Transnet National Ports Authority

Camera Mast Technical Specification

Infrastructure - Engineering: Control & Instrumentation

RCB.ENG 00199-SP-001

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1 Acronyms and Abbreviations

The acronyms and abbreviations applicable to this report are summarised in the following table:

Abbreviation	Description
ACS	Access Control System
AGL	Above Ground Level
CCTV	Closed-Circuit Television
CoC	Certificate of Compliance
MPa	Mega Pascal
PTZ	Pan, Tilt and Zoom camera
QA/QC	Quality Assurance/ Quality Control
SANS	South African National Standards
TNPA	Transnet National Ports Authority

2 Introduction and Background

2.1 Project Description

The port of Richards Bay has developed the New Port Entrances and Road Access Packages 3,4&5 (Outstanding scope) Project in order to address and complete the certain project aspects that were left incomplete during the initial construction phase. The project covers three port access locations, namely: Bayvue Gate; East Gate and West Gate.

The works the contractor is to perform involve completion of all the outstanding scope (Design and Build) in relation to access control, CCTV surveillance and fencing as to be identified on site by the successful service provider to ensure full functionality of the related infrastructure at all the three access locations.

#1 This specification forms part of the scope documentation for the provision of Security system and access control system (ACS) in the following areas:

a. Bayvue Gate: CCTV and ACS
b. West Gate: CCTV and ACS
c. East Gate: CCTV and ACS

2.2 Purpose

This technical specification supplements the Security system specification and drawings of the project. It sets out the minimum requirements for quality workmanship, standardisation and standards for the design, supply and installation of camera Mast and other mounting pole structures for the above mentioned systems.

2.3 Document Terminology

This document makes use of the words shall, should, may and will, with regard to requirements and specifications. To avoid any confusion among these terms, their legal and binding meaning, is indicated here. The reader is advised to be familiar with their contextual usage and meaning.

#2 In this document the word:

a. Shall is used to indicate a mandatory requirement.
b. Should is used as a preference.
c. May is used as a permissive (i.e. neither mandatory nor necessarily recommended).
d. Will is used as a declaration on behalf of something/ someone else.

#3 The word should shall be treated as a requirement by the contractor, although it may be negotiated, amended, approved or declined by the employer based on appropriate justification.

3 Statutory Requirements

#4 In addition to the specifications detailed on this document, the design shall comply with the following relevant South African Acts, Standards and Regulations and shall apply in the order of precedence as listed below:

a. Occupational Health and Safety Act 85 of 1993

b. South African National Standards and Codes of Practice

c. IEC Standards and Recommendations

d. International Standards and Codes – ISO, DIN, BS, ASME, ASCE, ANSI, ASTM, EU

e. All local, provincial or S.A. Government laws in force at the time.

4 Guidelines, Standards and Specifications

#5 All equipment and material to be supplied for the project must be designed, assembled and inspected in accordance with the publications shown in tables below. Each publication shall be the latest revision and addendum in effect on the date the specification is issued for construction unless noted otherwise.

#6 Where conflicts occurs the more stringent requirement of the code, standards and project specifications must be met.

#7 The *Contractor* shall adhere to the following further requirements:

- All installations shall be inspected and witnessed in accordance with this specification, the manufacturer's instructions and recommendations and the approved quality control plans for each activity.
- All calibration and test equipment shall hold valid, traceable calibration certificates, which shall be held on Site and shall form part of the quality control dossiers.
- All equipment, instruments and accessories shall, where appropriate, be calibrated and tested at the manufacturer's premises or by a duly authorised representative of the manufacturer.
- All test and calibration certificates shall be included in the on Site quality control dossiers and the as-constructed data packs.

4.1 Transnet Standards

The Transnet standards listed below, shall take precedence in terms of compliance.

Title		Document No.
[1]	CAD Drawing Standards	ENG-STD-0001
[2]	Cable, Racking, Trenching, Earthing Installation Codes of Practise	PL727
[3]	Earthing specification - rev01	TPD-004
[4]	Business Codification	SYS-P-0001

#8 It is the responsibility of the *Contractor* to ensure that he/she obtains all of the *Employer*'s standards (latest amendments apply). The *Employer* shall not be held liable for any losses incurred by the *Contractor* which may arise as a result of non-compliance of the Works by the *Contractor* to the standards.

4.2 National and International Standards

These national and international standards must be adhered to, except where it conflicts with Transnet standards.

#9 Where South African National Standards (SANS) do not cover a specific item, the *Contractor* shall ensure that the item is supplied and installed in compliance with all other relevant/mandatory national and/or international standards, as applicable. Where South African National Standards (SANS) fully cover the item(s) in question, further reference to associated international standards is not required.

#10 The *Contractor* may request approval by the *Employer* for the adoption of a standard not listed in the tables below. Acceptance of such standards will however be at the sole discretion of the *Employer.*

Title		Document No.
[5]	Quality management systems — Requirements	ISO 9001:2015
[6]	Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods.	ISO 1461:1999
[7]	Internal and/or external protective coatings for steel tubes - Specification for hot dip galvanized coatings applied in automatic plants	EN 10240:1999
[8]	Protection against corrosion of iron and steel in structures – Zinc and aluminium coatings - Guidelines. Note: The above specification supersedes SABS 0214	ISO 14713:1999
[9]	Hot rolled products of structural steels	SANS 50025 - 1 to 6
[10]	Specification for arc welding of carbon and carbon manganese steels (Superseded, Withdrawn by BS EN 1011-1:1998, BS EN 1011-2:2001)	BS 5135
[11]	Welding - Recommendations for welding of metallic materials. General guidance for arc welding	BS EN 1011-1:2009
[12]	Steel tubes for non-pressure purposes Part 1: Sections for scaffolding, general engineering and structural applications	SANS 657-1
[13]	Health, safety and environmental guidelines for the construction and operation of timber treatment plants	SANS 10255-1991-1
[14]	The design, fabrication and inspection of articles for hot-dip galvanising	SANS 10214-1987-1
[15]	Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods	SANS 121 2000-1
[16]	Welding Part 4: The fusion of steel (including stainless steel): Tests for the approval of welders working to approved welding procedures	SANS 10044 Part i,ii,iii,iv
[17]	Hot-dip (galvanized) zinc coatings (other than on continuously zinc coated sheet and wire).	SABS 763
[18]	Internal and/or external protective coatings for steel tubes - Specification for hot dip galvanized coatings applied in automatic plants	EN 10240
[19]	Protection against lightning - Physical damage to structures and life hazard	SANS 10313
[20]	Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods	ISO 1461
[21]	Standardized specification for civil engineering construction	SANS 1200

5 References

The following documents and drawings serve as reference for this design premise.

5.1 Documents

Title		Document No.
[22]	Security System Technical Specification	RCB.ENG 00199-SP-0002

5.2 Drawings

Title		Document No.
[23]	9m CCTV Type Mast Typical Details	1124367-1-004-K-LA-0006-01
[24]	3m CCTV Type Mast Typical Details	1126901-1-B01-E-LA-0016-02
[25]	Bayvue Gate Security System and Access Control System Layout	
[26]	West Gate Security System and Access Control System Layout	
[27]	East Gate Security System and Access Control System Layout	

6 General

6.1 Site Conditions

#11 The poles and other related equipment shall be designed to withstand the following environmental conditions:

Altitude:	Sea level up to 2500m above
Temperature range:	-5°C to +45°C
Relative humidity:	up to 95% RH
Atmospheric conditions:	Salt laden. Electrolytic corrosion conditions prevail in all areas.
Lightning conditions:	Severe, equipment must withstand and be immune to a maximum lightning ground flash density of 11 flashes per km² per annum
Wind Speed:	120kph

6.2 Documents and Drawings by the *Contractor*

#12 Security pole design drawings shall be provided as indicated in the Security Technical Specification.

6.3 Safety

#13 The location and extent of potentially explosive atmospheres are to be identified and indicated on hazardous area classification drawings. All electrical equipment and instruments for use in hazardous classified areas shall be supplied with a hazardous area certificate issued by a certifying authority approved by SABS/SANS/IEC. Certificates shall be indexed and filed in a certification register.

6.4 *Employer* QA Representative

#14 The *Contractor*'s QA requirements shall be as set out in the Works Information.

#15 The *Employer* may choose to appoint a QA/QC representative to monitor and report on some or all aspects of the production and fabrication processes.

7 Technical Requirements

7.1 General Requirements

#16 Additional plinth of the mast and underground sleeves will be installed by Contractor.

#17 The 9m mast shall be used for mounting PTZ cameras

#18 The 3m camera mast shall be used for mounting fixed cameras

#19 Where a PTZ and fixed camera are required on the same pole, a 9m mast shall be used with the fixed camera mounted at a 3m or 6m height.

#20 The mast shall be constructed in the form of a tapering enclosed column of polygonal or circular cross-section.

#21 The design of the mast shall be adequate to resist a wind loading produced by a wind speed of 150km/h, measured at a height of 10 meters above ground level and acting on the projected area of the mast with the cameras and brackets. The maximum permissible deflection at the top of the mast shall not exceed 2,5% of the height of the mast under wind loading produced by a wind speed of 100km/h. Provision shall be made in the mast design for minimising wind excited oscillation.

#22 The contractor shall submit dimensioned drawings of the mast structure including opening, strengthening and base plate connection details, signed by a registered professional structural engineer/technologist.

#23 The masts shall be designed for mounting on a reinforced concrete foundation by means of a base flange secured to a bolt cage into the foundation. The base flange shall be free from laminations and the welded connection to the mast, shall fully develop the strength of the section. Means shall be provided to enable masts to be adjusted from deviations from the vertical.

#24 The space between the top of the concrete foundation and the underside of the base flange shall be filled with a suitable compound after provision of a vermin proof drainage hole. The cable entry pipes shall not be obstructed.

#25 An opening shall be provided on the side of the mast to give easy access to cable termination and surge protection. The opening shall be protected by a lockable, close fitting, hinged door, incorporating a vermin proof ventilation opening and shall be effectively sealed against the weather.

#26 The sides of the base compartment opening on paragraph above, shall be suitably reinforced with fully welded steel sections to restore the section modulus and prevent buckling.

#27 Brackets or mounting plates, drilled to template shall be welded into the mast to support the mast mounted equipment.

#28 The mast shall be equipped with suitable earth lug for connection with grounding earthing system.

#29 Access shall be provided through the bottom of the mast and foundation for looping the supply cables into and out of the mast. Non-ferrous pipes shall be used for this purpose.

#30 110mm sleeves shall be used to for supplying the cables in and out of the mast.

#31 No site cutting, drilling or welding permitted without prior consent of the Employers' Engineer. Unless it is stated in the approved method statement sent to the Employer prior the installation.

#32 Mast plinth and cable sleeves shall be installed by the Contractor

Contractor to confirm camera quantities per mast prior to pole manufacturing.

7.2 Steel Mast

#33 All tubing shall comply with SANS 657-1

#34 Shall have ultimate tensile strength of 450MPa and above, S355 material

#35 Designing of the mast shall comply with new SANS 10255-1991-1

#36 The mast shall be manufactured to comply with SANS 10214-1987-1

#37 The mast shall be hot-dipped galvanized and comply to SANS 121 2000-1 (ISO 1461)

#38 All welding shall comply with SANS 10044 Part i,ii,iii,iv

#39 All steel used in the manufacture of the masts, camera mounting brackets, maintenance cages, etc., shall comply with the requirements of SANS 50025.

#40 Welding shall be in accordance with BS 5135,(replaced by BS EN 1011-1:2009) general requirements for the metal-arc welding of mild, or high tensile steel.

#41 All concrete works shall comply with SANS 1200.

7.3 Gooseneck Poles

#42 The heights shall be as specified in the Security system technical specification

#43 Shall be stainless steel powder coated.

#44 Surface or wall mount.

#45 Spring coupling where required.

#46 Rain covers to suit specified readers or cameras

#47 Every gooseneck shall be mounted on a plinth and grouting.

7.4 Protection Against Corrosion

#48 Mast ferrous parts shall be hot dip galvanized in accordance with SABS 763/ EN 10240. The mass of galvanized coating shall determine in accordance with the non-destructive method.

#49 All welding, drilling, punching, stamping, cutting and bending of parts shall be completed and all burns removed before the galvanizing process is carried out.

#50 A Paint treatment shall be applied to all exterior galvanized surfaces.

#51 All camera mast shall be powder coated in white colour.

#52 Stringent precautions shall be taken to protect finished surfaces from damage during transport and assembly.

7.5 Field Junction Box and Mast cabling

#53 A totally enclosed Field junction/equipment box of flame retardant reinforced fibreglass construction shall be mounted in an easily accessible position next to the mast.

#54 The Field junction/equipment box shall be equipped as follows:

a. Circuit breakers and surge protection (where required)

b. 3 pin industrial type, switched multi-socket outlet.

c. An adequately rated earthing bar.

d. Grommeted access holes in the bottom of the board for cable entry.

e. Each device on the JB shall be clearly labelled by means engraved or printed labels of metal or plastic or other approved material, firmly attached to the device. Labels of embossed adhesive tape are not acceptable.

#55 The Field junction/equipment box shall be mounted on a plinth with a minimum height of 300mm AGL.

7.6 Earthing and Lightning Protection

#56 Contractor shall earth the camera masts in accordance with the Transnet earthing philosophy – TPD-004

#57 The contractor shall supply and install earthing and lightning protection to the masts as per SANS 10313.

#58 Contractor shall provide and install the components of earthing and lightning protection installation for the camera masts

#59 Contractor shall connect earth cables (provided by others) to the camera masts and shall perform the necessary electrical Certificate of Compliance (CoC) inspection and testing for the earthing system, and issue the CoC as part of handover documents.

7.7 Erection of Masts

#60 Inspection of assembled masts prior to erection and witnessing of the load tests are required and the Contractor shall advise Transnet's Employer's Engineer in advance of his anticipated date of erection, to enable the necessary arrangements to be made.

#61 Before commencing the erection of the masts, the Contractor shall provide method statement on the installation of the Mast and mounting cameras for approval.

#62 After erection of painted masts, all damage to paint work shall be repaired according to the requirements.