



PART C3: SCOPE OF WORK

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1. Electrical Engineering Works

1.1 Scope of Work

The scope to be carried out by the *Contractor* shall include but not be limited to the following:

- a. The removal of the existing infrastructure along the promenade.
- b. The Supply, Delivery, installation and commissioning of all the associated works for the lighting upgrade.
- c. Supply and installation of lightning protection and earthing of the lighting structures.
- d. The Supply delivery and Installation of cabling and terminations, to power the lighting and associated infrastructure.
- e. Commission and testing of the entire installation and hand over to the *Employer*.

1.2 General

- 1.2.1 Transnet National Port Authority's (TNPA) appointed electrical personnel shall provide access to the main electrical distribution boards that will provide power to the associated works.
- 1.2.2 For access, the *Contractor* shall submit a notification to the Project Manager 48 hours prior to any requirement. The *Contractors* programme should indicate access requirement dates aligned with clause 3.1.2.
- 1.2.3 Prior to any work taking place *Contractor* to submit condition assessment of the existing electrical infrastructure.

1.3 Standard of work, Plant and Materials

- 1.3.1 The electrical installation shall conform to the requirements of the latest edition and amendments of SANS 10142-1 Code of Practice for the Wiring of Premises and any additional requirements thereto, described in this specification.
- 1.3.2 All Plant and Materials used shall be of high quality and the work shall be of a high standard of workmanship carried out by qualified staff (Foreman, Installation electrician with a wireman's license from the department of labour) under proper supervision by experienced and competent officers.
- 1.3.3 All Plant and Material shall comply with the relevant National or International recognised standard specification.

1.4 Generic Specifications

All Design's undertaken, Plant's and Materials supplied by the *Contractor* in agreement with the *Employer*, with the intention to execute the *works* detailed in this document, shall comply in general with all associated Transnet Specifications listed below. It is understood that Transnet Specification requirements are more stringent than the SANS standard requirements, the Contractor is required to fully comply with the Transnet Specifications. In the case where SANS standard is stringent than Transnet Standard, the Contractor shall comply with SANS Standard. The *Contractor* shall also verify all site details given in the *Employers'* drawings.

Specification No.	Description
TPD-002-DBSPEC	Technical specification for low voltage distribution boards
TPD-003-CABLESPEC	Technical specification for the installation of medium and low voltage cables.
TPD-004-EARTHINGSPEC	Technical specification for earthing and the protection of buildings and structures against lightning.

1.5 Service Conditions

The Plant and Material shall be designed and rated for continuous operation under the following conditions:

A	Altitude	0 to 1800m above Sea Level
B	Ambient temperature	-5°C to +40°C (daily average +35°C)
C	Relative humidity	As high as 96%
D	Lightning conditions	Severe, with a maximum lightning ground flash density of 4 flashes per km ² per annum
E	Atmosphere	Salt laden and corrosive industrial chemical and dust laden nature. Frequent heavy rains driven by wind reaching speeds of 100 Km/h and above

1.6 Lightning Conditions

All lightning protection Plant and Material offered shall be rated to withstand the following conditions:

- Current: The peak lightning current and its rate of rise of rise Shall be regarded as severe when $IMAX = 200kA$.
- Voltage: The highest cloud potential shall be assumed to be More than 100MV, where; $Q = CV$, where Q is Assumed at 100C and C to be 10^{-7}

1.7 Normative References

The following publications and specifications (latest edition) shall apply where contextually correct:

SANS 10313	Protection against Lightning – Physical damage to structures and life hazard
SANS 10064	Code Of Practice For The Preparation Of Steel Surfaces For Coating.
SANS10142-1	Code Of Practice For The Wiring Of Premises
SANS 10389-1	Exterior Lighting Part 1: Artificial Lighting Of Exterior Areas For Work And Safety
OHS Act	Occupational Health And Safety Act Of 1993
SANS 10199	The Design And Installation Of Earth Electrodes
SANS152	Low Voltage Air Breaker Switches, Connectors, Switch Disconnectors, Fuse Combination Units.
SANS 172	Low Voltage Fuses
SANS 767-1	Earth Leakage Protection Units.
SABS 763	Hot Dip Zinc (Galvanised) Coatings
SABS 950	Non-metallic Conduit And Fittings.
SANS 1091	National Colour Standards For Paints.
SANS 1065-1	Metal Conduits And Fittings For Electrical Wiring
SABS 1180	Electrical Distribution Boards
SANS 1507	Electric Cables With Extruded Solid Dielectric Installation For Fixed Installations
SANS 1279	Floodlight Luminaires
SABS IEC 439	Low Voltage Switchgear



1.8 North Groyne

1.8.1 Promenade

- a) The *Contractor* shall uninstall all the existing luminaires and spigots from the existing poles around the Promenade as shown in drawing no: XDNE025-1-000-E-LA-0001-01. All removed luminaires and spigots around the Promenade to be issued to *Employers* maintenance manager at the *Employers* Power Supplies and Service Depot no: 1 Kuwait road, Fynnlands, Durban. A handover certificate to be submitted to the project manager for record purposes.
- b) The *Contractor* shall uninstall with care all existing poles around the Promenade as shown in drawing no: XDNE025-1-000-E-LA-0001-01. All removed poles around the Promenade to be issued to *Employers* maintenance manager at the *Employers* Power Supplies and Service Depot no: 1 Kuwait road, Fynnlands, Durban. A handover certificate to be submitted to the project manager for record purposes.
- c) The *Contractor* shall carry out the required trench work and area preparation for the installation of new cables to supply the new street light poles around the promenade side as shown in drawing no: XDNE025-1-000-E-LA-0001-01. The *Contractor* shall take into consideration all other discipline drawings as they are also undertaking work in this area.
- d) The *Contractor* shall supply, deliver and install similar or equal approved to LEDlume-Midi 64 LEDs, 140W, 700mA, 5119 Optics, 10kV surge protection device as indicated in drawing number: XDNE025-1-000-E-LA-0001-01. Prior to ordering the luminaires specification to be accepted by *Supervisor*.
- e) The *Contractor* shall supply, deliver and install 9 x 10m steel galvanised street light poles with galvanised steel with double spigots. The poles shall all be painted in accordance with the Transnet specification **EEAM-Q-008** and must meet all the relevant quality requirements. The poles shall be supplied complete with protection switchgear inside the poles. The proposed poles shall be installed complete with fittings to mount the 2 luminaires as illustrated in drawing no: XDNE025-1-000-E-LA-0001-01. Prior to ordering the lighting poles details to be accepted by *Supervisor*.
- f) The *Contractor* shall supply, deliver and install 3 x 9m steel galvanised street light poles with hot dip galvanised steel spigots. The poles shall all be painted in accordance with the Transnet specification **EEAM-Q-008** and must meet all the relevant quality requirements. The poles shall be supplied complete with protection switchgear inside the poles. The proposed poles shall be installed complete with fittings to mount a single luminaire as illustrated in drawing no: XDNE025-1-000-E-LA-0001-01. Prior to ordering the lighting poles details to be accepted by *Supervisor*.



- g) The *Contractor* shall supply deliver and install 6mm² 4-core PVC insulated PVC bedded SWA PVC sheathed 600/1000V copper cable joints as shown on drawing no: XDNE025-1-000-E-LA-0001-01.
- h) The *Contractor* shall supply deliver and install 4mm² 4-core PVC insulated PVC bedded SWA PVC sheathed 600/1000V copper cable joints as shown on drawing no: XDNE025-1-000-E-LA-0001-01.
- i) The *Contractor* shall supply, deliver and install 3 x 3-way junction box complete with cable glands, circuit breaker, terminal block and all other accessories inside the junction box, as shown on drawing no: XDNE025-1-000-E-LA-0001-01.
- j) The *Contractor* shall supply, deliver and install 1 x 2-way junction box complete with cable glands, circuit breaker, terminal block and all other accessories inside the junction box, as shown on drawing no: XDNE025-1-000-E-LA-0001-01.
- k) Alterations to the existing Harbour kiosk: The *Contractor* shall supply, deliver and install all the circuit breakers on the existing Harbour electrical kiosk. The contractor to ensure that the circuit breakers that they are supplying, the fault level matches with the existing and they are of high quality. The circuit breakers shall be used to supply the lighting circuits shown in drawing no: XDNE025-1-000-E-LA-0001-01 and XDNE025-1-000-E-LA-0001-02.
- l) The *Contractor* shall supply and install new earthing and lightning protection to the new poles. The *Contractor* shall also supply and install stainless steel finials and bonding of the street pole to ground in all the street poles. Test results shall be submitted to the *Employer's* Engineer.
- m) Should the *Contractor* suggest different luminaires, they are to undertake simulations, designs and submit to the *Employer's* Engineer for acceptance. The technical specification for the proposed luminaire shall be submitted with the designs.
- n) The *Contractor* is required to test the installation in the presence of the *Supervisor* and *Employer's* and issue an electrical "Certificate of Compliance" (COC) for all work done to the satisfaction of the *Supervisor* and *Employer's* Engineers.
- o) The *Contractor* shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of the *Supervisor* and *Employer's* Engineers. The Contractor shall notify the *Supervisor* and *Employer's* Engineer, seven days prior to the lighting survey.

1.8.2 Wall Installation

- a) The *Contractor* shall supply, deliver and install similar or equal approved to 110 x LED Bulkhead series 52, 16W, wall light luminaire with vandal proof glass, to be surface mounted into the wall as indicated in drawing number: XDNE025-1-000-E-LA-0002-01 to XDNE025-1-000-E-LA-0002-06. These luminaires will be installed in the existing openings.



- b) The contractor shall supply, deliver and install 97 x 2mm thick, grade 316 stainless steel brushed plate (360mm x 260mm), as shown on drawing no: XDNE025-1-000-E-LA-0002-03 to XDNE025-1-000-E-LA-0002-06.
- c) The contractor shall supply, deliver and install a grade 316 stainless steel brushed cover
- d) The *Contractor* shall supply, deliver and install 1100m x 10mm² 4-core PVC insulated PVC bedded SWA PVC sheathed 600/1000V copper cable as shown on drawing no: XDNE025-1-000-E-LA-0002-01 to XDNE025-1-000-E-LA-0002-03.
- e) The *Contractor* shall supply, deliver and install 600m x 4mm² PVC insulated PVC bedded SWA PVC sheathed 600/1000V copper cable joints as shown on drawing no: XDNE025-1-000-E-LA-0002-03 to XDNE025-1-000-E-LA-0002-06.
- f) The *Contractor* shall supply, deliver and install 20m x 2.5mm² 2 core Red & Black surfix cable PVC sheathed 300/500V as shown on drawing no: XDNE025-1-000-E-LA-0002-03 to XDNE025-1-000-E-LA-0002-06.
- g) The *Contractor* shall supply, deliver and install 20m x 2.5mm² Blue & Black surfix cable PVC sheathed 300/500V copper cable as shown on drawing no: XDNE025-1-000-E-LA-0002-03 to XDNE025-1-000-E-LA-0002-06.
- h) The *Contractor* shall supply, deliver and install 20m x 2.5mm² White & Black surfix cable, PVC sheathed 300/500V copper cable as shown on drawing no: XDNE025-1-000-E-LA-0002-03 to XDNE025-1-000-E-LA-0002-06.
- i) The *Contractor* shall supply, deliver and install 1 x 4-way junction box No:1 complete with cable glands, circuit breaker, terminal block and all other accessories inside the junction box, as shown on drawing no: XDNE025-1-000-E-LA-0002-03 to XDNE025-1-000-E-LA-0002-06.
- j) The *Contractor* shall supply, deliver and install 10 x 4-way junction boxes No:2 complete with cable glands, circuit breaker, terminal block and all other accessories inside the junction box, as shown on drawing no: XDNE025-1-000-E-LA-0002-03 to XDNE025-1-000-E-LA-0002-06.
- k) The *Contractor* shall supply, deliver and install 97 x 3-way junction boxes complete with cable glands, compression gland, terminal block and all other accessories inside the junction box, as shown on drawing no: XDNE025-1-000-E-LA-0002-03 to XDNE025-1-000-E-LA-0002-06.
- l) The *Contractor* shall use the existing photo cell to integrate into the wall light circuit for operation during the night.
- m) All alterations to the existing Harbour kiosk: the contractor shall supply, deliver and install a three phase circuit breaker, single phase breakers and a contactor in the existing Harbour kiosk. This circuit breaker shall be used to supply the lighting circuit shown in drawing no: XDNE025-1-000-E-LA-0001-02.



- n) Should the *Contractor* suggest different luminaires, they are to undertake simulations and submit to the Employer's Engineer for acceptance. The technical specification for the proposed luminaire shall be submitted with the designs.
- o) The *Contractor* is required to test the installation in the presence of the Employer's Engineers and issue electrical "Certificate of Compliance" (COC) for all work done to the satisfaction of the *Employer's* Engineers.
- p) The *Contractor* shall undertake a lighting survey at night to measure and record the lighting level in the area where work was undertaken in the presence of *the Employer's* Engineers. The *Contractor* shall notify the *Employer's* Engineer, seven days prior to the lighting survey.

1.9 Testing and Commissioning the entire Installation

- a) The *Contractor* shall test the entire installation, including but not limited to the LV installation and the lighting installation as per SANS 10142-1 and hand over all relevant test certificates to the *Employer's* Project Manager for acceptance.

1.10 Earthing and Lightning Protection

- a) The *Contractor* shall supply and install earthing and lightning protection to all street light poles and high masts in accordance to specification No. TPD: 004-EARTHINGSPEC; "Transnet National Ports Authority Specification for lightning protection and earthing".
- b) The earth electrodes and couplers used on all street light poles shall be manufactured from stainless steel and in accordance to SABS 1063.
- c) The earth electrode resistance shall not exceed the requirements of SANS 10142-1 and SANS 10313.
- d) The *Contractor* shall submit all the proposed designs to the *Employers* Engineer for acceptance.

1.11 Compliance Certificate

- a) The *Contractor* is required to test the installation in the presence of the *Employer's* Engineers and issue compliance certificates for lightning protection and earthing systems (SANS 10313) for all work done to the satisfaction of the Employer's Engineers.

- b) The *Contractor* is required to test the installation in the presence of the *Employer's* Engineers and issue compliance certificates for Low Voltage Installations (SANS 10142-1) for all work done to the satisfaction of the *Employer's* Engineers.
- c) The *Contractor* shall submit a full set of completed and valid compliance certificates to the *Employer*.

1.12 List of Drawings

1.12.1 Drawings issued by the *Employer*

This is the list of drawings issued by the *Employer* at or before the Contract Date and which apply to this contract.

Note: Some drawings may contain both *Works* Information and Site Information.

Drawing number	Revision	Title
XDNE025-1-000-E-LA-0001-01	OA	Durban Harbour Entrance, North Groyne Promenade Terracing upgrade, Proposed Lighting Layout
XDNE025-1-000-E-LA-0001-02	OA	Durban Harbour Entrance, North Groyne Promenade Terracing upgrade, Alteration of the existing kiosk Single Line Layout
XDNE025-1-000-E-LA-0002-01	OA	Durban Harbour Entrance, North Groyne Promenade Terracing upgrade, Proposed Wall Lighting Layout
XDNE025-1-000-E-LA-0002-02	OA	Durban Harbour Entrance, North Groyne Promenade Terracing upgrade, Proposed Wall Lighting Layout
XDNE025-1-000-E-LA-0002-03	OA	Durban Harbour Entrance, North Groyne Promenade Terracing upgrade, Proposed Wall Lighting Layout
XDNE025-1-000-E-LA-0002-04	OA	North Groyne Promenade upgrade, Proposed Wall Lighting Layout
XDNE025-1-000-E-LA-0002-05	OA	Durban Harbour Entrance, North Groyne Promenade Terracing upgrade, Proposed Wall Lighting Layout
XDNE025-1-000-E-LA-0002-06	OA	Durban Harbour Entrance, North Groyne Promenade Terracing upgrade, Proposed Wall Lighting Layout