A.1 GENERAL

1. THE VARIOUS DOCUMENTS SHALL HAVE THE FOLLOWING DESCENDING ORDER OF PRECEDENCE:
   - DRAWINGS
   - PROJECT SPECIFICATIONS
   - STANDARD SPECIFICATIONS
   - SCHEDULE OF QUANTITIES
2. ALL MATERIALS, WORKMANSHIP AND TESTING MUST COMPLY WITH REQUIREMENTS OF THE LATEST PROJECT SPECIFICATIONS, SANS SPECIFICATIONS AND COLTO SPECIFICATIONS.
3. THE LATEST EDITION OF ANY STANDARD SPECIFICATION SHALL APPLY.
4. A COMPETENT, QUALIFIED SURVEYOR TO SET OUT ALL EXISTING SERVICES ACCORDING TO CO-ORDINATES ON PLANS.
5. ALL SETTING OUT MUST BE APPROVED BY THE ENGINEER OR THE ENGINEER'S SITE REPRESENTATIVE.
6. CONTRACTOR SHALL EXPOSE ALL EXISTING SERVICES WHICH MUST BE CONNECTED TO PRIOR TO ANY WORK BEING DONE. WORK MAY ONLY COMMENCE ONCE THE ENGINEER HAS CHECKED THAT THE CONNECTIONS ARE POSSIBLE AND WRITTEN APPROVAL GIVEN FOR COMMENCEMENT OF WORK.
7. ALL EARTHWORKS AND SERVICES TO BE SET OUT BY A COMPETENT AND QUALIFIED SURVEYOR ACCORDING TO CO-ORDINATES ON PLANS.
8. ALL BENCHMARKS TO BE CHECKED BY A COMPETENT LAND SURVEYOR AND AGREED UPON IN WRITING PRIOR TO ANY CONSTRUCTION WORK COMMENCES.
9. CONTRACTOR TO OBTAIN APPROVAL TO CONNECT UP WITH EXISTING INFRASTRUCTURE AND TO COMPLY WITH LOCAL AUTHORITY REGULATIONS.

A.2 WORK TO COMPLY WITH THE FOLLOWING STANDARD SPECIFICATIONS

1. THE FOLLOWING STANDARDIZED SPECIFICATIONS ARE APPLICABLE TO THE SERVICES RE-LOCATIONS FOR CIVIL ENGINEERING CONSTRUCTION SANS1200:
   - SANS 1200 D :EARTHWORKS
   - SANS 1200 DB :EARTHWORKS (PIPE TRENCHES)
   - SANS 1200 L :MEDIUM PRESSURE PIPE LINES
   - SANS 1200 LB :BEDDING (PIPES)
   - SANS 1200 LC :CABLE DUCTS
   - SANS 1200 LD :SEWERS

B. EARTHWORKS NOTES

1. THE INFORMATION PROVIDED IS AS PER THE TOPOGRAPHICAL SURVEY RECEIVED. ALL INFORMATION REGARDING THE SURVEY SHOULD BE VERIFIED PRIOR TO ANY WORKS COMMENCING.
2. CLEAR AND REMOVE ALL DEBRIS, UNMARKED TREES, GRASS AND RUBBLE FROM PLATFORM / AFFECTED VERGE AREAS.
3. EXCAVATE TO SPOIL ALL TOPSOIL EXCEPT THAT WHICH IS REQUIRED FOR LANDSCAPING / SHAPING, WHICH MUST BE STOCKPILED AS DIRECTED BY THE RELEVANT PROFESSIONAL.
4. EXCAVATED MATERIAL TO BE USED AS DIRECTED BY THE ENGINEER.
5. ALL EXCAVATION AND/OR FILL BATTERS TO BE AS INDICATED ON THE APPROPRIATE DRAWINGS.
6. ALL BULK FILL WITH APPROVED MATERIAL (G7) AS APPROPRIATE COMPACTED IN 150mm MAX THICK LAYERS TO 93% MODIFIED AASHTO DENSITY.
7. CARE TO BE TAKEN WHEN CUTTING OR EXCAVATING SO AS NOT TO DAMAGE SERVICE ELEMENTS SUCH AS WATER PIPES, SEWERS, GPO LINES, ELECTRICAL CABLES, ETC. REMOVAL OF SUCH ITEMS TO BE TO THE APPROVAL OF THE RELEVANT AUTHORITIES AND PROFESSIONAL CONSULTANT.
8. IF THE EMBANKMENT SLOPES SHOWN ON THE DRAWING CANNOT BE SAFELY CONSTRUCTED, THE REVISED SLOPES MUST BE AGREED ON BY THE ENGINEER ON SITE AT COMMENCEMENT OF CONSTRUCTION.
9. SETTING OUT OF BULK EARTHWORKS GIVEN TO THE NEAREST mm TO COINCIDE WITH ARCHITECT DIMENSIONS (IF APPLICABLE). THE CONTRACTOR MAY, IN SETTING OUT, ROUND OFF TO THE NEAREST 10mm.
   PERMISSIBLE DEVIATION OF LEVEL IS PER SANS1200, DEGREE OF ACCURACY II.
10. ALL EARTHWORKS TO BE IN ACCORDANCE WITH SANS1200D, AMENDMENTS THERETO AND ZUTARI PROJECT SPECIFICATIONS.
11. ALL FLOOR LEVELS SHOWN ON THE DRAWINGS ARE FINAL FLOOR LEVELS WITHIN BUILDINGS.
12. ALL FINISHED LEVELS SHALL ENSURE THAT NO STORM WATER WILL POND.
13. ALL PAVING LEVELS SHOWN ON THE DRAWINGS ARE FINAL PAVING LEVELS WITHIN THE SITE BOUNDARY.
14. THE CONTOURS AND NATURAL GROUND LEVELS REFLECTED ON THE DRAWING ARE AS PER SURVEY DATA SUPPLIED TO ZUTARI. THE CONTRACTOR IS TO CHECK THE ACCURACY OF THIS INFORMATION AND REPORT ANY DISCREPANCY IMMEDIATELY TO THE ENGINEER, PRIOR TO CONSTRUCTION.
15. THE CONTRACTOR SHALL FIND AN APPROPRIATE SITE TO SPOIL EXCESS MATERIAL.
16. MINIMUM NUMBER OF INDEPENDENT PROCESS CONTROL TESTS REQUIRED: FOR EACH TYPE OF MATERIAL.
    - RELATIVE COMPACTION - 4 TESTS/500m²/150mm THICKNESS.
    - INDICATOR TESTS, CBR, UCS AND GRADING ANALYSIS OF EACH MATERIAL
    - REIMBURSEMENT FOR PROCESS CONTROL TESTS SHALL BE INCLUDED IN RATES SUBMITTED.
14. AN AS BUILT SURVEY OF THE COMPLETED BULK EARTHWORKS PLATFORMS IS TO BE PROVIDED TO THE ENGINEER ON COMPLETION.
15. REFER TO OTHER INFRASTRUCTURE DRAWINGS FOR SERVICES TO BE INSTALLED.
16. TOPSOIL SHALL BE STOCKPILED SEPARATELY FROM OTHER MATERIALS AND PREVENTED FROM MOVEMENT.
17. EXCAVATED SUBSOIL, WHERE NOT CONTAMINATED, MUST BE USED FOR BACKFILLING, IF POSSIBLE, AND TOPSOIL FOR LANDSCAPING AND REHABILITATION OF DISTURBED AREAS.
18. WHERE TOPSOIL HAS BECOME MIXED WITH SUBSOIL OR IS NOT UP TO THE ORIGINAL STANDARD, FERTILIZER OR NEW TOPSOIL SHALL BE PROVIDED BY THE CONTRACTOR.

C. STRIPPING AND STOCKPILING TOPSOIL

1. THE CONTRACTOR SHALL STRIP THE TOPSOIL, WHICH INCLUDES THE TOP 200 mm OF SOIL (OR TO THE DEPTH OF THE BEDROCK WHERE THE SOIL IS SHALLOWER THAN 200 mm) AND ROOT MATERIAL OF CLEARED VEGETATION. FOR SUBSEQUENT USE DURING REHABILITATION AND RE-VEGETATION.
2. TOPSOIL SHALL BE STRIPPED FROM ALL AREAS OF THE WORKING AREA WHERE TOPSOIL WILL BE IMPACTED BY CONSTRUCTION ACTIVITIES, INCLUDING AREAS FOR TEMPORARY FACILITIES, AS DIRECTED BY THE ENVIRONMENTAL CONSULTANT. IF THE CONTRACTOR FAILS TO CONSERVE TOPSOIL AS INSTRUCTED, HE SHALL OBTAIN SUITABLE SUBSTITUTE MATERIAL FROM OTHER SOURCES, APPROVED BY A ENVIRONMENTAL CONSULTANT, WITHOUT ANY ADDITIONAL PAYMENT.
3. LOCATION AND TREATMENT OF MATERIAL STOCKPILES TAKING INTO CONSIDERATION PREVAILING WIND DIRECTIONS AND LOCATION OF SENSITIVE RECEPTORS.
4. THE VARIOUS SOIL LAYERS SHALL BE REMOVED AND STOCKPILED SEPARATELY. TOPSOIL COLLECTED FROM DIFFERENT AREAS SHALL BE STOCKPILED SEPARATELY AND REPLACED IN THE SAME AREAS FROM WHICH IT WAS TAKEN. FURTHERMORE, TOPSOIL SHALL BE STOCKPILED SEPARATELY FROM SUBSOIL.
5. WHERE POSSIBLE, STOCKPILES SHALL BE LOCATED ON PREVIOUSLY DISTURBED AREAS OR IN AREAS WHERE THEY POSE THE MINIMUM RISK OF CAUSING FURTHER ENVIRONMENTAL DEGRADATION. TOPSOIL AND SUBSOIL STOCKPILES SHALL NOT EXCEED 2m IN HEIGHT AND SHALL BE SO PLACED AS TO OCCUPY THE MINIMUM WIDTH COMPATIBLE WITH THE NATURAL ANGLE OF REPOSE OF THE MATERIAL, AND MEASURES SHALL BE TAKEN TO PREVENT THE MATERIAL FROM BEING SPREAD OVER TOO WIDE A SURFACE.
6. WHERE REQUIRED, APPROPRIATE PRECAUTIONS SHALL BE TAKEN TO PREVENT THE EROSION AND LIMIT THE COMPACTION OF THE STOCKPILES. THE CONTRACTOR SHALL ENSURE THAT ALL STOCKPILES DO NOT CAUSE THE DAMMING OF WATER OR RUN OFF OR ARE THEMSELVES WASHED AWAY. STOCKPILES SHALL BE VEGETATED WITH INDIGENOUS GRASSES OR SHALL BE COVERED WITH HESSIAN.
7. WHERE PRACTICAL, TOPSOIL SHALL NOT BE LEFT FOR LONGER THAN SIX MONTHS BEFORE BEING USED FOR REHABILITATION. IF STORED FOR LONGER THAN SIX MONTHS, THE TOPSOIL SHALL BE ANALYSED AND, IF NECESSARY, UPGRADED BEFORE PLACEMENT.
8. TOPSOIL SHOULD BE TEMPORARILY STOCKPILED, SEPARATELY FROM (CLAY) SUBSOIL AND ROCKY MATERIAL, WHEN AREAS ARE CLEARED. IF MIXED WITH CLAY OR SUB-SOIL THE USEFULNESS OF THE TOPSOIL FOR REHABILITATION OF THE SITE WILL BE LOST. STOCKPILED TOPSOIL SHALL NOT BE COMPACTED AND SHOULD BE REPLACED AS THE FINAL SOIL LAYER.
9. NO VEHICLES ARE ALLOWED ACCESS ONTO THE STOCKPILES AFTER THEY HAVE BEEN PLACED.
10. TOPSOIL STRIPPED FROM DIFFERENT SITES MUST BE STOCKPILED SEPARATELY AND CLEARLY IDENTIFIED AS SUCH. TOPSOIL OBTAINED FROM SITES WITH DIFFERENT SOIL TYPES MUST NOT BE MIXED.
11. TOPSOIL STOCKPILES MUST NOT BE CONTAMINATED WITH OIL, DIESEL, PETROL, WASTE OR ANY OTHER FOREIGN MATTER, WHICH MAY INHIBIT THE LATER GROWTH OF VEGETATION AND MICRO-ORGANISMS IN THE SOIL.

D. EROSION AND SEDIMENTATION CONTROL

1. THE CONTRACTOR SHALL TAKE ALL REASONABLE MEASURES TO LIMIT EROSION AND SEDIMENTATION DUE TO THE CONSTRUCTION ACTIVITIES AND SHALL INCLUDE IN THE DESIGN OF THE SITE WORKS MEASURES TO PREVENT SUCH OCCURRENCES. THE WORKS SHALL BE PHASED, AND DEVELOPMENT STAGED SO THAT STRIPPED AREAS ARE KEPT TO A MINIMUM.
2. THE CONTRACTOR SHALL ENSURE THAT THE STABILISATION OF CLEARED AREAS IS ACTIVELY MANAGED TO PREVENT AND CONTROL EROSION.
3. SURFACE STORMWATER SHALL NOT BE ALLOWED TO BE CONCENTRATED AND TO FLOW DOWN CUT OR FILL SLOPES, ACCESS ROADS OR OTHER AREAS PRONE TO EROSION WITHOUT EROSION PROTECTION MEASURES BEING IN PLACE. ACCORDINGLY, THE NECESSARY TEMPORARY AND PERMANENT DRAINAGE WORKS SHALL BE INSTALLED AS SOON AS POSSIBLE.
4. FOR ACCESS ROADS ON SLOPING TERRAIN, WATER DIVERSION BERMS SHALL BE INSTALLED IMMEDIATELY AFTER THE ROAD IS OPENED AND SHALL BE 2-4m IN WIDTH WITH A MINIMUM COMPACTED HEIGHT OF 350mm AND OUTLETS OF 2m IN LENGTH.
5. THE SPACING OF THE WATER DIVERSION BERMS SHALL BE INVERSELY PROPORTIONAL TO THE SLOPE OF THE ACCESS ROAD, RANGING FROM A SPACING OF 60m FOR A 2% SLOPE TO 10m WHERE THE SLOPE IS GREATER THAN 15%.
6. EROSION SHALL NOT BE ALLOWED TO DEVELOP ON A LARGE SCALE BEFORE REPAIRS ARE AFFECTED AND ALL EROSION DAMAGE SHALL BE REPAIRED AS SOON AS IT HAS BEEN DETECTED. IN THIS REGARD, ANY RUNNELS OR EROSION CHANNELS THAT DEVELOP DURING THE CONSTRUCTION SHALL IMMEDIATELY BE BACKFILLED AND COMPACTED AND THE AREAS RESTORED TO A PROPER STABLE CONDITION.
7. THE LANDSCAPING AND REHABILITATION OF DISTURBED AREAS SHALL OCCUR AS SOON AS PRACTICALLY POSSIBLE FOLLOWING THE CESSATION OF THE WORK IN A SPECIFIC AREA. IN THIS REGARD, THE CONTRACTOR'S WORKS PROGRAMME SHALL CLEARLY INDICATE THAT THE REHABILITATION WILL IMMEDIATELY BE EXECUTED, PER PHASE, UPON THE COMPLETION OF THE WORKS WITHIN A SPECIFIC AREA.
8. TRAFFIC AND MOVEMENT OVER STABILISED AREAS SHALL BE RESTRICTED AND CONTROLLED, AND DAMAGE TO STABILISED AREA SHALL BE REPAIRED AND MAINTAINED TO THE SATISFACTION OF THE ENVIRONMENTAL CONSULTANT.

E. STOCKPILING, SOIL MANAGEMENT AND PROTECTION OF FLORA

1. THE CONTRACTOR SHALL MEASURE THE EXTENT OF ALL AREAS CLEARED FOR CONSTRUCTION PURPOSES AND KEEP THIS FIGURE UPDATED. SENSITIVE AREAS SHALL BE CORDONED OFF AND AVOIDED IN THIS REGARD. REFER TO ENVIRONMENTAL CONSULTANT'S REQUIREMENTS AND SPECIFICATIONS.
2. STOCKPILING MAY ONLY TAKE PLACE IN DESIGNATED AREAS INDICATED ON THE APPROVED SITE LAYOUT PLAN.
3. ANY AREA TO BE USED FOR STOCKPILING OR MATERIAL LAYDOWN SHALL BE STRIPPED OF ALL TOPSOIL. CLEARANCE OF VEGETATION SHALL BE RESTRICTED TO THAT WHICH IS REQUIRED TO FACILITATE THE EXECUTION OF THE WORKS. VEGETATION CLEARANCE SHALL OCCUR IN A PLANNED MANNER, AND CLEARED AREAS SHALL BE STABILISED AS SOON AS POSSIBLE WHEN AND WHERE NECESSARY. THE DETAIL OF VEGETATION CLEARING SHALL BE SUBJECT TO THE ENVIRONMENTAL CONSULTANT'S APPROVAL AND SHALL OCCUR IN CONSULTATION WITH THE SAPS.
4. STOCKPILES MUST BE POSITIONED IN AREAS SHELTERED FROM THE WIND AND RAIN TO PREVENT EROSION AND DISPERSION OF LOOSE MATERIALS.
5. NO VEGETATION LOCATED OUTSIDE THE CONSTRUCTION SITE SHALL BE DESTROYED OR DAMAGED. AS FAR AS IS REASONABLY PRACTICABLE, EXISTING ROADS MUST BE USED FOR ACCESS TO THE SITE.
6. PRIOR TO SITE CLEARANCE OF NUTURAL AREAS PLANTS SHALL BE HARVESTED AS PER ENVIRONMENTAL SPECIFICATION.
7. NO DUMPING OF SOLID WASTE OR REFUSE SHALL BE ALLOWED WITHIN OR ADJACENT TO AREAS OF NATURAL VEGETATION.
8. THE CONTRACTOR SHALL IDENTIFY AND ERADICATE ALL DECLARED ALIEN AND INVASIVE PLANT SPECIES OCCURRING ON SITE. SOIL SHOULD BE EXPOSED FOR THE MINIMUM TIME POSSIBLE ONCE CLEARED OF INVASIVE VEGETATION, THAT IS THE TIMING OF CLEARING AND GRUBBING SHOULD BE CO-ORDINATED AS MUCH AS POSSIBLE TO AVOID PROLONGED EXPOSURE OF SOILS TO WIND AND WATER EROSION.
9. ALL EQUIPMENT MUST BE INSPECTED REGULARLY FOR OIL OR FUEL LEAKS BEFORE IT IS OPERATED. LEAKAGES MUST BE REPAIRED ON MOBILE EQUIPMENT OR CONTAINMENT TRAYS PLACED UNDERNEATH IMMOBILE EQUIPMENT UNTIL SUCH LEAKAGE HAS BEEN REPAIRED. SOIL CONTAMINATED WITH OIL MUST BE APPROPRIATELY TREATED AND DISPOSED OF AT A PERMITTED LANDFILL SITE OR THE SOIL CAN BE REGENERATED USING BIO-REMEDIATION METHODS.

F. SERVICE DUCTS AND SLEEVES NOTES

1. SLEEVES TO BE HEAVY DUTY CLASS 34 uPVC (WHITE) SOCKETED PIPE IN ACCORDANCE WITH SANS 791 WITH DIAMETERS AS SPECIFIED ON THE DRAWINGS.
2. SLEEVES TO BE SUPPLIED WITH A DRAW WIRE AND MARKER BLOCKS.
3. SLEEVES SHALL HAVE A MINIMUM COVER OF 1000mm UNLESS OTHERWISE SPECIFIED.
4. ALL SLEEVES TO BE INSTALLED BEFORE BACKFILLING AND/OR LAYERWORKS COMMENCE.

G. ROAD NOTES

1. ALL SIGNS AND MARKINGS SHALL COMPLY WITH THE SOUTH AFRICAN ROAD TRAFFIC SIGNS MANUAL (LATEST VERSION).
2. SIGN BOARDS TO BE SHEET METAL 1.6mm THICK ISCOR CHROMADEK OR SIMILAR APPROVED ENGINEERING GRADE CLASS 1 RETRO-REFLECTIVE MATERIAL SHALL BE USED FOR SIGN BOARDS UNLESS OTHERWISE SPECIFIED IN THE PROJECT SPECIFICATION.
3. ROAD MARKINGS TO BE DONE WITH WHITE (UNLESS SPECIFIED OTHERWISE). ALSO SEE PAINT SPECIFICATION FOR PAINT MATERIAL / TYPE TO BE USED.
4. ROAD MARKINGS TO BE DONE AS SPECIFIED ON THE ROAD MARKINGS DRAWING AND SPECIFICATIONS (UNLESS SPECIFIED OTHERWISE).
5. SIZES OF ROAD SIGNS AND MARKINGS ARE FOR A DESIGN SPEED OF 40km/h FOR INTERNAL ROADS AND 60km/h FOR EXTERNAL ROADS. ALSO REFER TO THE ROAD SIGNAGE DRAWINGS.
6. EXCESS EXCAVATED MATERIAL SHALL BE SPOILED TO AN APPROVED SITE LOCATED BY THE CONTRACTOR.
7. MINIMUM NUMBER OF PROCESS CONTROL TESTS REQUIRED FOR FILL AND LAYER WORKS:
   - RELATIVE COMPACTION = 1 EVERY 20m ON ROADS SEPARATELY FOR EACH LAYER.
   - INDICATOR TESTS = 1 EACH FOR LAYER AND TYPE OF MATERIAL.
   - CBR/UCS = 1 EACH LAYER AND TYPE OF MATERIAL.
   - REIMBURSEMENT FOR PROCESS CONTROL TESTS SHALL BE INCLUDED IN RATES SUBMITTED.
8. FINISHED LEVELS SHALL ENSURE THAT NO STORMWATER WATER WILL POND.

H. STORMWATER NOTES

GENERAL

1. ALL PIPELINES ARE ACCORDING TO CONTOUR DATA, PRIOR TO CONSTRUCTION ALL LEVELS TO BE CONFIRMED BY THE CONTRACTOR.
2. THE CONTRACTOR MUST LOCATE ALL EXISTING STORMWATER LINES, RECORD POSITIONS AND INVERT LEVELS BEFORE CONSTRUCTION COMMENCES. THIS INFORMATION MUST BE MADE AVAILABLE TO THE ENGINEER AS SOON AS POSSIBLE.
3. ALL STORMATER PIPES TO BE LAID SOFFIT TO SOFFIT.
4. ALL STORMWATER PIPES TO BE "OGEE" INTERLOCKING WITH A RUBBER COLLAR OVER AND LAID ON A CLASS 'B' BEDDING.
5. PIPES SHALL BE 375mm DIAMETER MINIMUM UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
6. PIPES UNDERNEATH SURFACE BEDS OF BUILDING TO BE CLASS 100D CONCRETE PIPES ACCORDING TO SANS 677 WITH SPIGOT AND SOCKET AND RUBBER RINGS. PIPES TO BE CAST IN CLASS 20/19 CONCRETE WITH FLEXIBLE JOINTS (12mm SOFT BOARD) AND WITH 150mm MINIMUM COVER.
7. CONCRETE STRUCTURES SHALL BE READ IN CONJUNCTION WITH STRUCTURAL ENGINEERS DETAILS, WHERE APPLICABLE.
8. GRIDS TO BE PROVIDED AT THE UPSTREAM END OF ALL LARGE CHANNELS AND BOX CULVERTS (IF APPLICABLE) FOR SECURITY PURPOSES AND TO ALLOW FOR EASY ACCESS FOR MAINTENANCE PURPOSE.
9. DRAINAGE PORTS TO BE PROVIDED AT BOUNDARY WALLS TO PREVENT PONDING.
10. JOINT SEALS IN CONCRETE CHANNELS, BOX CULVERTS AND MANHOLES ARE TO BE CLEANED AND RE-SEALED WATERTIGHT WITH POLYSULPHIDE.
11. ALL EXISTING STORMWATER SYSTEMS, INCLUDING GRID INLETS AND OUTLET STRUCTURES MUST BE CLEANED OUT. DEBRIS, RUBBISH, SILT AND VEGETATION MUST BE REMOVED AND DISPOSED OF.
12. MECHANICAL CLEANING OF STORMWATER DRAINAGE STRUCTURES WITH HIGH PRESSURE WATER JET.
13. NO EXISTING SERVICES TO BE DAMAGED.
14. FOR DETAILS ON MANHOLES, GRID INLETS, KERB INLERTS, JUNCTION BOXES, CUT-OFF DRAINS, ETC. REFER TO STANDARD DETAILS DRAWING.

MINIMUM AND MAXIMUM COVER TO PIPES (UNLESS SHOWN OTHERWISE)

15. MINIMUM COVER: ROADWAYS - 1000mm
    OTHER AREAS - 600mm
16. MAXIMUM COVER:

GRADES

17. MINIMUM GRADES FOR THE STORMWATER RETICULATION:
18. STORMWATERS LAID AT GRADIENTS STEEPER THAN 1:12 SHALL BE ANCHORED AT THE JOINTS WITH ANCHOR BLOCKS CONCRETE OF STRENGTH 15MPa (1:3.6) SHALL BE USED FOR ANCHOR BLOCKS.

MATERIAL SPECIFICATION

19. ALL PIPES USED MUST CONFORM TO SANS1200LE AND ALL OTHER STANDARDS REFERRED TO IN SANS1200LE.

BEDDING AND BACKFILL

20. SPECIFICATIONS SET OUT IN SANS1200LB MUST BE FOLLOWED FOR THE BEDDING AND BACKFILL OF WATER PIPES, BEDDING, BACKFILL AND PIPE STRENGTH SHALL BE SUFFICIENT TO ENSURE THAT PIPELINES ARE NOT OVERSTRESSED FROM ALL SUPERIMPOSED LOADING.
21. ALL BEDDING MATERIAL MUST BE OF SELECTED GRANULAR MATERIAL WITH A PI<6, AND FREE FROM ORGANIC MATTER, CLAY OR STONES LARGER THAN 20mm.
22. SUBSOIL DRAINS ARE TO BE PROVIDED WHERE GROUND WATER IS A PROBLEM. THE DESIGNER SHALL ENSURE THAT THE DESIGN IS SUFFICIENT TO MEET THE REQUIREMENTS.
23. BACKFILL MATERIAL MUST BE HOMOGENOUS AND MUST BE COMPACTED IN 150mm LAYERS TO 93% MODIFIED AASHTO DENSITY. INDEPENDENT DENSITY TESTS MUST BE CARRIED OUT IN 150mm LAYERS.

TESTS AND SPECIFICATIONS

24. INSPECTION ON COMPLETION OF THE EXCAVATION PRIOR TO LAYING THE PIPE.
25. INSPECTION OF PRESCRIBED BEDDING AND THE COMPACTION OF SURROUNDING MATERIAL UP TO THE CENTRELINE OF THE PIPE.
26. AIR OR WATER TESTS, AS PRESCRIBED IN THE STANDARD SPECIFICATION SANS 1200, ARE TO BE CONDUCTED AFTER THE PLACING AND COMPACTION OF THE BACKFILLING, CONTRACTORS MUST PRESSURE TEST THE PIPELINE PRIOR TO BACKFILLING, AT THEIR OWN EXPENSE, TO AVOID EXCAVATION OF THE FINAL BACKFILL.
27. DENSITY TESTS MUST BE CONDUCTED ON BEDDING AND BACKFILL MATERIAL. CORRELATED DCP TESTS WILL BE ACCEPTABLE UNLESS OTHERWISE SPECIFIED.
28. INSPECTION OF THE CONSTRUCTION OF THE CHAMBERS AND COMPLETION OF THE BACKFILL.

PUMPLINE NOTES - HDPE

1. ALL HDPE PIPES TO BE BUTT WELDED.
2. PIPES WILL BE HDPE (TYPE PE 100) SOLID (CLASS PN 10) OR STRUCTURED WALL (8kN/m²).
3. STORMWATER MANHOLES AND JUNCTION BOXES WILL BE HDPE (TYPE PE 100), WITH RING STIFFNESS OF 8kN/m².

K. WATER NOTES

GENERAL

1. ALL PIPELINES ARE ACCORDING TO CONTOUR DATA, PRIOR TO CONSTRUCTION ALL LEVELS TO BE CONFIRMED BY CONTRACTOR.
2. TIE IN POINTS TO BE DETERMINED BEFORE CONSTRUCTION COMMENCES.
3. EXISTING CONNECTIONS TO WET SERVICES TO BE LOCATED AND COMMUNICATED TO THE CONSULTANT PRIOR TO CONSTRUCTION.
4. WATER RETICULATION TO BE CONSTRUCTED IN LINE WITH SANS1200.
5. PIPELINES SHALL BE uPVC WITH MIN. PRESSURE RATING OF CLASS 12, UNLESS OTHERWISE INDICATED.
6. A MARKER BLOCK TO BE PLACED AT EVERY DIRECTION CHANGE AND EVERY 250m.
7. ALL END CAPS TO BE INSTALLED WITH MARKER BLOCK AND WIRE FIXED TO END CAP.
8. ALL ISOLATING VALVES SHALL BE FLANGED RSV (RESILIENT SEAT VALVE) GATE VALVE CLASS 16 TO SABS 664. CAP TOP, NON RISING SPINDLE AND ANTI CLOCKWISE CLOSING.
9. LOCATION OF FIRE HYDRANTS TO BE DETERMINED BY THE FIRE CONSULTANT.
10. LENGTHS OF CONNECTIONS AND SUBSEQUENT FITTINGS ARE NOT ACCOUNTED FOR IN THE QUANTITIES

MINIMUM AND MAXIMUM COVER TO PIPES.

11. MINIMUM COVER: ROADWAYS - 1000mm
    OTHER AREAS - 1000mm
12. MAXIMUM COVER:

MATERIAL SPECIFICATION

13. ALL PIPES USED MUST CONFORM TO SANS1200L AND ALL OTHER STANDARDS REFERRED TO IN SANS1200L.
    THIS WILL INCLUDE THE USED OF uPVC, mPVC, STEEL AND HDPE PIPES.

BEDDING AND BACKFILL

14. SPECIFICATIONS AS SET OUT IN SANS1200LB MUST BE FOLLOWED FOR THE BEDDING AND BACKFILL OF WATER PIPES, BEDDING. BACKFILL AND PIPE STRENGTH SHALL BE SUFFICIENT TO ENSURE THAT PIPELINES ARE NOT OVERSTRESSED FROM ALL SUPERIMPOSED LOADING.
15. ALL BEDDING MATERIAL MUST BE OF SELECTED GRANULAR MATERIAL WITH A PI<6, AND FREE FROM ORGANIC MATTER, CLAY OR STONES LARGER THAN 20mm.
16. SUBSOIL DRAINS ARE TO BE PROVIDED WHERE GROUND WATER IS A PROBLEM. THE DESIGNER SHALL ENSURE THAT THE DESIGN IS SUFFICIENT TO MEET THE REQUIREMENTS.
17. BACKFILL MATERIAL MUST BE HOMOGENOUS AND MUST BE COMPACTED IN 150mm LAYERS TO 93% MODIFIED AASHTO DENSITY. INDEPENDENT DENSITY TESTS MUST BE CARRIED OUT IN 150mm LAYERS.

TESTS AND INSPECTIONS

18. INSPECTION ON COMPLETION OF THE EXCAVATION PRIOR TO LAYING THE PIPE.
19. INSPECTION OF PRESCRIBED BEDDING AND THE COMPACTION OF SURROUNDING MATERIAL UP TO THE CENTRELINE OF THE PIPE.
20. PRESSURE TEST AT 1.25 TIMES CLASS OF PIPE.
21. AIR OR WATER TESTS, AS PRESCRIBED IN THE STANDARD SPECIFICATION SANS1200, ARE TO BE CONDUCTED AFTER THE PLACING AND COMPACTION OF THE BACKFILLING, CONTRACTORS MUST PRESSURE TEST THE PIPELINE PRIOR TO BACKFILLING, AT THEIR OWN EXPENSE, TO AVOID EXCAVATION OF THE FINAL BACKFILL.
22. DENSITY TESTS MUST BE CONDUCTED ON BEDDING AND BACKFILL MATERIAL. CORRELATED DCP TESTS WILL BE ACCEPTABLE UNLESS OTHERWISE SPECIFIED.
23. INSPECTION OF THE CONSTRUCTION OF THE CHAMBERS AND COMPLETION OF THE BACKFILL.

L. SEWER NOTES

GENERAL

1. ALL NATURAL GROUND LEVELS ARE ACCORDING TO CONTOUR DATA. PRIOR TO CONSTRUCTION ALL LEVELS TO BE CONFIRMED BY THE CONTRACTOR AND ANY DISCREPANCIES TO BE COMMUNICATED TO THE RE BEFORE CONSTRUCTION COMMENCES.
2. EXACT POSITION OF EXISTING MANHOLES TO BE CONFIRMED AND ANY DISCREPANCIES TO BE COMMUNICATED TO THE RE PRIOR TO CONSTRUCTION.
3. TIE IN POINTS AND LEVELS TO BE DETERMINED AND ANY DESCREPENCIES TO BE REPORTED TO THE RE BEFORE CONSTRUCTION COMMENCES.
4. CONNECTIONS TO WET SERVICES TO BE COMMUNICATED TO THE CONSULTANT PRIOR TO CONSTRUCTION.
5. SEWER PIPES UNDERNEATH SURFACE BEDS OF BUILDINGS TO BE ENCASED IN CLASS 20/19 CONCRETE WITH A MINIMUM COVER 150mm.
6. HEAVY DUTY MANHOLE COVERS TO BE USED IN ALL TRAFFICABLE AREAS.
7. HEAVY DUTY CONCRETE COVERS AND FRAMES TO BE USED IN AREAS UNDER CONTINUOUS ROAD TRAFFIC LOADS SHALL HAVE SHAPED GALVANIZED METAL PLATES 3mm THICK, CAST INTO THE CONCRETE OF EACH BEARING SURFACE, TO FORM ACCURATELY FITTING MATING SURFACES.
8. SEWER TO BE CONSTRUCTED IN LINE WITH SANS1200.
9. FOR DETAILS REFER TO DRAWING:

COVER

10. MINIMUM COVER FOR PIPES:
    10.1. TRAFFICKED AREAS - 1200mm
    10.2. OTHER AREAS - 600mm

GRADES

11. MINIMUM GRADES FOR THE SEWER RETICULATION:
    11.1. 110mm DIAMETER 1:60
    11.2. 160mm DIAMETER 1:140
12. ALL SEWER PIPES SHALL HAVE A SLOPE OF 1:100 (1%) OR STEEPER (UNLESS SPECIFIED OTHERWISE).

MANHOLE

13. MANHOLES MUST BE PLACED AT EVERY CHANGE IN GRADIENT, JUNCTIONS AND HORIZONTAL DIRECTION.
14. THE MAXIMUM SPACING OF MANHOLES IS 80m.

MATERIAL SPECIFICATIONS

15. ALL GRAVITY SEWER PIPES TO BE uPVC HEAVY DUTY CLASS 34 TO SANS791.
16. MANHOLES AND CHAMBERS SHALL BE CONSTRUCTED AS SPECIFIED IN SANS 1294.
17. MANHOLE CHANNELS TO BE PRECAST FIBRE CEMENT EVEN IF uPVC PIPES ARE USED IN RETICULATION.
18. MANHOLES SHALL BE PRECAST CONCRETE WITH DOLOMITIC AGGREGATE OR FIBRE-CEMENT RINGS (1,05M NOMINAL DIAMETER).
19. STEP IRONS SHALL BE CALCAMITE STEEL-PLASTIC-COATED OR COPOLYMER POLYPROPYLENE, FIXED TO STRUCTURES WITH SUITABLE EPOXY ADHESIVE.
20. BENCHING IN MANHOLES SHALL BE CONCRETE OF MINIMUM STRENGTH OF 20MPa AT 28 DAYS.
21. MANHOLES DEEPER THAN 3m SHALL BE A MINIMUM OF Ø1.5m IN DIAMETER.

BEDDING AND BACKFILL

22. SPECIFICATIONS AS SET OUT IN SANS 1200LB MUST BE FOLLOWED FOR THE BEDDING AND BACKFILL OF SEWER PIPES. BEDDING, BACKFILL AND PIPE STRENGTH SHALL BE SUFFICIENT TO ENSURE THAT PIPELINES ARE NOT OVERSTRESSED FROM ALL SUPERIMPOSED LOADING.
23. ALL BEDDING MATERIAL MUST BE OF SELECTED GRANULAR MATERIAL WITH A PI<6, AND FREE FROM ORGANIC MATTER, CLAY OR STONES LARGER THAN 20mm.
24. SUBSOIL DRAINS ARE TO BE PROVIDED WHERE GROUND WATER IS A PROBLEM. THE DESIGNER SHALL ENSURE THAT THE DESIGN IS SUFFICIENT TO MEET THE REQUIREMENTS.
25. BACKFILL MATERIAL MUST BE HOMOGENOUS AND MUST BE COMPACTED IN 150mm LAYERS TO 93% MODIFIED AASHTO DENSITY. DENSITY TESTS MUST BE CARRIED OUT ON THE BACKFILL.

TESTS AND INSPECTIONS

26. INSPECTION ON COMPLETION OF THE EXCAVATION PRIOR TO LAYING PIPE.
27. INSPECTION OF PRESCRIBED BEDDING AND THE COMPACTION OF SURROUNDING MATERIAL UP TO THE CENTRE LINE LEVEL OF THE PIPE.
28. PIPES SHALL BE AIR AND MIRROR TESTED.
29. AIR OR WATER TESTS, AS PRESCRIBED IN THE STANDARD SPECIFICATION SANS1200, ARE TO BE CONDUCTED AFTER THE PLACING AND COMPACTION OF THE BACKFILLING. CONTRACTORS MUST PRESSURE TEST THE PIPELINE PRIOR TO BACKFILLING, AT THEIR OWN EXPENSE, TO AVOID EXCAVATION OF THE FINAL BACKFILL.
30. DENSITY TESTS MUST BE CONDUCTED ON BEDDING AND BACKFILL MATERIAL. CORRELATED DCP TESTS WILL BE ACCEPTABLE UNLESS OTHERWISE SPECIFIED.
31. INSPECTION OF THE CONSTRUCTION OF THE MANHOLES AND COMPLETION OF THE BACKFILL.
32. CCTV INSPECTIONS ARE TO BE CONDUCTED ON ALL SECTIONS OF THE PIPE. THE CCTV VIDEO AND REPORTS ARE TO BE SUBMITTED AS PART OF THE AS-BUILT INFORMATION.

M. TESTING

1. THE MINIMUM TESTING REQUIREMENTS SHALL BE AS FOLLOWS:
   1.1. FIEL