audits himself as well as on all Sub-Contractors that he has appointed. Detailed reports of the audit findings shall be reported on at all levels of project management meetings/forums. Copies of all audit reports shall be kept in the project Health and Safety File.

The Contractor shall implement a Deviation Register whereon all external and internal audit and inspection findings are captured, responsibility allocated and closeout verified. This Deviation Register must be kept updated at least on a weekly basis and made available to the Safety Agent, or any other party (i.e. ACSA representative, Inspector, etc.) on request. A copy of this Deviation Register must be issued to the Construction Manager on a Weekly Basis to keep him/ her informed of the findings made and status of closeout thereof.

7.19. Housekeeping

(Construction Regulations, Regulation 27)

Suitable housekeeping must be continually implemented. Materials and equipment must be properly stored. Scrap debris and waste must be removed at appropriate intervals. Loose materials required for use may not be placed or allowed to accumulate in work areas so as to obstruct the employee access and walkways.

The volume of material stored on site should be as minimal as possible to prevent impacts on available space for access and walkways.

Special care shall be taken not to store any materials or equipment in operational areas inside the airport.

7.20. Demolition

(Construction Regulations, Regulation 14)

Prior to starting any demolition work activities, the Contractor shall ensure its appointed Demolition Work Supervisor conducts a detailed structural engineering survey in order to ascertain the method of demolition to be done and prepare a suitable method statement prior to commencement of such demolition works. The Contractor is required to submit a demolition method statement, including a risk assessment, prior
for any planned demolition work. Such method statement must be submitted to the engineer and CHSA for comment prior to commencement.

The demolition work method statement shall also make provision for the identification of all existing services (i.e. electricity, water, sewer, etc.) which may be affected by the demolition work activities as well as management of dust.

The Demolition Work Supervisor shall remain present on site during all demolition works and conduct daily inspections to check the structural integrity.

7.21. **Scaffolding**

*(Construction Regulations, Regulation 16)*

Only aluminum wheeled mobile scaffolding will be allowed on this project. This mobile scaffolding must be erected and inspected by a competent person. Proof of erector and supervisor competencies must be kept on site.

The mobile scaffolding shall be inspected after erection, weekly thereafter and after changes have been made to it. Registers of the inspections shall be kept on site. “Safe to use/ Not Safe to Use” scaffolding tags shall be displayed on all scaffolding.

All scaffolding used must be of sound and safe material, must have safe working platforms, guard rails, inspection tags and toe boards as a minimum, in accordance with SANS 10085.

7.22. **Construction Vehicles and Mobile Plant**

*(Construction Regulations, Regulation 23)*

The Contractor shall ensure that all construction vehicles are used, maintained and inspected as required by Regulation 23 of the Construction Regulations.

Vehicles used to transport employees shall have seats firmly secured and adequate for the number of employees to be carried.

All construction vehicles operating on public roads shall comply with the requirements of the National Road Traffic Act, 1996.

Speed limits inside airport must be adhered to and construction employees must park only at approved locations.

7.23. **Electrical Installations**

*(Electrical Installation Regulations 2009 and Construction Regulations, Regulation 24)*

All electrical installation work to be undertaken under the direct supervision of a person registered with the Department of Labour as an Electrical Contractor and proof of such valid registration must be kept available on site.
The Electrical Contractor must be registered with the Electrical Contracting Board of South Africa. His registration should not be older than a year. Registration has to be done on an annual basis.

The Electrical Contractor must conduct a risk assessment for the electrical work prior to commencement of work and the safety plan must incorporate a safety standard for electrical installations.

The Contractor shall be required to adhere to the ACSA electrical and mechanical lockout procedure. Such procedure shall be documented and the responsibility of implementing and managing it delegated to a competent person in writing who shall exercise general control over all electrical and mechanical lockout work.

An alternate competent person shall also be appointed to be available in the absence of the appointed competent person only. The Contractor shall engage with the ACSA Safety department on the lockout approach and the ACSA and the Contractor’s competent persons shall be the only people allowed to implement lockout measures, and to remove such measures (e.g. locks).

The Contractor shall implement an Electrical and Mechanical Lockout Register to be kept updated for all lockouts by the appointed competent person. Padlocks, Lockout Tags and any further necessary equipment shall be provided and used for lockouts.

All employees to work on the project shall be trained on the LOTO procedure and proof of such training shall be kept available.

7.24. **Permit to Work**

The Contractor shall follow the ACSA Permit to Work Procedure. This may include all high-risk activities and currently has a focus on Hot Works. Such procedure shall be issued to the contractor by the ACSA Safety department and shall make provisions for Electrical and Mechanical Lockout, Water or Sewer Lockouts, Hot Works, Demolition Work, etc. The Contractor shall ensure that only one Permit to Work Procedure is implemented and that its sub-contractors do not each implement their own procedures.

In addition to the Permit to Work Procedure to be implemented the Contractor will also be required to obtain written approval from the ACSA responsible person before going into any new work area i.e. change of ablution block. The same applies to locking out/ opening or closing of any services at the airport, i.e. water, sewer and electricity.

All employees to work on site shall be trained on the ACSA Permit to Work Procedure prior to commencement of any work activities on site.

7.25. **Stacking and storage**

*(Construction Regulations, Regulation 28)*

The Contractor shall make use of the allocated area at the Airport basement for storage. This area shall be kept neat and tidy at all times.
Specific attention must be given to maintain safe and demarcated passage ways for airport staff, and passengers passing close to the works area.

The Contractor shall ensure that no materials are stacked and stored outside the demarcated and hoarded storage and work areas.

The storage of flammables and hazardous chemical substances must be avoided or kept a minimum.

Special care shall be taken not to store any materials or equipment in operational areas inside the airport. Stacking of materials or equipment shall also not be done in any emergency evacuation routes or in front of any firefighting equipment.

Accessibility and movement of material from the storage area to the working areas should be planned in such a way that the airport staff and passengers are not inconvenienced.

The movement of trolleys, provision of non-slip floor cover and routes will be discussed in detail with ACSA prior to commencement of work.

7.26. **Fire prevention and protection**

*(Construction Regulations, Regulation 29)*

The Contractor must ensure that:

Appropriate measures are taken to avoid the risk of fire;

- Sufficient and suitable storage for flammables is provided;
- Sources of ignition are removed wherever flammable or highly combustible material is present and notices prohibiting smoking must be displayed and enforced.
- Hot works is only allowed under controlled conditions that includes written hot work permits.
- Only spark-free hand and power tools are used.
- Good housekeeping is maintained to prevent the accumulation of unnecessary combustibles.
- Adequate ventilation is maintained.
- Adequate and suitable fixed and portable firefighting equipment is provided and maintained in good working order.
- All employees are instructed in the use of the firefighting equipment and know how to attempt to extinguish a fire.
- The contractor employees are informed of the airport fire requirements.

7.27. **Welfare Facilities**

*(Construction Regulations, Regulation 30)*

The Contractor must confirm if employees are allowed to use the airport ablution facilities, if not the Contractor shall therefore provide mobile chemical ablution facilities, or any form of temporary facilities at the allocated site office area.
7.28. **Occupational Health and Safety Signage and Work Area Demarcation**

*(General Safety Regulations as amended)*

The Contractor shall ensure that the necessary signage is displayed, as is required by the OHS Act and the accompanying Regulations. The signage shall be displayed at all work areas and at the site office.

Suitable hoarding and demarcation shall be used to completely isolate work areas from the airport operational areas.

The Contractor shall ensure where any noise and dust generating activities are adequately sealed off/cordoned off.

Effective access control measures shall be implemented into all construction work areas to prevent unauthorised entry.

7.29. **Reporting and Investigation of Incidents and Occupational Diseases**

*(General Administrative Regulations, Regulation 8 & 9)*

The Contractor shall ensure that, where required, accidents and incidents are reported to the Department of Labour. This must be done by completing Annexure 1 of the General Administrative Regulations (2003).

The Contractor must investigate all incidents and a formal incident investigation report must be submitted to the Employer within 7 working days of the incident occurring.

Apart from reporting all injuries to the Employer, the Contractor must report all incidents where an employee is injured on duty to the extent that he/she:

- dies
- becomes unconscious
- loses a limb or part of a limb
- is injured or becomes ill to such a degree that he/she is likely either to die or to suffer a permanent physical defect or likely to be unable for a period of at least 14 days either to work or continue with the activity for which he/she was usually employed
- or,
- a major incident occurred
- the health or safety of any person was endangered
- where a dangerous substance was spilled
- the uncontrolled release of any substance under pressure took place
- machinery or any part of machinery fractured or failed resulting in flying, falling or uncontrolled moving objects
- machinery ran out of control

...
that, where a person has died, has become unconscious for any reason or has lost a limb or part of a limb or may die or suffer a permanent physical defect, the incident must be reported to both the Employer and the provincial director of the Department of Labour forthwith by telephone or e-mail. All other reports should still be completed and provided as required.

The Contractor is further responsible for:

- The investigation of all accidents and/or incidents where employees and non-employees were injured to the extent that he, she and/or they had to be referred for medical treatment by a doctor, hospital or clinic.
- The results of the investigation to be entered into the accident and/or incident register.
- The investigation of all minor and non-injury incidents as described in Section 24(1)(b) and (c) of the OHS Act and keeping a record of the results of such investigations including the steps taken to prevent similar accidents in future.
- The investigation of all road traffic accidents, related to the construction activities, and keeping a record of the results of such investigations including the steps taken to prevent similar accidents in future.
- The Employer reserves the right to hold its own investigation into an incident or call for an independent external investigation.

7.30. **Portable Electrical Equipment**

*(Electrical Machinery Regulation, Regulation 10)*

Portable electrical tools and equipment includes every unit that takes electrical power from a 15 ampere plug point and is moved around for use in the workplace for example; drills, saws, grindstones, portable lights, etcetera.

The use, inspection and maintenance of portable electrical tools and equipment shall be as follows:

- Regular inspections must be carried out by a competent person appointed in writing;
- Inspection results must be recorded in a register;
- Only competent authorised persons are allowed to use portable electrical tools and equipment; and
- The correct protective equipment must be worn or used whilst operating portable electrical tools and equipment.

All employees operating or using machines and tools shall:

- Be competent.
- Have a valid certificate.
- Have proof of any form of task related training.
7.31. **Confined Space Work**

(General Safety Regulations, Regulation 5)

No confined space work is expected on this project except for limited work that will take place on the utility/service duct.

The contractor shall ensure adequate lighting is provided if working on this utility duct.

If any other confined work arises during the course of the project, all confined space work must be performed in accordance with GSR 5.

7.32. **Personal Protective Equipment (PPE)**

The following PPE will be compulsory for all employees working on the project:

- Foot protection (safety boots);
- Overalls;
- Hard hats with employee name and induction sticker affixed to the hard hat;
- Reflective vest with contractor name and conform to the ACSA specification;
- Eye protection (where required); and
- Safety gloves (where required).

Further PPE will be required depending on the risk associated with the specific activities undertaken, i.e. hearing protection, full body harnesses, gum boots, etc.

Fall arrest protection measures (i.e. full body harnesses) must be warn where work takes place at a fall risk position of higher than 2m.

There must be a record of PPE issued on site. A commitment must be made by the employee in writing to wear the PPE issued to him/her.

Visitors to wear safety boots, hard hats, eye protection and reflective vests as a minimum.

7.33. **Health and Hygiene**

All employees must have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the prescribed form (Annexure 3 of the OHS Act).

Medical examinations shall be done before commencing with work (pre-placement), periodically, after illness or injury and at the end of the project.

All first aiders shall have access to Material Safety Data Sheets and the emergency procedures to prevent further injury or harm until professional help arrives.

7.34. **Access Control and Security**

The Contractor and all its appointed subcontractors shall comply with the ACSA Site Access Rules.

The Contractor’s (including its appointed subcontractors) employees are not allowed to enter any unauthorised facilities except those areas approved and demarcated as
construction areas, as defined in the scope of work within the contract. Failure to comply with this instruction will result in the Contractor’s employees being escorted from the Airport premises.

### 7.35. Hours of Work

The hours of work for the site will be on the tender document and confirmed by ACSA Management Representative prior to commencement of work.

### 7.36. Change Management

The Contractor shall develop and implement a Change Management Plan to ensure occupational health and safety risks are controlled when changes are made/occurs. The impacts of change on occupational health and safety risks must be documented and communicated to all relevant parties, including employees.

Typical examples of changes include:

- Management changes (short and long term);
- New equipment, materials, products or a change of equipment configuration (new model or different type manufacturer);
- Design or construction changes not approved by the Design Engineer;
- Abnormal changes in workplace conditions (other contractors and high-risk activities);
- Changed work methodology (requires different tools and work method, etc.); and
- Deviation from safe work procedures especially during re-work.

### 7.37. Public Safety

Relevant and effective measures to be identified and incorporated into risk assessments to ensure for the safeguarding of the site to prevent any likely injury or property damage to members of the public, passengers as well as employees. Such measures shall be implemented and may include amongst others, barricading, hoarding, signage etc.

The contractor shall ensure the airport operations are not disturbed during construction.

### 7.38. Monthly Report and Site Meeting

The Contractor will use the monthly site meeting as a platform to report on all health and safety issues. During the monthly site meeting the Contractor will submit a monthly safety report, including incident and labour statistics.

External audit reports will also be discussed in these meetings and any non-conformances/findings/observations found in these audits/inspections shall be raised and discussed with the contractor.
7.39. **Employer Actions to Stop Work**

The conditions that lead to work stoppages by the employer’s safety representative, in the form of the Safety Agent, are based on:

- Safety system breakdown – where non-conformances, findings and observations don’t result in a response to the system, either through closing out, or the amendment of risk assessments, changing work practises, staffing interventions etc;
- Inadequate change management – in instances such as changes in site conditions, or the design changes, or there are changes to staffing, and these changes are not well managed and result in higher risks on site;
- Unsafe acts/behaviours; and
- Unsafe conditions.

Work will be stopped by the Safety Agent for a section of the work, a type of activity or the entire site.

In the event that the Safety Agent determines that the contractor is to stop work, a Work Stoppage Form will be issued. This will include the reasons for the stoppage and the conditions under which work can re-start will be documented. The contractor is to react to the Work Stoppage Form immediately by stopping work.

The process to be followed to ensure the worksite is rendered safe:

- The relevant activity or the whole site must be stopped;
- The Client’s Project Manager, CHSA, Engineer and/or Contractor and his subcontractors shall immediately remove the workforce from the work area and correct the health and safety deficiencies by allowing only the people in the area that are competent to make the area safe.
- Contractor and his subcontractors shall ensure that no other work is being performed during this time. Should the estimated time from the outset to make the area safe where life threatening/imminent danger situations exist, then the area will be barricaded and a sign placed with the wording “Unsafe Area – Authorized Access Only”.
- The Client’s Project Manager, CHSA, Engineer shall review the affected parts/sections of the HSS with the purpose of providing sufficient Health and Safety information to the Contractor when necessary.
- The Contractor shall then revise the relevant sections in the Health and Safety Plan to accommodate the changes.
- The CHSA must ensure that the revised provisions in the Health and Safety Plan are adequate, and are implemented, and must approve it before the work activity is commenced.

Before the workforce is allowed back in the area, the Contractor and his subcontractors shall ensure:

- Investigation of the work stoppage and the area is to re-inspected by Contractor CHSO/ CHSM and supervisor and corrective actions taken documented on the Work Stoppage Form;
• Sign off of the “Work Stoppage Form” issued by the CHSA to declare the area/activity/person/plant/or equipment safe for work. Refer to requirements of Construction Regulation 5(q) of the OHS Act.

7.40. Categories of Contractor Violations

The Safety Agent will make safety system violations known to the principal contractor in three forms:

• Observations – activities or conditions which could be improved, but which are not in violation of the safety legislation;
• Findings - activities or conditions which violate the safety legislation; and
• Non-conformance – these are activities, conditions or states of the safety system which require urgent interventions. They may be high impact violations of the safety legislation or are high impact violations of the client’s health and safety specifications.

The Safety Agent will note the violations in their various categories in the monthly report. Each violation should be closed out by the contractor and such close-out should be documented by the contractor. All close-outs are to be carried out to the satisfaction of the Safety Agent.

7.41. Sanctions for Contractor Violations

Sanction for contractor violations are applied in a sequential fashion by the Safety Agent. The sanctions are listed in order of severity:

• Verbal Discussions – these are site-based discussions on safety conditions of concern;
• Identification of Violations in the Monthly report – violations that are highlighted in the report as being of concern. These violations will be tracked until close-out has been affected;
• Withholding of Payment – should the contractor have more than three non-conformances listed in the monthly report, the employer is entitled with withhold payment of the any outstanding certificate, in its entirety, until the non-conformances are closed out;
• Work Stoppage – the stoppage of work by the Safety Agent, through the issue of a Work Stoppage Form. Work will continue only one the condition that has led to the stoppage is mitigated.

Items 3 and 4 can occur concurrently, and they may be applied without regard to the importance on the list. In other words, payment does not have to be withheld first, before work can be stopped. Conversely, work can be stopped despite payment not having been withheld prior to the work stoppage.

7.42. Health and Safety File Submission to Client on Project Completion

The contractor will be required to hand over a consolidated Health and Safety file at the end of the project.

A list of critical information to be included in the Health and Safety file on completion of the project will be provided to the Contractor during the project.
ANNEXURE A

MANDATORY AGREEMENT
OCCUPATIONAL HEALTH AND SAFETY ACT (85 OF 1993)
CONSTRUCTION REGULATIONS 2014

Project Name: ACSA Ablution Facilities Upgrades

AGREEMENT WITH MANDATORY
In terms of Section 37(1) and (2)

WRITTEN AGREEMENT ENTERED INTO AND BETWEEN

AIRPORT COMPANY SOUTH AFRICA

“Employer”

AND

“Mandatory”

Agreement with Mandatory to be completed in black ink and each page and any change made to be initialled
OCCUPATIONAL HEALTH AND SAFETY ACT OF 1993
AND CONSTRUCTION REGULATIONS 2014

REQUIREMENTS:

1. Attention is drawn to “General Duties of Employers to their Employees” as required by Section 8 of the Act.
2. You are required to:

   Sign a written “Agreement with Mandatory” as required by Sect 37(1)(2) of the Act before commencing any work on site.
   Ensure that all employees receive the necessary Induction Training and have proof thereof.

   Note: Mandatory must ensure that all employees under direct control are informed, instructed and trained by a competent person regarding any hazard and the related word procedures before any work commences.

   Ensure the provision of Welfare Facilities by all employees as per Construction Regulation 30.
   Provide the Employer with the Health and Safety Plan and Specifications
   Ensure that Method Statements, Risk Assessments and Safe Work Procedures are done and available
   Provide the Employer with written appointment of the person who is going to Manage the Construction Work per Construction Regulation 8(1)
   Provide the Employer with written appointment of the person who is going to Supervise the Construction Work per Construction Regulation 8(7)
   Provide the Employer with written designation of the nominated Health and Safety Representative as per Section 17(1).

   Note: Your Health and Safety Representative will be expected to attend the Employer/ Contractor safety meetings.

   If more than five (5) persons are employed, the Mandatory is required to provide your own qualified First Aid Box as per GSR 3(2).
   If more than ten (10) persons are employed, the Mandatory is required to provide your own qualified First Aider as per GSR 3(4).

   Note: If difficulty in complying with the two first aid requirements above, the mandatory may arrange/ come to an agreement with the Employer/Contractor to make use of his First Aid facilities in case of injury and will be expected to communicate such an agreement to your employees.

   When working with Hazardous Chemical Substances, comply with HCS Reg. 3.

   Note: Asbestos and Lead Regulations are separate.
When using Lifting Machines and Lifting Tackle, comply with DMR 19 and Construction Reg. 22.

**Note:** The Mandatory may be required to appoint a Banksman to control Lifting/Slinging operations.

If working at heights, a Fall Protection Plan must be submitted (roof work included) as per requirements of Construction Reg. 10.

When work involve structures comply with Construction Reg. 11.

When using/erecting Support/Form Work (Temporary Works), comply with Construction Reg. 12.

When doing Excavation Work, comply with Construction Reg. 13.

When doing Demolition Work, comply with Construction Reg. 14.

When erecting/using scaffolding comply with the requirements of SANS/10085 “Access Scaffolding” and Construction Reg. 16.

When erecting/using Suspended Scaffolding comply with the requirements of Construction Reg. 17.

When using bulk mixing plants comply with Construction Regulation 20.

When using explosive actuated fastening devices comply with Construction Regulation 21.

When using Construction Vehicles, comply with Construction Reg. 23.

When doing Electrical Installation and Machinery Work, comply with Construction Reg. 24, Electrical Installation Regulations and Electrical Machinery Regulations.

When using and storing flammable liquids, comply with Construction Regulation 25.

Ensure that good Housekeeping, Stacking and Storage principles are applied on this project as per Construction Reg. 27 and 28.

Ensure that appropriate measures are taken to avoid the risk of Fire/Explosion and comply with requirements of Construction Reg. 29.

When doing Blasting to comply with Explosives Regulations Chapter 10.

When doing electrical installations or working with electrical machinery ensure compliance to the Construction Reg. 24, Electrical Installation Regulations and Electrical Machinery Regulations.

When installing or working with mechanical equipment and machinery ensure compliance to the Driven Machinery Regulations and General Machinery Regulations.

**Note:** Electrician to provide copy of registration as per Electrical Installations Reg. 9(3).

When using Explosive Powered Tools, comply with GSR 19.

When working in Confined Spaces, comply with GSR 5.
3. The Mandatory responsible for providing your own legal safety documents and registers to comply with the Act’s requirements. A copy of the OHS Act of 1993 and the Construction Regulations 2014 will be available for perusal in the Contractor’s site office.

4. The Mandatory is required to comply with General Safety Regulations 2(1) to (7) and provide employees with:
   Personal protective equipment which will allow them to carry out their work in a safe manner, e.g. hard hats, safety harnesses, gloves, safe footwear, eye protection, ear protection, waterproof clothing, etc.

5. Reporting of Incidents of Occupational Diseases shall be done as per General Admin. Regulation 8 (also see Sect 24 of the Act).


The Mandatory is required to provide the Employer with proof of registration with the Compensation Commissioner/Federated Employer(s) Mutual when signing this agreement. If not registered, the Employer/Contractor may deduct the necessary amounts from your progress payment and pay it over to the Commissioner to ensure that the Mandatory is insured, see Section 80 and 89 of the COID Act.

Signature: ……………………………  Signature: ……………………………
(Employer/Agent of Employer)  (Contractor)
IN TERMS OF SECTION 37(1) AND (2)

DEFINITION OF MANDATORY

- Includes an Agent, a Contractor or Sub-Contractor for work, but without derogating from his status in his own right as an employer or user

SECTION 37(1)

Whenever an employee does or omits to do any act which would be an offence in terms of this Act for the employer such employee or a user to do or omit to do, then, unless it is provided that-

(a) in doing or omitting to do that act the employee was acting without the connivance of permission of the employer or any such user

(b) it was not under any condition or in any circumstance within the scope of the authority of the employee to do or omit to do an act, whether lawful or unlawful, of the character of the act or omission charged; and

(c) all reasonable steps were taken by the employer or any such user to prevent any act or omission of the kind in question, the employer or any such user himself shall be presumed to have done or omitted to do that act, and shall be liable to be convicted and sentenced in respect thereof; and the fact that he issued instructions forbidding any act or omission of the kind in question shall not, in itself, be accepted as sufficient proof that he took all reasonable steps to prevent the act or omission.

SECTION 37(2)

The provision of subsection (1) shall *mutates mutandis* apply in the case of a mandatory of any employer or user, except if the parties have agreed in writing to the arrangements and procedures between them to ensure compliance by the mandatory with the provisions of this Act.

ACCEPTED BY MANDATORY

In terms of the provisions of Section 37(2) of the Occupational Health and Safety Act 1993

I, ________________________________________________ acting

for and on behalf of __________________________________________________________
(Company/Close
Corporation/Enterprise/Owner/User undertake to ensure that the requirements and provisions of the Act and Regulations are complied with.

Signature: ……………………………… Print Name: ………………………………………
(Contractor)

Designation: ……………………………… Date: ……………………………………………

Mandatory-Workmen’s Compensation/Federated Employers Mutual No: …………………

Company: ……………………………………………………………………………………………

Project/Site: …………………………………………………………………………………………...
ANNEXURE B

Baseline Risk Assessment
**Document Description**  
Baseline Risk Assessment

**Revision**  
Final

**Project Description**  
O.R. Tambo Toilet Facilities Upgrades Phase 1

**Client**  
Airports Company South Africa (ACSA)

**Project Location**  
The O. R. Tambo International Airport, 1 Jones Rd, Kempton Park, Johannesburg, 1632, Gauteng Province, South Africa.

**Client Acceptance**

**Risk Assessor** Temperance Sebele  
**Date** 29/10/2019

**Risk Assessor Signature**  
Sebele

**Document Number** BRA01

### RISK ASSESSMENT METHODOLOGY

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROBABILITY</strong></td>
<td><strong>SEVERITY</strong></td>
<td><strong>FREQUENCY</strong></td>
<td><strong>RISK SCORE ((A x B)+C)</strong></td>
</tr>
<tr>
<td>5</td>
<td>Almost Certain</td>
<td>5</td>
<td>Frequent Occurrence/ Daily</td>
</tr>
<tr>
<td>4</td>
<td>Likely</td>
<td>4</td>
<td>It has happened/ Weekly</td>
</tr>
<tr>
<td>3</td>
<td>Possible</td>
<td>3</td>
<td>It has happened/ Monthly</td>
</tr>
<tr>
<td>2</td>
<td>Unlikely</td>
<td>2</td>
<td>Could occur/ Yearly</td>
</tr>
<tr>
<td>1</td>
<td>Conceivable but improbable</td>
<td>1</td>
<td>Less than Annually</td>
</tr>
</tbody>
</table>
Figure 1: Hierarchy of Controls
<table>
<thead>
<tr>
<th>No</th>
<th>Activity</th>
<th>Hazards</th>
<th>Risk</th>
<th>Probability</th>
<th>Severity</th>
<th>Frequency</th>
<th>Risk Score</th>
<th>Category High/ Medium/ Low</th>
<th>Specific Mitigation Measures in addition to those in the HSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Site Establishment</td>
<td>Unsafe access. Construction work to take place within an operational airport</td>
<td>Minor to Fatal Injuries Disruptions to operational facilities at the airport Property Damage</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td>MEDIUM</td>
<td>Allocated area to be used for site camp. Contractors to comply with the airport security requirements. Communication procedures should be established with the ACSA facility management to ensure communication of planned work. The Contractor shall abide by the ACSA Permit to Work Procedures. Relevant measures in SSHSS to be complied with.</td>
</tr>
<tr>
<td>2.</td>
<td>Medical Fitness Assessments</td>
<td>Exposure to construction related hazards.</td>
<td>Minor to Fatal Injuries</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td>MEDIUM</td>
<td>Medical fitness assessments to be conducted for all employees prior to start of work onsite.</td>
</tr>
<tr>
<td>3.</td>
<td>Access Control into the Airport and Work Areas</td>
<td>Unauthorised/ uncontrolled access into work areas</td>
<td>Minor to Fatal Injuries</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td>MEDIUM</td>
<td>Site camp to be adequately fenced off and screened off.</td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Specific Mitigation Measures in addition to those in the HSS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>----------</td>
<td>---------</td>
<td>------</td>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Hoarding of work areas inside the airport</td>
<td>Disruptions to airport operations. Security risks.</td>
<td>Disruptions to airport operations. Security risks.</td>
<td>Prior to commencement, the Contractor shall consult with ACSA on access requirements as well as preferred access control measures to be implemented for the works within the airport. Effective access control measures should be implemented inside the airport to prevent any unauthorised entry into construction work areas. Hoarding of work areas, access control and signage.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hoarding of work areas inside the airport</td>
<td>Unauthorized/uncontrolled access into dangerous construction areas. Dust Noise</td>
<td>Unauthorized/uncontrolled access into dangerous construction areas. Dust Noise</td>
<td>Work areas to be adequately hoarded with solid boards to limit passengers’ exposure to dust, flying objects etc. Noise generation to be minimal, anything that needs to be cut to size should be cut at the site office.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Probability</td>
<td>Severity</td>
<td>Frequency</td>
<td>Risk Score</td>
<td>Category High/Medium/Low</td>
<td>Specific Mitigation Measures in addition to those in the HSS</td>
</tr>
<tr>
<td>----</td>
<td>----------</td>
<td>---------</td>
<td>------</td>
<td>-------------</td>
<td>----------</td>
<td>-----------</td>
<td>------------</td>
<td>--------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>5.</td>
<td>Flammable and Hazardous chemical substances</td>
<td>Unsafe stacking and storage. Unsafe use. Spillages. Fires.</td>
<td>Health impacts Skin irritations Minor to serious injuries</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td>MEDIUM</td>
<td>Availability of firefighting equipment. Hot works only to be undertaken in as per the hot works permit requirements. Only small quantities for the days use to be kept on site on a daily basis. Availability and communication of relevant MSDSs. HCS containers to be clearly labelled, showing its contents. Training and awareness. Relevant measures in SSHSS to be complied with.</td>
</tr>
<tr>
<td>6.</td>
<td>Housekeeping and stacking and storage</td>
<td>Trip and fall hazards.</td>
<td>Minor to Serious Injuries Property Damage</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>12</td>
<td>MEDIUM</td>
<td>No storage of material allowed in walkways or any other area in the airport</td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Probability</td>
<td>Severity</td>
<td>Frequency</td>
<td>Risk Score</td>
<td>Category High/ Medium/ Low</td>
<td>Specific Mitigation Measures in addition to those in the HSS</td>
</tr>
<tr>
<td>----</td>
<td>----------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------</td>
<td>-------------</td>
<td>----------</td>
<td>-----------</td>
<td>------------</td>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Material stacking and storage obstructing roads and walkways. Fire hazards.</td>
<td>Hygiene Impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MEDIUM</td>
<td>outside the allocated storage and work areas. Tools and equipment to be stored at safe positions on site so as not to obstruct employee movement. Only the designate stacking and storage areas must be used. Effective waste management practices to be implemented. Training and awareness. Relevant measures in SSHSS to be complied with.</td>
</tr>
<tr>
<td>7</td>
<td>Use of Hand tools</td>
<td>Unidentified services being damaged. Trip and fall hazards. Defective tools. Use of incorrect tools. Incorrect use.</td>
<td>Minor to Serious Injuries Property Damage</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>14</td>
<td>MEDIUM</td>
<td>Hand tools to be inspected prior to use. Identify and mark all services in the areas to be demolished.</td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Probability</td>
<td>Severity</td>
<td>Frequency</td>
<td>Risk Score</td>
<td>Category High/Medium/Low</td>
<td>Specific Mitigation Measures in addition to those in the HSS</td>
</tr>
<tr>
<td>----</td>
<td>----------------</td>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>-------------</td>
<td>----------</td>
<td>-----------</td>
<td>------------</td>
<td>--------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>8</td>
<td>Manual handling</td>
<td>Too heavy, unsafe gripping and slippery material. Moving equipment and material from the storage areas to the working area in the airport.</td>
<td>Minor to Serious Injuries Property Damage</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>12</td>
<td>MEDIUM</td>
<td>Employees not to lift loads heavier than 25kg without help. Correct lifting methods to be used. Communication. Special care needs to be taken when moving equipment and material from storage to work areas. Designated nonslip floor covers to be used and trolleys should move only in designated routes. Training and awareness.</td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Probability</td>
<td>Severity</td>
<td>Frequency</td>
<td>Risk Score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>-------------</td>
<td>----------</td>
<td>-----------</td>
<td>------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Building/Refurbishment Works</td>
<td>Incorrect manual handling techniques (Lifting, carrying, Pushing, pulling); Ergonomics (Bending, twisting, prolonged, frequent, repetitive movements); Substandard hand tools being used. Contact with wet cement. Cement dust inhalation.</td>
<td>Back strains, minor hand injuries. Skin irritations and respiratory diseases</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MEDIUM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Relevant measures in SSHSS to be complied with. Correct lifting and handling practices and ergonomic awareness. Plan lifting operations and if the assessed risk is too great, use mechanical aids or seek assistance. Use of relevant PPE.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Working at Heights i.e. Ceiling removals and replacement</td>
<td>Falling from heights or ladder or scaffold. Fall Prevention and Protection Equipment failure.</td>
<td>Minor to fatal injuries. Property damage.</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HIGH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Only trained persons, who are medically and psychologically fit may work at heights or erect mobile scaffolding. Method statement, risk assessment and safe work procedures to be in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Risk Scoring</td>
<td>Specific Mitigation Measures in addition to those in the HSS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>--------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Probability</td>
<td>4 4 4 20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Severity</td>
<td>HIGH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Risk Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Category High/Medium/Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Scaffold Work</td>
<td>Unsafe scaffolding. Incompetent supervision. Unsafe stacking of material at heights</td>
<td>Minor to Fatal Injuries Property Damage</td>
<td>4 4 4 20</td>
<td>All scaffold structures to be designed and erected in accordance with SANS10085-1:2004. Mobile, wheeled scaffolding to be used for this project. No trestles All the required inspections to be done by the relevant appointed competent persons. The Contractor to develop a Fall Protection Plan and relevant Risk Assessments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Probability</td>
<td>Severity</td>
<td>Frequency</td>
<td>Risk Score</td>
<td>Category High/ Medium/ Low</td>
<td>Specific Mitigation Measures in addition to those in the HSS</td>
</tr>
<tr>
<td>----</td>
<td>---------------------</td>
<td>--------------------------------</td>
<td>-----------------------------------</td>
<td>-------------</td>
<td>----------</td>
<td>-----------</td>
<td>------------</td>
<td>-----------------------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>12</td>
<td>Plumbing works</td>
<td>Existing services. Contact with raw sewage</td>
<td>Minor to Serious Injuries Health impacts (i.e. viral and bacterial infections)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>12</td>
<td>MEDIUM</td>
<td>Identify and mark all services in work areas. Isolating supply at source.</td>
</tr>
</tbody>
</table>

All employees to work at heights to receive Work at Heights training and training on the Fall Protection Plan prior to performing such work.

All persons, including inspectors, working at heights to wear and use safety harnesses when working above 2 metres.

Loose materials and tools not to be left at heights unless safely secured.

All hand tools used at heights to be fitted with a lanyard which must be tied to the employee’s hand.

Training and awareness.

Relevant measures in SSHSS to be complied with.
<table>
<thead>
<tr>
<th>No</th>
<th>Activity</th>
<th>Hazards</th>
<th>Risk</th>
<th>Probability</th>
<th>Severity</th>
<th>Frequency</th>
<th>Risk Score</th>
<th>Category High/ Medium/ Low</th>
<th>Specific Mitigation Measures in addition to those in the HSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Electrical Installations</td>
<td>Hot pipes High pressure pipes Dust Water supply cuts. Property Damage (i.e. water and electrical services) Service interruptions.</td>
<td>Minor to Fatal Injuries Property Damage Electrocution Fires Facilities and equipment installed posing risk during operation and maintenance e.g. exposure to exposed electrical components, inadequate earthing, etc.</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>25</td>
<td>HIGH</td>
<td>Suitable service detection equipment shall be used to identify known and unknown services prior demolition work. Training and awareness. Use of PPE. All electrical installation work to be carried out under the direct supervision of an appointed person registered with the Department of Labour as an Electrical Contractor. Contractor to abide by the ACSA Lockout and Tag Out (LOTO) procedure. All electrical installations and equipment must be installed in accordance with the relevant designs, and where relevant, cables and equipment must be clearly labelled.</td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Risk Scoring</td>
<td>Specific Mitigation Measures in addition to those in the HSS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>----------</td>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>--------------</td>
<td>-------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control panels and distribution boards should be clearly labelled and kept in a closed condition.</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td>HIGH</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Training and awareness.</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td></td>
<td>Where construction material or waste is to be moved up or down floor levels on multi floor buildings such handling of material shall be undertaken outside normal working hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relevant measures in SSHSS to be complied with.</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td></td>
<td>Where construction material or waste is to be moved up or down floor levels on multi floor buildings such handling of material shall be undertaken outside normal working hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Storage areas not adequately demarcated.</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td></td>
<td>Where construction material or waste is to be moved up or down floor levels on multi floor buildings such handling of material shall be undertaken outside normal working hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unsafe stacking and storage.</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td></td>
<td>Where construction material or waste is to be moved up or down floor levels on multi floor buildings such handling of material shall be undertaken outside normal working hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Delivery of Material and Equipment (Loading and offloading)</td>
<td>Unsafe lifting activities.</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td></td>
<td>Where construction material or waste is to be moved up or down floor levels on multi floor buildings such handling of material shall be undertaken outside normal working hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unsafe lifting machinery.</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td></td>
<td>Where construction material or waste is to be moved up or down floor levels on multi floor buildings such handling of material shall be undertaken outside normal working hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Storage areas not adequately demarcated.</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td></td>
<td>Where construction material or waste is to be moved up or down floor levels on multi floor buildings such handling of material shall be undertaken outside normal working hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unsafe stacking and storage.</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td></td>
<td>Where construction material or waste is to be moved up or down floor levels on multi floor buildings such handling of material shall be undertaken outside normal working hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Uncontrolled movement of material.</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td></td>
<td>Where construction material or waste is to be moved up or down floor levels on multi floor buildings such handling of material shall be undertaken outside normal working hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minor to Fatal Injuries</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td></td>
<td>Where construction material or waste is to be moved up or down floor levels on multi floor buildings such handling of material shall be undertaken outside normal working hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Property Damage</td>
<td>Adequate measures to be implemented for the delivery of material.</td>
<td></td>
<td>Where construction material or waste is to be moved up or down floor levels on multi floor buildings such handling of material shall be undertaken outside normal working hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Probability</td>
<td>Severity</td>
<td>Frequency</td>
<td>Risk Score</td>
<td>Category High/ Medium/ Low</td>
<td>Specific Mitigation Measures in addition to those in the HSS</td>
</tr>
<tr>
<td>----</td>
<td>----------</td>
<td>---------</td>
<td>------</td>
<td>-------------</td>
<td>----------</td>
<td>-----------</td>
<td>------------</td>
<td>-----------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>15</td>
<td>Construction vehicles and mobile plant operation</td>
<td>Construction vehicles and mobile plant operation interface with people. Construction vehicles and mobile plant operation interface with other vehicles. Incompetent operators.</td>
<td>Minor to Fatal Injuries Property Damage Road accidents</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td>MEDIUM</td>
<td>No parking in airport emergency access routes. Contractor designated parking bays to be used. Training and awareness. Relevant measures in SSHSS to be complied with.</td>
</tr>
<tr>
<td>16</td>
<td>Use of Portable Electrical Equipment and Hot works</td>
<td>Faulty portable electrical equipment. Unsafe use of portable electrical equipment. Sparks Open flames</td>
<td>Minor to Fatal Injuries Property Damage Electrocuton Scalds and burns Eye injuries Fires and explosions</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>16</td>
<td>MEDIUM</td>
<td>Portable Electrical Equipment to be inspected prior to use. Tools and equipment to be stored at safe positions. Use of portable electrical equipment or hot works not to put the safety of the operator, other employees or the public at risk. E.g. grinding sparks to be directed to a safe and access-controlled direction.</td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Risk Scoring</td>
<td>Specific Mitigation Measures in addition to those in the HSS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>---------------------------------</td>
<td>------------------------------------</td>
<td>---------------------------</td>
<td>--------------</td>
<td>-------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot works only to be undertaken in designated areas.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot works permit to be in place.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No hot works to be undertaken near any flammable gasses.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Training and awareness.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Relevant measures in SSHSS to be complied with.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Use of Pneumatic equipment</td>
<td>Unsafe use. Unsafe equipment.</td>
<td>Minor to Serious Injuries</td>
<td>MEDIUM</td>
<td>Use of pneumatic equipment not to put the safety of the</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excessive noise. Flying debris.</td>
<td>Property Damage</td>
<td></td>
<td>operator, other employees or the public at risk.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Training and awareness.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Relevant measures in SSHSS to be complied with.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Installation of Fire Systems</td>
<td>Fire detection and suppression</td>
<td>Burns and severe injuries</td>
<td>MEDIUM</td>
<td>Permit to work to be acquired from ACSA prior to tampering</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>system not operating or</td>
<td>Fatalities</td>
<td></td>
<td>with any existing fire installation equipment e.g.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

29/10/2019
<table>
<thead>
<tr>
<th>No</th>
<th>Activity</th>
<th>Hazards</th>
<th>Risk</th>
<th>Specific Mitigation Measures in addition to those in the HSS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>locked out for construction works. Fire detection system accidently triggered e.g. smoke / heat from construction activities.</td>
<td>Property damage Explosions.</td>
<td>smoke detectors, water pipes, sprinklers, etc. Fire detection and suppression systems to be disconnected and temporarily locked out where refurbishment works are taking place. Alternative and temporary fire detection and suppression measures need to be assessed, approved and implemented. No open fires to be allowed. Training and awareness. Relevant measures in HSS to be complied with.</td>
</tr>
<tr>
<td>19.</td>
<td>Working in an operational facility</td>
<td>Airport staff and passengers’ movement restrictions and inconvenience.</td>
<td>Respiratory infections due to dust Security risks Trip and falls</td>
<td>Work areas to be adequately hoarded. Signage to be provided around the airport to alert the public of construction activities.</td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Probability</td>
</tr>
<tr>
<td>----</td>
<td>----------</td>
<td>---------</td>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Mechanical installations (i.e. HVAC/extractor fans etc.)</td>
<td>Dust</td>
<td>Movement Injuries</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Noise</td>
<td>Noise nuisance</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cuts /abrasions/bruises</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Minor to severe injuries</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Electrocution</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Respiratory infections</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Asphyxiation</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Probability</td>
</tr>
<tr>
<td>----</td>
<td>----------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>21</td>
<td>Demolition Work</td>
<td>Uncontrolled collapse. Inadequate communication. Incompetent persons. Poor supervision. No permit to work procedure. Drawings not detailed / not available. Existing services. Lockout valves / taps old and not functional. Overload of surfaces. Dust</td>
<td>Minor to Fatal Injuries Property Damage Respiratory infections Musculoskeletal injuries Damage to existing services. Structural collapse.</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Risk Scoring</td>
</tr>
<tr>
<td>----</td>
<td>--------------</td>
<td>---------</td>
<td>------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td>Heavy lifting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Probability</td>
</tr>
<tr>
<td>----</td>
<td>----------</td>
<td>---------</td>
<td>-------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>22.</td>
<td>Removal and Replacement of wall tiles</td>
<td>Working at heights. Loose tiles at heights. Use of tools at heights. Poor waste management. Flying debris.</td>
<td>Minor to Fatal Injuries Property Damage Falling objects Trip and fall.</td>
<td>3 4 3 15</td>
</tr>
<tr>
<td>23.</td>
<td>Commissioning Activities</td>
<td>Inadequate communication. Incompetent persons. Poor supervision. No permit to work procedure. Installation not ready for commissioning. Inadequate earthing.</td>
<td>Minor to Fatal Injuries Property Damage Electrocution Fires Facilities and equipment installed posing risk during maintenance e.g. inadequate provision for electrical lockout, etc.</td>
<td>4 5 4 24</td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Risk Scoring</td>
</tr>
<tr>
<td>----</td>
<td>----------</td>
<td>---------</td>
<td>------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Probability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Severity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Risk Score</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Probability</td>
</tr>
<tr>
<td>----</td>
<td>------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>24</td>
<td>Painting</td>
<td>Non construction employees exposed to associated hazards. Paint fumes</td>
<td>Minor injuries. Spillage of paints. Respiratory tract irritations Trip and fall hazards.</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Probability</td>
</tr>
<tr>
<td>----</td>
<td>--------------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>25.</td>
<td>Welfare Facilities</td>
<td>No sanitary facilities. Use of airport sanitary facilities by construction employees. Public inconveniences Passenger complaints</td>
<td>Health and hygiene risks. Privacy issues</td>
<td>3</td>
</tr>
<tr>
<td>26.</td>
<td>Fatigue Management</td>
<td>Inadequate rest breaks. Loss of concentration/distraction due to long</td>
<td>Minor to serious injuries Property Damage Trip and fall</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>Activity</td>
<td>Hazards</td>
<td>Risk</td>
<td>Probability</td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>working hours or night work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Change Management</td>
<td>Change of personnel. New activities starting.</td>
<td>Minor to serious injuries Property Damage Miscommunication Employees not informed of new risks. New design or construction sequence changes not approved. New work method not being followed. New personnel not being competent.</td>
<td>4</td>
</tr>
</tbody>
</table>
HOARDING SPECIFICATION HANDBOOK
1.0 Introduction

The manual was produced by ACSA-ORTIA Project Management Division as reference to Consultants, contractors and other persons who intend to execute any construction works at the O.R. Tambo International Airport.

It is important to note that the application of hoarding specifications as detailed herein is the ACSA-ORTIA Standard and must be issued to every (Hoarding) Contractor for implementation prior to execution of any hoarding work. It is the responsibility of the consultants and contractor to verify the latest revision with the ACSA-ORTIA Project Manager, Project Management Division.

Failure to verify all requirements of all hoarding finishes internal and externally may result in the contractor having to incur additional costs for alterations.

The scope of hoarding work should always be part of the construction programme and a major priority for any construction work to commence on site for ACSA-ORTIA. The Project Team must inform contractors at tender stage that working on the airport environment will require them to execute hoarding work outside normal working hours.

It is envisaged that the manual will be informative enough to everyone involved but in certain areas the specification for internal and external hoarding may not be applicable, such exceptions will be addressed as they arise and must be referred to the ACSA-ORTIA Project Manager.

All hoarding remains the property of ACSA (if paid for in Preliminaries) but must be removed off site by the contractor on completion of the project subject to further instruction by the ACSA-ORTIA Project Manager.
2.0  Types of Hoardings

2.0.1  Type A. (See Detail A)

This type of internal hoarding will be applicable where construction work takes place adjacent to other tenants to minimise noise, dust and visual screening.

Construction and Material

The construction method is of permanent nature and uses the existing building structure for secure fixing, i.e. fixed to the roof structure and the floor.

The framework consist of galvanised floor track 61 mm wide fixed to the floor and soffit with suitable fasteners at 600 mm centres minimum.

The board on the public side will be 16 mm chipboard with melamine finish (Grey Cambrink) and on the construction side can be either 12 mm chipboard for heavy usage or 12, 7 mm Gypsum plasterboard for lighter usage.
NB: Heavy usage when shelving is to be hung onto the walls or when any other fixing onto the walls is required. Lighter usage when no hanging is to be done onto the walls.

The melamine boards are cut into module width of 900 mm or 1200 mm and the heights will be those that can be manoeuvred by human labourers without any hindrance to the public where applicable, preferably 3000 high.

The melamine board will be held in place by a tophat section on the vertical joint, colour black. The back board will be screwed directly to the grid.

Where soundproofing is required the hoarding will be filled with an approved insulating material.

2.0.2 Type B. (see detail A)

The method of construction is similar to Permanent type except that the hoarding is only on the public side and is melamine finish (Grey Cambrink).

Construction and Material

The construction method will match that of the Permanent hoarding on the public side only and no finishes on the construction side.
No insulation for this type of hoarding will be required.

2.0.3 Type C.

This type of hoarding is made out of 2100 h X 900 w melamine faced (Grey Cambrink) chipboard panel on metal supports. Generally, it will consist of four to six panels that can be placed around a particular area for maintenance or repair to floors.

Construction and Material

The panels off-cuts can be easily acquired from the hardware outlets and the steel support frame must be fixed to the panel to prevent the panels from falling over.
2.0.4 Type D.

Yellow New Jersey barriers or orange plastic netting (at the discretion of the ORTIA-Project Manager) must be used to barricade the construction site from the public prior to construction work taking place.

**Construction and Material**

Steel post at 3000 mm maximum apart onto which the orange plastic netting is attached to.
Water filled yellow New Jersey barrier used to block roadway temporarily during repairs or entrance roadway prior to construction work taking place.

**Note:**

High impact industrial moulded, interlocking plastic barriers to be filled with water to make it stable and not movable. The hoarding must be kept neat and tidy at all times.
2.0.5 Type E

This hoarding must remain in place for the duration of the construction period and is only removed at the end of construction when all the work has been completed.

Either one of two types of hoarding is acceptable, viz. Sheet metal and Pre-cast concrete hoarding mainly used for site establishment.
2.0.6 Type F.

The sheet metal hoarding must be a minimum of 2000mm high around the perimeter of the construction site establishment. *(see detail B)*

**Construction and Material**

The IBR/Corrugated sheeting must be fixed onto steel or timber posts, with horizontal steel members positioned at the top, centre and bottom to secure the sheeting firmly. The sheet metal is to extend to ground level or floor finish level i.e.: no gaps are permitted.
2.0.7 Type G.

Pre-cast panel and pole hoarding will be used when indicated by ACSA. This hoarding will be used for contractor yards that will be used for extended periods of time. **Specifications to be confirmed by the ACSA Project Manager.**
2.0.8 Type H.

These are concrete panels 2100 h X 1500 w X 200 thick similar to the concrete walls around the airport site. The panel thickness slopes from the top to the bottom, thus the thickness at the top of the panel are 100 mm. The base extend 500 mm on either side of the centre of panel for support. These panels can be used for permanent or temporary purposes.

Construction and Material

These panels are constructed out of concrete; the inner surface shaped according to the shattering used on the public side should be roughcast to give a permanent appealing appearance. Where this panels are permanently installed closer to Terminals they should be painted in colour specified below for external hoarding.

3.0 Painting

Internal hoarding will be mainly grey cambrink melamine on the public side and where painting is used, it must match the grey cambrink melamine. In the other side where plane chipboard or plasterboard is used and the area utilised as a temporal office, then the walls will be painted with white contractors PVA. All
external types hoarding will be painted and all paint types must be as per specification unless changed by the ACSA-ORTIA Project Manager.

Painting specifications

For IBR/Corrugated sheeting paint spec: PLASCON WALL & WALL. TEAL RAL 5021.

The supporting posts are to be painted in PLASCON WALL & WALL. TEAL RAL 5021.

4.0 Corner Protectors

Internal hoarding to have aluminium corner protectors to match the height of the melamine chipboard panels used and the size to be 50 mm X 50 mm. External hoarding to have no corner protectors but the contractor to finish of the corners neatly i.e. with corner flashing to protect public from being injured.

5.0 Signage

All hoarding should have enough signage to inform the general public of the construction process.

*****************************************************************************
GENERAL NOTES:

- No structure of hoarding to be visible to public.
- All gates to be made for wind loading as necessary.
- All the gates to open into construction site and be provided with locks.
- Sheets are not to have dents or tears.
- "A" must be horizontal with step up/down to maintain minimum heights.
- Landscaping to be provided where possible.
- Public notices (busi) blue to be mounted on public side of hoarding @ +/- 10000 cc.

SCALE: 1:50

EXTERNAL HOARDING SPECIFICATION (DETAIL B)
JOHANNESBURG INTERNATIONAL AIRPORT

Scale: 1:50
Date: 02 AUGUST 2000
Checked by: K. Naicker

PROJECT MANAGEMENT DIVISION

Drawing by: Wil Maleka
GENERAL NOTES:

- This type of hoarding will be applicable where construction work takes place in any area that is in danger of being exposed to the elements or as specified by the airport's company South Africa.

CONSTRUCTION AND MATERIAL:

- The construction method is of a permanent nature and uses existing building structures for secure fixing if fixed to the roof structure and the floor.

- The framework consists of galvanised floor tracks 61mm wide fixed to the floor and soffits with suitable fasteners at 500mm centres.

- The board on the public side will be 10mm chipboard with melamine finish and on the construction side can be either 12mm chipboards for heavy usage or 12mm OSB (oriented strand board) for lighter usage.

- No heavy usage when hoarding is to be hung onto the walls or any fixings onto the walls.

- Lighter usage when no hanging is to be done onto the walls.

- The melamine boards are to be used in module widths of 1250mm and the height is from existing floor level to the underside of the ceiling or slab unless otherwise instructed by the airport's company South Africa. The minimum height of the hoarding where it does not extend to the underside of ceilings or slabs is 3000mm.

- The melamine boards will be held in place by a black top hat channels on the vertical joints, any horizontal joints are to also have top hat channels installed. The backboards will be screwed directly onto the support grid.

OPTIONAL: If required, the hoardings will be filled with an approved insulating material.

- Access to the site through the hoarding will be via a hollow panel hinged door fitted with a door closer and lock. This must be painted ex dulux "restless sea".

INTERNAL HOARDING SPECIFICATION

Johannesburg International Airport

Scale: 1:50 & 2

Date: 02 August 2000

Checked by: K. Naidoo

PROJECT MANAGEMENT DIVISION

Drawing no. AOSA 1 of 2

Revised Date: July 2016