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C3.2 – OCCUPATIONAL HEALTH AND SAFETY SPECIFICATION

public works
& infrastructure

Department:
Public Works and Infrastructure
REPUBLIC OF SOUTH AFRICA

OCCUPATIONAL HEALTH AND SAFETY SPECIFICATION

FOR

EASTERN CAPE: GQEBERHA: EAST LONDONM PROVINCIAL OFFICE: DEPARTMENT OF EMPLOYMENT AND LABOUR: SUPPLY AND INSTALLATION OF WATER TANKS.

MANAGED ON BEHALF OF

THE DEPARTMENT OF EMPLOYMENT AND LABOUR

(THE "CLIENT")

SUPERVISION BY THE DEPARTMENT OF PUBLIC WORKS:

Mr. A. Mgijima - **PROJECT MANAGER**

AND/OR ITS AGENT: [as per CR 5(5)] – {Also refer specifically to Sections 8(2)(g), 8(2)(h) and 37(2) of the Act}

AGENT: **Mr. Mshumpela**

SUPERVISION BY THE PRINCIPAL CONTRACTOR:

PRINCIPAL CONTRACTOR: **(full particulars of principle contractor / contractor)**

Mr. /Ms/Me - **HEALTH & SAFETY OFFICER (BUILDING)**
(Add full details of this officer)

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……..

Mr. /Ms/Me **-HEALTH & SAFETY OFFICER (ELECTRICAL)**
(Add full details of this officer)

……..
……..

Mr. /Ms/Me - **HEALTH & SAFETY OFFICER (MECHANICAL)**
(Add full details of this officer)

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……..

Mr. /Ms./Me - **HEAD: PROJECTS & MAINTENANCE**
(Add full details of the head of the project)

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1. PREAMBLE

In terms of Construction Regulation 5(1)(*a*) of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), the Department of Public Works, as the Client and/or its Agent on its behalf, shall be responsible to prepare a baseline risk assessment for an intended construction work project. In terms of construction regulations 5(1)(b), the client must prepare a suitable, sufficiently documented and coherent site specific Health & Safety Specifications for any intended construction project and provide any Principal Contractor who is making a bid or appointed to perform construction work for the Client and/or its Agent on its behalf with the same.

The Client's further duties are as described in The Act and the Regulations made there-under. The Principal Contractor shall be responsible for the Health & Safety Policy for the site in terms of Section 7 of the Act and in line with Construction Regulation 5 as well as the Health and Safety Plan for the project.

This 'Health and Safety Specifications' document is governed by the "Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), hereinafter referred to as 'The Act'. Notwithstanding this, cognisance should be taken of the fact that no single Act or its set of Regulations can be read in isolation. Furthermore, although the definition of Health and Safety Specifications stipulates 'a documented specification of all health and safety requirements pertaining to associated works on a construction site, so as to ensure the health and safety of persons', it is required that the entire scope of the Labour legislation, including the Basic Conditions of Employment Act be considered as part of the legal compliance system. With reference to this specification document this requirement is limited to all health, safety and environmental issues pertaining to the site of the project as referred to here-in. Despite the foregoing it is reiterated that environmental management shall receive due attention.

Due to the wide scope and definition of construction work, every construction activity and site will be different, and circumstances and conditions may change even on a daily basis. Therefore, due caution is to be taken by the Principal Contractor when drafting the Health and Safety Plan based on these Health and Safety Specifications. Prior to drafting the Health and Safety Plan, and in consideration of the information contained here-in, the contractor shall set up a Risk Assessment Program to identify and determine the scope and details of any risk associated with any hazard at the construction site, in order to identify the steps needed to be taken to remove, reduce or control such hazard. *This Risk Assessment and the steps identified will be the basis or point of departure for the Health and Safety Plan.* The Health and Safety Plan shall include documented 'Methods of Statement' (see definitions under Construction Regulations) detailing the key activities to be performed in order to reduce as far as practicable, the hazards identified in the Risk Assessment.

The Department of Public Works is tasked to provide accommodation and operational facilities to a very large proportion of the approximate 40 National Departments responsible for the governance of the Department of Public Works. A very large number of State employees and public users of the facilities and the services provided there-in directly interacts with the facilities provided by the well-being, health and safety of a great number of people. This Department thus

has directly or indirectly, an impact on the Republic of South Africa as well as the National Parliament.

In this a high premium is to be placed on the health and safety of the most valuable assets of the Department of Public Works. These are its personnel, the personnel of its Clients and the physical assets of which it is the custodian and may also include the public as well. The responsibilities the Department and relevant stakeholders have toward its employees and other people present in the facilities or on the sites are captured further in this specification document. These responsibilities stem from both moral, civil and a variety of legal obligations. The Principal Contractor is to take due cognisance of the above statement.

Every effort has been made to ensure that this specification document is accurate and adequate in all respects. Should it however, contain any errors or omissions they may not be considered as grounds for claims under the contract for additional reimbursement or extension of time, or relieve the Principal Contractor from his responsibilities and accountability in respect of the project to which this specification document pertains. Any such inaccuracies, inconsistencies and/or inadequacies must immediately be brought to the attention of the Agent and/or Client.

2. SCOPE OF HEALTH AND SAFETY SPECIFICATION DOCUMENT

These Specifications should be read in conjunction with the Act, the Construction Regulations and all other Regulations and Safety Standards which were or will be promulgated under the Act or incorporated into the Act and be in force or come into force during the effective duration of the project. The stipulations in this specification, as well as those contained in all other documentation pertaining to the project, including contract documentation and technical specifications shall not be interpreted, in any way whatsoever, to countermand or nullify any stipulation of the Act, Regulations and Safety Standards which are promulgated under, or incorporated into the Act.

3. PURPOSE

The Department is obligated to implement measures to ensure the health and safety of all people and properties affected under its custodianship or contractual commitments, and is further obligated to monitor that these measures are structured and applied according to the requirements of these Health and Safety Specifications. (***All references to the singular shall also be regarded as references to the plural***)

The purpose of this specification document is to provide the relevant Principal Contractor (and his /her contractor) with any information other than the standard conditions pertaining to construction sites which might affect the health and safety of persons at work and the health and safety of persons in connection with the use of plant and machinery; and to protect persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work during the carrying out of construction work for the Department of Public Works. The Principal Contractor (and his /her contractor) is to be briefed on the significant health and safety aspects of the project and to be provided with information and requirements on inter alia:

a) Safety considerations affecting the site of the project and its environment;
b) Health and safety aspects of the associated structures and equipment;

c) Submissions on health and safety matters required from the Principal Contractor (and his /her contractor); and
d) The Principal Contractor's (and his /her contractor) health & safety plan.

To serve to ensure that the Principal Contractor (and his /her contractor) is fully aware of what is expected from him/her with regard to the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and the Regulations made there-under including the applicable safety standards, and in particular in terms of Section 7 and 8 of the Act, Construction regulations 7 and 8.

To inform the Principal Contractor that the Occupational Health and Safety Act, 1993 (Act 85 of 1993) in its entirety shall apply to the contract to which this specification document applies. The Construction Regulations promulgated on 07 February 2014 shall apply to any person involved in construction work pertaining to this project, as will the Act.

4. DEFINITIONS - The most important definitions in the Act and Regulations pertaining to this specification document are hereby extracted.

"Purpose of the Act" –
To provide for the health and safety of persons at work and the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.

"Agent" –
means any person who acts as a representative for a client;

"Client" –
means any person for whom construction work is performed;

''Construction Work'' is defined as any work in connection with –

(a) The construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure; or
(b) the construction, erection, maintenance, demolition or dismantling of any bridge, dam canal, road, railway, runway, runway, sewer or water reticulation system; or the moving of earth, clearing or land, the making of excavation, piling or any similar civil engineering structure or type of work;

"Construction work permit"

means a document issued in terms of construction regulations 3

"Contractor" –

means an employer, as defined in Section 1 of the Act, who performs construction work and includes Principal Contractors;

"Health and Safety File" –

means a file, or other record in permanent form, containing the information required a contemplated in the regulations;
"Health and Safety Plan" –

means a documented plan which addresses hazards identified and includes safe work procedures to mitigate, reduce or control the hazards identified;

"Health and Safety Specification" –

means a documented specification of all health and safety requirements pertaining to the associated works on a construction site, so as to ensure the health and safety of persons;

"Method Statement" –

means a document detailing the key activities to be performed in order to reduce as reasonably as practicable the hazards identified in any risk assessment;

"Principal Contractor" –

means an employer, as defined in section 1 of the Act who performs construction work and is appointed by the client to be in overall control and management of a part of or the whole of a construction site;

"Risk Assessment" –

means a program to determine any risk associated with any hazard at a construction site, in order to identify the steps needed to be taken to remove, reduce or control such hazard.

5. OCCUPATIONAL HEALTH & SAFETY MANAGEMENT

5.1 Structure and Organization of OH&S Responsibilities

5.1.1. *Overall Supervision and Responsibility for OH&S*

* The Client and/or its Agent on its behalf to ensure that the Principal Contractor, appointed in terms of Construction Regulation 5(5), implements and maintains the agreed and approved H&S Plan. Failure on the part of the Client or Agent to comply with this requirement will not relieve the Principal Contractor from any one or more of his/her duties under the Act and Regulations.

* The Chief Executive Officer of the Principal Contractor in terms of Section 16 (1) of the Act to ensure that the Employer (as defined in the Act) complies with the Act. The pro forma Legal Compliance Audit may be used for this purpose by the Principal Contractor or his/her appointed contractor.

* All OH&S Act (85 /1993), Section 16 (2) appointee/s as detailed in his/her/their respective appointment forms to regularly, in writing, report to their principals on matters of health and safety per routine and ad hoc inspections and on any deviations as soon as observed, regardless of whether the observation was made during any routine or ad hoc inspection and to ensure that the reports are made available to the principal Contractor to become part of site records (Health & Safety File).

* The Construction Manager and Assistant Construction Manager appointed in terms of Construction Regulation 8(1), 8(2) to regularly, in writing, report to their principals on matters of health and safety per routine and ad hoc inspections and on any deviations as soon as observed, regardless of whether the observation was made during any routine or ad hoc inspection and to ensure that the reports are made available to the principal Contractor to become part of site records (Health & Safety File).

* All Health and Safety Representatives (SHE-Reps) shall act and report as per Section 18 of the Act.

5.1.2. *Further (Specific) Supervision Responsibilities for OH&S*

Several appointments or designations of responsible and /or competent people in specific areas of construction work are required by the Act and Regulations. The following competent appointments, where applicable, in terms of the Construction Regulations are required to ensure compliance to the Act, Regulations and Safety Standards.

Required appointments as per the Construction Regulations:-

Item	Regulation	Appointment	Responsible Person
1.	5(1)(k)	Principal contractor for each phase or project	Client
2.	7(1)(c)	Contractor	Principal Contractor
3.	7(2)(c)	Contractor	Contractor
4.	8(1)	Construction Manager	Principal Contractor
5.	8(2)	Construction Manager assistant	Principal Contractor
6.	8(5)	Construction Health and Safety Officer	Principal Contractor
7.	9(1)	Person to carry out risk assessment	Contractor
9.	10(1)(a)	Fall protection planner	Contractor
10.	12 (1)	Temporary works designer	Contractor
12.	13(1)(a)	Excavation supervisor	Contractor
13.	13(2)(b)(ii)(bb)	Professional engineer or technologist	Contractor
14.	13(2)(k)	Explosives expert	Contractor
15.	14(1)	Supervisor demolition work	Contractor
16.	14(11)	Demolition expert	Contractor
18.	16(1)	Scaffold supervisor and scaffold erector	Contractor
19.	17(1)	Suspended platform supervisor	Contractor
20.	17(2)(c)	Compliance plan developer	Contractor
21.	17(8)(c)	Suspended platform expert	Contractor
22.	17(13)	Outrigger expert	Contractor
23.	18(1)	Rope access supervisor	Contractor
24.	19(8)(a)	Material hoist inspector	Contractor
25.	20(1)	Bulk mixing plant supervisor	Contractor
26.	21(2)(b)	Explosive actuator expert	Contractor
27.	22(a)	Crane supervisor	Contractor
28.	24(d)	Temporal electrical installations controller	Contractor
29.	24(e)	Temporal electrical installations inspector	Contractor
30.	28(a)	Stacking and storage supervisor	Contractor
31.	29(h)	Fire equipment inspector	Contractor

This list may be used as a reference or tool to determine which components of the Act and Regulations would be applicable to a particular site, as was intended under paragraph 3 & 4 of the Chapter "Preamble" (page 4) above. This list must not be assumed to be exclusive or comprehensive.

5.2 ***Communication & Liaison***

5.2.1 OH&S Liaison between the Employer, the Principal Contractor, the other Contractors, the Designer and other concerned parties shall be through the H&S Committee as per the procedures determined by the H&S Committee.

5.2.2 In addition to the above, communication may be directly to the Client or his appointed Agent, verbally or in writing, as and when the need arises.

5.2.3 Consultation with the workforce on OH&S matters will be through their Supervisors and H&S Representatives ('SHE – Reps')

5.2.4 The Principal Contractor will be responsible for the dissemination of all relevant OH&S information to the other Contractors e.g. design changes agreed with the Client and/or its Agent on its behalf and the Designer, instructions by the Client and/or his/her agent, exchange of information between Contractors, the reporting of hazardous/dangerous conditions/situations etc.

6. INTERPRETATION

(i) The Occupational Health and Safety Act and all its Regulations, with the exception of the Construction Regulations, distinguish between the roles, responsibilities and functions of employers and employees respectively. It views consultants and contractors as employees of the "owner" of a construction or operational project, the "owner" being regarded as the employer. Only if formally agreed to by way of the written agreement in this regard between the "owner(s)" and consultant and /or between the "owner(s)" and the contractor(s), will these assumptions be relinquished in favour of the position agreed upon between the relevant parties.

(ii) The position taken by the Construction Regulations is that the "owner", in terms of its instructions, operates (has to operate) in the role of client as per relevant definition. The contractors working for the "client" are seen to be in two categories, i.e. the Principal Contractor and Contractors. The Principal Contractor has to take full responsibility for the health and safety on the site of the relevant project / contract. This includes monitoring health and safety conditions and overseeing administrative measures required by the Construction Regulations from all contractors on the project site. (Ordinary / sub) Contractors are required to operate under the scrutiny and control (in terms of all health and safety measures which are covered in the Construction Regulations) of the Principal Contractor. Where, for the work the Principal Contractor will have to execute himself, practical health and safety measures are applicable, he will also be subject to the relevant requirements with which (ordinary / sub) Contractors have to comply. The Principal Contractor will, however, not have to actually fulfill such requirements in respect of any of the work / functions of any (ordinary / sub) Contractors on the site for which he has been appointed as Principal Contractor. However, he has to monitor / oversee such processes, ensuring that the requirements are complied with and that the required appointments / evaluations /

inspections / assessments and tests are done and that the records are duly generated and kept as prescribed in the Construction Regulations. This has to feature clearly in the Principal Contractor's Health and Safety Plan.

7. RESPONSIBILITIES

7.1 Client

7.1.1 The Client or his appointed Agent on his behalf will appoint each Principal Contractor for this project or phase/section of the project in writing for assuming the role of Principal Contractor as intended by the Construction Regulations and determined by the Bills of Quantities.

7.1.2 The Client or his appointed Agent on his behalf shall discuss and negotiate with the Principal Contractor the contents of the health and safety plan of the both Principal Contractor and Contractor for approval.

7.1.3 The Client or his appointed Agent on his behalf, will take reasonable steps to ensure that the health and safety plan of both the Principal Contractor and Contractor is implemented and maintained. The steps taken will include periodic audits at intervals of at least once every month.

7.1.4 The Client or his appointed Agent on his behalf, will prevent the Principal Contractor and/or the Contractor from commencing or continuing with construction work should the Principal Contractor and/or the Contractor at any stage in the execution of the works be found to:

- have failed to have complied with any of the administrative measures required by the Construction Regulations in preparation for the construction project or any physical preparations necessary in terms of the Act;
- have failed to implement or maintain their health and safety plan;
- have executed construction work which is not in accordance with their health and safety plan; or
- act in any way which may pose a threat to the health and safety of any person(s) present on the site of the works or in its vicinity, irrespective of him/them being employed or legitimately on the site of the works or in its vicinity.

7.2 Principal Contractor

7.2.1 The Principal Contractor shall accept the appointment under the terms and Conditions of Contract. The Principal Contractor shall sign and agree to those terms and conditions and shall, before commencing work, notify the Department of Labour of the intended construction work in terms of Regulation 3 of the Construction Regulations. Annexure B of this Specification contains a "Notification of Construction Work" form. The Principal Contractor shall submit the notification in writing prior to commencement of work and inform the Client or his Agent accordingly.

7.2.2 The Principal Contractor shall ensure that he is fully conversant with the requirements of this Specification and all relevant health and safety legislation. This Specification is not intended to supersede the Act nor the Construction Regulations or any part of either. Those sections of the Act and the Construction Regulations which apply to the scope of work to be performed by the Principal Contractor in terms of this contract (entirely or in part) will continue to be legally required of the Principal Contractor to comply with. The Principal Contractor will in no manner or means be absolved from the responsibility to comply with all applicable sections of the Act, the Construction Regulations or any Regulations proclaimed under the Act or which may perceivable be applicable to this contract.

7.2.3 The Principal Contractor shall provide and demonstrate to the Client a suitable and sufficiently documented health and safety plan based on this Specification, the Act and the Construction Regulations, which shall be applied from the date of commencement of and for the duration of execution of the works. This plan shall, as appendices, include the health and safety plans of all Sub-contractors for which he has to take responsibility in terms of this contract.

7.2.4 The Principal Contractor shall provide proof of his registration and good standing with the Compensation Fund or with a licensed compensation insurer prior to commencement with the works.

7.2.5 The Potential Principal Contractor shall, in submitting his tender, demonstrate that he has made provision for the cost of compliance with the specified health and safety requirements, the Act and Construction Regulations. (Note: This shall have to be contained in the conditions of tender upon which a tenderer's offer is based.)

7.2.6 The Principal Contractor shall consistently demonstrate his competence and the adequacy of his resources to perform the duties imposed on the Principal Contractor in terms of this Specification, the Act and the Construction Regulations.

7.2.7 The Principal Contractor shall ensure that a copy of his health and safety plan is available on site and is presented upon request to the Client, an Inspector, Employee or Sub-contractor.

7.2.8 The Principal Contractor shall ensure that a health and safety file, which shall include all documentation required in terms of the provisions of this Specification, the Act and the Construction Regulations, is opened and kept on site and made available to the Client or Inspector upon request. Upon completion of the works, the Principal Contractor shall hand over a consolidated health and safety file to the Client.

7.2.9 The Principal Contractor shall, throughout execution of the contract, ensure that all conditions imposed on his Sub-contractors in terms of the Act and the Construction Regulations are complied with as if they were the Principal Contractor.

7.2.10 The Principal Contractor shall from time to time evaluate the relevance of the Health and Safety Plan and revise the same as required, following which revised plan shall be submitted to the Client and/or his/her Agent for approval.

7.3 **Contractor** (Responsibilities of ..... in terms of this contract and health and safety specification)

As per 7.2 above, as and where applicable or as indicated in the letter of appointment.

8. SCOPE OF WORK

These specifications are applicable to the specific scope of work pertaining to the above-mentioned project as detailed in the tender documents, this amongst all includes:

Provision of steel water tank and booster pump connection for the Mdantsane Department of Employment and Labour Offices, and entails.

- Site clearance for concrete stand upstand beams.
- Site hoarding and demarcation.
- Assembly of Tank Steel Panels.
- Excavations for foundations and pipe laying.
- Electrical Pump connection to the distribution board.
- Lightning Protection.

The scope work must be read in conjunction with the engineer drawings and specifications.

N.B Construction Regulation 5(1)(g) determines that potential contractors submitting tenders have made provision for the cost of health and safety measures during the construction process. The Principal Contractor shall on tendering make provision for the cost of health and safety measures in terms of his/her documented Health and Safety Plan and measures based on these Health and Safety Specifications during the period of the project. The cost shall be duly quantified and clearly identified for such identifiable purpose.

9. HEALTH AND SAFETY FILE

The Principal Contractor must, in terms of Construction Regulation 7(1)(b), keep a Health & Safety File on site at all times that must include all documentation required in terms of the Act and Regulations and must also include a list of all Contractors on site that are accountable to the Principal Contractor and the agreements between the parties and details of work being done. A more detailed list of documents and other legal requirements that must be kept in the Health and Safety File is attached as an addendum to this document.

IMPORTANT:

The Health and Safety File will remain the property of the Client and/or its Agent on its behalf throughout the period of the project and shall be consolidated and handed over to the Client and/or its Agent on its behalf at the time of completion of the project.

10. OH&S GOALS AND OBJECTIVES AND ARRANGEMENTS FOR MONITORING AND REVIEWING OH&S PERFORMANCE

The Principal Contractor is required to maintain an acceptable disabling incident frequency rate (DIFR) and report on this to the Client and/or its Agent on its behalf on a monthly basis.

11. IDENTIFICATION OF HAZARDS AND DEVELOPMENT OF RISK ASSESSMENTS, STANDARD WORKING PROCEDURES (SWP) AND METHOD STATEMENTS

The Principal Contractor is required to develop Risk Assessments, Standard Working Procedures (SWP) and Method Statements for each activity executed in the contract or project. The identification of hazards is over and above the hazards identification programme and those hazards identified during the drafting of the Health and Safety Plan.

12. ARRANGEMENTS FOR MONITORING AND REVIEW

12.1 Monthly Audit by Client and/or its Agent on its behalf

The Client and/or its Agent on its behalf will be conducting Periodic Audits at times agreed with the Principal Contractor Audit to comply with Construction Regulation 7(1)(c)(vii) to ensure that the principal contractor has implemented, is adhering to and is maintaining the agreed and approved OH&S Plan.

12.2 Other audits and inspections by client and/or its agent on its behalf.

The Client and/or its Agent on its behalf reserves the right to conduct any other ad hoc audits and inspections as it and/or its Agent on its behalf deem necessary.

A representative of the Principal Contractor and the relevant Health and Safety Representative(s) (SHE-Reps) must accompany the Client and/or its Agent on its behalf on all Audits and Inspections and may conduct their own audit/inspection at the same time. Each party will, however, take responsibility for the results of his/her own audit/inspection results. The Client and/or its Agent on its behalf may require to be handed a copy of the minutes of the previous Health and Safety Committee meeting reflecting possible recommendations made by that committee to the Employer for reference purposes.

12.3 Reports

12.3.1 The Principal Contractor shall 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 where:

* 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,

to the Provincial Director of the Department of Labour within seven days and at the same time to the Client and/or its Agent on its behalf.

Refer in this regard to Section 24 of the Act & General Administrative Regulation 8.

12.3.2 The Principal Contractor is required to provide the Client and/or its Agent on its behalf with copies of all statutory reports required in terms of the Act and the Regulations.

12.3.3 The Principal Contractor is required to provide the Client and/or its Agent on its behalf with a monthly "SHE Risk Management Report".

12.3.4 The Principal Contractor is required to provide a.s.a.p. the Client and/or its Agent on its behalf with copies of all internal and external accident/incident investigation reports including the reports contemplated in 12.7, 12.8.2, 15, 16, 17, 21 and 22 below. As soon as the occurrence of any accident/incident of whatever nature comes to the notice of the Principal Contractor, it shall be reported immediately to the relevant Regional Manager for that particular jurisdiction.

12.4 Review

The Principal Contractor is to review the Hazard Identification, Risk Assessments and Standard Work Processes at each Production Planning and Progress Report meeting as the construction work develops and progresses and each time changes are made to the designs, plans and construction methods and processes.

The Principal Contractor must provide the Client and/or its Agent on its behalf, other Contractors and all other concerned parties with copies of any changes, alterations or amendments as contemplated in the above paragraph.

12.5 Site Rules and other Restrictions

12.5.1 *Site OH&S Rules*

The Principal Contractor must develop a set of site-specific OH&S rules that will be applied to regulate the Health and Safety Plan and associated aspects of the construction.

When required for a site by law, visitors and non-employees upon entering the site shall be issued with the proper Personal Protective Equipment (PPE) as and when necessary.

12.5.2 *Security Arrangements*

The Principal Contractor must establish site access rules and implement and maintain these throughout the construction period. Access control must include the rule that non-employees shall at all times be provided with fulltime supervision while on site.

The Principal Contractor must develop a set of Security rules and procedures and maintain these throughout the construction period.

If not already tasked to the H&S Officer appointed in terms of Construction Regulation 6(6), the Principal Contractor must appoint a competent Emergency Controller who must develop contingency plans for any emergency that may arise on site as indicated by the risk assessments. These must include a monthly practice/testing programme for the plans e.g. January: trench collapse, February: flooding etc. and practiced/tested with all persons on site at the time, participating.

12.6 Training

The contents and syllabi of all training required by the Act and Regulations including any other related or relevant training as required must be included in the Principal Contractor's Health and Safety Plan and Health and Safety File.

12.6.1 *General Induction Training*

All employees of the Principal and other Contractors must be in possession of proof of General Induction training

12.6.2 *Site Specific Induction Training*

All employees of the Principal and other Contractors must be in possession of Site Specific Occupational Health and Safety Induction or other qualifying training.

12.6.3 *Other Training*

All operators, drivers and users of construction vehicles, mobile plant and other equipment must be in possession of valid proof of training.

All employees in jobs requiring training in terms of the Act and Regulations must be in possession of valid proof of training as follows:

Occupational Health and Safety Training Requirements: (as required by the Construction Regulations and as indicated by the Health and Safety Specification Document & the Risk Assessment/s and recommendations by the Health and Safety Committee):

* General Induction (Section 8 of the Act)
* Site/Job Specific Induction (also visitors) (Sections 8 & 9 of the Act)
* Site/Project Manager
* Construction Supervisor
* OH&S Representatives (Section 18 (3) of the Act)
* Training of the Appointees indicated in 12.6.1 & 12.6.2 above
* Operation of Cranes (Driven Machinery Regulations 18 (11)
* Operators & Drivers of Construction Vehicles & Mobile Plant (Construction Regulation 23)
* Basic Fire Prevention & Protection (Environmental Regulations 9 and Construction Regulation 29)
* As a minimum basic First Aid to be upgraded when necessary (General Safety Regulations 3)
* Storekeeping Methods & Safe Stacking (Construction Regulation 28)
* Emergency, Security and Fire coordinator

12.7 Accident and Incident Investigation

The Principal Contractor is responsible to oversee the investigation of all accidents/incidents where employees and non-employees were injured to the extent that he/she/they had to receive first aid or be referred for medical treatment by a doctor, hospital or clinic. (General Administrative Regulation 9)

The results of the investigation to be entered into the Accident/Incident Register listed above. (General Administrative Regulation 9)

The Principal Contractor is responsible for the investigation of all non-injury incidents as described in Section 24 (1) (b) & (c) of the Act and keeping a record of the results of such investigations including the steps taken to prevent similar incidents in future.

The Principal Contractor is responsible for the investigation of all road traffic accidents relating to the construction site and keeping a record of the results of such investigations including the steps taken to prevent similar accidents in future.

Notwithstanding the requirements of Section 24 of the Act, ALL incidents shall be investigated and reported on in writing, irrespective of whether such incident gave rise to injury or damage.

12.8 H&S Representatives (SHE-Reps – 'safety, health & environment') and H&S Committees

12.8.1 *Designation of H&S Representatives('SHE – Reps')*

Where the Principal Contractor employs more that 20 persons (including the employees of other Contractors (sub-contractors) he has to appoint one H&S Representatives for every 50 employees or part thereof. (Section 17 of the Act and General Administrative Regulation 6. & 7.)

H&S Representatives have to be designated in writing and the designation shall be in accordance with the Collective Agreement as concluded between the parties as is required in terms of General Administration Regulation 6.

12.8.2 *Duties and Functions of the H&S Representatives*

The Principal Contractor must ensure that the designated H&S Representatives conduct at least a weekly inspection of their respective areas of responsibility using a checklist and report thereon to the Principal Contractor, after which these reports shall be consolidated for submission to the Health and Safety Committee.

H&S Representatives must be included in and be part of accident/incident investigations.

H&S Representatives shall be members of at least one H&S Committee and must attend all meetings of that H&S committee.

12.8.3 *Establishment of H&S Committee(s)*

The Principal Contractor must establish H&S Committees consisting of designated H&S Representatives together with a number of Employers Representatives appointed as per Section 19(3) that are not allowed to exceed the number of H&S Representatives on the committee. The persons nominated by the employer on a H&S Committee must be designated in writing for such period as may be determined by him. The H&S Committee shall co-opt advisory (temporary) members and determine the procedures of the meetings including the chairmanship.

The H&S Committee must meet minimum monthly and consider, at least, the following Agenda for the first meeting. Thereafter the H&S Committee shall determine its own procedures as per the previous paragraph.

***Agenda*:**

1) Opening and determining of chairmanship (only when necessary)
2) Minutes of Previous Minutes
3) Observations
4) Program and Safety considerations
5) Hygiene
6) Housekeeping improvement
7) Incidents & Accidents / Injuries
8) Registers:
    a H&S Rep. Inspections
    b. Matters of First Aid
    c. Scaffolding
    d. Ladders
    e. Excavations
    f. Portable Electric Equipment
    g. Fire Equipment
    h. Explosive Power Tools
    i. Power Hand tools
    j. Incident! Report Investigation
    k. Pressure Vessels
    l. Personal Protective Equipment
9) Safety performance Evaluations
10) Education & Safety promotion program
11) First Aid Officials and training in First Aid
12) Demarcation of work- /hazardous-/safe areas/walkways
13) Posters and signage
14) Environmental preservation and conservation
15) Specific training programmes
16) General
17) Date of Next Meeting
18) Closing

13. PROJECT/SITE SPECIFIC REQUIREMENTS

The following is a list of specific activities and considerations that have been identified for the project and site and for which Risk Assessments, Standard Working Procedures (SWP), management and control measures and Method Statements (where necessary) have to be developed by the Principal Contractor:

* Clearing & Grubbing of the Area/Site
* Site Establishment including:
    - Office/s
    - Secure/Safe Storage and storage areas for materials, plant & equipment
    - Ablution facilities
    - Sheltered dining area
    - Vehicle access to the site
* Dealing with existing Structures.
* Location of existing Services
* Installation & Maintenance of Temporary Construction Electrical Supply, Lighting and Equipment
* Adjacent Land uses/Surrounding property exposures
* Boundary & Access control/Public Liability Exposures (Remember: the Employer is also responsible for the OH&S of non-employees affected by his/her work activities.)
* Health risks arising from neighboring as well as own activities and from the environment e.g. threats by dogs, bees, snakes, lightning, allergies etc.
* Exposure to Noise
* Exposure to Vibration
* Protection against dehydration and heat exhaustion
* Protection from wet & cold conditions
* Dealing with HIV/Aids and other diseases as per specific programme provided by the client and/or its Agent on its behalf
* Use of Portable Electrical Equipment including:
    - Angle grinder
    - Electrical Drilling machine
    - Skill saw
* Excavations including:
    - Ground/soil conditions
    - Trenching
    - Shoring
    - Drainage
    - Daily inspections
* Welding including:
    - Arc Welding
    - Gas welding
    - Flame Cutting
    - Use of LP Gas torches and appliances
* Loading & Offloading of Trucks
* Aggregate/Sand and other Materials Delivery
* Manual and Mechanical Handling

* Lifting and Lowering Operations
* Driving & Operation of Construction Vehicles and Mobile Plant including:
    - Trenching machine
    - Excavator
    - Bomag Roller
    - Plate Compactor
    - Front End Loader
    - Mobile Cranes and the ancillary lifting tackle
    - Parking of Vehicles & Mobile Plant
    - Towing of Vehicles & Mobile Plant
* Use and Storage of Flammable Liquids and other Hazardous Substances – the client and/or its Agent on its behalf to be informed of this prior to commencing of the project
* Layering and Bedding of trench floor
* Installation of Pipes in trenches
* Backfilling of Trenches
* Protection against Flooding
* Gabion work
* Use of Explosives - the client and/or its Agent on its behalf to be informed of this prior to commencing of the project
* Protection from Overhead Power Lines
* As discovered by the Principal Contractor's hazard identification exercise
* As discovered from any inspections and audits conducted by the Client and/or its Agent on its behalf or by the Principal Contractor or any other Contractor on site
* As discovered from any accident/incident investigation.

13.1 The following are in particular requirements depending on scope of works and will form a basis for compliance audits.

1. Administrative & Legal Requirements
2. Education, Training & Promotion
3. Public Safety & Emergency Preparedness
4. Personal Protective Equipment
5. Housekeeping
6. Scaffolding, Formwork & Support work
7. Ladders
8. Electrical Safeguarding
9. Emergency/Fire Prevention & Protection
10. Excavations & Demolition
11. Tools
12. Cranes
13. Personnel & Material Hoists
14. Transport & Materials Handling
15. Site Plant & Machinery
16. Plant & Storage Yards/Site Workshops Specifics
17. Health & Hygiene

14. OUTLINED DATA, REFERENCES AND INFORMATION ON CERTAIN AND/OR SPECIFIC OBLIGATORY REQUIREMENTS TO ENSURE COMPLIANCE

14.1 Administrative & Legal Requirements

OHS Act Section/ Regulation	**Subject**	**Requirements**
Construction Regulation 3	**Construction work permit**	Apply to the Provincial Labour Office for any construction work as defined under CR 3(1)(a)(b) & (c)
Construction. Regulation 4	**Notice of carrying out Construction work**	Department of Labour notified Copy of Notice available on Site
General Admin. Regulation 4	***Copy of OH&S Act (Act 85 of 1993)**	Updated copy of Act & Regulations on site. Readily available for perusal by employees.
COID Construction regulations 5(1)(j)	***Registration with Compensation Insurer**	Written proof of registration/Letter of good standing available on Site
Construction. Regulation 5(1)(b) & 5(1)(n)	**H&S Specification & Programme**	H&S Spec received from Client and/or its Agent on its behalf OH&S programme developed & Updated regularly
Section 8(2)(d) Construction. Regulation 9	***Hazard Identification & Risk Assessment**	Hazard Identification carried out/Recorded Risk Assessment and – Plan drawn up/Updated RA Plan available on Site Employees/Sub-Contractors informed/trained
Section 16(2)	***Assigned duties (Managers)**	Responsibility of complying with the OH&S Act assigned to other person/s by CEO.
Construction. Regulation 8(1)	**Designation of Person Responsible on Site**	Competent person appointed in writing as Construction Manager with job description
Construction. Regulation 8(2)	**Designation of Assistant for above**	Competent person appointed in writing as Assistant Construction Supervisor with job description
Section 17 & 18 General Administrative Regulations 6 & 7	***Designation of Health & Safety Representatives**	More than 20 employees - one H&S Representative, one additional H&S Rep. for each 50 employees or part thereof. Designation in writing, period and area of responsibility specified in terms of GAR 6 & 7 Meaningful H&S Rep. reports. Reports actioned by Management.
Section 19 & 20 General Administrative Regulations 5	***Health & Safety Committee/s**	H&S Committee/s established. All H&S Reps shall be members of H&S Committees Additional members are appointed in writing. Meetings held monthly, Minutes kept. Actioned by Management.
Section 37(1) &	***Agreement with**	Written agreement with (Sub-)Contractors

(2)	**Mandataries/ (Sub-)Contractors**	List of (Sub-) Contractors displayed. Proof of Registration with Compensation Insurer/Letter of Good Standing Construction Supervisor designated Written arrangements re. H&S Reps & H&S Committee Written arrangements re. First Aid
Section 24 & General Admin. Regulation 8 COID Act Sect.38, 39 & 41	***Reporting of Incidents (Dept. of Labour)**	Incident Reporting Procedure displayed. All incidents in terms of Sect. 24 reported to the Provincial Director, Department of Labour, within 3 days. (Annexure 1?)(WCL 1 or 2) and to the Client and/or its Agent on its behalf Cases of Occupational Disease Reported Copies of Reports available on Site Record of First Aid injuries kept
General Admin. Regulation 9	***Investigation and Recording of Incidents**	All injuries which resulted in the person receiving medical treatment other than first aid, recorded and investigated by investigator designated in writing. Copies of Reports (Annexure 1) available on Site Tabled at H&S Committee meeting Action taken by Site Management.
Construction. Regulation 10	**Fall Prevention & Protection**	Competent person appointed to draw up and supervise the Fall Protection Plan Proof of appointees competence available on Site Risk Assessment carried out for work at heights Fall Protection Plan drawn up/updated Available on Site
Construction. Regulation 11	**Structures**	Information re. the structure being erected received from the Designer including: - geo-science technical report where relevant - the design loading of the structure - the methods & sequence of construction - anticipated dangers/hazards/special measures to construct safely Risk Assessment carried out Method statement drawn up All above available on Site Structures inspected before each shift. Inspections register kept
Construction. Regulation 16	**Scaffolding**	Competent persons appointed in writing to: - erect scaffolding (Scaffold Erector/s) - act as Scaffold Team Leaders - inspect Scaffolding weekly and after inclement weather (Scaffold Inspector/s) Written Proof of Competence of above appointees available on Site Risk Assessment carried out Inspected weekly/after bad weather. Inspection register/s kept

Construction. Regulation 17	**Suspended Platforms**	Competent persons appointed in writing to: - control the erection of Suspended platforms - act as Suspended platforms Team Leaders - inspect Suspended Scaffolding weekly and after inclement weather Risk Assessment conducted Certificate of Authorisation issued by a registered professional engineer available on Site/copy forwarded to the Department of Labour The following inspections of the whole installation carried out by a competent person - after erection and before use - daily prior to use. Inspection register kept The following tests to be conducted by a competent person: - load test of whole installation and working parts every three months - hoisting ropes/hooks/load attaching devices quarterly. Tests log book kept Employees working on Suspended Platform medically examined for physical & psychological fitness. Written proof available
Construction. Regulation 13	**Excavations**	Competent person/s appointed in writing to supervise and inspect excavation work Written Proof of Competence of above appointee/s available on Site Risk Assessment carried out Inspected: - before every shift - after any blasting - after an unexpected fall of ground - after any substantial damage to the shoring - after rain. Inspections register kept Method statement developed where explosives will be/ are used
Construction. Regulation 14	**Demolition Work**	Competent person/s appointed in writing to supervise and control Demolition work Written Proof of Competence of above appointee/s available on Site Risk Assessment carried out Engineering survey and Method Statement available on Site Inspections to prevent premature collapse carried out by competent person before each shift. Inspection register kept
Construction. Regulation 19	**Materials Hoist**	Competent person appointed in writing to inspect the Material Hoist Written Proof of Competence of above appointee available on Site. Materials Hoist to be inspected weekly by a competent person. Inspections register kept.

Construction. Regulation 21	**Explosive actuated fastening device**	Competent person appointed to control the issue of the Explosive actuated fastening & cartridges and the service, maintenance and cleaning. Register kept of above Empty cartridge cases/nails/fixing bolts returns recorded Cleaned daily after use **Work areas are demarcated!**
Construction. Regulation 20	**Bulk mixing plant**	Competent person appointed to control the operation of the Bulk mixing plant and the service, maintenance and cleaning. Register kept of above Risk Assessment carried out Bulk mixing plant to be inspected weekly by a competent person. Inspections register kept
Construction. Regulation 23/ Driven Machinery Regulations 18 & 19	**Cranes & Lifting Machines Equipment**	Competent person appointed in writing to inspect Cranes, Lifting Machines & Equipment Written Proof of Competence of above appointee available on Site. Cranes & Lifting tackle identified/numbered Register kept for Lifting Tackle Log Book kept for each individual Crane Inspection: - All cranes - **daily by operator** - Tower Crane/s - **after erection/6monthly** - Other cranes - **annually by comp. person** - Lifting tackle(slings/ropes/chain slings etc.) - daily or before every new application
Construction. Regulation 24/Electrical Machinery Regulations 9 & 10/ Electrical Installation Regulations	***Inspection & Maintenance of Electrical Installation & Equipment (including portable electrical tools)**	Competent person appointed in writing to inspect/test the installation and equipment. Written Proof of Competence of above appointee available on Site. Inspections: - Electrical Installation & equipment inspected after installation, after alterations and quarterly. Inspection Registers kept Portable electric tools, electric lights and extension leads must be uniquely identified/numbered. Weekly visual inspection by User/Issuer/Storeman. Register kept.
Construction. Regulation 28/ General Safety Regulation 8(1)(a)	***Designation of Stacking & Storage Supervisor.**	Competent Person/s with specific knowledge and experience designated to supervise all Stacking & Storage Written Proof of Competence of above appointee available on Site
Construction. Regulation 29/ Environmental Regulation 9	***Designation of a Person to Co-ordinate Emergency Planning And Fire Protection**	Person/s with specific knowledge and experience designated to co-ordinate emergency contingency planning and execution and fire prevention measures Emergency Evacuation Plan developed: - Drilled/Practiced - Plan & Records of Drills/Practices available on Site Fire Risk Assessment carried out All Fire Extinguishing Equipment identified and on ***register***. Inspected weekly. Inspection Register kept

		Serviced annually
General Safety Regulation 3	***First Aid**	Every workplace provided with sufficient number of First Aid boxes. (Required where 5 persons or more are employed) First Aid freely available Equipment as per the list in the OH&S Act. One qualified First Aider appointed for every 50 employees. (Required where more than 10 persons are employed) List of First Aid Officials and Certificates Name of person/s in charge of First Aid box/es displayed. Location of First Aid box/es clearly indicated. Signs instructing employees to report all Injuries/illness including first aid injuries
General Safety Regulation 2	**Personal Safety Equipment (PSE)**	PSE Risk Assessment carried out Items of PSE prescribed/use enforced Records of Issue kept Undertaking by Employee to use/wear PSE PSE remain property of Employer, not to be removed from premises GSR 2(4)
General Safety Regulation 9	***Inspection & Use of Welding/Flame Cutting Equipment**	Competent Person/s with specific knowledge and experience designated to Inspect Electric Arc, Gas Welding and Flame Cutting Equipment Written Proof of Competence of above appointee available on Site All new vessels checked for leaks, leaking vessels NOT taken into stock but returned to supplier immediately Equipment identified/numbered and entered into a register Equipment inspected weekly. Inspection Register kept Separate, purpose made storage available for full and empty vessels
Pressure Equipment Regulations (PER)	**Pressure Equipment Regulations (PER)**	Competent Person/s with specific knowledge and experience designated to supervise the use, storage, maintenance, statutory inspections & testing of Pressure Equipment. Written Proof of Competence of above appointee available on Site Risk Assessment carried out Certificates of Manufacture available on Site Register of Pressure Equipment on Site Inspections & Testing by Approved Inspection Authority (AIA): - after installation/re-erection or repairs - Annual External inspections, - every 36 months. - Register/Log kept of inspections, tests. Modifications & repair A risk based inspection process by an authorised certification body, SAQCC(IPE) registered person

Construction. Regulation 23	**Construction Vehicles & Mobile Plant**	Operators/Drivers appointed to: - Carry out a daily inspection prior to use - Drive the vehicle/plant that he/she is competent to operate/drive Written Proof of Competence of above appointee available on Site. Record of Daily inspections kept
General Safety Regulation 13A	***Inspection of Ladders**	Competent person appointed in writing to inspect Ladders Ladders inspected at arrival on site and weekly there after. Inspections register kept Application of the types of ladders (wooden, aluminium etc.) regulated by training and inspections and noted in register
General Safety regulation 13B	**Ramps**	Competent person appointed in writing to Supervise the erection & inspection of Ramps. Inspection register kept. Daily inspected and noted in register

14.2 Education & Training

Subject	Requirement
*Company OH&S Policy Section 7(1)	Policy signed by CEO and published/Circulated to Employees Policy displayed on Employee Notice Boards Management and employees committed.
*Company/Site OH&S Rules (Section 13(a)	Rules published Rules displayed on Employee Notice Boards Rules issued and employees effectively informed or trained: written proof Follow-up to ensure employees understand/adhere to the policy and rules.
*Induction & Task Safety Training (Section 13(a)	All new employees receive OH&S Induction Training. Training includes Task Safety Instructions. Employees acknowledge receipt of training. Follow-up to ensure employees understand/adhere to instructions.
*General OH&S Training (Section 13(a)	All current employees receive specified OH&S training: written proof Operators of Plant & Equipment receive specified training Follow-up to ensure employees understand/adhere to instructions.
*Occupational Health & Safety Promotion	Incident Experience Board indicating e.g. * No. of hours worked without an Injury * No. of days worked without an Injury Mission, Vision and Goal Star Grading - Board kept up to date. Safety Posters displayed & changed regularly Employee Notice Board for OH&S Notices. Site OH&S Competition. Company OH&S Competition. Participation in Regional OH&S Competition Suggestion scheme.

14.3 Public Safety, Security Measures & Emergency Preparedness

Subject	Requirement
*Notices &Signs	Notices & Signs at entrances / along perimeters indicating **"No Unauthorised Entry".** Notices & Signs at entrance instructing visitors and non - employees what to do, where to go and where to report on entering the site/yard with directional signs. e.g. **"Visitors to report to Office"** Notices & Signs posted to warn of overhead work and other hazardous activities. e.g. **General Warning Signs**
Site Safeguarding	Nets, Canopies, Platforms, Fans etc. to protect members of the public passing / entering the site.
*Security Measures	Access control measures/register in operation Security patrols after hours during weekends and holidays Sufficient lighting after dark Guard has access to telephone/ mobile/other means of emergency communication
*Emergency Preparedness	Emergency contact numbers displayed and made available to Security & Guard Emergency Evacuation instructions posted up on all notice boards (including employees' notice boards) Emergency contingency plan available on site/in yard Doors open outwards/unobstructed Emergency alarm audible all over (including in toilets)
***Emergency Drill & Evacuation**	Adequate No. of employees trained to use Fire Fighting Equipment. Emergency Evacuation Plan available, displayed and practiced. **(See Section 1 for Designation & Register)**

14.4 Personal Protective Equipment

Subject	Requirement
*PPE needs analysis	Need for PPE identified and prescribed in writing. PPE remain property of Employer, not to be removed from premises GSR 2(4)
*Head Protection	All persons on site wearing Safety Helmets including Sub-contractors and Visitors (where prescribed)
*Foot Protection	All employees on site wearing Safety Footwear including Gumboots for concrete / wet work and non-slip shoes for roof work. Visitors to wear same upon request or where prescribed
*Eye and Face Protection	Eye and Face (also Hand and Body) Protection (Goggles, Face Shields, Welding Helmets etc.) used when operating the following: * Jack/ Kango Hammers * Angle / Bench Grinders * Electric Drills (Overhead work into concrete / cement / bricks * Explosive Powered tools * Concrete Vibrators / Pokers * Hammers & Chisels * Cutting / Welding Torches * Cutting Tools and Equipment * Guillotines and Benders * Shears * Sanders and Sanding Machines * CO2 and Arc Welding Equipment * Skill / Bench Saws

	* Spray Painting Equipment etc.
*Hearing Protection	Hearing Protectors (Muffs, Plugs etc.) used when operating the following: * Jack / Kango Hammers * Explosive Powered Tools * Wood/Aluminium Working Machines e.g. saws, planers, routers
*Hand Protection	Protective Gloves worn by employees handling / using: * Cement / Bricks / Steel / Chemicals * Welding Equipment * Hammers & Chisels * Jack / Kango Hammers etc.
*Respiratory Protection	Suitable/efficient prescribed Respirators worn correctly by employees handling / using: * Dry cement * Dusty areas * Hazardous chemicals * Angle Grinders * Spray Painting etc.
*Fall Prevention Equipment	Suitable Safety Belts / Fall Arrest Equipment correctly used by persons working on / in unguarded, elevated positions e.g.: * Scaffolding * Riggers * Lift shafts * Edge work * Ring beam edges etc. Other methods of fall prevention applied e.g. catch nets
*Protective Clothing	All jobs requiring protective clothing (Overalls, Rain Wear, Welding Aprons etc.) Identified and clothing worn.
*PPE Issue & Control	Identified Equipment issued free of charge. All PPE maintained in good condition. (Regular checks). Workers instructed in the proper use & maintenance of PPE. Commitment obtained from wearer accepting conditions and to wear the PPE. Record of PPE issued kept on H&S File. PPE remain property of Employer, not to be removed from premises GSR 2(4)

14.5 Housekeeping

Subject	Requirement
*Scrap Removal System	All items of Scrap/Unusable Off-cuts/Rubble and redundant material removed from working areas on a regular basis. (Daily) Scrap/Waste removal from heights by chute/hoist/crane. Nothing thrown/swept over sides. Scrap disposed of in designated containers/areas Removal from site/yard on a regular basis.
Stacking & Storage	Stacking: * Stable, on firm level surface/base. * Prevent leaning/collapsing * Irregular shapes bonded * Not exceeding 3x the base * Stacks accessible * Removal from top only.

(See Section 1 for Designation & Register)	Storage: * Adequate storage areas provided. * Functional – e.g. demarcated storage areas/racks/bins etc. * Special areas identified and demarcated e.g. flammable gas, cement etc. * Neat, safe, stable and square. * Store/storage areas clear of superfluous material. * Storage behind sheds etc. neat/under control. * Storage areas free from weeds, litter etc.
*Waste Control/Reclamation	Re-usable off-cuts and other re-usable material removed daily and kept to a minimum in the work areas. All re-usable materials neatly stacked/stored in designated areas. (Nails removed/bent over in re-usable timber). Issue of hardware/nails/screws/cartridges etc. controlled and return of unused items monitored.
Sub-contractors (Housekeeping)	Sub-contractors required to comply with Housekeeping requirements.

14.6 Working at Heights (including roof work)

Subject	Requirement
Openings	Unprotected openings adequately guarded/fenced/barricaded/catch nets installed
	Roof work discontinued when bad/hazardous weather Fall protection measures (including warning notices) when working close to edges or on fragile roofing material Covers over openings in roof of robust construction/secured against displacement

14.7 Scaffolding / Formwork / Support Work

Subject	Requirement
Access/System Scaffolding	Foundation firm / stable Sufficient bracing. Tied to Structure/prevented from side or cross movement Platform boards in good condition/sufficient/secured. Handrails and toe boards provided. Access ladders / stairs provided. Area/s under scaffolding tidy. Safe/unsafe for use signs Complying with OH&S Act/SABS 085
Free Standing Scaffolding	Foundation firm / stable Sufficient bracing. Platform boards in good condition/sufficient/secured. Handrails and toe boards provided. Access ladders / stairs provided. Area/s under scaffolding tidy. Safe/unsafe for use signs Height to base ratio correct Outriggers used /tied to structure where necessary Complying with OH&S Act/SABS 085
*Mobile	Foundation firm / stable

Scaffolding	Sufficient bracing. Platform boards in good condition/sufficient/secured. Handrails and toe boards provided. Access ladders / stairs provided. Area/s under scaffolding tidy. Safe/unsafe for use signs
*Mobile Scaffolding	Wheels / swivels in good condition Brakes working and applied. Height to base ratio correct. Outriggers used where necessary Complying with OH&S Act/SABS 085
Suspended Scaffolding	Outriggers securely supported and anchored. Correct No. of steel wire ropes used. Platform as close as possible to the structure. Handrails on all sides All winches / ropes / cables / brakes inspected regularly and replaced as prescribed Scaffolding complies with OHS Act (Act 85/93) Winch(es) maintained by competent person(s)
Formwork / Support Work	All components in good condition. Foundation firm / stable. Adequate bracing / stability ensured. Good workmanship / uprights straight and plumb. Good cantilever construction. Safe access provided. Areas under support work tidy. Same standards as for system scaffolding.
Special Scaffolding	Special Scaffolding e.g. Cantilever, Jib and Truss-out scaffolds erected to an acceptable standard and inspected by specialists.
Edges & Openings	Edges barricaded to acceptable standards. Manhole openings covered / barricaded. Openings in floor / other openings covered, barricaded/fenced. Stairs provided with handrails. Lift shafts barricaded / fenced off.

14.8 Ladders

Subject	Requirement
*Physical Condition / Use & Storage	Stepladders - hinges/stays/braces/stiles in order. Extension ladders - ropes/rungs/stiles/safety latch/hook in order. Extension / Straight ladders secured or tied at the bottom / top. No joined ladders used Wooden ladders are never painted except with varnish Aluminium ladders NOT to be used with electrical work All ladders stored on hooks / racks and not on ground. Ladders protrude 900 mm above landings / platforms / roof. Fixed ladders higher than 5 m have cages/Fall arrest system

14.9 Electricity (as part of, or additional to the manual "Safety & Switching Procedures for Electrical Installations"- see attached document)

Subject	Requirement
*Electrical Distribution Boards & Earth Leakage	Colour coded / numbered / symbolic sign displayed. Area in front kept clear and unobstructed. Fitted with inside cover plate / openings blanked off / no exposed "live" conductors / terminals/Door kept close Switches / circuit breakers identified. Earth leakage protection unit fitted and operating. Tested with instrument: Test results within 15 – 30 milliamps Aperture/Opening/s provided for the plugging in and removal of extension leads without the need to open the door Apertures and openings used for extension leads to be protected against the elements and especially rain
*Electrical Installations & Wiring	Temporary wiring / extension leads in good condition / no bare or exposed wires. Earthing continuity / polarity correct: **Looking at the open connectors to connect the wiring, the word "Brown" has the letter 'R' in it, so the b'R'own wire connects to the 'R'ight hand connector. "Blue" has the letter 'L' in it, so the b'L'ue wire connects to the 'L'eft hand connector.** Cables protected from mechanical damage and moisture. Correct loading observed e.g. no heating appliance used from lighting circuit etc. Light fittings/lamps protected from mechanical damage/moisture. Cable arrestors in place and used inside plugs
*Physical condition of Electrical Appliances & Tools	Electrical Equipment and Tools: (includes all items plugging in to a 16 Amp supply socket) Insulation / casing in good condition. Earth wire connected/intact where not of double insulated design Double insulation mark indicates that no earth wire is to be connected. Cord in good condition/no bare wires/secured to machine & plug. Plug in good condition, connected correctly and correct polarity.

14.10 Emergency and Fire Prevention and Protection

Subject	Requirement
*Fire Extinguishing Equipment	Fire Risks Identified and on record The correct and adequate Fire Extinguishing Equipment available for: * Offices * General Stores * Flammable Store * Fuel Storage Tank/s and catchment well * Gas Welding / Cutting operations * Where flammable substances are being used / applied. * Equipment Easily Accessible
*Maintenance	Fire equipment checked minimum monthly, serviced yearly
*Location & Signs	Fire Extinguishing Equipment: * Clearly visible * Unobstructed * Signs posted including "No Smoking" / "No Naked Lights" where required. (Flammable store, Gas store, Fuel tanks etc.)
* Storage Issue &	Storage Area provided for flammables with suitable doors, ventilation, bund etc.

Control of Flammables (incl. Gas cylinders	Flammable store neat / tidy and no Class A combustibles. Decanting of flammable substances carried out in ignition free and adequately ventilated area. Container bonding principles applied Only sufficient quantities issued for one task or one day's usage Separate, special gas cylinder store/storage area. Gas Cylinders stored / used / transported upright and secured in trolley/cradle/structure and ventilated. Types of Gas Cylinders clearly identified as well as the storage area and stored separately. Full cylinders stored separately from empty cylinders. All valves, gauges, connections, threads of all vessels to be checked regularly for leaks. Leaking acetylene vessels to be returned to the supplier **IMMEDIATELY**.
*Storage, Issue & Control of Hazardous Chemical Substances (HCS)	HCS storage principles applied: products segregated Only approved, non-expired HCS to be used Only the prescribed PPE shall be used as the minimum protection Provision made for leakage/spillage containment and ventilation Emergency showers/eye wash facilities provided HCS under lock & key controlled by designated person Decanted/issued in containers as prescribed with information/warning labels Disposal of unwanted HCS by accredited disposal agent No dumping or disposal of any HCS on or inside the storage area or anywhere else on the project site All vessels or containers to be regularly checked for leaks

14.11 Excavations

Subject	Requirement
Excavations, any man-made cavity, trench, pit or depression formed by cutting, digging or scooping	Shored / Braced to prevent caving / falling in. Provided with an access ladder. Excavations guarded/barricaded/lighted after dark in public areas Soil dumped at least 1 m away from edge of excavation On sloping ground soil dumped on lower side of excavation All excavations are subject to daily inspections

14.12 Tools

Subject	Requirement
*Hand Tools	<u>Shovels / Spades / Picks:</u> * Handles free from cracks and splinters * Handles fit securely * Working end sharp and true <u>Hammers:</u> * Good quality handles, no pipe or reinforcing steel handles. * Handles free from cracks and splinters Handles fit securely <u>Chisels:</u> * No mushroomed heads / heads chamfered * Not hardened * Cutting edge sharp and square <u>Saws:</u> * Teeth sharp and set correctly

	* Correct saw used for the job
*Explosive actuated fastening device.	Only used by trained / authorised personnel. Prescribed warning signs placed / displayed where tool is in use. Work area must be properly isolated/demarcated during use of tool. Inspected at least monthly by competent person and results recorded. Issue and return recorded including cartridges / nails and unused cartridges / nails / empty shells recorded. Cleaned daily after use.

14.13 Cranes

Subject	Requirement
Tower Crane	Only operated by trained authorised operator with valid certificate of training Structure - no visible defects Electrical installation good/safe Crane hook: Throat pop marked/safety latch fitted/functional SWL/MML displayed Limit switches with backup switches fitted/operational Access Ladder fitted with backrests/Fall arrest system installed Lifting tackle in good condition/inspection colour coding Lifting tackle checked daily
*Mobile Crane	Only operated by trained authorised operator with valid certificate of training Rear view mirrors Windscreen visibility good Windscreen wipers operating effectively Indicators operational Hooter working Tyres safe/sufficient tread/pressure visibly sufficient No missing Wheel nuts Headlights, taillights operational Reverse alarm working and audible and known by all employees
*Mobile Crane continued	Grease nipples and grease on all joints No Oil leaks Hydraulic pipes visibly sound/no leaks No corrosion on Battery terminals Boom visibly in good condition/no apparent damage Cable/sheaves greased/no visible damage/split wires/corrosion and checked daily Brakes working properly Crane hook: Throat pop marked/safety latch fitted/functional SWL/MML displayed By-pass valves operational Deflection chart displayed/visible to operator/driver Outriggers functional used
*Gantry Crane	Only operated by trained authorised persons Correct slinging techniques used Recognised/displayed on chart signals used Log book kept/up to date Prescribed inspections conducted on crane &lifting tackle and checked daily "Crane overhead" signage, where applicable Crane hook: Throat pop marked/safety latch fitted/functional SWL/MML displayed/load limiting switches fitted/operational

14.14 Builder's Hoist

Subject	Requirement
Builder's Hoist	**"Hoist In Operation"** - sign displayed. General construction strong and free from patent defects. Tower: * Adequately secured / braced. * At least 900 mm available for over travel. * Barricaded at least 2 100 mm high at ground level and floors. * Landing place provided with gate at least 1 800 high. Platform: * No persons conveyed on platform * Steel wire ropes with breaking strength of six times max. load. * Signal systems used which may include two way radio connection. * Goods prevented from moving / falling off. * Effective brake capable of stopping and holding max. load.

14.15 Transport & Materials Handling Equipment

Subject	Requirement
*Site Vehicles	All Site Vehicles, Dumpers, Bobcats, Loaders etc; checked daily before use by driver / operator. Inventory of vehicles used/operated on site Inspection by means of a checklist / results recorded. No persons riding on equipment not designed or designated for passengers. Site speed limit posted, enforced and not exceeded. Drivers / Operators trained / licensed and carrying proof. No unauthorised persons allowed to drive / operate equipment.
Conveyors	Conveyor belt nip points and drive gear guarded. Emergency stop/lever/brake fitted, clearly marked & accessible and tested to be functional under full load.

14.16 Site Plant and Machinery

Subject	Requirement
Brick Cutting Machine	Operator Trained. Only authorised persons use the machine. Emergency stop switch clearly marked and accessible. Area around the machine dry and slip/trip free/clear of off-cuts All moving drive parts guarded/electrical supply cable protected Operator using correct PPE - eye/face/hearing/foot/hands/body.
*Electric Arc Welder	Welder Trained. Only authorised / trained persons use welder. Earth cable adequately earthed to work. Electrode holder in good condition/safe Cables, clamps & lugs/connectors in good condition. Area in which welding machine is used is dry/protected from wet. Welder using correct PPE - eye/ face/foot/body/respirator. Correct transparent screens & warning signs placed
*Woodworking Machines	Operators Trained. Only authorised persons use machines. Provided with guards. Guards used. Operators using correct PPE - eye/face/feet/hearing

	Circular saws strictly operated according to prescribed methods and settings Only prescribed saw blades (cross-cut, ripping blade, smooth cut, aluminium) shall be used for various applications
*Compressors	Relief valves correctly set and locked / sealed. Maximum Safe Working Pressure (MSWP) indicated on face of pressure gauge: not on glass cover. All drives adequately guarded. Receiver/lines drained daily Hoses good condition/clamped, not wired Compressed air NEITHER used to dust off clothing/PPE/ and work areas NOR on bare skin
Concrete Mixer / Batch Plant	Top platform provided with guardrails. Dust abatement methods in use. Operators using correct PPE - eye / hands / respirators. All moving drive parts guarded. Emergency stops identified / indicated and accessible. Area kept clean/dry/and free from tripping and slipping hazards. Operators overseer identified and crane signals displayed and used.
*Gas Welding / Flame Cutting Equipment	Only authorised/trained persons use the equipment. Torches and gauges in good condition. Flashback arrestors fitted at cylinders and gauges. Hoses in good condition/correct type/all connections with clamps Cylinders stored, used and transported in upright position, secured in trolley / cradle / to structure. All cylinders regularly checked for leaks, leaking cylinders returned immediately Fire prevention/control methods applied/hot work permits

14.17 Plant & Storage Yards/Site Workshops Specifics

Subject	Requirements
Section 8(2)(1) General Machinery Regulation 2(1): **Supervision of the Use & Maintenance of Machinery**	Person/s with specific knowledge and experience designated in writing to Supervise the Use & Maintenance of Machinery Critical items of Machinery identified/numbered/placed on register/inventory Inspection/maintenance schedules for abovementioned Inspections/maintenance carried out to above schedules Results recorded
General Machinery Regulation 9(2): **Notices Operation of Machinery**	Schedule D Notice posted in Work areas

Lock-out Procedure	Lock-out procedure in operation
Ergonomics	Ergonomics survey conducted – results on record Survey results applied
Demarcation & Colour Coding	Demarcation principles applied All services, pipes, electrical installation, stop-start controls, emergency controls etc. colour coded to own published or SABS standard Employees trained to identify colour coding
Portable & Bench Grinders	Area around grinder clear/trip/slip free Bench grinders mounted securely/grinder generally in good condition/No excessive vibration On/Off switch/button clearly demarcated/accessible Adequate guards in place Tool rest – secure/square/max. 2 mm gap, perpendicular to drive shaft Stone/disk - correct type and size/mounted correctly/dressed Use of Eye protection enforced
Battery Storage & Charging	Adequately ventilated, ignition free room/area/no smoking sign/s Batteries placed on rubber/wooden surface Emergency shower/eye wash provided No acid storage in area Prescribed methods in place and adhered to when charging batteries
Ancillary Lifting Equipment	Chain Blocks/Tirfors/jacks/mobile gantries etc. identified/ numbered on register Chains in good condition/links no excessive wear/checked daily Lifting hooks – throat pop marked/safety latch fitted SWL/MML marked/displayed
Presses/Guillotines/ Shears	Only operated by trained/authorised persons Interlocks/lock-outs fitted/PPE worn or used at all times

14.18 Workplace Environment, Health and Hygiene

Subject	Requirement
*Lighting	Adequate lighting in places where work is being executed e.g. stairwells and basements. Light fittings placed / installed causing no irritating/blinding glare. Stroboscopic effect eliminated (not only reduced) where moving objects or machinery is used
*Ventilation	Adequate ventilation / extraction / exhausting in hazardous areas e.g. chemicals / adhesives / welding / petrol or diesel/ motors running and in confined spaces / basements.
*Noise	Tasks identified where noise levels exceeds 85 dB at any one time. All reasonable steps taken to reduce noise levels at the source. Hearing protection used where noise levels could not be reduced to below 85 dB.
*Heat Stress	Measures in place to prevent heat exhaustion in heat stress problem areas e.g. steel decks, when the WBGT index reaches 30. (See Environmental Regulation 4) Cold drinking water readily available at all times.
*Ablutions	Sufficient hygiene facilities provided - 1 toilet per 30 employees (National Building Regulations prescribe chemical toilets for Construction sites) Toilet paper available. Sufficient showers provided. Facilities for washing hands provided Soap/cleaning agent available for washing hands

	Means of drying hands available Lock-up changing facilities / area provided. Ablution facilities kept hygienic and clean.
*Eating / Cooking Facilities	Adequate storage facilities provided. Weather protected eating area provided, separate from changing area Refuse bins with lids provided. Facilities kept clean and hygienic.
*Pollution of Environment	Measures in place to minimize dust generation. Accumulation or littering of empty cement pockets, plastic wrapping / bags, packing materials etc. prevented. Spillage / discarding of oil, chemicals and dieseline into storm water and other drains or into existing or newly dug holes/cavities on site expressly prohibited.
*Hazardous Chemical Substances	All substances identified and list available e.g. acids, flammables, poisons etc. Material Safety Data Sheets (MSDS) indicating hazardous properties and emergency procedures in case of incident on file and readily available. Substances stored safely. Expiry dates meticulously checked where applicable

15. THE PRINCIPAL CONTRACTOR'S GENERAL DUTIES

The Principal Contractor shall at all times ensure his status of an "employer" as referred to in the Act, and will abide by his/her responsibilities, duties and functions as per the requirements of the Act and Regulations with specific reference to Section 8 of the Act.

The Principal Contractor shall keep, and on demand make available, a copy of the Act on site at all times and in addition to that he/she will introduce and maintain a file titled "Health and Safety File", or other record in permanent form, which shall contain all relevant aspects and information as contemplated in the Construction Regulations. He/she will make this file available to the client or his representative whenever necessary or on request to an interested party.

16. THE PRINCIPAL CONTRACTOR'S SPECIFIC DUTIES

The Principal Contractor's specific duties in terms of these specifications are detailed in the Construction Regulations promulgated in February 2014. The Principal Contractor is specifically referred to the following elements of the Construction Regulations:

Regulation No. 1 - Definitions
Regulation No. 2 - Scope of application
Regulation No. 3 - Application of construction permit
Regulation No. 4 - Notification of construction work
Regulation No. 7 - Principal Contractor and Contractor
Regulation No. 8 - Supervision of construction work
Regulation No. 9 - Risk Assessment
Regulation No. 28 - Stacking & Storage on construction sites

Regulation No. 30 - Construction employees' facilities

Regulation No. 32 - Approved Inspection authorities

Regulation No. 33 - Offences and penalties

This list must not be taken to be exclusive or exhaustive!

The Principal Contractor shall ensure compliance to the Act and its Regulations and specifically to the above regulations, and document each record in the Health and Safety File.

19. HOUSE KEEPING

Good housekeeping will be maintained at all times as per Construction Regulation 27. Poor housekeeping contributes to three major problems, namely, costly or increased accidents, fire or fire hazards and reduction in production. Good housekeeping will enhance production time.

Particular emphasis is to be placed on the following crucial elements of a construction site:

- Phase priorities and production/plant layout
- Enclosures
- Pits, openings and shoring
- Storage facilities
- Effective, sufficient and maintained lighting or illumination
- Principal sources of injuries e.g. stairways, runways, ramps, loose building material
- Oil, grease, water, waste, rubble, glass, storm water
- Colour coding
- Demarcations
- Pollution
- Waste disposal
- Ablution and hygiene facilities
- First aid

This list must not be taken to be exclusive or exhaustive!

In promotion of environmental control all waste, rubble, scrap etc, will be disposed of at a registered dump site and records will be maintained. Where it is found to be impractical to use a registered dump site or it is not available, the Principal Contractor will ensure that the matter is brought to record with the client or his representative, after which suitable, acceptable alternatives will be sought and applied.

Dross and refuse from metals, and waste matters or by-products whose nature is such that they are poisonous or capable of fermentation, putrefaction or constituting a nuisance shall be treated or disposed of by methods approved of by an inspector.

NOTE: No employer (Principal Contractor) shall require or permit any person to work at night or after hours unless there is adequate, suitable artificial lighting including support services in respect of Health and Safety.

20. LOCKOUT SYSTEMS: - *ELECTRICAL*

A system of control shall be established in order that no unauthorized person can energize a circuit, open a valve, or activate a machine on which people are working or doing maintenance, even if equipment, plant or machinery is out of commission for any period, thus eliminating injuries and damage to people and equipment as far as is reasonably practicable.

Physical/mechanical lock-out systems shall be part of the safety system and included in training. Lockouts shall be tagged and the system tested before commencing with any work or repairs.

21. INCIDENT INVESTIGATION

Inspection and reporting is the best way in which a responsible contractor can control his area of responsibility. All incidents therefore, irrespective of whether it gave rise to loss, injury, damage or not, shall be investigated and the results recorded in the Health and Safety File.

22. GENERAL

The project under control of the Principal Contractor shall be subject to periodic health and safety audits that will be conducted by the client at intervals agreed upon between the Principal Contractor and the client, provided such intervals will not exceed periods of one month. The Principal Contractor is to ensure that he/she and all persons under his control on the construction site shall adhere to the above specifications, as non-conformance will lead to the client taking action as directed by Construction Regulation 5(1) (q). The Principal Contractor should note that he/she shall be held liable for any anomalies including costs and resulting deficiencies due to delays caused by non-conformance and/or non-compliance to the above Health and Safety Specifications and the Health and Safety Plan based on these specifications.

23. IMPORTANT RECORDS TO BE KEPT

1 Inspection checklist (template)

The documents are to be used as a point of reference to determine which components of the Act would be applicable to a particular site or task or project,

INSPECTION CHECKLIST

Employer Particulars	
Employer:	
Registered Name of Enterprise:	
Trade Name of Enterprise:	
Company Registration No.:	
SARS Registration No.:	
UIF Registration No.:	
COIDA Registration No.:	
Relevant SETA for EEA purposes:	
Industry Sector:	
Bargaining Council:	
Contact Person:	

Address of Premises:	
Postal Address:	
Telephone Number:	
Fax Number:	
E-mail Address:	
Chief Executive Officer:	
Chief Executive Officer Address:	
Competent Person:	
Maximum power demand: in KW	
Health and Safety Representatives:	
Activities, products manufactured and/ services rendered:	
Raw materials, materials and chemical/ biological substances:	
Total Number of Employees:	Male: Female:

Contractor Particulars	
Contractors:	
Site Address:	
Contracts Manager:	
Managing Director:	
Competent Persons:	
CR16(1): SCAFFOLDING:	
CR17(1): SUSPENDED PLATFORMS:	
CR19(8)(a): MATERIAL HOIST (S):	
CR20(1): BULK MIXING PLANT:	
CR10(1)(a): FALL PROTECTION:	
CR13(1)(a): EXCAVATION WORK:	
CR14(1): DEMOLITION WORK:	
CR21(2)(b): EXPLOSIVE ACTUATED FASTENING TOOLS	
CR28(a): STACKING	

INSPECTION				
SECTION/REGS	ITEM CHECKED	N/A	YES	NO
	APPOINTMENTS			
CR8(1)	Supervisor:			
CR8(2)	Assistant Supervisor:			
CR8(5)	Construction Health and Safety Officer			
S17(1)	Health & Safety Representative: (ratio)			
S19(1)	Health & Safety Committees			
CR 14(1)	Demolition Expert			
	DOCUMENTS			
GAR 9(1)	Records of Incidents			

GAR 4	Copy of the Act			
GAR 7	Safety Reps Report			
Section 20(2)	Safety Committee Minutes			
DMR 18(7)	Lifting Machines, hand-powered lifting devices and lifting tackle			
CR 3(4)	Application for Construction Work Permit			
CR 4	Notification of Construction Work			
CR 9(6)	Risk Assessment			
CR 7(7)	Proof of the Health & Safety Induction Training			
CR 11(2)(c)	Structures			
CR13(2)(i)	Excavations			
CR7(1)(g)	Medical Certificates of Fitness			
CR 17(11)	Suspended platforms; inspections and performance test records			
CR 7(1)	Health & Safety File			
CR 17(11)	Suspended Platforms' Performance Records			
CR 19(8)(c)	Material Hoists Record Book			
CR21(2)(g)	Explosive actuated fastening device register			
CR 23(1)(k)	Construction Vehicle & Mobile Plant Register			
CR 24(e)	Electrical Installation & Machinery Register			
	INCIDENTS			
GAR 8(1) S24	Reported			
GAR 9(1)	Recorded Investigated Action Taken			
	PUBLIC SITE			
FR 2(1)	Sanitary Facilities			
CR 30(1) (c)	Changing Facilities for each sex			
CR 27(f)	Perimeter fence & no admittance			
CR 27(g)	Overhead protection netting/falling objects			
NB Notice	Pedestrian warning			
	PERSONAL SAFETY EQUIPMENT			
	Items Issued:			
GSR 2(3)	Items Required:			
S23	(What is the payment on each item?)			
	SAFETY PLANS			
	FIRST AID			
GSR 3(6)	Name(s) of First Aider(s):			
CR 5(1)(b)	Client's Health & Safety Specification			
CR7(1)(a)	Principal's contractor H&S Plan			
	FIRE HAZARD & PRECAUTIONS			
GR29	Flammables used, waste, hot work, diesel, fuel, gas			
	ELECTRICAL INSTALLATIONS & MACHINERY			
CR24	Guarding to Electrical Installations			
	ILLUMINATION			
ER 3(6)	Dangerous Places and signage as well			
	Housekeeping			
ER6(2)(b),(c),(d)	Clear space storage			
ER6(3)	Disposal of waste			

The guidelines and conditions provided in this attached document form an integral constituent of the Health and Safety Specifications. It is therefore a condition of acceptance that no Health and Safety Plan shall be complete unless all relevant elements of this document applicable to the above project have been included in the Health and Safety Plan. The final approval of the Health and Safety Plan in terms of CR5(1)(l) shall be subject to this requirement based on the following certification by the Principal Contractor or his Agent:

IMPORTANT CONTACT DETAILS

(FOR HEALTH & SAFETY ASPECTS ONLY)

The contractor is to add all the important contact information about essentials services, support and assistance.

	SERVICE	NUMBER	CONTACT PERSON
	Hospital		
	Ambulance		
	Water		
	Electricity		
	Police		
	Fire Brigade		
	Engineer		

C3.3 – PW 371-B SPECIFICATION

PW 371-B

EDITION 2.2

Department: Public Works

REPUBLIC OF SOUTH AFRICA

CONSTRUCTION WORKS: SPECIFICATIONS

PARTICULAR SPECIFICATION

First Edition October 1983
Second Edition January 2013
Edition 2.2 December 2015

Particular Specification

(read with PW371-A)

This specification falls under the Scope of Work as defined in *Standard for Uniformity in Construction Procurement,* published by the Construction Industry Development Board (CIDB), and is based on national or international standards, where such exist.

Works: **EASTERN CAPE: GQEBERHA: EAST LONDON PROVINCIAL OFFICE: DEPARTMENT OF EMPLOYMENT AND LABOUR: SUPPLY AND INSTALLATION OF WATER TANKS.**

Ref no: **14/1/3/2/1/6425/5458**

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1 Earthworks

1.1 Site clearance

Applicable standard: SANS 2001 – Construction Works Part BS1: Site clearance

Specification data[1]:

SANS 2001 standard specifications are deemed to satisfy the provisions of SANS 10400.

SANS 2001-BS1 covers removal of vegetation, fences, guard rails and posts, litter and building rubble, boulders of size up to 0,15 m3, and surface and subsurface obstructions, and demolition and removal of structures (including their basements, if any), not directly associated with or incidental to any excavation.

€ designated area/site in which work is to be carried out: see drawings

€ level of finished earthworks: see drawings

€ site clearing activity numbers: ...

1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12

1 removal and disposal of vegetation; 2 removal and disposal of structures by means of bulldozing; 3 demolition, breaking up and removal of buildings to ground level; 4 demolition, breaking up and removal of underground structures; 5 ditto septic tanks, soak pits; 6 ditto litter, rubble, rocks on surface; 7 removal and stacking of re-useable materials; 8 removal of asphalt layers; 9 removal of paving; 10 removal of kerbs, channels, haunching; 11 scarifying, ripping to blocks <200 mm; 12 removal of disused foulwater and stormwater drains and watermains

€ description of materials to be reused: ...

Activity 7 requires description of reuseable materials

€ depth of underground structures to be demolished: see drawings

Activity 4 requires depth of demolition of underground structures to be specified.

€ depth for ripping or excavation: see drawings

Activity 11 requires depth for ripping or excavation to be specified

€ designated sites for disposal of materials: see drawings

€ designated sites for disposal of reusable materials: see drawings

€ trees, turf, plants, bushes, shrubs and flora to be preserved and/or replanted: see drawings

Look up tree distance guidelines in SANS 10400-H Annex E.

€ topsoil: select and stockpile

Topsoil is mostly a precious commodity.

1.2 Earthworks (general)

Applicable standard: SANS 2001-Construction works Part BE1: Earthworks (general).

Specification data:

SANS 2001-BE1 covers: excavation, filling, compaction and finishing of general excavations for buildings, bridges and structures, terracing, landscaping and private railway sidings, carried out with heavy construction equipment or light construction equipment, or by hand.

€ topsoil: select and stockpile

€ areas where surplus and unsuitable materials shall be disposed of: see drawings

€ areas to be topsoiled: see drawings

[1] The specification data for SANS 2001 standards as listed in this publication is a selection of importance mainly for buildings. See Annex A of the relevant standard for the full list of specification data, and follow instructions when required for civil works.

- € areas to be grassed or vegetated: see drawings
- € degree of accuracy required : II

Relevant standards:
SANS 10400-F Site Operations.
SANS 10400-G Excavations.
To be published: SANS 2001- Construction works Part BE2: Earthworks (small works).

2 Concrete works

2.1 Structural works (SANS 2001-CC1)

Omit this part if not relevant, or SANS 2001-CC2 Concrete Works (Minor Works) is specified.

SANS 2001-CC1 covers: structural concrete in buildings and structures where the design and supervision of reinforced, prestressed and precast concrete are under the direct control of appropriately qualified engineers and technologists. Does not cover piles, harbour and marine works, and underground works in mines.

Specification data:

materials

€ strength concrete grade: see drawings

10 / 15 / 20 / 25 / 30 / 40

Contractor is responsible for design of strength concrete.

Strength concrete is designated by its characteristic strength followed by the size of stone used in its manufacture, for example, grade 30/19 refers to a 30 MPa mix made with 19 mm stone. Stone size has little influence on strength but does affect workability and water demand.

Grades for typical applications are

10 (plain [unreinforced] concrete strip foundations, or surface beds where the slab does not serve as the final wearing surface);

15 (plain concrete strip foundations, floors on the ground that will serve as the final wearing surface);

20 (reinforced concrete subject to non-aggressive (dry) conditions; base courses of lightly loaded floors (no trucking) and one-course domestic and office floors on the ground that will serve as the final wearing surface; landscape footpaths);

25 (general reinforced concrete construction in buildings, bridges, culverts, silos, machine foundations, slab-on-the-ground foundations, unplastered walls above ground);

30 (machine foundations subject to vibration and shock; concrete roads; paving and floors on the ground to carry fork-lift trucks), precast concrete;

40 (specially watertight walls and tanks; highly stressed rc members; precast structural units; concrete subject to severe vibration and shock, abrasion and wear).

€ prescribed mix concrete: SANS 2001-CC2 table 5 / …

SANS 2001-CC2 table 5 (19 mm aggregate) and table 6 (13 mm aggregate) contains generic prescribed concrete mixes for strength grade 10, 15, 20, 25, 30, or specify bespoke requirements.

€ characteristic strength of tendon steel for prestressing: …

€ joint fillers, sealants, waterstops, bearings and accessories: … / see Section 6

€ steel joint cover plate finish: not galvanized / galvanized

off-form surfaces

€ concrete off-form surface finish (smooth-special): steel forms, uniform texture, appearance and colour

Specify special off-form and exposed aggregate surfaces only with permission: timber boards, special patterned finish (hardboard, rubber, plastic), brushed, tooled, sand-blasted or aggregate transfer. See SANS 2001-CC1 table 1.

construction joints

€ type: see drawings

construction joint / movement joint / contraction joint / expansion joint

In general, in off-form surfaces, construction joints should be shown where a day's casting starts and ends, e.g. bottom and top of slab/column.

€ joint sealing requirements: see Section 6

SANS 2001-CC1 specifies the finishing of exposed horizontal cast in situ concrete surfaces excluding industrial floors. Public ramps must have a safe gradient and frequent landings for disabled persons. Check with SANS 10400-S. See note on stairways at end of section.

€ parts of the structure which need to be watertight: see drawings

€ degree of accuracy required: II

precast/prestressed concrete

€ surface finish required to precast units: special off-form / exposed aggregate / mosaic / ...

€ prestressing particulars: ...

€ order of loading and magnitude of load for each component of prestressing tendon: ...

€ prestressing test requirements: ...

€ position of lifting and supporting points, method of lifting, type of equipment and transport used in handling and erection of precastunits: ...

€ method of assembly and erection of precast units: ...

€ design requirements for structural connections of precast units: ...

€ degree of accuracy required: II

additional requirements

€ low-density concrete if not breeze (clinker) concrete at 800-960 kg/m^3

60-160 (vermiculite) / 120-240 (perlite) / 450-720 (foamed slag) kg/m^3

€ form drip joint or downstand under all exposed off-form slab edges; chamfer exposed edges of off-form columns, slabs, joints etc.; use standard plastic joint formers

2.2 Minor works (SANS 2001-CC2)

Omit this part if SANS 2001-CC1 is specified.

SANS 2001-CC2 covers concrete works in foundations, slabs, stairways, masonry walls, pipelines, manholes, latrines, conservancy tanks, septic tanks and the like where the design and supervision of plain, reinforced and precast concrete are not necessarily under the direct supervision of approved, qualified engineers and technologists and no special finishes to the concrete are required. Use SANS 2001-CC1 when special finishes are required.

Specification data:

€ horizontal surfaces that need to be non-skid: see drawings

2.3 Foundations (SANS 2001-CM2)

SANS 2001-CM2 covers construction requirements for strip footings, pad footings and slab-on-the-ground foundations to receive masonry walling, and the construction of lightly loaded concrete surface beds.

Specification data:

€ site class designation: see drawings

R / H / C / S / P / H1 / C1 / S1 / H2 / C2 / S2 / H3

R rock; H heaving (expansive) soils; C collapsible soils; S compressible sand; P fill, dolomite, marshy areas, mine waste, very soft clays. Site class designations R, H, C,S indicate that the expected range of total soil movements arising from ground movements is such that no special precautionary measures are required to minimize the effects of differential ground movements on buildings. Number denotes higher range of movement. Behaviour of P is variable and the reason for such classification should be given in brackets, e.g. P (fill).

€ foundations: in accordance with the requirements of SANS 10400-H for strip footings, slab-on-the-ground foundations or modified normal construction for category of expected damage 1 or 2 / rational design by competent person

See SANS 10400-H for geotechnical and/or structural solutions for foundations on problem soils.

€ construction of steps in foundations in excess of 400 mm: see drawings

€ minimum founding depth: see drawings

Required where the geotechnical report indicates a deeper requirement than that provided for in SANS 10400-H.

additional requirements

€ protection against termites: SANS 10124.

2.4 Concrete floors and paving on the ground

€ industrial floors: direct-finished one course slab as designed and constructed to SANS 10109 under direction of a competent person

Direct-finished one-course concrete floors on the ground are superior to concrete bases with screed or topping, and should be used if floor is to be left as is, or if to be covered with resilient floor finishes like thermoplastic tiles or carpet.

concrete

€ concrete grade: see drawings

20 / 30

Show grades on drawings.

Default: (grade 20 for base courses of lightly loaded floors [no trucking] and one-course domestic and office floors on the ground that will serve as the final wearing surface, or grade 30 for paving and floors on the ground to carry fork-lift trucks) is acceptable.

damp-proof under-surface membrane

€ DPM under floor area: required / not required

Dpm normally not required under external floors.

fabric reinforcement

€ fabric reinforcement ref. no. 100 / … / not required

€ floor/paving thickness: see drawings

Floor thickness ranges between 120 and 360 mm, depending on loading, use

placing

€ levels and gradients: see drawings

joints

€ joint sealing: left open / sealed

Joints should be sealed when the floor is used under wet conditions, or where hygiene or dust has to be controlled.

2.5 Strongrooms

€ fire rating, burglar resistance and wall thickness class: see drawings

1 / 2 / 3 / 4

Class: 1 (4h, no burglar resistance, 200 mm wall, 125 mm floor/ceiling); 2 (4h, limited burglar resistance, 300 mm); 3 (4h, medium burglar resistance, 450 mm); 4 (4h, high burglar resistance, 525 mm)

NOTE ON STAIRWAYS

The rule in SANS 10400 – M of a minimum going of 250 mm and a maximum rise of 200 mm often leads to a disregard for two other rules, i.e, "*the dimension of each step of the stairway shall be such that the sum of the going and twice the riser is not less than 570 mm and not more than 650 mm*", and "*any stairway … shall have dimensions appropriate to its use*" (NBR part M Stairways). A maximum rise of 180 and a minimum going of 280 is a more comfortable and safer proportion, and should be used in most public buildings.

The full range of a more comfortable and safer proportion would be (rise/going):

180/280 mm; 170/280 – 320 mm; 150/280 – 350 mm; 120/280

3 Masonry

3.1 Masonry Walling (SANS 2001-CM1)

SANS 2001-CM1 Masonry Walling covers requirements for masonry walls, materials, the laying of masonry units in unreinforced and reinforced applications, the building in of door and window frames, holes and chases, the securing of timber roof structures and the fixing of slips.

Specification data:

masonry units

Bricks and blocks are collectively termed *masonry units,* whether solid or hollow. A block has dimensions which satisfy any one of the following conditions: a length of 300–650 mm, width of 130–300 mm, or height of 120–300 mm.

€ type: burnt clay / concrete

€ masonry units: SANS 2001-CM1 clause 4.1.1.3

Omit if masonry units to SANS 227 and SANS 1215 are specified.

SANS 2001 CM1 clause 4.1.1.1 states "Masonry units shall comply with the requirements of either 4.1.1.2 (SANS *227 and* SANS *1215*) or 4.1.1.3". Clause 4.1.1.3 is a generic description, which may be more practical in areas where bricks to SANS 227 are unobtainable. Specify to clause 4.1.1.3 only with permission.

burnt clay masonry units (SANS 227*[2])

Omit if requirements of SANS 2001-CM1 clause 4.1.1.3 are acceptable.

€ nature of face unit: hollow / solid / contractor's choice

€ class of face units: FBS / FBX / FBA

Class E bricks are any class of masonry unit produced for structural or load-bearing purposes in face or non-face work, and is supplied to an agreed compressive strength e.g. FBSE2, where the number equals the nominal compressive strength in megapascals.

€ nominal dimensions: 222 x 103 x 76 mm

See SANS 227 for modular sizes, e.g. 190 x 90 x 90 mm.

€ colour of face units: …

concrete masonry units (SANS 1215*)

Omit if requirements of SANS 2001-CM1 clause 4.1.1.3 are acceptable.

€ nature of unit: hollow / solid

€ colour of face units: …

€ nominal dimensions: 190 x 90 x 90 / 290 x 90 x 90 / 390 x 90 x 190 / 390 x 190 x 190 mm

mortar

€ sand: SANS 1090*

Omit if default (clause 4.1.4.1) is acceptable.

Clause 4.1.4.1 states that "Sand shall either comply with all of the following requirements or, if required in terms of the *specification data*, the requirements of SANS 1090 for mortar sand (natural or manufactured)"

€ mortar class: II

[2] Asterisk (*) denotes the preferred attribute or value.

Class I mortar is *suitable* for highly stressed masonry, e.g. multi-storey loadbearing buildings; class II is *suitable* for normal loadbearing applications, including parapets, balustrades, retaining structures, freestanding and garden walls, and walls exposed to severe dampness; class III mortar (not mentioned in SANS 2001-CM1) is *suitable* for lightly stressed bearing walls where exposure to dampness is not severe, or for renovation to unburnt clay masonry walling.

€ pigments for mortar: … ; colour: ... ; other requirement(s) : …

reinforcement

€ prestressing steel (hot-rolled bars or high tensile steel wire and strand) : …

Provide particulars or omit if not required.

NOTE on metal wall ties: SANS 204 requires masonry walls enveloping habitable portions of the building fabric in all climatic zones to be cavity or insulated cavity walls. Note that existing wire tie types may not be able to be centred centrally and conform to the minimum embedment rule of 50 mm. Note that crimp wire ties are not for use on cavity walls.

work

€ face work jointing: struck* / flush / recessed / drip

Struck (half-round) joints are denser with better resistance to water penetration. Flush joints require careful cleaning of face work. Face work includes fair face work.

€ face work pointing shape, colour: …

Pointing is the raking out of brickwork joints 20 mm deep, then filling with mortar, usually coloured. Joint faces can be left flush, projecting, or shaped in the same way as jointing.

€ multi-leaf wall bond: stretcher and brickforce / English bond (header course every second course) / collar-jointed bond

SANS 2001-CM1 specifies collar-jointed walls as default. Collar-jointed walls have a narrow cavity (<25 mm) between the leaves (the collar joint) which is filled solid with mortar or grout as the work progresses (not to be confused with *grouted cavity* construction where the cavity is wider and filled with concrete). Collar-jointing is intended for walls that require an effective thickness equal to the actual overall thickness of the wall. The success of this construction depends heavily on proper supervision. Collar-jointing is not mentioned in SANS 10249 Masonry Walling.

€ position of control and articulation joints: see drawings

additional requirements

€ wall type: see drawings

single leaf / multileaf / cavity / insulated cavity / grouted cavity / sealed multileaf

Sealed multileaf walls (outside face of inner leaf treated with a bitumen sealer) may be used in place of cavity walls in areas of prolonged, heavy, wind-driven rains, or where wall is faced with masonry-type facings (see *Masonry-type facings*)

€ special shape face bricks: see drawings

single bullnose / double bullnose / single cant / double cant

€ lintels in face work: see drawings

bed joint reinforced masonry / prestressed concrete lintels / galvanized steel / wood

For timber lintels see Section 4.

€ cavity reveals around windows/doors: open / closed / see drawings

In energy rated buildings, at cavity reveals around openings, cavity insulation should continue up to window or door frames to prevent thermal bridging, therefore "open".

A bituminous damp-proofing type may be required where bituminous waterproofing is to be bonded to damp-proofing – see Section 8.

3.2 Glass blockwork

glass blocks

€ nominal dimensions: ...
€ surface pattern: ...
€ opacity: ...
€ colour: ...

3.3 Stone masonry

Loadbearing stone masonry. For stone cladding see *Masonry-type facings.*

€ type: rubble / dimension stone

3.3.1 Rubble

Rubble (koppieklip) is stone with irregular faces as found in nature on or near surface.

€ bedding of stones: set in mortar / dry set, with smaller stones to achieve stability.

3.3.2 Dimension stone

€ stone type: freestone / granite / marble / slate / cast stone

Freestone (makklip) is building stone soft enough to be cut with tools and uniform enough to be carved in any direction, typically sandstone.

€ face dressing: plain / polished / rusticated / vermiculated / boasted / drafted margin
€ shape and size: square sawn in modular rectangular sizes / ...
€ bond to homogenuous pattern: random coursed / regular coursed
€ jointing: flush / keyed
€ pointing colour: ...

3.4 Masonry-type facings

SANS 10073 The Safe Application of Masonry-type Facings to Buildings was withdrawn in May 2011 and "replaced" by SANS 10400-K Walls which does not yet touch on this important subject.

Thin panel cladding, e.g. marble, should be rail-fixed, leaving a cavity between facing and backing. The advantages of this system are avoidance of staining of the stone face, more reliable support, faster erection, smaller joints and less dependency on skilled labour. Consult specialist stonework contractors.

Facings wholly dependent on fixing to the backing with proprietary adhesive only may lead to failure.

€ facing type: precast concrete / natural stone / burnt clay units / concrete units of design, size, colour and finish: ...

Joints should be sealed to prevent ingress of water and to provide for thermal and structural movement.

Relevant standards

SANS 993Modular co-ordination

SANS 10021 The waterproofing of buildings (in the case of facings this depends on climatic region, facing material and backing).

SANS 10073 The safe application of masonry-type facings to buildings (withdrawn).

SANS 10145 Concrete masonry construction.

SANS 10164 The structural use of masonry.

SANS 10249 Masonry walling.

SANS 10400-H Foundations.

SANS 10400-K Walls.

SANS 10400-M Stairways.

SANS 10400-P Drainage.

4 Structural timberwork

4.1 Structural timberwork (flooring) (SANS 2001-CT1)

SANS 2001-CT1 covers the installation of suspended timber floors in buildings to be constructed for occupancy class H3 (domestic residence) and H4 (dwelling house) buildings, as described in SANS 10400-J Floors, and that have a distance that does not exceed 7 m between supports, and a beam/joist spacing that does not exceed 600 mm. Modify to make this part of SANS 2001 applicable for the installation of suspended timber floors designed for other occupancies or for greater dimensions between beams or supports.

For wood floors on solid substrates see Section 13.

Specification data:

softwood timber joists

- € type: solid / laminated
- € cross section: see drawings

Omit if default description (to SANS 10400-J) is acceptable.

hangers, masonry anchors

- € size/strength: …

Omit if default description in SANS 2001-CT1 (hangers: 4,0 kN; masonry anchors: 10 dia x 45 mm length, 2,5 kN) is acceptable.

softwood flooring boards

Omit this part if default description in SANS 2001-CT1 is acceptable. NOTE SANS 629 withdrawn 2012 without replacement. Most req'd data kept except marking.

- € softwood flooring boards:
  - € genus: Pinus / Cedrus / Podocarpus / Cupressus
  - € nature: solid / laminated
  - € grade: clear flooring / select flooring / flooring
  - € density group: light / heavy

Density group: light (400-550 kg/m^3); heavy (550 kg/m^3, for example squash court floor boards)

  - € cross section: see drawings

Omit if default (50 – 140 x ≥22 mm) is acceptable. Also 33 mm thickness.

  - € length: >1 800 mm when square sawn at ends, >600 mm when matched
  - € finger joints: not prominent

Omit if default (prominent) is acceptable.

hardwood strip flooring

NOTE SANS 281 Hardwood block and strip flooring withdrawn 2009 without replacement.

- € species: …
- € dimensions: ≥460 x 57 – 90 x ≥20 mm

additional requirements

- € hardwood species: …
- € hardwood prefinish: required / not required
- € exposed faces of sawn structural timber: planed, sandpapered, and arris rounded to 3 mm radius.

4.2 Structural timberwork (roofing) (SANS 2001-CT2)

SANS 2001-CT2 covers the construction of timber roof assemblies in buildings. It includes the manufacture of bolted trusses that are designed in accordance with the requirements of SANS 10400, the erection of prefabricated timber trusses, the erection of rafters and purlin rafters, the fixing of purlins and battens, and the fixing of brandering to roofing members to support ceilings that comprise gypsum plasterboard, fibre-cement board or similar boards

Specification data:

softwood roofing timber

€ type: solid / laminated

€ cross section, grade: see drawings / to SANS 10400-L Roofs / to standard …

roofing poles ("fence poles" SANS 457)

"fence" poles are normally used for roofs. See also "transmission" poles below

€ roofing pole type: softwood SANS 457-2 / hardwood SANS 457-3 / to standard …

€ top diameter (thin end, colour-coded) : see drawings

50-79 (red), 80-99 (yellow), 100-119 (blue), 120-139 (white), 140-159 (orange), 160-179 (green), 180-199 (black) mm; ditto posts: 145-174, 175-199, 200-230 mm.

hangers, clips, masonry anchors

€ size/strength: …

Omit if default requirements (hangers: 4,0 kN; hurricane clips: 1,2 kN; masonry anchors: 10 dia x 45 mm length, 2,5 kN) are suitable.

additional clauses

€ truss type: monoplanar prefabricated rational design to SANS 10243 or SANS 1900 / lapped and bolted within scope of SANS 10400-L/10243

In case of lapped and bolted trusses, show all member sizes and connection details on drawings. SANS 10243 provides guidance on the manufacture, erection and bracing of timber roof trusses. SANS 1900 covers a rational design prepared by a *Competent Person* and inspected by such a person during installation.

€ "transmission" poles, diameter: softwood poles SANS 753 / hardwood poles SANS 754

Omit if "fence" poles to SANS 457 as required by SANS 2001-CT2 are acceptable. "Transmission" poles to SANS 753/754 should only be used when high strength is specifically required. See SANS 753 for lengths, minimum top diameter of poles.

€ gang planks: two 150 x 38 mm softwood grade S5, nailed onto tie beams where shown on drawings / nailed onto tie beams of two adjoining trusses on both sides of geysers

Gang planks for walking/crawling in roof space, when required.

€ timber lintels type and size: see drawings

softwood / hardwood / structural laminated timber / composite structural plywood web and solid timber flanges; grade: 5 / 7 / 10

4.3 Structural laminated timber (SANS 1460)

€ material: see drawings

softwood (Pinus) / hardwood (Eucalyptus) / board (fibreboard, plywood, composite board)

€ exposure class: 1 (exterior), 2 (semi-exterior), 3 (humid interior), 4 (dry interior)

€ type: G (stocklam) / C (customlam)

€ appearance and finish: rough-sawn (R), fine-sawn (F), planed (P), sanded (S), smoothed (G), coated (C), special (X)

€ stress grade: 5 / 7 / 10 / 14

€ fire retardant treatment: required / not required

€ cross section: see drawings.

Relevant standards:
SANS 1288 Preservative treated timber.
SANS 1900: Monoplanar prefabricated timber roof trusses (nail-plated).
SANS 10005: Preservative treatment of timber.
SANS 10043:The laying of wood floors.
SANS 10082: Timber buildings.
SANS 10096: Manufacturing of finger-jointed structural timber.
SANS 10163 The structural use of timber.
SANS 10243 The design, manufacture and erection of timber trusses.
SANS 10400-J Floors.
SANS 10400-L Roofs.
SANS 10400-M Stairways.
SANS 10400-T Fire Protection.

5 Structural steelwork

5.1 Structural steelwork (SANS 2001-CS1)

SANS 2001-CS1 covers structural steelwork for buildings and other structures, excluding bridges, offshore structures, mobile equipment (stackers, reclaimers, draglines, cranes, etc.), mine shaft steelwork (buntons and guides) and mining conveyances, but does not cover roof and side cladding, or the detailed aspects of sundry items such as handrails, ladders, steel flooring and the like, neither does it cover protection of steelwork against corrosion or fire.

Specification data:

- € class and grade of fasteners: ...
- € format of drawings: ...

State in which format and to which standards each category of drawings shall be prepared.

- € hole sizes for holding-down bolts in excess of 36 mm diameter: ...
- € connections to allow movement: ...
- € requirements for machining: ...
- € requirements for non-destructive tests on welds: ...

5.2 Sundry steelwork

5.2.1 Material

cold-formed structural steel (SANS 10162)

- € commercial quality steel: permitted if yield stress equals 200 MPa, tensile strength 365MPa; obtain proof.

Cold-formed profiles are often made from commercial quality steel of which the yield stress is seldom less than 210 MPa.

structural steel tubes SANS 657-1

- € coating: uncoated / hot dip galvanized coating SANS 32 quality B
- € size/profile: see drawings

Size/profile: 21, 27, 32, 34, 38, 42, 48, 51, 60, 76, 89, 102, 114, 127, 140, 152, 165, 178, 219 mm ø (general purpose); 20 x 20, 25 x 25, 30 x 30, 40 x 40, 50 x 50, 60 x 60, 70 x 70, 80 x 80, 90 x 90, 100 x 100, 115 x 115, 120 x 120, 135 x 135, 140 x 140, 150 x 150, 160 x 160, 175 x 175, 180 x 180 mm (square); 40 x 20, 50 x 30, 60 x 40, 80 x 40, 90 x 50, 100 x 50, 100 x 60, 120 x 60, 120 x 80, 140 x 90, 150 x 100, 160 x 80, 180 x 100, 200 x 100, 200 x 120, 220 x 140, 250 x 150 mm (rectangular)

corrosion resistant (weathering) steel

Corrosion resistant steel also known as COR-TEN, a registered trademark of USX Corporation. Corrosion resistant steel is weldable. Available in sheet (<2,0 mm) and strip (2,5 – 6,0 mm). Consult Mittal Steel.

- € grade: 1 / A

steel wire rope (cables)

- € class: 6 x 7 / 6 x 24 / 6 x 37 / 8 x 19 mm
- € diameter: 6 / 7 / 8 / 9 / 10 mm.

5.3 Coating

- € type: hot dip galvanising / prepainting / hot dip galvanising and prepainting (duplex system)

Other coating types on steel are vitreous enamel, plastic or protective tape.

SANS 121 provides for one set of coating thickness only – see NOTES at end of Section. Thicker (25%) coatings may be requested without affecting specification conformity. The primary influencer on hot dip galvanized coating is the steel composition. See SANS 14713 for design guidelines.

hot dip galvanising

The Hot Dip Galvanizers Association South Africa (HDGASA) is the industry representative body.

€ significant (architectural) surfaces: see drawings

NOTE on appearance of galvanized coatings

SANS 121:

"The primary purpose of the galvanized coating is to protect the underlying iron or steelwork against corrosion. Considerations related to aesthetics or decorative features should be secondary. Where these secondary features are also of importance it is highly recommended that the galvanizer and customer agree the standard of finish that is achievable on the work [in total or in part], given the range of materials used to form the article. This is of particular importance where the required standard of finish is beyond that set out in this section. It should be noted that 'roughness' and 'smoothness' are relative terms and the roughness of coatings on articles galvanized after fabrication differs from mechanically wiped products, such as galvanized sheet, tube and wire. It is not possible to establish a definition of appearance and finish covering all requirements in practice.

The occurrence of darker or lighter area (e.g. cellular pattern or dark grey areas) or some surface unevenness shall not be cause for rejection: also wet storage stain (white or dark corrosion product – primarily basic zinc oxide – formed during storage in humid conditions after hot dip galvanising) shall not be cause for rejection, providing the coating thickness remains above the specified minimum value."

€ sample: required / not required

€ special pre-treatments: …

€ special coating thickness: …

€ any after treatments: …

€ method of site repair and maximum allowable size of repair: …

Omit if default (repair by either zinc metal thermal spraying, zinc rich epoxy or a *suitable* zinc rich paint, provided that the repaired surface receive an additional 30 µm over and above that required in terms of the specification; HDGASA recommends a practical repair area of ± a R5 coin) is acceptable.

€ architectural work to be packaged: required / not required

paint or varnish

SANS 12944 covers the following suitable surfaces for painting: uncoated steel; thermally sprayed with zinc, aluminium or their alloys; hot dip galvanized; zinc-electroplated; sherardized; prefabrication primed; other painted surfaces. Part 2 deals with the principal environments and the corrosivity of these environments to which steel structures are exposed: atmospheric corrosivity category: C1 very low / C2 low / C3 medium / C4 high / C5-I very high (industrial) / C5-M (marine); immersed category for water and soil: Im1 (fresh water) / Im2 (sea or brackish water) / Im3 (soil). Part 5 deals with paint systems.

€ paint system: alkyd / chlorinated rubber / PVC / acrylic / epoxy / ethyl silicate / polyurethane / bitumen

Protective paint systems not covered: powder coating; stoving enamel; heat-cured paints; linings of tanks; products for the chemical treatment of surfaces.

5.4 Fire protection

The yield strength of steel is halved at temperatures exceeding 550°C. Consider placing columns outside building.

€ protection of structural steel against fire: see drawings

reinforced concrete grade 25 / solid masonry / sprayed vermiculite-cement/perlite-cement / metal lath and plaster

Relevant standards:

SANS 1921 Construction and management requirements for works contracts.

SANS 10094 The use of high-strength friction-grip bolts.

SANS 10162 The structural use of steel.

SANS 14713 Protection against corrosion of iron and steel in structures – zinc and aluminium coatings – guidelines.

HDGASA code of practice no 1-1990 The Surface Preparation and Application of Organic Coatings to New, Unweathered Hot Dip Galvanized Steel (Sheet and Section) Excluding In-line Coil Coatings.

HDGASA code of practice no 2-1990 Specification for the Performance Requirements of Coating Systems Applied to New Unweathered Hot Dip Galvanized Steel (Sheet and Section) excluding In-line Coil Coating (Duplex Systems).

NOTES on hot dip zinc coating thickness and service life:

Consult the Hot Dip Galvanizer's Association of South Africa (HDGASA) for determination of high corrosivity areas.

All hot dip galvanising specifications state the minimum *suitable* coating thickness and not average coating thickness. The thickness actually achieved varies with steel composition and thickness of steel, and can range from the minimum up to >50% greater. As life expectancy predictions are normally based on the minimum coating thickness, they are usually conservative.

Hot dip galvanized coating on structural steel should in most cases provide a service-free life of 40 – 50 years. This is determined by dividing the minimum achieved coating thickness taken on the thinnest steel component by the corrosion rate per year for the location in question (see table).

HDGASA uses *SANS ISO* 9223 to determine corrosivity categories, based on three factors:
1) Time of wetness, being the period that the zinc surface is covered by liquid containing the corrosive elements (electrolyte); 2) Airborne pollution containing sulphur dioxide (SO_2); 3) Airborne pollution containing salinity, usually in the form of chlorides carried on prevailing sea winds.

Estimated service life of hot dip galvanized steel complying with SANS 121				
Corrosivity Category ISO 9223	Zinc corrosion rate / yr	55 µm for steel 1.5 – 3mm thick	70 µm for steel 3 – 6 m m thick	85 µm for steel >6 mm thick
C 1 very low	<0.1 µm	>100 yrs	>100 yrs	>100 yrs
C 2 low	0.1 – 0.7	<78.5 yrs	>100 yrs	>100 yrs
C 3 medium	0.7 – 2.1	26 – 78.5 yrs	33 – 100 yrs	40 – >100 yrs
C 4 high	2.1 – 4.2	13 – 26 yrs	16 – 33 yrs	20 – 40 yrs
C 5 very high	4.2 – 8.4	6.5 – 13 yrs	8.3 – 16 yrs	10 – 20 yrs

Source: HDGASA Information sheet No 8.

Coating thickness in µm can be converted to approximate coating mass per unit area in g/m² by multiplying by the nominal density of the coating (7,2 g/cm³): thus 55 µm = 395 g/m²; 70 µm = 505 g/m²; 85 µm = 610 g/m²

Source: SANS 121 / SANS 14713.

Z275 is the designation for 275 g/m² zinc/surface area on both sides of steel sheet (for sheet that would mean 137.5 g/side) which equals a mean coating thickness of 19 µm. Similarly, Z450 equals 22 µm, and Z600 equals 43 µm).

6 Insulation, sealants, seals

6.1 Thermal insulation

6.1.1 Materials

Consider insulation materials with recycled content, e.g. polystyrene, glass fibre, cellulose and polyester fibre. Consult TIASA (Thermal Insulation Association of SA) or EPSASA (Expanded Polystyrene Ass. of SA).

€ type: bulk (rigid board, fibre matts or batts) / reflective (foil) / composite bulk / loose fill / pipe / spray foam

€ required R-value/thickness: SANS 204

Show all insulation thicknesses on drawings. Actual R-value test results may be obtained from the South African Fenestration and Insulation Energy Rating Association (SAFIERA).

€ required fire performance classification of thermally insulated building envelope systems: SANS 428

€ combustability: A / B

A (non combustible); B (combustible)

€ surface fire spread properties: 1 / 2 / 3 / 4 / 5 / 6

1 (no flame spread) / 2 – 6 (rapid flame spread)

€ application: vertical / horizontal / vertical and horizontal / see drawings

Consult SANS 10400-T for fire performance requirements.

rigid board

€ material: EPS / XPS / EPU

€ expanded polystyrene (EPS) grade: 16D-85 / 24D-170 / 32D-225

16D-85 (standard); 24D-170 (high); 32D-225 (extra high) (density kg/m³–compressive strength kPa)

EPS is combustible on its own but claimed to be fire-safe in a masonry cavity with closed reveals (see EPSASA leaflet *EPS Cavity Wall Insulation*). EPS will resist the passage of moisture. Panel width: 600 mm; thicknesses: 25, 30, 40, 50 (ex stock), 60, 70, 80 (to order)

€ face: plain / foil / …

€ edge: square / shiplap / tongue and groove

fibre mats/batts

€ form: mats (flexible) / batts (rigid)

€ face: plain / foil / …

Typical fibres are mineral (rock wool, glass wool), synthetic (polyester, polyethylene), and natural (wool). Fibre insulation is not recommended in partial fill masonry cavity construction – consult manufacturer.

reflective foil

€ reflective foil class: A / B / C / D

A (reinforced, both surfaces reflective), B (reinforced, one surface reflective), C (unreinforced, both surfaces reflective), D (unreinforced, one surface reflective). Foil may double as an effective vapour barrier. See additional notes on foil at end of this section.

The thermal resistance of reflective insulation varies with the direction of heat flow through it, i.e. vertical, horizontal or sloped, and the number and defined thicknes of air spaces it faces. It is important that bright surfaces facing air spaces remain untarnished on at least one surface.

The difference in direction of heat flow is generally marginal for bulk insulation but can be pronounced for reflective insulation. Reflective insulation is more effective at reducing summer heat gain than reducing winter heat loss.

Reflective foils are valuable when used in combination with bulk insulation for improved performance.

Composite bulk and reflective materials are available that combine some features of both types. Examples include foil bonded to bulk insulation, whether blankets, batts or boards, i.e. foil faced blankets, foil faced batts and foil faced boards.

metal faced insulation panels

For use in buildings, cold rooms and hot rooms, interior and exterior.

€ corrosion comparison index of panel-facing coating: 1 / 2 / 3 / 4

€ core insulation: calcium silicate / mineral fibre / polyisocyanurate / polyphen / polystyrene / polyurethane / rockwool

€ facing: chromadek / galvanized steel / PVC laminated galvanized steel / stainless steel / zincalume

Metal faced insulation panels are typically used in cold storage systems. Consult TPMA (Thermal Panel Manufacturer's Association).

loose fill

€ loose fill: pellets or granules / cellulose.

6.1.2 Installation

€ system: SANS 204 / rational design

masonry cavity wall insulation

€ type: full fill cavity / partial fill cavity / loose fill / see drawings

Insulation can be installed full fill in cavities in most areas where cavity walls are not required to prevent moisture migration, or where walls are plastered and painted or protected by roof overhangs of >750 mm.

Insulation should be installed partial fill in cavities where the cavity also serves as a moisture barrier against wind-driven rain, mostly in winter rainfall areas, but also in cases of exposed face brick walls in general (e.g. gable walls, walls without roof overhangs, high buildings).

In exposed walls, filling cavities with loose fill insulation may result in insulation becoming wet, losing its insulation value and causing dampness on the inner leaf.

Filling of concrete block cores with any type of insulation offers little energy savings since the majority of heat is conducted through the webs and mortar joints.

masonry wall external face insulation

€ masonry wall external face insulation: …

Omit if default (patent system of EPS external insulation bonded and mechanically fixed to dry, sound and flat surface, finished with reinforced polymeric plaster) is acceptable, or specify alternative.

Installing insulation against internal face of envelope wall would result in losing capacitive insulation of internal leaf (thermal mass).

pitched roof/ceiling insulation

€ system: reflective foil under roof covering / bulk insulation on ceiling / foil + bulk / see drawings

flat roof insulation

€ material: rigid EPS insulation density 32D

€ flat roof insulation position: over waterproofing / under screed

Insulation on flat trafficable concrete roofs should be firm enough to support the waterproofing system and foreseeable loadings, i.e.under screed. See Section 8 for further particulars.

floor insulation

€ under floor slab insulation: required / not required

In case of in-slab heating as required by SANS 204.

6.2 Vapour barriers

€ type: ...

€ position: see drawings

Clay brick and concrete block masonry is able to accommodate moisture migration (damp open), normally rendering a vapour barrier unnecessary. SANS 204 advises that designers should consider that interstitial condensation occurs in walling systems which are not able to prevent or accommodate moisture migration. Also, that artificial cooling of buildings in some climates can cause condensation to form inside the layers of the building envelope. Such condensation can cause significant structural or cosmetic damage to the envelope before it is detected. Associated mould growth may also create health risks to the occupants. Effective control of condensation is a complex issue. In some locations a fully sealed vapour barrier may need to be installed on the more humid, or generally warmer, side of the insulation.

6.3 Sound absorption

materials

€ structure-borne sound insulation: mineral fibre mats SANS 1381 / cork

€ airborne sound absorption: mineral fibre mats SANS 1381 + perforated 10 mm plywood / plasterboard / hardboard / metal / see drawings.

6.4 Joint fillers/sealants

€ joint filler/sealant colour: ...

Industrial sealants compatible with bitumen may not be available in SA.

Two-part sealants are generally more effective and costly than one-part sealants.

See also SANS 2001-CC1 for specification of waterstops.

6.5 Architectural seals

€ type: patent extruded aluminium carriers with flexible seal inserts of synthetic rubber, rigid PVC, nylon brush filaments, polypropylene pile, or silicone rubber / patent PVC, pile or neoprene door and window frame seals / patent silicone intumescent seals (fire and smoke) / patent external extruded aluminium threshold plate seals

Architectural seals need careful study by the designer – consult supplier.

€ aluminium extrusion finish: mill / anodised / painted

€ intended use of seal: energy (draughts, dust, insects) / intumescent (fire and smoke) / acoustic (noise) / finger-pinch protection (schools, day-care centres) / threshold plate / access (mobility, disabled persons)

Intumescent seals are designed to expand when subjected to heat.

€ duty level: light / medium / heavy

Duty level: light (domestic); medium (commercial); heavy (hospitals, airports, shopping malls).

€ mounting: fully morticed / semi morticed / surface mounted / grooved.

NOTE: Additional notes on reflective foil thermal insulation:

The difference in direction of heat flow is generally marginal for bulk insulation but can be pronounced for reflective insulation. Reflective insulation is more effective at reducing summer heat gain than reducing winter heat loss.

The thermal resistance of reflective insulation varies with the direction of heat flow through it, i.e. vertical, horizontal or sloped, the number of air spaces and defined thicknesses of the air spaces. Furthermore, that the bright surfaces facing the air space/spaces remains untarnished on at least one surface.

Reflective foils are valuable when used in combination with bulk insulation for improved performance.

Composite bulk and reflective materials are available that combine some features of both types. Examples include foil bonded to bulk insulation, whether blankets, batts or boards, i.e. foil faced blankets, foil faced batts and foil faced boards.

7 Plaster, screeds, toppings, terrazzo

11.1 Plaster

€ type: see drawings

cement plaster / gypsum plaster / lime plaster / insulating plaster / barite plaster / waterproof plaster.

11.1.1 Cement plaster (SANS 2001 EM1)

SANS 2001- Construction Works Part EM1: Cement Plaster Admixtures are not permitted in cement plasters to improve workability or improve the properties of the finished plaster.

Specification data:

€ application: single coat / multicoat

€ finish to cement plaster: smooth / textured / roughcast / bagged / skimmed

Show in drawings: V-joints through full plaster thickness at dpc level and where different materials meet; metal lath strips over roof anchors on single leaf masonry walls, or across joints between different materials – see SANS 2001-EM1.

11.1.2 Gypsum plaster

Do not mix gypsum-based plaster with plaster made with common cement – the sulphate compound in gypsum attacks common cement paste.

11.1.4 Insulating plaster

€ low density aggregate density range: 60 – 160 / 120 – 240 / 450 – 720 kg/m³

60 – 160 (exfoliated vermiculite); 120 – 240 (perlite); 450 – 720 (foamed slag).
Omit if default (800 – 960 kg/m³ (clinker) covered in SANS 2001-EM1) is acceptable.

Barite plaster for use in X-ray rooms. Thickness for general diagnostic X-ray work normally between 15 and 30 mm. Check mix and thickness with requirements.

11.1.6 Accessories

€ expanded metal, type: sheet/plate / angle bead / base bead / corner mesh / plaster lath / plaster stop / rib lath / strip mesh

€ angle rounded corner protection: 1 500 x 1,0 x 35 mm girth strip, position: see drawings.

11.2 Screeds, toppings, terrazzo

To be published: SANS 2001-EM2 Screeds and toppings.

Screed is a layer of a well-compacted mixture of cement and fine aggregate applied to a concrete base, *suitable* for receiving a floor finish.

Topping is a layer of high-strength concrete designed to provide a dense, abrasion-resistant surface on a concrete base.

Terrazzo is a hard-wearing decorative concrete finish in which crushed or uncrushed aggregate like marble and pigments is used, and of which the surface is generally ground and polished.

Specify screed or topping only where a direct-finished one-course concrete floor is impracticable.

11.2.1 Materials

proprietary surface treatments

Treatments to harden or seal the surface of toppings are not normally required, provided a sufficiently high grade of properly finished concrete is used. They may however be useful in dust sensitive areas or where oil spills or mildly acidic solutions may occur. Expert advice should be sought from the manufacturer/supplier.

€ form: dry shake / coating / screed

€ to improve: abrasion resistance / chemical impact resistance / slip resistance / density / UV resistance

€ colour/finish: …

mesh reinforcement

€ mesh reinforcement: …

Mesh reinforcement may be required to restrain differential shrinkage stresses and control cracking on precast concrete elements – not normally required.

water

€ water: SANS 51008

Omit if default (drinking water) is acceptable.

11.2.2 Mix

topping

€ concrete grade: see drawings

20 / 30 / 40 / 50

Topping: 1 part cement to 1½ parts sand to 1½ parts stone would produce a concrete strength of 25 – 30 MPa. Use concrete of at least grade 20 where abrasion resistance is not a consideration; grade 30 for floors for light duty industrial and commercial purposes; 40 for ditto medium duty; 50 for heavy duty industrial, workshops, special commercial; very heavy duty engineering workshops would require a proprietary topping. Consult The Concrete Institute for advice.

11.2.4 Laying

Method of laying as described here is known as "separate bonded construction", where the topping or screed is laid on and bonded to a hardened base. For other methods, for example monolithic construction, and separate unbonded construction, consult SANS 10109 part 2.

Compaction of the mix is most important. Stiff semi-dry mixes not well compacted are a common cause of bond failure. Compact stiff mixes with power-operated equipment such as vibrating screed boards.

Joints in screeds should be minimal. Screeds laid in large areas may crack, but this is more acceptable than curling at edges of small panels.

€ screed thickness: see drawings

25 – 50 mm

€ topping thickness: see drawings

25 – 40 mm

€ edge/feature/dividing strips: see drawings.

11.2.5 Finishing

€ type of finish: ordinary / hard / colour pigmented / dry shake / surface ground and polished

Ordinary finish is *suitable* for surfaces that are to be covered by flooring. Hard finish is *suitable* for surfaces that are not to be covered with flooring and for toppings that require high resistance to wear (grade 30 and higher).

Hardwearing surfaces like toppings and terrazzo may be ground and polished – not recommended for sand:cement screeds. Grinding tends to create lower slip resistance. Grinding will affect appearance and will remove surface treatments such as dry shakes.

€ surface smoothness: smooth / non-slip

pigmentation

€ type: integral (mix with dry cement) / add to freshly laid surface as a dry shake / not required.

11.2.6 Joints

€ type: isolation joint / intermediate sawn contraction joint / patent movement joint

€ pattern: see drawings

€ seal joints: required / not required

€ patent movement joint system with flexible inserts: aluminium / stainless steel / PVC

Material depends on nature and intensity of traffic. Joints should be sealed when floor is subjected to liquids, hygiene.

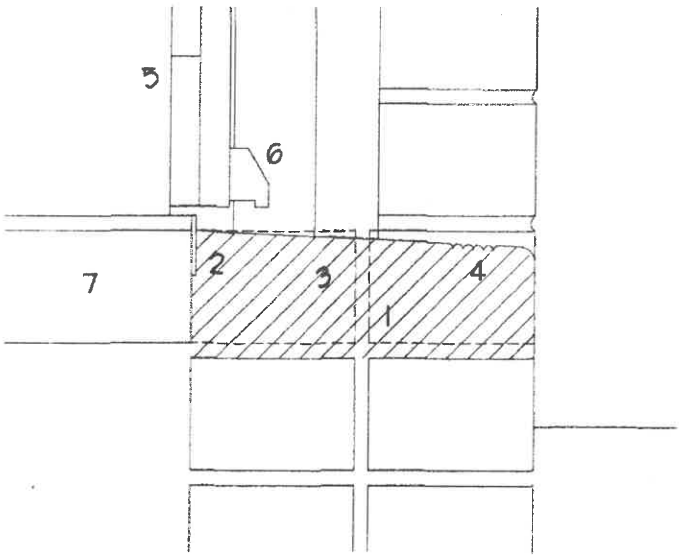
11.2.7 Surface regularity

€ degree of surface regularity: I (3 mm) / III (10 mm over 3 m in any direction)

Omit if default (II) is acceptable. Check with SANS 10155. In small rooms deviation should be less.

11.2.8 External thresholds

Placing the door in line with the inside wall face allows the join
under the door and adds a measure of rain protection to the d



1 break out bricks

2 metal edge strip

3 in situ or precast concrete threshold with slight fall

4 reeding

5 external door

6 weather bar

7 concrete surface bed

11.2.13 Surface sealing

€ seal floor surface with: one coat non-slip wax polish / epoxy / not required.

Relevant standards:
SANS 10109 Part 2 Finishes to Concrete Floors.
Concrete Basics for Building. 2004. Cement and Concrete Institute.

8 Drainage, sewerage, water and gas supply, fire equipment, sanitary plumbing

See SANS 10400-P for length formula, positioning, soil type, etc.

18.5 Water supply

18.5.1 Earthworks (SANS 2001-DP1)

SANS 2001-DP1 covers earthworks for trenches for all types and sizes of buried pipelines, ducts, cables and prefabricated culverts, including excavation, preparation of trench bottoms, bedding, backfilling and reinstatement of surfaces.

Specification data:

€ pipes that are to be encased in concrete: see drawings.

18.5.2 Below ground medium pressure pipelines (SANS 2001-DP2)

SANS 2001-DP2 covers the supply and installation of pipelines of diameter greater than 160 mm and up to 1 000 mm, complete with ancillary works (valves, strainers, hydrants, manholes, surface boxes, chambers) for transporting water and sewage under working pressures up to 2,5 MPa.

Erf or connections to buildings from mains are covered in SANS 2001-DP6.

Specification data:

€ type of pipe: steel / ductile iron / concrete / fibre-cement / GRP / PE / PP / contractor's choice)

glass-reinforced plastics (GRP); polyethylene (PE); polypropylene (PP)

€ nominal pipe sizes: see *drawings.*

225 / 300 / 375 / 450 / 525, 600 / 675 / 750 / 825 / 900 mm

18.5.3 Below ground water installation for buildings (SANS 2001-DP6)

SANS 2001-DP6 covers the construction of water pipelines having a nominal diameter of up to 160 mm from a water reticulation main to the boundaries of individual erven or other specified points on erven. It covers the installation of pipework and associated specials which provide water, meters and fire hydrants

SANS 2001-DP6 is suitable for construction of fire installations designed in accordance with the design rules provided in SANS 10400 W, Fire installations.

Specification data:

€ type of pipe and associated fittings: galvanised mild steel / fibre cement / GRP / PE / PP / PVC / PVC-U / PVC-M / PVC-O / copper / contractor's choice

Glass-fibre reinforced plastics (GRP) / polyethylene (PE) / polypropylene (PP) / polyvinyl chloride (PVC) / unplasticised polyvinyl chloride (PVC-U) / modified polyvinyl chloride (PVC-M) / oriented polyvinyl chloride (PVC-O).

€ nominal pipe size: see drawings

40 / 50 / 75 / 110 / 160 mm

€ meter type and size: …

18.5.4 Above ground water installation

€ pipe material: galvanised mild steel / PP / copper / contractor's choice

€ nominal pipe size: see drawings

8 / 10 / 12 / 15 / 18 / 22 / 28 / 35 / 42 / 54 / 67 / 76 / 108 mm (copper, check other pipe types)

€ fixing of pipes <20 mm: chased / surface fixed

Surface mounting may be a requirement from a maintenance point of view.

Chasing is prohibited in wall faces that are to receive roof flashing. Roof flashing is inserted in grooves sawn by a separate trade with disc cutters after pipes are installed, leading to unnecessary and costly pipe repair work when pipes are damaged.

18.5.5 Water storage tanks

- € tank material: tumbled polymer / pressed steel sections bolted and sealed together / corrugated steel
- € capacity or size: see drawings / ...L
- € stand for external tanks: ...

9 Electrical works

19.1 Earthworks (SANS 2001-DP1)

SANS 2001-DP1 covers earthworks for trenches for all types and sizes of buried pipelines, ducts, cables and prefabricated culverts, including excavation, preparation of trench bottoms, bedding, backfilling and reinstatement of surfaces.

Specification data:

€ areas where pipes are to be encased in concrete: see drawings

19.2 Cable ducts (underground) (SANS 2001-DP3)

SANS 2001-DP3 covers the supply, and the laying and bedding in trenches, of pipes of diameter not exceeding 160 mm as ducts for the protection of telephone and electric power cables.

Specification data:

€ type of pipe, associated fittings: pitch impregnated fibre / PVC-U / fibre cement / vitrified clay

Unplasticised polyvinyl chloride (PVC-U).

€ draw pits: see drawings.

19.3 Materials and installation

19.3.1 Wiring

conduits

Chasing is prohibited in wall faces that are to receive roof flashing. Roof flashing is inserted in grooves sawn with disc cutters after conduits are installed, leading to unnecessary and costly repair work.

conductors

See SANS 10198 The selection, handling and installation of electric power cables of rating not exceeding 33 kV.

distribution board, meter cabinets

€ position of DB's and meter cabinets: see drawings.

19.3.2 Fittings

luminaires

€ type: see drawings

surface mount / recessed / accent / downlighter / step / theatre / outdoor (pole, step, bollard)

stove, hob, oven, cooker hood

€ stoves, hobs, ovens, cooker hoods model, type: … / see drawings.

Relevant standards:
SANS 10114 Interior lighting.
SANS 10389 Exterior lighting.
SANS 10142 The wiring of premises.
SANS 10222 Electrical security installations.
SANS 10313: The protection of structures against lightning.
SANS 61024 Lightning protection of structures.

10 External works

A fall of 1:60 is regarded as an optimum fall. Gradients of 1:100 are less forgiving (workmanship, settlement).

21.1 Paving

21.1.1 Materials

precast concrete blocks / burnt clay pavers / in-situ concrete / precast concrete slabs

units

€ paving unit type: see drawings

Edge restraints along the perimeter of the paving is necessary to prevent lateral spread of the units and to retain the bedding course sand. See concrete culverts, kerbs etc. below.

Class 25 (MPa) concrete blocks should be specified for most uses.

Thickness of blocks depends on site conditions, design requirements and cost.

precast concrete segmental paving blocks

€ type: S-A (interlock) / S-B (semi-interlock) / S-C (rectangular)

PB (uniform), PA (highly uniform in shape and size).

€ class: 25 / 35

€ nominal thickness: 50 / 60 / 80 / 100 / 120 mm

See SANS 784 for guidance on tactile indicators for access and mobility.

€ top edges: chamfered / not chamfered

€ colour: …

The use of mine sand for jointing is generally accepted.

burnt clay paving units

€ class: PB / PA

€ colour and work size: …

precast concrete paving slabs

€ size: 295 / 445 / 595 x 295 / 445/295 / 595/455 x 50/65 mm

sand for bedding and jointing of flexible paving

21.1.2 Preparation

subgrade

€ subgrade levels and falls: see drawings

concrete sub-base for rigid paving

€ thickness, reinforcement: see Section 2

weed killer

€ treat area to be paved with *suitable* weed killer: required / not required

levels, falls, pattern

€ levels and falls: see drawings

€ pattern: see drawings / herringbone / basket weave / stretcher / waving

10.1.3 Laying

€ type of paving: see drawings / flexible block/brick / flexible slab / rigid block/brick / in situ concrete

Check soil and traffic conditions with a Competent Person. The sub-base thickness is a function of both the type and amount of traffic to be carried and the strength of the subgrade. See also SANS 1200 ME, MF, ML.

flexible block/brick paving

Flexible paving is paving laid on sand, with joints filled with sand. The surfaces of flexible paving usually bed down ±5 mm after trafficking.

Consider mixing filling sand with 10 – 15% cement depending on traffic, type of paver, and control of weed growth. Spray paving thus filled with a fine spray of water immediately after filling to clean off all cement.

€ concrete anchor beams across road on grades exceeding 8%: ...

Horizontal forces of motor traffic increase considerably on grades exceeding 8%, causing creep. This is avoided by casting concrete anchor beams across the road. On steeper grades the paving should preferably be rigid. See CMA technical note 6.2 1994.

flexible slab

€ joints: filled with mortar / to be left open

rigid block/brick paving

Rigid paving is paving units bedded in mortar on a concrete base. External paving is exposed to wide temperature and moisture fluctuation which can only be provided for by movement joints.

accuracy

Accuracy depends on experience of contractor and/or labourers, and importance of the contract.

21.2 Concrete culverts, kerbs, channels

€ type: see drawings

culvert / kerb / channel

21.2.1 Materials

€ precast concrete culvert class: 75S / 100S / 125S / 150S / 175S / 200S

Class depends on foundation conditions and fill.

€ dimensions (internal) : see drawings

span: 450 / 600 / 750, 90 / 120 / 150 / 180 / 240 / 3 000 mm; height: 300 / 450 / 600 / 900 / 1 200 / 1 500 / 1 800 / 2 400 / 3 000 mm

€ kerb type: see drawings

rectangular / half-battered / battered / mountable

€ edging type: see drawings

rectangular / half-round

€ channel type: see drawings

rectangular / tapered.

21.2.2 Laying

€ movement joints: leave open / fill with

Concrete retaining blocks are an economical, versatile and environmentally compatible method of retaining earth and be used for planting, steps, seats, pavilions, and for erosion and scour control.

polysulphide.

21.3 Concrete retaining blocks

blocks

€ shape, size and colour: ...

preparation

€ depth, level and type of foundation: see drawings

Foundations: also on sloping or gravel foundation. *Drawings* should show this. Compacted earth foundation is usually sufficient for structures not higher than 1,2m. Higher walls should be thicker, inclined towards the retained earth, anchored with a geogrid mesh, or by modifying the properties of the backfill. Consult the supplier of the blocks and/or Competent Person. Ensure building regulations are complied with.

€ width of foundation: see drawings

Show width of foundation if of concrete.

€ drain pipes, aggregate drain, geofabric drain behind retaining wall: required / not required

placing

€ stacking pattern: see drawings

€ geofabric reinforcement: required / not required.

SANS 207 gives recommendations for the application of reinforcement techniques to soils and other fills.

21.4 Gabions

materials

€ cage dimension: 4 x 1 x 1 / 6 x 2 x 0,5 m

€ mesh wire to be PVC-coated: required / not required.

C3.4: CIVIL ENGINEERING SPECIFICATION

The following parts of SANS 2001 Construction works standards and associated specification data are applicable to the works:

1) SANS 2001- BS1- 2008: Site Clearance
2) SANS 2001- BE1- 2008: Earthworks (General)
3) SANS 2001-CC2- 2007: Concrete works (minor works)
4) SANS 2001-CS1 – 2017: Structural Steel
5) SANS 2001-CM1-2012: Masonry walling
6) SANS 2001-EM1-2007: Cement plaster
7) SANS 2001 -DP4-2010: Sewer
8) SANS 2001 -DP5-2010: Stormwater
9) SANS 2001- DP6-2012: Below ground water installation
10)

The following parts of SANS 1200 Construction works standards and associated specification data are applicable to the works:

11) SANS 1200 ME Subbase – 1981
12) SANS 1200 MF Base - 1981
13) SANS 1200 MJ Segmented Paving- 1984
14) SANS 1200 MK Kerbing and Channelling-1983

The abovementioned South African National Standards, which can be purchased online from www.sabs.co.za, make several references to the Specification Data for data, provisions and variations that make these standards applicable to this contract. The Specification Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and these standards.

Each item of Specification Data given below is cross-referenced to the clause in the standard

to which it mainly applies. The associated Specification Data is as follows:

SANS 2001-BS1-2008: Site Clearance	
Essential Data:	
Clause Number	**Specification data**
3.2	The designated area or site in which work shall be carried out is shown in the drawings. The site is a confined site with existing buildings around the site.
3.4	The level of the finished earthworks shall be as follows: as shown in drawings
4.2.1	Activity numbers 1, 2, 3, 5, 7,8, 9, 10, 11 apply. The depth associated with activity 3 is 1.5 .m.
4.2.4(b)	Pipes shall be disposed of.
4.4.1	Materials from clearing and grubbing operations and the demolition of structures shall be disposed of as follows: At the local municipality landfill.
Variations	
N/A	
Additional clauses	
New	DCP test results to be done in excavated foundations and submitted to the Engineer for approval prior to placing the blinding layer.
SANS 2001- BE1- 2008: Earthworks (General)	
Essential data	**Specification data**
Clause number	
4.1.1	The following materials are required in embankments and terraces: as indicated in 4.1.1
4.1.5.1	Topsoil shall be conserved.

4.2.1.1	All areas in which excavation is to take place or that are to be covered by terraces, banks or structures, shall be cleared in terms of SANS 2001-BS1 and stripped of all remaining vegetation to a depth of 150 mm.
4.2.1.2	Topsoil shall be conserved for later use in the following manner: stockpiled
4.2.1.3	The overburden shall be stripped and removed to a depth of 300 mm.
4.2.2.1.4	A working space of 1,0 m shall be provided.
4.2.5.1.6	The layers shall be compacted to as indicated in drawings
4.2.5.2.5	The density close to structures shall be not less than as indicated in drawings
5.2.1	A degree of accuracy I is required in respect of position, dimensions, levels, etc.
SANS 2001-CC2- 2007: Concrete works (minor works)	
Essential data	**Specification data**
Clause number	
4.2.3.1	The nominal size of aggregate shall be 19 mm.
4.2.6	The concrete shall be as follows: As shown in drawings
4.7.11.2	Exposed surfaces shall have non-skid surfaces.
Variations	
N/A	
Additional clauses	
N/A	
SANS 2001-CM1-2012: Masonry walling	
Essential data	**Specification data**
Clause number	
4.1.1.2	Burnt clay masonry units shall comply with the requirements of SANS 227 and have the following properties:
	a) class of unit: (see 3.1, 3.2 and 4.2 of SANS 227[a])
	b) work size: (see appendix E of SANS 227[a])
	c) colour of face units
	d) nature of unit: solid
	e) uniformity of colour and texture: required
	f) nominal compressive strength (non-facing): (see table 3 and 4.4 of SANS 227[a])
	g) grade (efflorescence): normal
	h) limit of water absorption: (see 4.7 of SANS 227[a])
	i) limit of water-soluble salts content: (see 4.7 of SANS 227[a])
	j) limits of selected radicals: (see 4.7 of SANS 227[a])
	k) limits of pH value of water extracts: (see 4.7 of SANS 227[a])
	l) limits of moisture expansion: (see 4.7 of SANS 227[a])
	m) the usage rates per square metre of walling of FBA units: (see appendix D of SANS 227[a])
	The quality verification shall be as follows: (see appendix F of SANS 227[a])
4.1.4.1	Sands that comply with the requirements of SANS 1090 are required.

4.1.9.1.2	Brickforce shall be galvanized.
4.1.9.2.2	Rod reinforcement shall be galvanized.
4.1.9.4	Prestressing steel shall comprise the following:
4.1.10	Metal lath strips shall comply with the requirements of SANS 190-2.
4.1.12.1	Metal wall ties in cavity walls shall be of the crimp wire and butterfly type.
4.1.12.2	Only metal wall ties shall be used.
	[c]SANS 1215 (SABS 1215:1984).
4.1.16	Damp-proof course material shall comprise SANS 952
4.2.1	Mortars shall comply with the requirements of class II
4.3.8.1	Joints in face masonry shall be finished raked to a depth not more than 5mm
4.4.1.2	Single-leaf, collar-jointed, diaphragm and cavity walls shall be constructed in stretcher bond
4.11.1	Control and articulation joints shall be as shown in drawings
4.14.3	Fibre-cement sills need not be of a uniform length.
4.14.4	The external sloping face of the masonry sill shall not be painted.
5.1.1	The degree of accuracy shall be II
5.2.3	The frequency of testing strength mortar shall be as follows: as stated in clause 5.2.3
Variations	
N/A	
Additional clauses	
N/A	
SANS 2001 - EM1: 2007	
Essential data	**Specification data**
Clause number	
4.1.1	Cement shall comply with the requirements of SANS 50197-1
4.1.3	Sand shall comply with the requirements of SANS 1090.
4.2.3.10	The finish to the plaster shall be as follows:
	Wood float finish for external works and smooth finish for internal works.
5	The permissible deviations shall apply to the following walls: not exceed 6mm under a 2m straight edge
Variations	
N/A	
Additional clauses	
N/A	
SANS 2001 -DP4:2010	
Essential data	**Specification data**
Clause number	
4.1.1	Sewers shall be constructed using the following types of pipes: PVC-U
4.1.5	PVC-U pipes shall
	a) be of heavy duty type;
	b) have one end plain and the other end socketed;
	c) have the plain ends chamfered;
	d) have an injection-moulded solvent cement socket/an integral socket;
	e) have sockets of the rubber ring type
4.1.12.5	Manhole covers and frames shall comply withn the requirements of SANS 558 type 2B for manholes in roads and type 4 in areas not subject to traffic loads

4.1.12.6	Polymer concrete manhole and inspection covers and frames shall comply with the requirements of SANS 1882 (meduim duty class where heavy commercial vehicles have no access and heavy duty class where heavy commercial vehicles have access)
4.4.5.2	Masonry units shall be plastered internally.
4.7.3	The location of connecting sewers shall be recorded.
	The recording of co-ordinates is also required.
5.3.1.4	An air test and a visual internal inspection test is required.
5.3.4	Manholes shall be tested separately from pipelines for watertightness.
	Variations
	State variations, if any.
	Additional clauses
	State additional clauses, if any.
SANS 2001 -DP5:2010	
Essential data	**Specification data**
Clause number	
4.1.1.1	Stormwater pipes shall be constructed using the following types of pipes: Concrete Pipes
4.1.2.1	Concrete pipes shall
	a) be reinforced
	b) be provided with spigot and sockets with rolling rubber rings
	c) have a D-load designation of 100D;
	f) have a low content of material insoluble in hydrochloric acid;
4.1.10.1.1	Masonry units attributes shall have te following: 14 Mpa compressive strength
4.1.10.3	The concrete shall be grade 25
4.1.10.5.1	Covers and frames for manholes shall comply withn the requirements of SANS 558 type 2B for manholes in roads and type 4 in areas not subject to traffic loads
4.1.10.6	Polymer concrete manhole and inspection covers and frames shall comply with the following requirements:SANS 1882 (meduim duty class where heavy commercial vehicles have no access and heavy duty class where heavy commercial vehicles have access)
4.4.3.2	Masonry manholes shall be plastered internally.
4.4.4.3	A single layer of tape shall be applied to the joints on the outside of the manhole.
5.3.1	Stormwater drainage, including manholes, shall be tested in accordance with the requirements of SANS 2001-DP4.
	The following tests shall be carried out:
	a) an air test;
	b) a water test;
	c) water drop down test.
	Visual internal inspection is required.

	Manholes shall be tested separately from pipelines for watertightness
	Variations
	State variations, if any.
	Additional clauses
	State variations, if any.
SANS 2001- DP6:2012	
Essential data	**Specification data**
Clause number	
4.1.1.1	The following types of pipes and associated fittings shall be used: As shown in the drawings
4.1.1.2	
4.1.3.3	A certificate certifying compliance with the requirements of SANS 62-1 and SANS 62-2, as relevant, shall be required for each consignment of pipes and fittings.
4.1.3.4	Fabricated flanged steel pipework shall comply with SANS 1476
4.1.6.1	PE pipes shall comply with requirements of SANS 4427-2
4.1.7	PP pipes shall comply with the requirements of SANS 15874-2, and shall be class 12
	PP pipes shall be jointed by butt- fusion/heated-tool socket weld/mechanical fittings.
4.1.8.2	PVC-U pipes and fittings shall comply with the requirements of SANS 966-1
	Pipes shall not be joined by means of solvent-weld joints
4.1.9	Copper pipes shall comply with requirements of SANS 460
4.1.10	Metallic compression-type pipe couplings shall comply with requirements of SANS 1808-2
4.1.13.6	Cast iron gate valves shall comply with requirements of SANS 664
4.1.15	Mechanical backflow-prevention devices shall comply with requirements of SANS 1808-18
	a) be a type 1/2/3 device;
	b) have a working pressure rating of 1 600 kPa.
4.1.16	Above-ground hydrant valves shall open anticlockwise.
	Above-ground hydrant valves shall have
	a) a flanged/threaded valve inlet;
	b) upwards oblique/downwards oblique/ right angle/straight-through pattern valve outlet;
	c) an outlet furnished with an instantaneous connection integrally cast with the body/ instantaneous coupling or connection screwed onto the body;
	d) a gland with packing/"O" rings;
	e) an operating device of the tamperproof key type that has an open/ shielded sheath/fixed-wheel type;
	f) an outlet coupling and outlet adaptor comprising 65mm instantaneous
	outlet connection
	Blank caps shall be furnished for each outlet.
4.1.17.1	Masonry units attributes : shall have the following: FBS or NFP with compressive strength of 14 Mpa
4.1.17.3	Concrete shall be grade 25
4.1.17.5	Manhole covers and frames shall be supplied in matching sets
4.1.17.6	

4.1.17.7	Surface boxes shall be polymer concrete.
4.1.17.7	Polymer concrete valve chambers and fire hydrant boxes shall be heavy duty class.
	The additional marking information required is SANS 1882
4.1.18.2	Meters shall be as specified in the drawings
4.5.3.5.1	Screw threads shall not be cut on PE pipes.
4.6.1	The concrete used in the casing of pipes shall be grade 15
4.6.3	The concrete used in anchor or thrust blocks shall be grade 15
4.7	Valve and hydrant chambers shall be constructed in accordance with relevant requirements of SANS 2001-DP2
4.8.2.2.1	Plug-in type ferrules shall be used for service connections in FC pipes.
4.8.2.7	The recording of service connection data is required.
4.9.5	The recording of meter installation data is required.
5.3.2	The water installation shall be tested in accordance with the requirements of SANS 2001-DP2.
5.4	Testing of PE or PP pipe assemblies is required.
Variations	
N/A	
Additional clauses	
N/A	

SANS 1200 ME - 1981

PSME SUBBASE

PSME 1 SCOPE

Add the following to Clause 1:

All the requirements as specified for the construction of subbase shall, except where otherwise stated or ordered, apply to the construction of the gravel wearing course.

PSME 3 MATERIALS

PSME 3.2 PHYSICAL PROPERTIES

PSME 3.2.1 Subbase Material

All subbase material shall be at least of G5 quality with a CBR of not less than 45 at 95% modified AASHTO maximum density for un-stabilised layers

SELECTION

The subbase layer shall consist of material obtained from a commercial source.

PSME 5 CONSTRUCTION

PSME 5.4 PLACING AND COMPACTING

PSME 5.4.1 Placing

The subbase layer shall measure 150mm in thickness when compacted unless shown otherwise on the drawings.

PLACING AND COMPACTING

PSME 5.4.1 Placing

The compacted thickness of the subbase course whether stabilised or unstabilised shall be 150mm.

PSME 7 TESTING

PSME 7.2 PROCESS CONTROL AND ROUTINE

PSME 7.2.2 Routine Inspection and Testing

Notwithstanding the provisions of subclause 7.2.2 and Table 3, no single test result which is below the specified density shall be accepted.

PSME 8 MEASUREMENT AND PAYMENT

PSME 8.1 BASIC PRINCIPLES

Add the following to Subclause (d):

A commercial source shall be held to include any off site source located by the Contractor. Furthermore, no additional payment will be made for the temporary stockpiling of material from commercial sources.
The Contractor shall further make provision in the rates tendered for the construction of the gravel wearing course for the cost of his own process control testing and the cost of complying with Clause PSME 6.4.

SANS 1200 MF -1981

PSMF BASE

PSMF 3 MATERIALS

PSMF 3.3 PHYSICAL AND CHEMICAL PROPERTIES

PSMF 3.3.1 Natural Gravel

The base material for the bitumen surfaced minor roads shall consist of G4 quality material from a source selected by the Contractor. The minimum CBR shall be 80 at 98% Mod AASHTO density, the maximum PI shall be 6 and the grading shall comply with Table 1.

PSMF 5 CONSTRUCTION

PSMF 5.4 PLACING AND COMPACTION

PSMF 5.4.1 Placing

Add the following:

The completed thickness of the base layer shall be 150mm.

PSMF 5.10 CEMENT SOIL STABILISATION

Where Cement soil stabilisation of the base layer is specified the following shall apply

Requirements for cemented chemically stabilised materials

Classification		C2
Type of material before stabilization (1)		At least G4 quality
PI after stabilization (maximum)		Non-plastic
UCS (Unconfined Compression Strength) (MPa) at 100 % of MDD(3)	Min	3.0
	Max	5.0
ITS (Indirect Tensile Strength) (kPa) at 100 % of MDD	Min	300
	Max	500
WDD (Wet/Dry Durability) (mass loss maximum)		10 %

a) For materials derived from the basic crystalline rock group, the plasticity index after stabilisation shall be non-plastic.

b) It is more important that the ITS requirement be met than the UCS, as the ITS affects both the structural behavior of the layer and limits the potential to degrade should the durability decreases in time.

c) ITS in brackets apply for a stabilised base layer.

d) The UCS and ITS requirements in the Table are determined at the standard 7-day curing, and not at the 24-hour rapid or accelerated curing testing.

e) The 7-day cured strengths shall always be taken as the reference requirements, as the rapid curing may give a higher strength. Should rapid curing be done during the construction, both tests shall be done in parallel and a calibration factor derived for that material with that specific stabiliser.

f) The rapid testing can then be used for acceptance control provided that regular calibration checks are made against the 7-day cured strengths to ensure that nothing has changed significantly. When significant variations are found in the relationship between the results of the two types of test, then all further test samples that are rapid cured shall have duplicate samples that are tested by the standard full 7-day acceptance test until a reliable, stable calibration factor has been re-established.

PSMF 6 TOLERANCES

PSMF 6.1 DIMENSIONS, LEVELS, ETC

PSMF 6.1.2 Grade

Delete the contents of Subclause (a) and (b) and replace by:

The height of the edge of the channel above the top of the completed base is to be not less than the minimum thickness of asphalt surfacing, ie 5mm less than the specified thickness. (See SABS 1200MH 6.3.4).

PSMF 6.1.5 Cross Section

Delete "25mm" from subclause 6.1.5 and replace by "15mm".

PSMF 7 TESTING

PSMF 7.3 ROUTINE INSPECTION AND TESTING

PSMF 7.3.2 Routine Inspection and Testing

Notwithstanding the provisions of Subclause 7.3.2 and Table 4, no single test result which is below the specified density shall be accepted.

SANS 1200 MJ - 1984

PSMJ SEGMENTED PAVING

PSMJ 1 SCOPE

The scope of this specification is extended to cover the removal of existing segmented block paving and edge restraints.

PSMJ 5 CONSTRUCTION

PSMJ 5.8* REMOVAL OF EXISTING SEGMENTED BLOCK PAVING AND EDGE RESTRAINTS

When directed by the Engineer, existing segmented block paving and edge restraints are to be removed and stacked at the contractor's site camp for possible further use by the Client

PSMJ 8 MEASUREMENT AND PAYMENT

PSMJ 8.2 SCHEDULED ITEMS

PSMJ 8.2.6* Removal of existing segmented block paving and edge restraints ..... Unit: sq.m

The rate shall cover the cost of all labour, plant and equipment required to remove the segmented block paving and edge restraints from site to the site camp including all haul.

SANS 1200 MK -1983

PSMK KERBING AND CHANNELLING

PSMK 1 SCOPE

Add the following:

This specification shall also cover the construction of:

- Compacted dished open drains outside the bounds of road reserves
- Compacted in-situ earth road side channels
- Concrete lined road side channels and channel cross drains

PSMK 5 CONSTRUCTION

PSMK 5.1 EXCAVATION AND BEDDING

Notwithstanding the provisions of this subclause dished open drains shall be trimmed to the lines and levels given on the drawings or ordered and the surface area of the drain compacted to 90% of modified AASHTO maximum density. The compacted depth shall be 150mm. Where in the opinion of the Engineer the in-situ material is unsuitable, the Engineer may order that it be removed to the depth required and replaced with selected material compacted to a density of at least 90% of modified AASHTO maximum density, or 15 MPa/19 concrete.

Excavations for road side channels shall be trimmed to the lines and levels given on the drawings or ordered and the surface area of the channel compacted to 90% of modified AASHTO maximum density. The compacted depth shall be 150mm. Where in the opinion of the engineer the in-situ material is unsuitable, the Engineer may order it to be removed to the depth required and replaced with selected material compacted to a density of at least 90% of modified AASHTO maximum density or 15 MPa/19 concrete.

Excavations for road side channels to be concrete lined shall be treated as stated in the paragraph immediately above.

PSMK 5.8 MACHINE PLACED (EXTRUDED) KERBING AND CHANNELLING

PSMK 5.8.5 Curing

Notwithstanding the provisions of this subclause, curing shall be carried out in accordance with the requirements of SABS 1200 G, subclause 5.5.8(e).

PSMK 5.13* CONCRETE LINING

Concrete lining shall be constructed as detailed on the drawings and in accordance with the requirements of subclause 5.6, except that the exposed concrete surface shall be given a broomed textured finish.

PSMK 5.14* REMOVAL OF EXISTING KERB AND CHANNEL AND EDGING RESTRAINTS

When directed by the Engineer badly damaged kerbs, channels and edge restraints to be removed to spoil.

PSMK 6.2 CONCRETE LINED CHANNELS AND CONCRETE CHUTES

Add the following to Clause 6.2:

"The requirements of this clause shall also as relevant apply to concrete lined channel cross drains.

PSMK 7.3 RESPONSIBILITY FOR COSTS OF TESTING, ETC

Delete the contents of Subclause 7.3 and replace with the following:

For all concrete elements constructed in terms of this specification, the Contractor shall bear the costs of all testing required by the Engineer, including the provision of an adequate number of cube moulds, making of concrete cubes, transporting cubes to a laboratory for testing and the cost of testing etc.

C3.5 ELECTRICAL ENGINEERING SPECIFICATION

public works & infrastructure

Department:
Public Works and Infrastructure
REPUBLIC OF SOUTH AFRICA

ELECTRICAL SPECIFICATIONS

EAST LONDON LABOUR CENTRE
SUPPLY AND INSTALLATION OF WATER TANKS
(WCS 056628)

DATE : 29TH JULY 2024

Prepared for:
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Gqeberha Regional Office
Construction Project Management
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Prepared by:
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SPECIFICATION FOR ELECTRICAL WORK

PART 1 – PREAMBLES AND GENERAL

CONTENTS

PART 1 – PREAMBLES AND GENERAL SPECIFICATIONS

1 INTRODUCTION

1.1. These General/Standard Specifications cover the general technical requirements for the equipment, materials, installation, testing, commissioning and maintenance of electrical installations for the Department. These requirements shall be read in conjunction with the Documents as specified below as well as the other sections of this document.

1.2. The source documents used for the incorporation of this document are PW 354 section A, B and C and the South African National standards.

1.3. "Document" shall mean the complete set of contract documents, including the Department's Tender Conditions, Tender Qualifications, the Standard Specification and the Detailed Technical Specification including all drawings and variation orders issued in terms of the contract and all other contract documents of the contract.

1.4. "Contractor" shall mean the person, partnership, company or firm appointed for the supply, installation, testing, commissioning and maintenance of the Electrical Installation. In the case of the Electrical Installation being a sub-contract, nominated in terms of the Main Contract or otherwise, the word "Contractor" shall also mean "Sub-Contractor" in terms of the Sub-Contract Conditions for the specific installation. Where applicable the Builder or Principal Contractor shall be referred to as "Main Contractor".

2 INSTALLATION WORK

2.1. The complete installation shall comply with the requirements of all parts of the specifications. Should any discrepancies or contradictions exist between this specification and the Detailed Technical Specification for the specific installation, then the latter shall take precedence.

2.2. In the event of discrepancies between the drawings, specifications and bill of quantities the Department shall decide whether the work as executed shall be remeasured on site or whether remeasurement shall be effected from the working drawings only.

2.3. The Department's authorised representative will inspect the installation from time to time during the progress of the work. Discrepancies of the contract will be pointed out to the Contractor and these shall be remedied at the Contractor's expense. Under no circumstances shall these inspections relieve the Contractor of his obligations in terms of the Documents.

2.4. The Contractor shall notify the Department timeously when the installation reaches important stages of completion (e.g. before closing cable trenches, before casting concrete, etc.) so that the Department's authorised representative may schedule his inspections in the best interest of all parties concerned.

3 COMPLIANCE WITH REGULATIONS

3.1. The installation shall be erected and tested in accordance with the South African Acts and Regulations or IEC regulations where applicable.

3.2. The entire installation shall be carried out in accordance with Local SANS Regulations, By-Laws, the Occupational Health and Safety Act.

3.3. No claims for extras in respect of failure by the Contractor to comply with any regulations will be considered.

3.4. Where conflict exists between regulations, specifications or drawings, the said conflict must be referred to the Employers Agent / Engineer in writing for his ruling.

4 CODES OF PRACTICE OR STANDARD SPECIFICATION

4.1. Where reference is made to any Regulations, Code of Practice or Standard Specification in this document the latest edition or amendment shall be applicable, except where specified to the contrary.

5 NOTICES AND FEES

5.1. 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.

5.2. 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.

5.3. The Contractor shall issue all notices and pay all of the required fees in respect of the installation to the authorities, and shall exempt the Department from all losses, claims, costs or expenditures which may arise as a result of the Contractor's negligence in complying with the requirements of the regulations.

5.4. It shall be the responsibility of the Contractor to make the necessary arrangements with the local Supply Authority at his own cost and to supply the labour, equipment and means to inspect, test and commission the installation to the satisfaction of the Local and Supply Authorities.

5.5. The Contractor shall supply and install all notices and warning signs that are required by the relevant laws, regulations and/or the Documents.

6 SITE CONDITIONS

6.1. Tenderers are advised to visit the site and acquaint themselves with all local conditions pertaining to the execution of the installation before tender closing date or as indicated on the tender document with the permission of the department. No claims from the Contractor which may arise from insufficient knowledge of site access, type of site, labour conditions, establishment space, transport and loading/unloading facilities, power and water supply, etc. will be considered after submission of tenders.

6.2. For services where prior permission is required before contractors can visit the site, a visit will be arranged for all interested parties at the request of the Department.

7 COMPETENCE OF PERSONNEL, WORKMANSHIP AND STAFF

7.1. All work shall be executed and supervised by suitably qualified staff. Only "ACCREDITED/COMPETENT PERSONS" shall be permitted to carry out and supervise electrical work on site. Copies of all qualifications, certifications and registration shall be issued to the employers representation/engineer and project manager prior to the commencement of works.

7.2. 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.

7.3. The workmanship shall be of the highest grade and to the satisfaction of the Employer/Employer's representative.

7.4. All inferior work shall, on indication by the Employer's representative, immediately be removed and rectified by and at the expense of the Contractor.

7.5. The contractor shall at all times have an adequate number of employees available during the construction period to ensure that the electrical works does not delay the construction programme.

8 ELECTRICAL EQUIPMENT AND QUALITY OF MATERIALS

8.1. 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.

8.2. 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.

8.3. Materials wherever possible, must be of South African manufacture.

8.4. All equipment and fittings supplied must be in accordance with the Specifications, suitable for the relevant supply voltage and frequency and must be approved by the Employer's Representative.

8.5. Materials and equipment used in this Contract must, where possible, shall comply with the specifications. Proof of compliance must be submitted prior to installation of any materials or equipment in the form of submittals.

8.6. The Contractor shall submit samples of all materials or equipment for approval by the Engineer and Employer before installation, unless prior approval to the contrary has been obtained in writing from the Engineer or Employer. Such samples shall be held for purposes of comparison with equipment and materials installed and will be released on satisfactory completion of the Contract.

8.7. All apparatus, components, fittings and materials supplied and/or installed, whether expressly specified herein or not, shall conform in respect of quality, manufacture, tests and performance.

8.8. Where a certain manufacturer's material or apparatus is mentioned in the drawings or specifications, such materials or apparatus shall be provided as specified, except where an alternative to this condition is allowed in the specifications. Where a detailed specification for material or apparatus is not provided, it shall be understood that all normal requirements for the use of such materials or equipment shall apply.

8.9. Where certain products of a specified manufacturer are unobtainable, substitutes may be offered, but shall only be supplied after written consent by the Engineer and Employer.

9 MAINTENANCE OF INSTALLATIONS

9.1. 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 stipulated by the contract and shall make all adjustments necessary for the correct operation thereof.

9.2. 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.

9.3. 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.

10 SCHEDULE OF FITTINGS

10.1. In all instances where schedule of light, socket outlet, electronic equipment and power points are attached to or included on the drawings, these schedules are to be regarded as forming part of the specification.

11 SWITCHES AND SOCKET OUTLETS

11.1. All switches and switch-socket outlet combination units shall conform to the Department Quality Specifications and relevant SANS regulations, which form part of this specification.

11.2. No other than 16A 3 pin sockets are to be used, unless other special purpose types are distinctly specified or shown on the drawings.

11.3. All light switches and socket outlets shall be installed in accordance with SANS 10400-S or otherwise indicated.

11.4. 5A Socket outlets are only permitted to supply power to light fittings in accordance with SANS 10142-1.

12 SWITCHGEAR

12.1. 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.

12.2. 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.

13 DISTRIBUTION BOARDS

13.1. All distribution boards shall be in accordance with the types as specified, be constructed according to the shop or type drawings and must be approved by the Employer/Employer's representative before manufacture or installation.

13.2. 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.

13.3. Any construction or standard type aboard proposed, as an alternative to that specified must have the prior approval of the Employer/Employer's representative.

13.4. 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.

13.5. 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.

13.6. All distribution boards 10kA or above are to be provided with a type test certificate.

14 CONDUIT AND ACCESSORIES

14.1. 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 enamelled or galvanised, is specified in Part 2 (Detailed specification) of this specification.

14.2. Unless other methods of installation are specified for certain circuits, the installation shall be in conduit throughout. No open wiring or mechanically unprotected wiring in roof spaces or elsewhere will be permitted.

14.3. 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.

14.4. 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.

14.5. 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.

14.6. Draw-boxes are to be provided in accordance with the "Wiring Code" and wherever necessary to facilitate easy wiring.

14.7. 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.

14.8. Only one manufactured type of conduit and conduit accessories will be permitted throughout the installation.

14.9. 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.

14.10. 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.

14.11. 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.

14.12. 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.

14.13. All conduit and accessories used in areas within 50 km of the coast shall be galvanised to SANS 32 and SANS 121.

14.14. 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.

15 CONDUIT IN ROOF SPACES

15.1. 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.

15.2. Nail or crampets will not be allowed.

15.3. 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.

15.4. 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.

15.5. 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.

16 SURFACE MOUNTED CONDUIT

16.1. 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.

16.2. The use of inspection bends is to be avoided and instead the conduit shall be set uniformly and inspection coupling used where necessary.

16.3. No threads will be permitted to show when the conduit installation is complete, except where running couplings have been employed.

16.4. Running couplings are only to be used where unavoidable, and shall be fitted with a sliced couplings as a lock nut.

16.5. Conduit is to be run on approved spaced saddles rigidly secured to the walls.

16.6. 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.

16.7. 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.

16.8. Where several conduits are installed side by side, they shall be evenly spaced and grouped under one purpose-made saddle.

16.9. Distribution boards, draw-boxes, industrial switches and socket outlets etc., shall be neatly recessed into the surface to avoid double sets.

16.10. In situations where there are no ceilings the conduits are to be run along the wall plates and the beams.

16.11. Painting of surface conduit shall match the colour of the adjacent wall finishes.

16.12. 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.

17 CONDUIT IN CONCRETE SLABS

17.1. 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.

17.2. The Contractor shall have a representative in attendance at all times when the casting of concrete takes place.

17.3. 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.

17.4. Draw and/or inspection boxes shall be grouped under one common cover plate, and must preferable be installed in passages or male toilets.

17.5. 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.

17.6. Before any concrete slabs are cast, all conduit droppers to switchboards shall be neatly spaced and rigidly fixed.

18 FLEXIBLE CONNECTIONS FOR CONNECTING UP OF STOVES, MACHINES, ETC.

18.1. 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.

18.2. 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.

18.3. Aluminium and zinc alloy connectors will not be acceptable.

19 WIRING:

19.1. 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.

19.2. 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.

19.3. 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.

19.4. 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".

19.5. The loop-in system shall be followed throughout, and no joints of any description will be permitted.

19.6. The wiring shall be done in PVC insulated 600/1000 V grade cable to SANS 1507.

19.7. 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.

19.8. All wiring to be terminated and labelled in accordance with SANS 10142-1.

20 EARTHING OF INSTALLATION

20.1. Main earthing

20.1.1. 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.

20.1.2. 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.

20.1.3. Alternatively or additionally earth rods or trench earths may be required as specified or directed by the Electrical Engineer.

20.1.4. 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.

20.1.5. 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 mm 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.

20.1.6. 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.

20.2. Roofs, gutters and down pipes

20.2.1. 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.

20.3. Sub-distribution boards

20.3.1. 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.

20.4. Sub-circuits

20.4.1. The earth conductors of fall sub-circuits shall be connected to the earth busbar in the supply board in accordance with SANS 10142.

20.5. Ring Mains

20.5.1. 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 not be broken.

20.6. Non-metallic Conduit

20.6.1. Where non-metallic conduit is specified or allowed, the installation shall comply with the Department's standard quality specification for "conduit and conduit accessories".

20.6.2. 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.

20.7. Flexible Conduit

20.7.1. 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.

20.8. Connection

20.8.1. 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.

20.8.2. Unless earth conductors are connected to proper terminals, the end shall be tinned and lugged.

21 MOUNTING AND POSITIONING OF LUMINAIRES

21.1. 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.

21.2. 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. The contractor is responsible to ensure that the luminaries are free of damage, debris and is installed in an aesthetic manner.

21.3. Incandescent and Fluorescent luminaires are not permitted to be installed in any government installation.

22 INSPECTION, TESTS AND COMMISSIONING

22.1. On completion of the erection and installation of 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.

22.2. The contractor to inspect and test the services installation in accordance with the Wiring Code, the Regulations of the Supplier of Electricity and the Occupational Health and Safety Act 85. Record test results on printed test sheets and submit to the Engineer

22.3. 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.

22.4. The following tests should be conducted in accordance with regulation but are not limited to the following:

- Ensure correct polarity, Verify polarity and phase identification.
- Continuity and resistance of earth conductor including all bonding conductors.
- Continuity of ring circuit.
- Earth electrode resistance.
- Insulating resistance of the cable.
- Earth fault loop impedance test.
- Operation of earth leakage protection devices and circuit breakers.

22.5. After inspection and testing, timeously arrange for any inspection and test by the Supplier of electricity if required, and assist as necessary the Inspector of the Supplier of electricity by providing access, tools, instruments and attendance.

22.6. Replace any portion of the services installation that does not comply with the Wiring Code or the Specification. Such replacement shall be done at the Contractor's expense.

22.7. Submit a "Certificate of Compliance by an accredited person" Annexure 1 in terms of the Occupational Health and Safety Act 85, Electrical Installation Regulation 1992, to the Client and forward a copy to the Engineer.

22.8. Timeously advise the Engineer of all inspections and tests as the Engineer reserves the right to witness such inspections and tests.

22.9. The Engineer shall have the power at any time to examine any part of the Works or materials intended for use in or on the Works either on site, or at the place of manufacture or storage.

22.10. On completion of the works, the Contractor shall submit three indexed volumes of all test certificates to the Engineer for tests done at factories and on site. (To be included in the manuals).

22.11. The Manuals should contain the following information if applicable:

- Cover Page
- Contact Personnel & Emergency contact personnel
- Scope of Work
- Operating Instructions
- Normal Operation
- Safety Measures
- Fault Finding Guide
- Equipment Information
- Schedule of Information
- List of Spares and Agents
- Design Data
- Factory acceptance and site acceptance certificates
- As Commissioned Data
- Maintenance Requirements & Checklists
- Manufacturers Service Recommendations
- Manufactures Literature
- Equipment Brochures

- Approved Shop Drawings, Exploded Views and Wiring Diagrams
- As Built Drawings
- Electrical Drawings
- System Layouts (General arrangement layouts) and Schematics
- Certificate of compliance
- Signed QCP(Quality control plan) documentation
- Training Certificates/Register

23 VERIFICATION AND CERTIFICATION OF ELECTRICAL INSTALLATION (CERTIFICATE OF COMPLIANCE AND TEST REPORT

23.1. On completion of the installation, 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.

23.2. Certificate of completion must also be issued for Earthing and lightning protection installation and all applicable Electronic installation in accordance with South African National Standards and Occupational Health and Safety Act.

PART 2: DETAILED SPECIFICATIONS

CONTENTS

PART 2: DETAILED SPECIFICATIONS

1. EMPLOYER'S OBJECTIVE

1.1. The objective is the supply and installation of water tanks at East London Labour centre for Department of Employment and Labour in East London, Eastern Cape, South Africa.

2. EXTENT OF WORK

2.1. This Contract covers the manufacture, supply, factory testing, insurance, delivery, transport, handling, storing, erection, site welding and making good coatings, aligning, fixing, supporting, connecting, adjusting, guaranteeing, site testing, painting, commissioning, handing over in complete working order, providing as-built drawings, operating and maintenance instructions in Triplicate, instructing staff and attending to defects for the Electrical works as described in greater detail below in this document and/or shown on the drawings and/or set out in the Bills of Quantities and as briefly described below:

2.2. The works covered by this Contract will include but not be limited to the following:

- Replace existing distribution boards SDB A and DBC with all new switchgear and install surge protection.
- Supply and install of 20A, 5kA curve D circuit breaker in distribution boards SDA and DBC respectively.
- Supply and install conduit and sleeve from the buildings to each pump set.
- Supply and install approximately 160m 2,5 sqmm x 3C PVC 600V/1000V low voltage cable with glands and accessories.
- Supply and install 2x 20A, IP66 weatherproof isolator/socket outlet dependent on the required receptacle electrical input of the pump sets, mounted within 1m of each pump set.
- Terminate power point to pump sets.
- Certificate of compliance to be provided for complete installation for the new distribution boards.

3. COMPLIANCE WITH REGULATIONS

3.1. The entire installation shall be carried out in accordance with the latest revision and amendments of the following but not limited to:

- The Occupational Health and Safety Act
- The Basic Conditions of Employment Act
- The Local Fire Office Regulations.
- Electricity Regulations Act
- Occupational Health and Safety Act with all regulations
- Department of Public Works: General Electrical Specifications part A, B and C.
- SANS 10400 – The National Building Regulations
- SANS 10142-1 – The Code of Practice for the Wiring of Premises
- SANS 10114-1 – Artificial Lighting of Interiors
- SANS 10114-2 – Emergency Lighting
- SANS 10389 – Exterior lighting
- SANS 62305 – Protection against lightning
- SANS 10292 – Earthing of low voltage installation
- SANS 1973 - Low voltage switchgear and control gear assemblies.
- All relevant regulations and bylaws.

PART C4: SITE INFORMATION

C4: SITE INFORMATION
PG-03.2 (EC)

Department
Public Works and Infrastructure
REPUBLIC OF SOUTH AFRICA

PG-03.2 (EC) SITE INFORMATION – JBCC 2000 PRINCIPAL BUILDING AGREEMENT (EDITION 6.2 OF MAY 2018)

Project title:	**EASTERN CAPE: GQEBERHA: EAST LONDON PROVINTIAL OFFICE: DEPARTMENT OF EMPLOYMENT AND LABOUR: SUPPLY AND INSTALLATION OF WATER TANKS.**				
Tender no:	GQET-25/26-013	**WCS no:**	056628	**Reference no:**	*14/1/3/2/1/6464/5458*

C4 Site Information

The Department of Employment and Labour occupies a state owned property which is located on Erven 15810 - 15821, No.1,3 & 5 Hill street, East London.

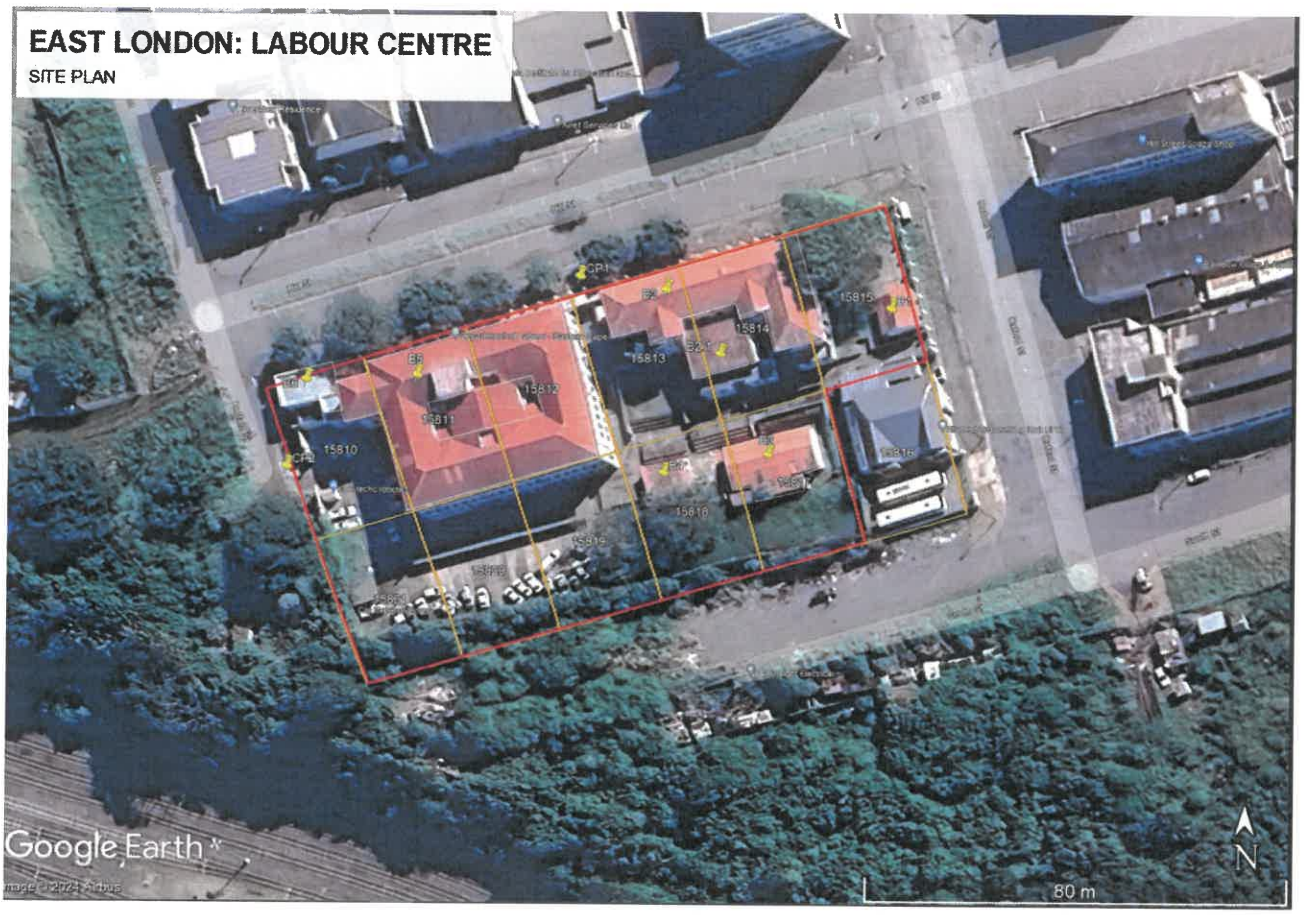

Figure 1: Site Plan

PART C5: DRAWINGS

DRAWING ISSUE SLIP /
DRAWING REGISTER

public works & infrastructure
Department:
Public Works and Infrastructure
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF PUBLIC WORKS
AND INFRASTRUCTURE
Gqeberha Regional Office
Eben Donges Building,

	WCS: 056628 East London Labour Centre				ISSUE DATE AND NO OF COPIES				
	FULL SIZE PAPER PRINTS ISSUED TO (E FOR EMAILED)			ISSUE DATE	22 Jul 25				
	DRAWING STATUS: ISSUED FOR TENDER				E				
1	USER CLIENT								
2	PROJECT MANAGER: MR S MNGENELA				1				
3	QUANTITY SURVEYOR: MR M MEIRING				1				
4	ELECTRICAL ENGINEER: MS Y DIDIBANI				1				
5	MECHANICAL ENGINEER								
ITEM	**DRAWING NO.**	**TITLE**	**SIZE**	**CURRENT REVISION**	**REVISION NO**				
		CIVIL DRAWINGS							
C.1	WCS056628/1	SITE LAYOUT PLAN	A1	--	--				
C.2	WCS056628/2	EMERGENCY WATER SUPPLY DETAILS 1	A1	--	--				
C.3	WCS056628/3	EMERGENCY WATER SUPPLY DETAILS 2	A1	--	--				
C.4	WCS056628/4	TYPICAL WATER DETAILS 1	A0	--	--				
C.5	WCS056628/5	TYPICAL WATER DETAILS 2	A0	--	--				

ISSUED BY: DATE:

RECEIVED BY: DATE:

COMMENTS

C5.2: CIVIL AND STRUCTURAL ENGINEERING DRAWINGS

A1

ISSUED FOR TENDER

DRAWING NOTES: STRUCTURAL

1 GENERAL
1.1 THIS DRAWING MUST BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS AND OTHER ASSOCIATED DRAWINGS
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3.2 BEARING CAPACITY 100KPA

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No.	DATE	AMENDMENT	D.P.W.

concept drawings
certified concept drawings as per Centralised Drawing Archive SKETCH PLAN DRAWING REQUIREMENTS

name :
date :
professional registration no. :

consultant
IN-HOUSE PROFESSIONAL SERVICES

service
EAST LONDON LABOUR CENTRE
SUPPLY AND INSTALLATION OF WATER TANKS

DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE
public works & infrastructure
Department: Public Works and Infrastructure
REPUBLIC OF SOUTH AFRICA

discipline CIVIL ENGINEERING
client
DEPARTMENT OF JUSTICE AND CONSTITUTIONAL DEVELOPMENT
employment & labour
Department: Employment and Labour
REPUBLIC OF SOUTH AFRICA

WCS number WCS 056628
drawing title
SITE LAYOUT PLAN

ref.no. —
scale 1:200
date

designed DS
drawn DS
checked —

DPW drawing number
WCS 056628 / 1
Revision

A1

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No.	DATE	AMENDMENT	D.P.W.

concept drawings
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professional registration no. :

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EAST LONDON LABOUR CENTRE
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WCS number WCS 056628
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SITE LAYOUT PLAN

ref.no. —
scale 1:200
date
designed DS
drawn DS
checked —
DPW drawing number
WCS 056628 / 1
Revision

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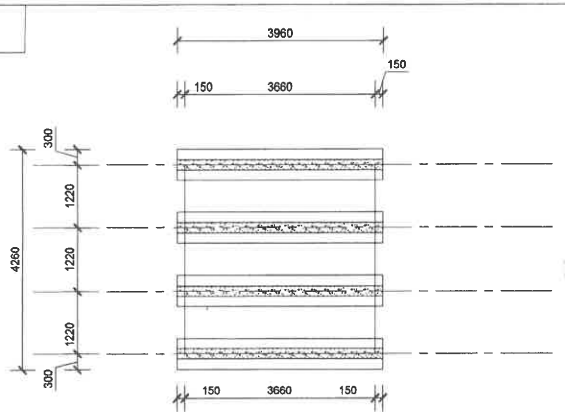
A1



PLINTH PLAN FOR
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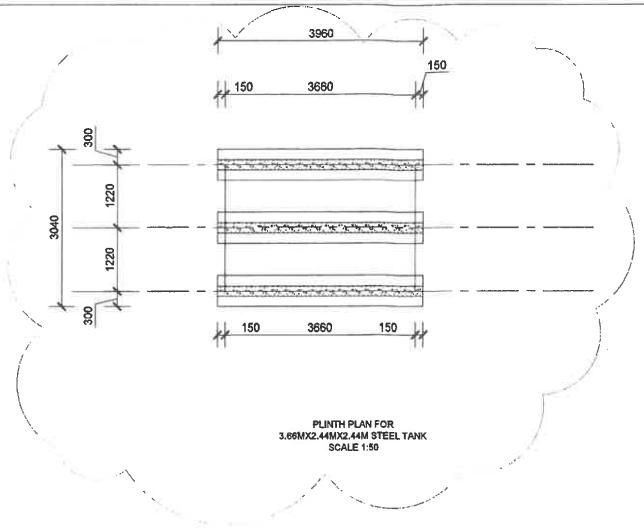

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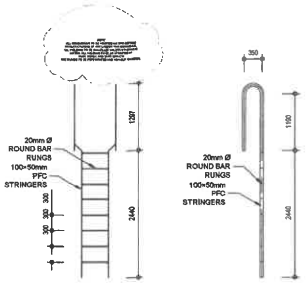

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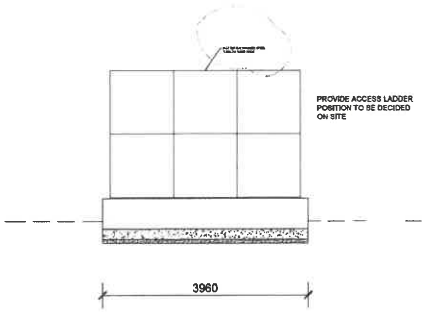

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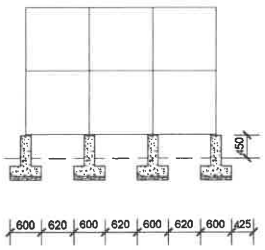

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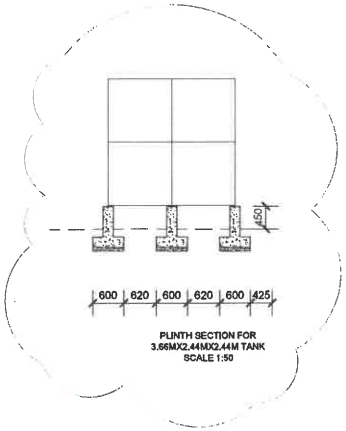
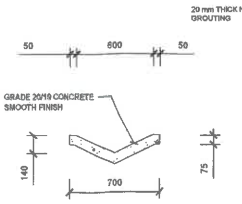


PLINTH SECTION FOR
3.66MX2.44MX2.44M TANK
SCALE 1:50

MEMBER	NO OF BARS	NO IN EACH	TYPE & SIZE	BAR MARK	TOTAL NO	LENGTH OF EACH BAR (mm)	SHAPE CODE	BENDING DIMENSIONS (mm) A	B	C	D	E/R
PLINTHS FOR 3.66MX3.66MX2.44M TANK	4	4	Y12	A	16	3610	20					
		26	Y12	B	104	900	37	200				
		13	Y12	C	52	1200	38	550	120			

MEMBER	NO OF BARS	NO IN EACH	TYPE & SIZE	BAR MARK	TOTAL NO	LENGTH OF EACH BAR (mm)	SHAPE CODE	BENDING DIMENSIONS (mm) A	B	C	D	E/R
PLINTHS FOR 3.66MX2.44MX2.44M TANK	3	4	Y12	A	12	3610	20					
		26	Y12	B	78	900	37	200				
		13	Y12	C	39	1200	38	550	120			

BENDING SCHEDULES



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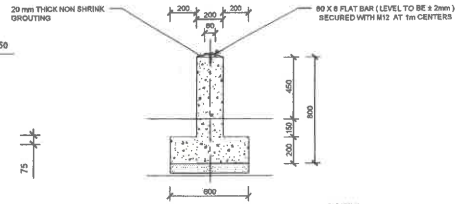

PLINTH DETAIL
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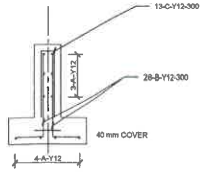

REINFORCEMENT DETAIL
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TENDER

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employment & labour
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Employment and Labour
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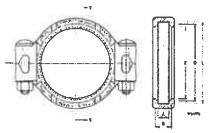
WCS number
WCS 056628
drawing title
EMERGENCY WATER SUPPLY DETAILS 1

ref no.
scale
date
designed DS
drawn DS
checked
DPW drawing number
WCS 056628 / 2
Revision

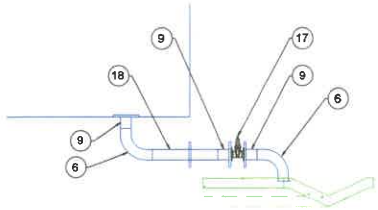
A1

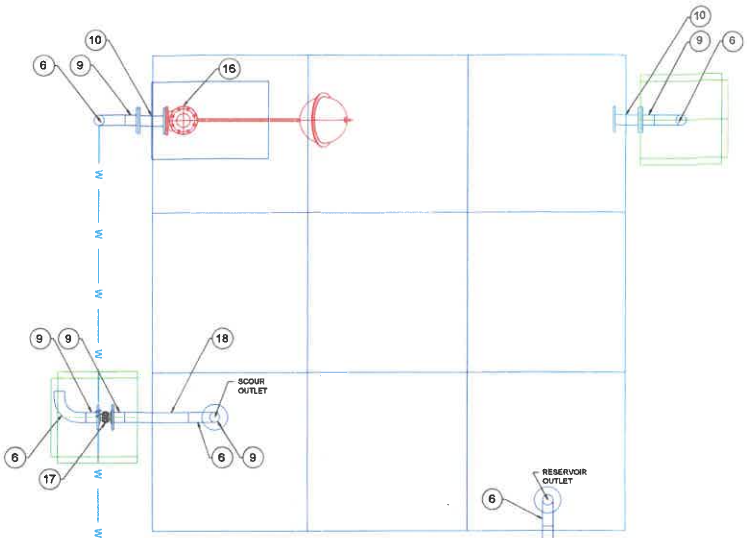


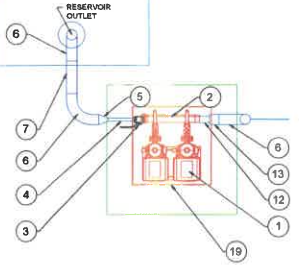
SANS 815-2 CAST IRON COUPLING

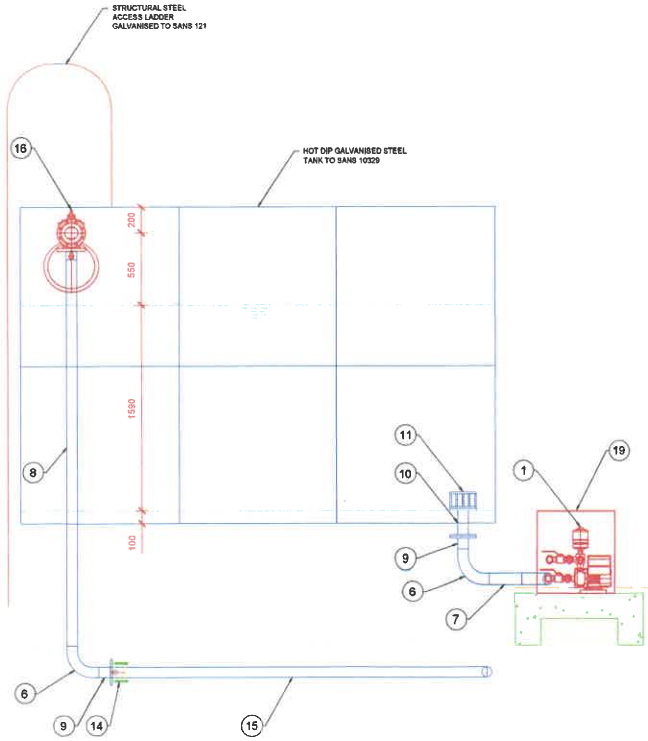
GENERAL NOTES FOR MECHANICAL SCOPE
CONTRACTOR TO SUBMIT SHOP DRAWING FOR APPROVAL BEFORE MANUFACTURING
UNLESS OTHERWISE NOTED, ALL PIPES TO BE SANS 62 MEDIUM GRADE GROOVED TO SANS 813-2 AND HOT DIP GALVANISED TO SANS
ALL GROOVED PIPES TO BE CONNECTED WITH CAST IRON COUPLINGS AS PER PG 1600 OF SANS 813-2 WITH SUITABLE
UNLESS OTHERWISE NOTED, ALL FITTINGS TO BE SANS 813-2, ALL PIPE FLANGES TO SANS 1123 FOR PN16, ALL PIPE THREADS TO SANS

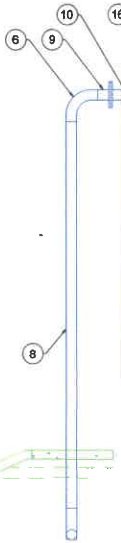
ITEM	DESCRIPTION	NO. OFF
1	TWIN BOOSTER PUMP COMPLETE WITH VARIABLE SPEED DRIVE (1.1kW, 2.5-7.0 M³/H AND 30M) COMPLETE WITH BOLTS AND VIBRATION DAMPERS	1
2	650MM PIPE MANIFOLD COMPLETE WITH 2 BALL VALVES CONNECTED TO THE PUMP	2
5	65MM FULLWAY ISOLATING BALL VALVE WITH PLASTIC COATED STAINLESS STEEL LEVER. BSP FEMALE CONNECTION ENDS, SANS 1058-3	1
4	65MM X 300MM PIPE WITH EXTERNAL THREADS BOTH SIDES	1
5	SPECIAL ECCENTRIC REDUCER 80MM TO 25MM, 25MM INTERNAL THREAD AND 80MM GROOVE	1
6	80MM 90° BEND GROOVED BOTH ENDS	8
7	80MM X 250MM PIPE GROOVED BOTH ENDS	1
8	80MM X 3M PIPE GROOVED BOTH ENDS AND PIPE SUPPORTS AT 1.5M INTERVALS	1
9	80MM GROOVED-TO-FLANGED ADAPTOR	8
10	80MM X 200MM PIPE FLANGED BOTH ENDS	4
11	ANTI-VORTEX PLATE / VORTEX INHIBITOR	1
12	80MM x 65MM REDUCER GROOVED BOTH ENDS	1
13	650 X 625MM REDUCER GROOVED 650MM END AND EXTERNAL THREADED ON 65MM END	1
14	65MM FLANGE ADAPTOR TO SANS 986-1	2
15	65MM UPVC PIPE CLASS 9 TO SANS 986-1	SEE LAYOUT
16	65MM FLOAT VALVE FLANGED, STAINLESS STEEL VALVE TRIM. SANS 1606-32	1
17	65MM RESILIENT SEATED GATE VALVE 65MM SPINDLE TYPE TO SANS 664-1 FLANGED BOTH ENDS	1
18	65MM X 500MM PIPE WITH PUDDLE FLANGE AND GROOVED BOTH ENDS	1
19	650MM X 500MM X 650MM IP56 VENTILATED OUTDOOR LOCKABLE VANDAL PROOF PUMP ENCLOSURE 5MM THICK HOT DIP GALVANISED STEEL BOLTED TO THE CONCRETE, DETAILS MUST BE SUBMITTED FOR ACCEPTANCE PRIOR TO PROCUREMENT	1

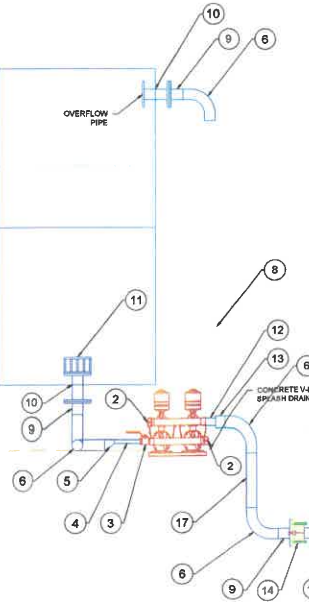












ISSUED FOR TENDER

No.	DATE	AMENDMENT	D.P.W.

concept drawings

certified concept drawings as per Controlled Drawing Archive SKETCH PLAN DRAWING REQUIREMENTS

name :

date :

professional registration no. :

consultant

INHOUSE PROFESSIONAL SERVICES

service EAST LONDON LABOUR CENTRE: SUPPLY AND INSTALLATION OF WATER TANKS

DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE

public works & infrastructure

Department: Public Works and Infrastructure REPUBLIC OF SOUTH AFRICA

discipline CIVIL ENGINEERING

client DEPARTMENT OF JUSTICE AND CONSTITUTIONAL DEVELOPMENT

employment & labour

Department: Employment and Labour REPUBLIC OF SOUTH AFRICA

WCS number WCS 056628

drawing title EMERGENCY WATER SUPPLY DETAILS 2

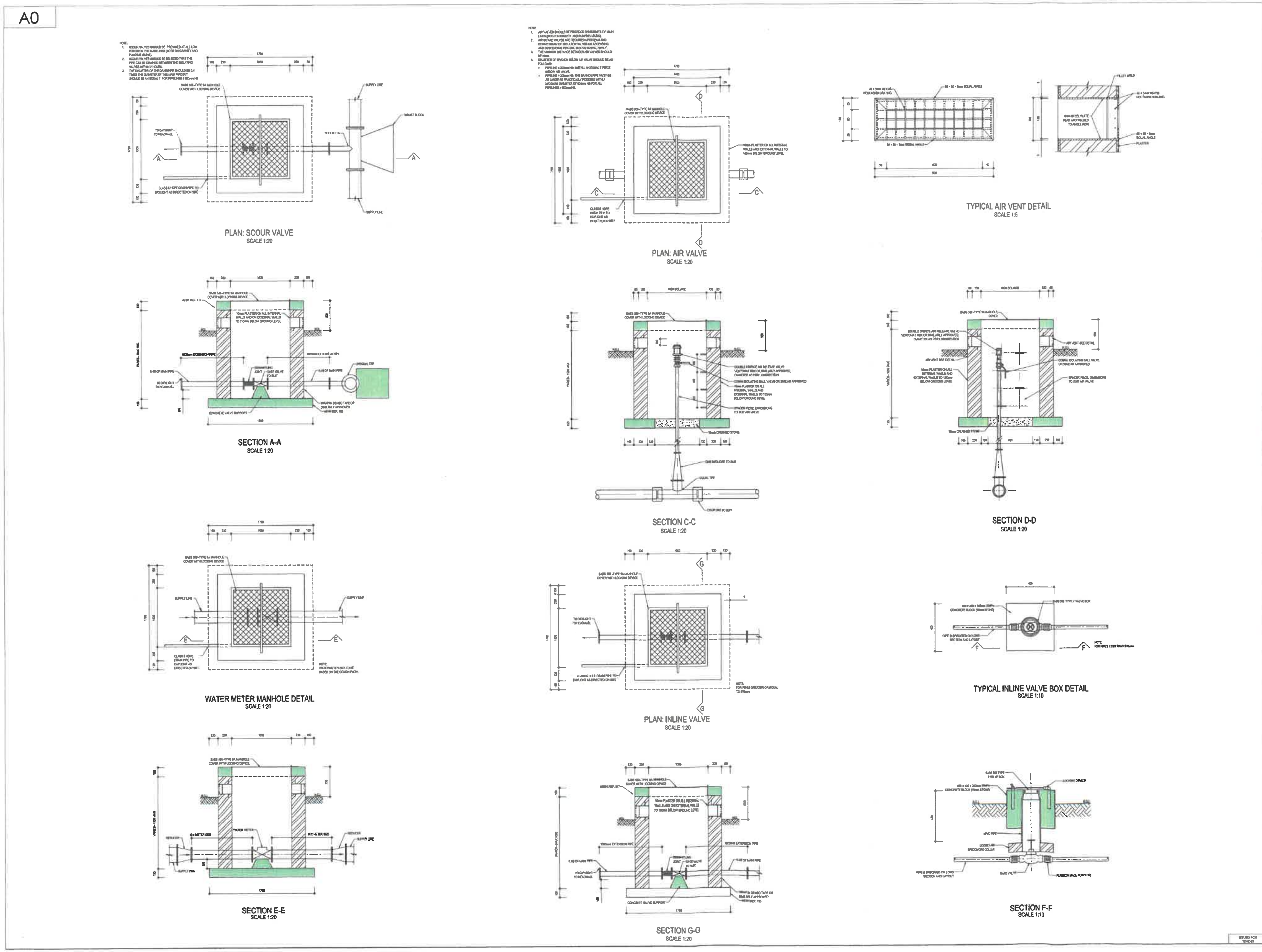
ref.no. ---- designed DS

scale 1:20 drawn DS

date checked ---

DPW drawing number WCS 056628 / 3

Revision



IN-HOUSE PROFESSIONAL SERVICES

EAST LONDON LABOUR CENTRE SUPPLY AND INSTALLATION OF WATER TANKS

DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE

public works & infrastructure
Department: Public Works and Infrastructure
REPUBLIC OF SOUTH AFRICA

CIVIL ENGINEERING

DEPARTMENT OF EMPLOYMENT AND LABOUR

employment & labour
Department: Employment and Labour
REPUBLIC OF SOUTH AFRICA

WCS 056628

TYPICAL WATER DETAILS 1

AS SHOWN

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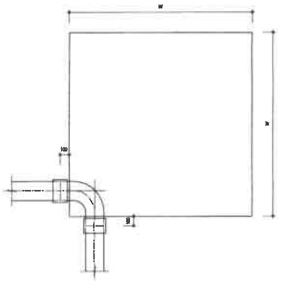
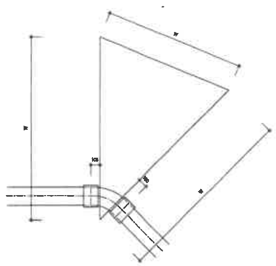


COUPLINGS
SCALE 1:20



COUPLINGS
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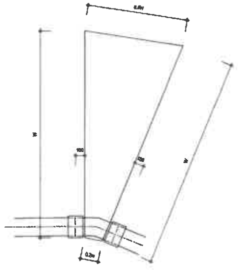
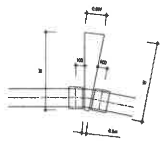


COUPLINGS
SCALE 1:20



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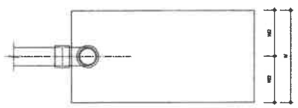
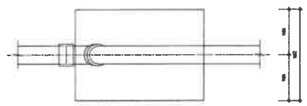
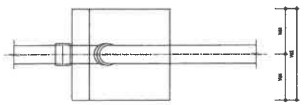


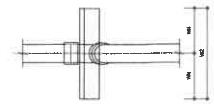
90° BEND
SCALE 1:20



45° BEND
SCALE 1:20



22.5° BEND
SCALE 1:20



11.25° BEND
SCALE 1:20

	VALUE OF 'W' IN METRES																																			
OPERATING PRESSURE Mpa	0.3				0.6				0.9				1.2				1.6				1.8				[illegible]				2.5				3.4			
BENDS	90	45	22.5	11.25	90	45	22.5	11.25	90	45	22.5	11.25	90	45	22.5	11.25	90	45	22.5	11.25	90	45	22.5	11.25	90	45	22.5	11.25	90	45	22.5	11.25	90	45	22.5	11.25
NOMINAL DIAMETER OF PIPE IN mm. 50	0.41	0.42	0.40	0.30	0.52	0.55	0.50	0.30	0.61	0.66	0.55	0.33	0.80	0.74	0.56	0.50	0.87	0.78	0.80	0.30	0.80	0.80	0.62	0.30	0.70	0.52	0.42	0.25	0.80	0.58	0.45	0.25	0.85	0.75	0.57	0.41
75	0.53	0.98	0.50	0.30	0.70	0.71	0.70	0.30	0.68	0.81	0.68	0.35	0.84	0.84	0.63	0.40	0.96	0.86	0.65	0.50	0.96	0.98	0.70	0.55	1.10	0.75	0.57	0.30	1.20	0.82	0.63	0.35	1.30	1.02	0.78	0.54
90-110	0.67	0.68	0.68	0.35	0.85	0.84	0.75	0.40	0.97	0.86	0.76	0.46	1.06	0.83	0.80	0.50	1.17	1.20	0.86	0.55	1.20	1.22	0.90	0.60	1.30	0.88	0.70	0.37	1.45	0.98	0.75	0.42	1.67	1.38	1.04	0.79
125	0.70	0.70	0.67	0.40	0.85	0.86	0.85	0.42	1.20	1.05	0.90	0.50	1.30	1.10	0.95	0.62	1.40	1.30	1.05	0.65	1.53	1.45	1.10	0.70	1.80	1.15	0.95	0.50	2.00	1.25	1.00	0.56	2.00	1.44	1.14	0.87
150	0.86	0.90	0.80	0.46	1.10	1.14	1.00	0.50	1.30	1.30	1.05	0.55	1.45	1.30	1.10	0.65	1.58	1.47	1.20	0.70	1.65	1.80	1.25	0.75	2.10	1.31	1.05	0.60	2.40	1.46	1.15	0.63	2.40	1.66	1.30	1.00
200	1.08	1.10	1.00	0.50	1.44	1.37	1.05	0.55	1.57	1.50	1.10	0.80	1.81	1.72	1.15	0.70	2.10	1.90	1.25	0.75	0.23	2.00	1.35	0.80	2.75	1.63	1.32	0.75	3.00	1.82	1.45	0.82	3.00	2.08	1.60	1.24
250	1.35	1.00	0.80	0.50	1.70	1.40	0.80	0.55	1.90	1.50	1.10	0.80	2.10	1.80	1.20	0.70	2.35	1.98	1.50	0.80	2.41	2.06	1.50	0.83	3.40	2.15	1.58	0.92	3.70	2.30	1.72	1.00	3.70	2.38	1.86	1.48
300	1.40	1.20	0.80	0.50	1.80	1.40	1.10	0.55	2.15	1.65	1.20	0.75	2.40	1.85	1.40	0.80	2.66	2.10	1.80	0.80	2.80	2.20	1.70	0.86	4.00	2.23	1.80	1.10	4.35	2.45	2.00	1.15	4.33	2.68	2.13	1.66
350	2.00	1.35	1.00	0.70	2.65	1.75	1.30	0.75	3.25	2.00	1.56	0.86	3.65	2.25	1.70	1.00	4.15	2.60	1.90	1.10	4.30	2.75	2.00	2.15	4.50	2.80	2.10	1.20	5.00	3.00	2.25	1.30	5.00	2.87	2.35	1.85
400	2.20	1.50	1.10	0.80	2.00	1.95	1.46	0.86	3.60	2.25	1.70	1.00	4.10	2.50	1.85	1.10	4.80	2.75	2.10	1.25	4.85	2.90	2.20	1.30	5.10	3.10	2.30	1.35	5.66	3.30	2.45	1.45	5.68	3.25	2.60	2.04
450	[illegible]	1.60	1.20	0.90	3.15	2.10	1.55	0.90	4.00	2.50	1.80	1.10	4.50	2.75	2.10	1.20	5.20	3.10	2.30	1.35	3.60	3.20	2.40	1.40	5.80	3.40	2.50	1.50	6.20	3.60	2.70	1.60	6.20	3.52	2.80	2.20

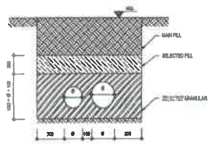
THRUST BLOCK SIZE TABLE

MATERIALS	DESCRIPTION	COMPACTION
SELECTED GRANULAR	GRANULAR NON COHESIVE MATERIAL 90% PASSING (5mm SIEVE)	100% MOD AASHTO DENSITY
SELECTED BACKFILL	GRANULAR NON COHESIVE MATERIAL 90% PASSING (12mm SIEVE)	IN 150mm LAYERS a. 95% MOD AASHTO UNDER ROADS b. 90% MOD AASHTO IN FIELDS
BACKFILL	EXCAVATED MATERIAL MAXIMUM SIZE 150mm	IN 150mm LAYERS a. 95% MOD AASHTO
CONCRETE BEDDING	MIX 15	

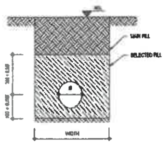
TABLE: BACKFILL AND BEDDING

TRENCH WIDTH	
PIPE Ø(mm) O.D.	SIDE ALLOWANCE ON EACH SIDE (mm)
- TO 125	300
125 TO 700	300
700 TO 1000	400
1000 TO 2000	500
2000 TO -	600

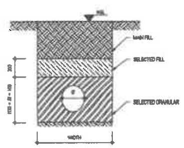
NOTES:
1. A FLEXIBLE PVC MEMBRANE TO BE INSERTED ON THE CONTACT FACE BETWEEN THE PIPE OR FITTING AND THE CONCRETE THRUST BLOCK.
2. CONCRETE MIX 20MPa.



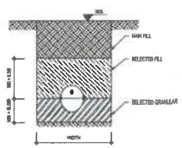
SECTION THROUGH TRENCH
TWO PIPES IN SAME TRENCH
SCALE 1:20



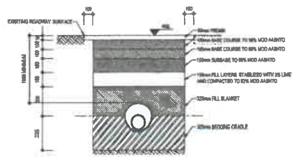
DUCTILE IRON PIPE



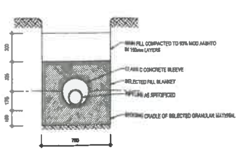
FLEXIBLE PIPE
SECTION THROUGH TRENCH
SCALE 1:20



CONCRETE PIPE



TYPICAL SECTION THROUGH SLEEVE
PIPE IN ROAD RESERVE
SCALE 1:20



TYPICAL SECTION THROUGH SLEEVE
PIPE IN ROAD RESERVE
SCALE 1:20

DRAWING NOTES

1 GENERAL
1.1 THIS DRAWING MUST BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS AND OTHER ASSOCIATED DRAWINGS
1.2 ALL WORK MUST BE COORDINATED WITH OTHER DISCIPLINES AND THE ARCHITECT'S DRAWINGS TAKES PRECEDENCE OVER THIS DRAWING
1.3 ALL WORK MUST BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS
1.4 ANY DISCREPENCIES ON THE DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE THE WORK IS DONE
1.5 ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE NOTED
1.6 ONLY FIGURED DIMENSIONS MUST BE USED FOR CONSTRUCTION
1.7 NO WORK MUST BE COVERED WITHOUT THE ENGINEER'S CONSENT
1.8 SHORING OF EXCAVATIONS MUST BE PROVIDED WHERE THE TRENCH IS WITHIN 1.5M AWAY AND IS PARALLEL TO THE BUILDING, AND EXTENDS BELOW THE FOUNDATION FOOTING
1.9 ALL WORK SHALL BE SUBJECT TO ACCEPTANCE TESTS AS REQUIRED IN TERMS OF THE SPECIFICATIONS
1.10 ALL CONCRETE WORKS SHALL BE GRADE 20/19 IN ACCORDANCE WITH SANS 2001 CC1 UNLESS OTHERWISE NOTED
1.11 MINIMUM COVER TO UNDERGROUND PIPES 600MM UNLESS OTHERWISE INSTRUCTED

2 WATER
ALL WORK MUST BE CARRIED IN STRICT ACCORDANCE WITH SANS 2001-DP6
2.1 PIPES BELOW GROUND
2.1.1 NOT EXCEEDING Ø75MM SHALL BE HDPE PE 80 PN 10 COMPLYING WITH SANS 4427 UNLESS OTHERWISE NOTED
2.2.2 EXCEEDING Ø75MM SHALL BE UPVC CLASS 9 COMPLYING WITH SANS 966-1 UNLESS OTHERWISE NOTED
2.2 PIPES ABOVE GROUND
2.2.1 NOT EXCEEDING Ø150MM SHALL BE HOT DIP GALVANISED STEEL MEDIUM CLASS COMPLYING WITH SANS 62 UNLESS OTHERWISE NOTED
2.2.2 EXCEEDING Ø150MM SHALL BE 4.5MM HOT DIP GALVANISED STEEL GRADE B COMPLYING WITH SANS 719 UNLESS OTHERWISE NOTED
2.2.3 HOT DIP GALVANISED STEEL PIPES MUST BE QUALITY DESIGNATION A 1 (FOR PORTABLE WATER) COMPLYING WITH SANS 32
2.2.4 ALL FLANGES SHALL BE DRILLED TO SANS 1123 VALVES
2.2.5 ALL VALVES SHALL BE RESILIENT SEAL GATE VALVES TO SANS 664

3 SEWER
3.1 ALL WORK MUST BE CARRIED IN STRICT ACCORDANCE WITH SANS 2001-DP7
3.2 ALL PIPES AND FITTINGS BELOW GROUND SHALL BE CLASS 34 UPVC PIPES COMPLYING WITH SANS 791
3.3 ALL PIPES AND FITTINGS ABOVE GROUND SHALL MINIMUM Ø110MM UPVC PIPES COMPLYING WITH SANS 967
3.4 THE SPACING BETWEEN A SEWER AND ANY CROSSING SERVICES (CABLE OR PIPE) SHALL BE AT LEAST 300MM

4 PAVING AND STORMWATER
4.1 ALL WORK SHALL BE IN ACCORDANCE WITH SANS 2001 DP5, SANS 1200 MJ, SANS 1200DK AS AMENDED BY THE PROJECT SPECIFICATIONS
4.2 THE PAVERS SHALL BE CLASS 30/2.0 COMPLYING WITH SANS 1058
4.3 THE KERBS AND CHANNELS SHALL BE IN ACCORDANCE WITH SANS 927

ISSUED FOR TENDER

consultant: IN-HOUSE PROFESSIONAL SERVICES

service: EAST LONDON LABOUR CENTRE SUPPLY AND INSTALLATION OF WATER TANKS

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drawn: DS
checked: —
DPW drawing number: WCS 066628/ 5