



education

Department:
Education
PROVINCE OF KWAZULU-NATAL

KZN DOE INFRASTRUCTURE DEVELOPMENT AND MAINTANANCE

Cato Crest Primary School Tender Documentation – Stage 4



Annexure C Electrical – Project Specifications

1 Cato Crest Primary School

Figure 1 Site - Building Layout



1.1 Block descriptions:

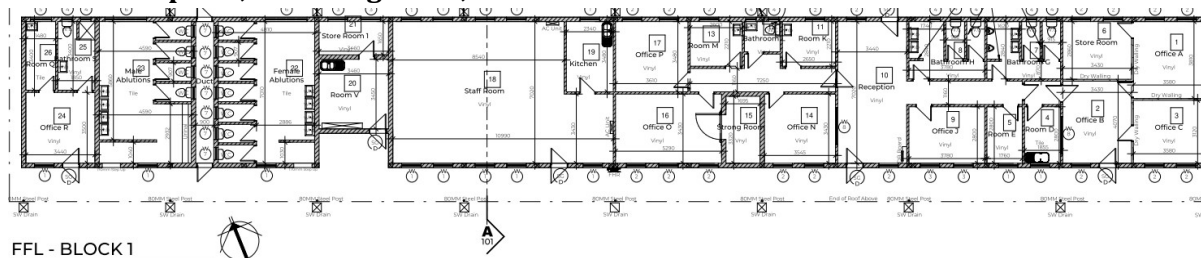
Table 1 Building - Block functional descriptions



Block Number	Description
1	14x Offices, 6x Ablutions, 1x Staff room, 2x store rooms, 1x Reception, 1x Strong room, 1x Kitchen
2	Not on Site
3	2 Story = 5x Ablutions, 2x Classrooms, 4x Offices, 4x Store rooms
4	1x Covered assembly area
5	2 Story = 20x Classrooms, 2x Store rooms, 2x Rooms
6	2 Story = 10x Classrooms, 2x Store rooms, 6 x Offices
7	
8	1x Classroom, 1x Room
9	1x Classroom, 1x Room
10	1x Ablutions, 1x Classroom, 1x Room
11	1x Covered play area
"12"	Guard House: 1 x room




2 Scope of works


2.1 Building Installations:

2.1.1 Block 1: Admin: 14x Offices, 6x Ablutions, 1x Staff room, 2x store rooms, 1x Reception, 1x Strong room, 1x Kitchen



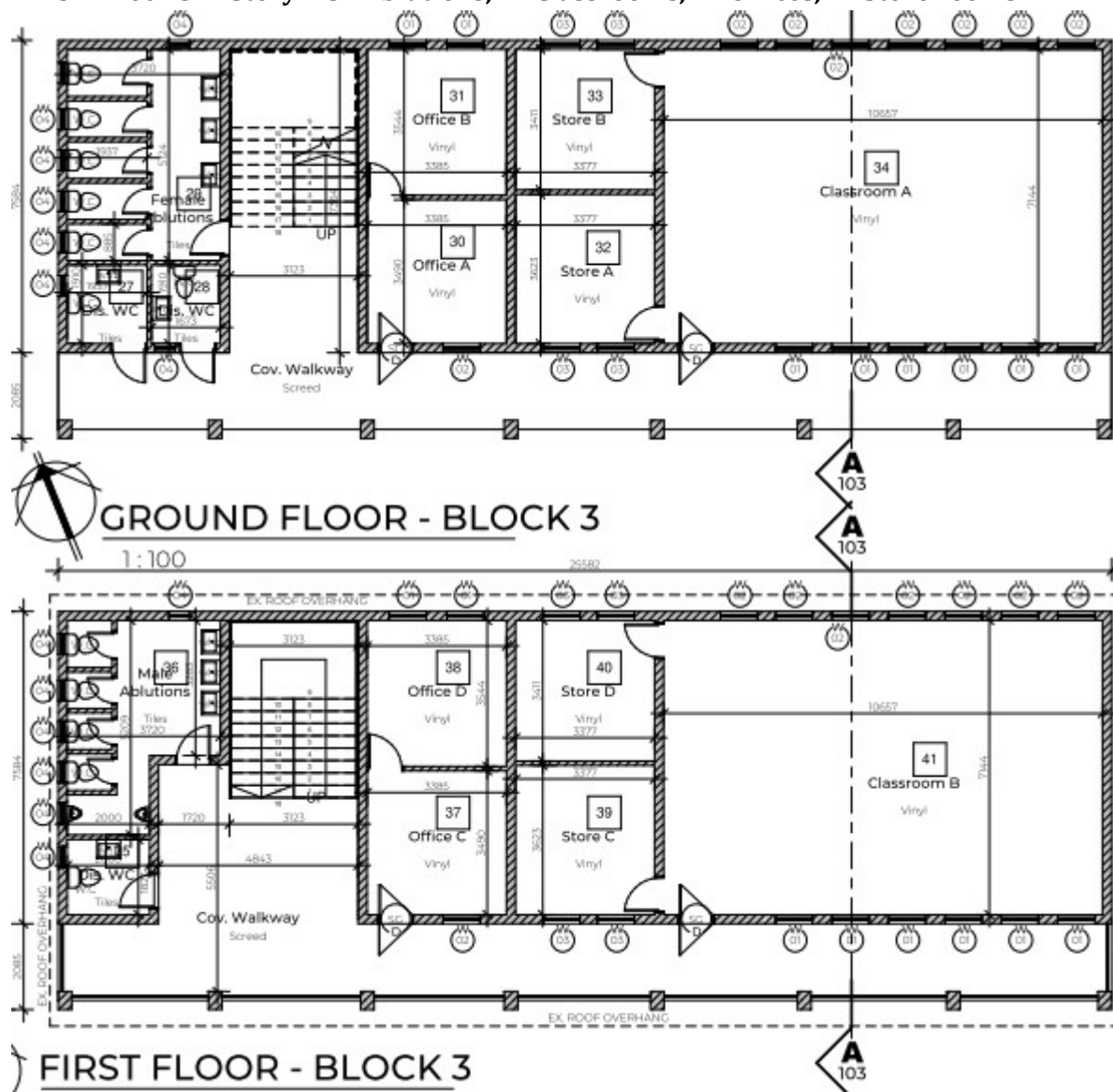
1	Block 1	<p>Replace 36x fluorescent light fittings with 36x (Flat Panel LED fitti suitable for installation in a 600mm x 1200mm suspended ceiling) ± 2400 Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p> <p>Replace 8x light fitting with 8x Round Indoor bulkhead light fitting complete with LED 9W / ± 1900 Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours.</p> <p>Install, including 2.5mm² PVC GP wire, and PVC conduit, 6x Round Indoor bulkhead light fitting complete with LED 9W / ± 1900 Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours.</p>  <p>Install, including 2.5mm² PVC GP wire, and PVC conduit "Safe in Use Warning / Pilot Light"</p>  <p>Dispose safely of old / defective / faulty fittings and lamps.</p>
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		<p>Replace 5x Single lever and light switches with Steel cover plate classic light switch</p> <p>Install, including 2.5mm² PVC GP wire, and PVC conduit 3x Single lever and light switches with Steel cover plate classic light switch</p> <p>Install, including 2.5mm² PVC GP wire, and PVC conduit 1x Two lever and light switches with Steel cover plate classic light switch</p> <div data-bbox="533 495 868 719">  </div> <p>Replace 14x Switched Socket Outlet with Steel Cover plate 14x Double Switched Socket Outlet 10x (1 “Old” + 2x New SA Outlet) and 4x Double Switched Socket Outlet (2x “Old” SA Outlet)</p> <div data-bbox="533 853 1050 1077">  </div> <p>Replace 2x Isolator Steel cover plate classic.</p> <div data-bbox="533 1144 758 1368">  </div> <p>Remove existing wall mounted fans and speed controllers, clean, store, future re-use in this project, dispose safely of defective/faulty fittings</p> <p>Install 11x new wall mounted fans and speed controllers</p>
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2	Exterior	<p>Replace 14x light fittings with 14x (Outdoor round bulkhead light fittings) complete with LED 9W / ± 1 900 Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p>  <p>Dispose safely of old / defective / faulty fittings and lamps.</p> <p>Install 2x daylight switches / photocells then wire to switches for outside lights</p> <p>Replace galvanized steel conduit and re-wire all electrical circuits. Light circuits 2.5mm².</p>
	Distribution Board	<ul style="list-style-type: none"> • Clean DB • Identify and Label Circuits <ul style="list-style-type: none"> ○ Replace: 3x 63A ELU, L+N, 5kA • Labelling <ul style="list-style-type: none"> ○ DB Name ○ Supply from ○ Supply cable size ○ Fault level ○ Outgoing Circuits • New printed/typed legend • CoC
	Building	Produce detailed "As Built" drawings clearly identifying all circuits, light switches, Socket outlets, Light fittings, isolators, loads (stove / AC / geyser) etc.

2.1.2 Block 2: Not on Site

2.1.3 Block 3: 2 Story = 5x Ablutions, 2x Classrooms, 4x Offices, 4x Store rooms



1	Block 3	<p>Replace 16x fluorescent light fittings with 16x (1200mm 2x LED Open Chunnel fitting) complete with LED "1200mm tubes" 15W / ± 2 400 Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p> 
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Replace 3x light fittings with 3x Surface mounted weatherproof 1,2 m – (1200mm 2x LED fitting) complete with LED “1200mm tubes”, each LED “Tube” shall comply with the following: 15W / ± 2 400 Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80 , Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours



Replace 4x light fitting with 4x Round Indoor bulkhead light fitting complete with LED 9W / ± 1 900 Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80 , Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours

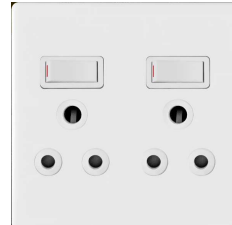



Dispose safely of old / defective / faulty fittings and lamps.

Replace 2x Single lever and 2x (1 lever 2 way) light switches with Steel cover plate classic light switch



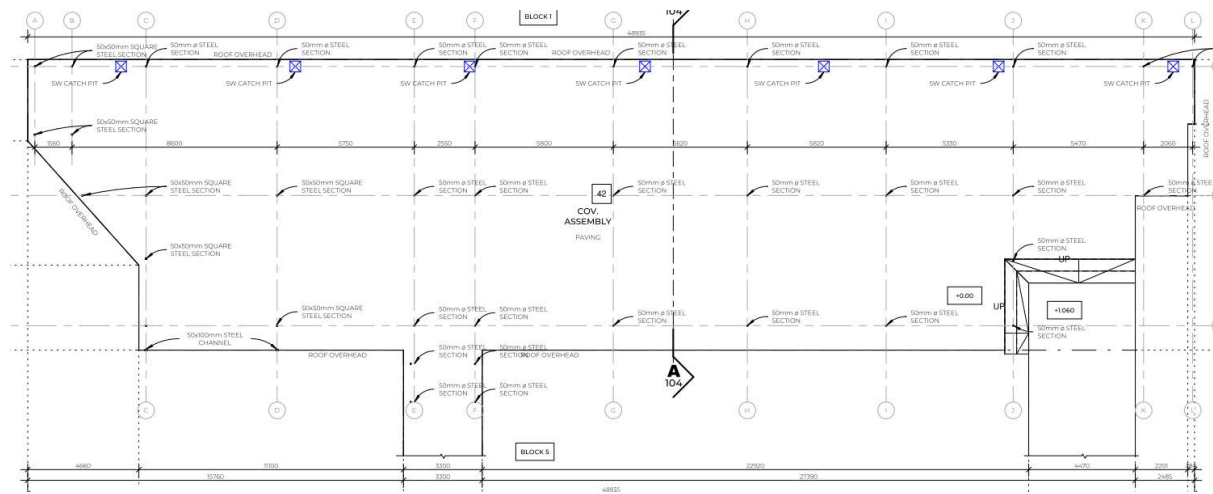
Replace 18x Switched Socket Outlet with Steel Cover plate 18x Double Switched Socket Outlet 10x (1 “Old” + 2x New SA Outlet) and 8x Double Switched Socket Outlet (2x “Old” SA Outlet)





2	Exterior	<p>Replace 15x light fittings with 15x (Outdoor round bulkhead light fittings) complete with LED 9W / ± 1 900 Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p>  <p>Dispose safely of old / defective / faulty fittings and lamps.</p> <p>Install 2x daylight switches / photocells then wire to switches for outside lights</p> <p>Replace galvanized steel conduit and re-wire all electrical circuits. Light circuits 2.5mm².</p>
	Distribution Board	<ul style="list-style-type: none"> • Clean DB • Identify and Label Circuits • Labelling <ul style="list-style-type: none"> ○ DB Name ○ Supply from ○ Supply cable size ○ Fault level ○ Outgoing Circuits • New printed/typed legend • CoC
	Building	Produce detailed "As Built" drawings clearly identifying all circuits, light switches, Socket outlets, Light fittings, isolators, loads (stove / AC / geyser) etc.

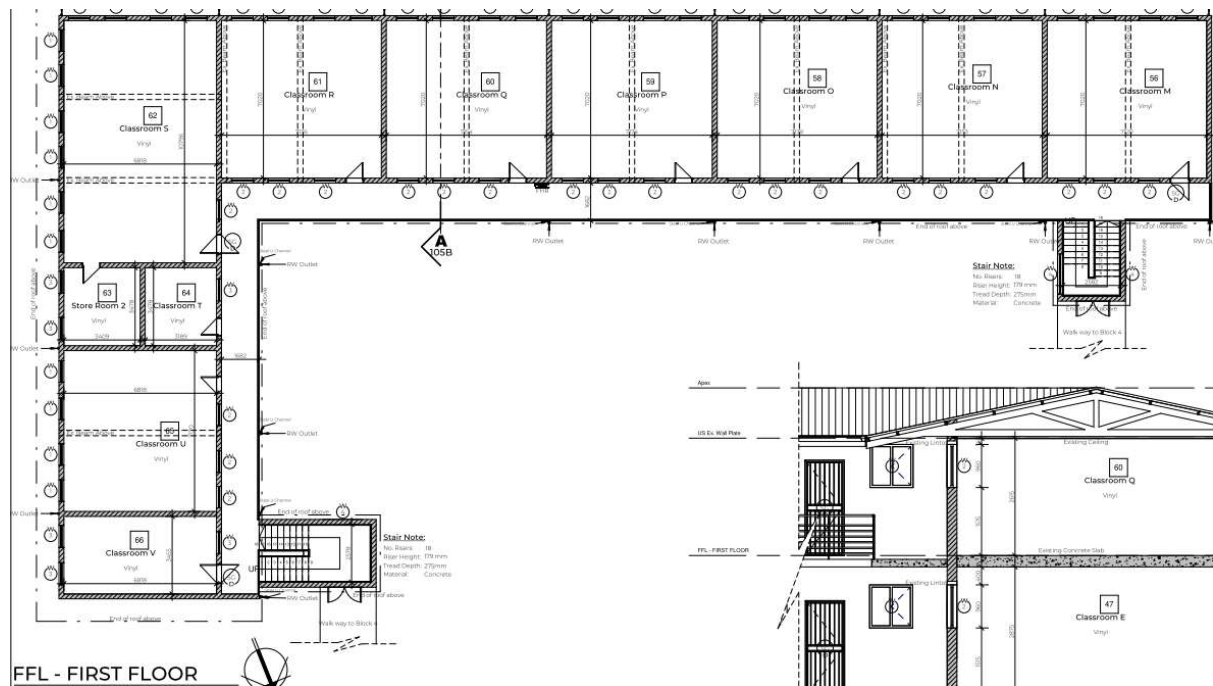
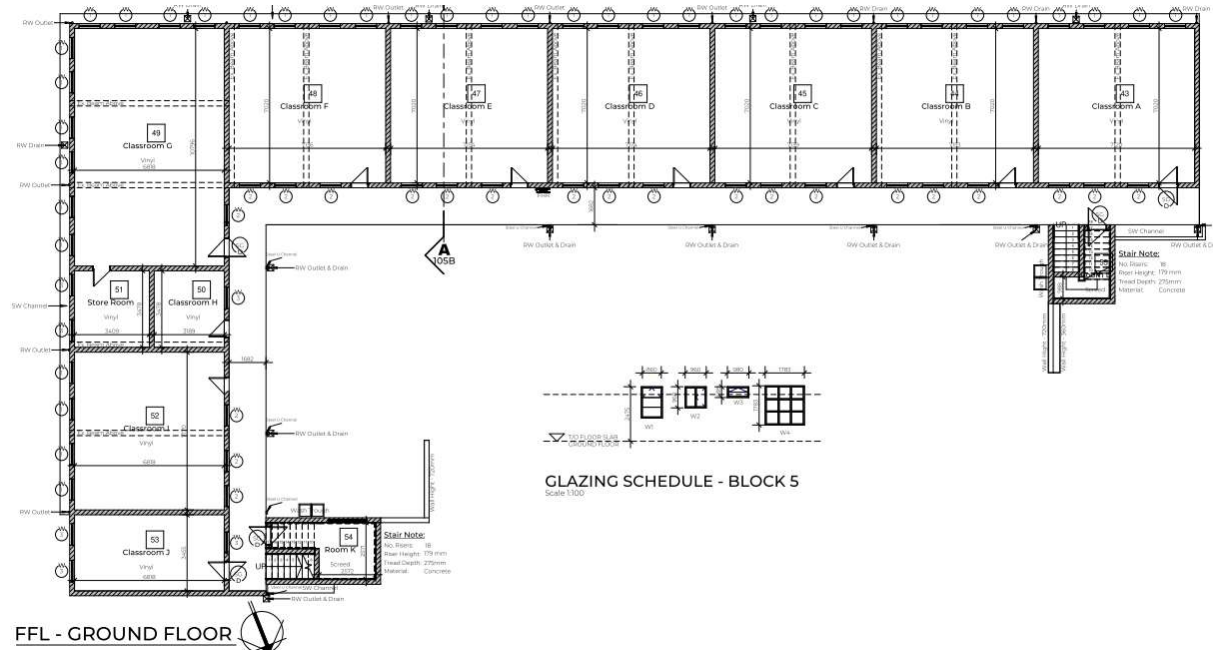
2.1.4 Block 4: 1x Covered assembly area


Provisional: 300 lux average illumination.







1	Block 11	<p>Install, including 2.5mm² PVC GP wire, and galvanized steel conduit, 45x Surface mounted weatherproof 1,2 m – (1200mm 2x LED fitting) complete with LED “1200mm tubes”, each LED “Tube” shall comply with the following: 15W / ±2 400 Lumen, ±190° Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p>  <p>Install, including 2.5mm² PVC GP wire, and galvanized steel conduit, 1x single lever and 2x Two lever light switches with Steel cover plate classic light switch</p> 
	Distribution Board	<ul style="list-style-type: none"> Supply for above from DB Block 1 Add: 5x 10A, 5kA, 1-pole CB for “Covered assembly area Circuit 1 through Circuit 5” CoC
	Building	Produce detailed “As Built” drawings clearly identifying all circuits, light switches, Socket outlets, Light fittings, isolators, loads (stove / AC / geyser) etc.

2.1.5 Block 5: 2 Story = 20x Classrooms, 2x Store rooms, 2x Rooms

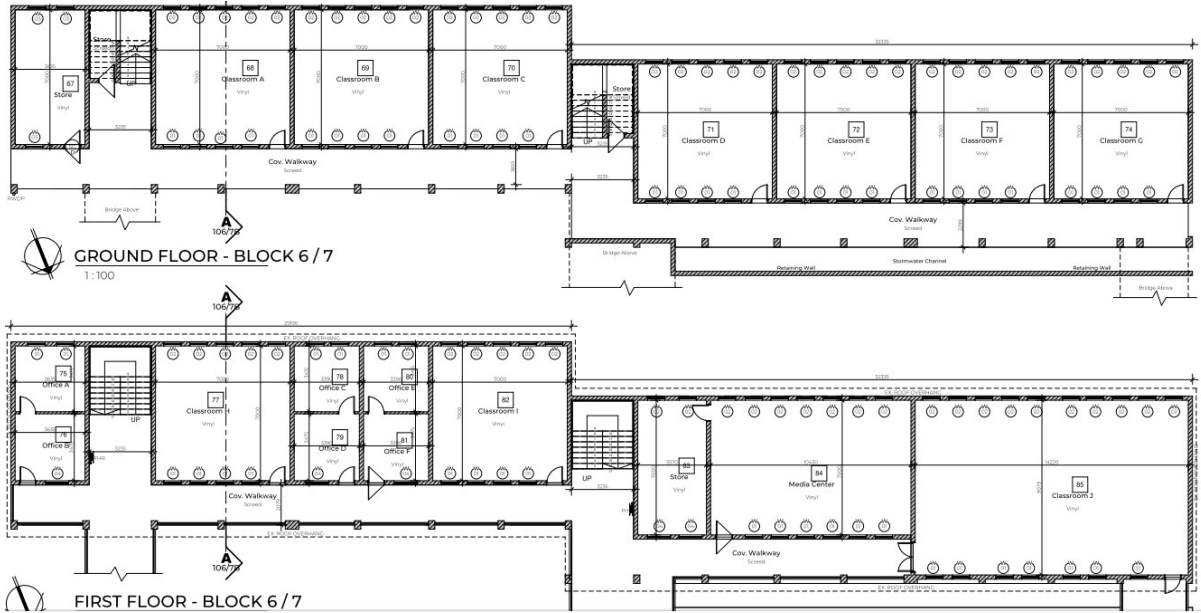


<p>1 Block 5</p>	<p>Replace 76x fluorescent light fittings with 76x (1200mm 2x LED Open Channel fitting) complete with LED "1200mm tubes" 15W / ± 2 400 Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p> 
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		<p>Replace 2x fluorescent light fittings with 2x (1200mm 1x LED Open Channel fitting) complete with LED "1200mm tubes" 15W / $\pm 2\ 400$ Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p>  <p>Dispose safely of old / defective / faulty fittings and lamps.</p> <p>Replace 2x Single lever and 8x (1 lever 2 way) light switches with Steel cover plate classic light switch</p> 
		<p>Replace 23x Switched Socket Outlet with Steel Cover plate 23x Double Switched Socket Outlet 20x (1 "Old" + 2x New SA Outlet) and 3x Double Switched Socket Outlet (2x "Old" SA Outlet)</p> <p>Install with 4mm² PVC GP wire and conduit 3x Switched Socket Outlet with Steel Cover plate 3x Double Switched Socket Outlet 1x (1 "Old" + 2x New SA Outlet) and 2x Double Switched Socket Outlet (2x "Old" SA Outlet)</p> 
2	Exterior	<p>Replace 24x light fittings with 24x (Outdoor round bulkhead light fittings) complete with LED 9W / $\pm 1\ 900$ Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p>  <p>Dispose safely of old / defective / faulty fittings and lamps.</p> <p>Install 2x daylight switches / photocells then wire to switches for outside lights</p> <p>Replace galvanized steel conduit and re-wire all electrical circuits. Light circuits 2.5mm².</p>

	Distribution Board	<ul style="list-style-type: none"> • Clean DB • Identify and Label Circuits • Labelling <ul style="list-style-type: none"> ○ DB Name ○ Supply from ○ Supply cable size ○ Fault level ○ Outgoing Circuits • New printed/typed legend • CoC
	Building	Produce detailed “As Built” drawings clearly identifying all circuits, light switches, Socket outlets, Light fittings, isolators, loads (stove / AC / geyser) etc.

2.1.6 Block 6 & 7: 2 Story = 10x Classrooms, 2x Store rooms, 6 x Offices



1 Block 6 & 7

Replace 52x fluorescent light fittings with 52x (1200mm 2x LED Open Channel fitting) complete with LED "1200mm tubes" 15W / ± 2 400 Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80 , Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours





Dispose safely of old / defective / faulty fittings and lamps.

Replace 2x Single lever, 1x Two lever, and 2x (1 lever 2 way) light switches with Steel cover plate classic light switch



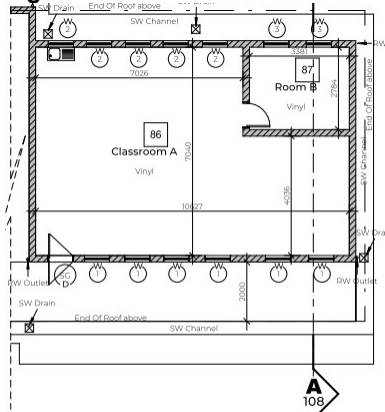
Replace 8x Switched Socket Outlet with Steel Cover plate 8x Double Switched Socket Outlet 4x (1 "Old" + 2x New SA Outlet) and 4x Double Switched Socket Outlet (2x "Old" SA Outlet)



		<p>Remove existing ceiling fans and speed controllers, clean, store, future re-use in this project, dispose safely of defective/faulty fittings</p> <p>Install 6x new ceiling fans and speed controllers</p> 
2	Exterior	<p>Replace 25x light fittings with 25x (Outdoor round bulkhead light fittings) complete with LED 9W / $\pm 1\ 900$ Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p> <p>Install, including 2.5mm² PVC GP wire, and galvanized steel conduit, 6x (Outdoor round bulkhead light fittings) complete with LED 9W / $\pm 1\ 900$ Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours. On the back of the building for perimeter lighting.</p>  <p>Dispose safely of old / defective / faulty fittings and lamps.</p> <p>Install 4x daylight switches / photocells then wire to switches for outside lights</p> <p>Replace galvanized steel conduit and re-wire all electrical circuits. Light circuits 2.5mm².</p>
	Distribution Board	<ul style="list-style-type: none"> • 4x Clean DB • Identify and Label Circuits • Labelling <ul style="list-style-type: none"> ○ DB Name ○ Supply from ○ Supply cable size ○ Fault level ○ Outgoing Circuits • New printed/typed legend • CoC
	Building	<p>Produce detailed "As Built" drawings clearly identifying all circuits, light switches, Socket outlets, Light fittings, isolators, loads (stove / AC / geyser) etc.</p>

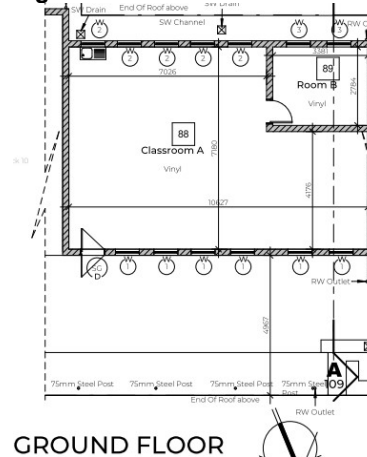
2.1.7 Block 8, 9 & 10: 3x Classrooms, 3x Rooms, 1x Ablutions

Figure 2 Block 8



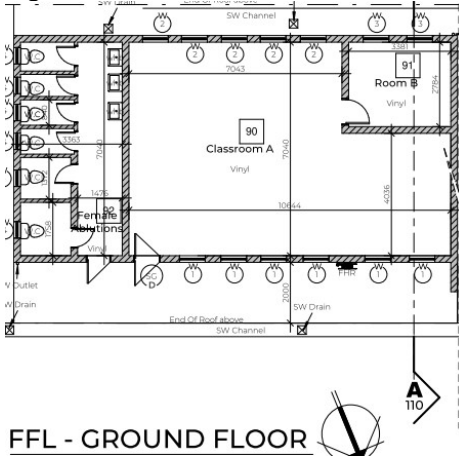
GROUND FLOOR_BLOCK 8

Figure 3 Block 9








GROUND FLOOR

Figure 4 Block 10



FFL - GROUND FLOOR

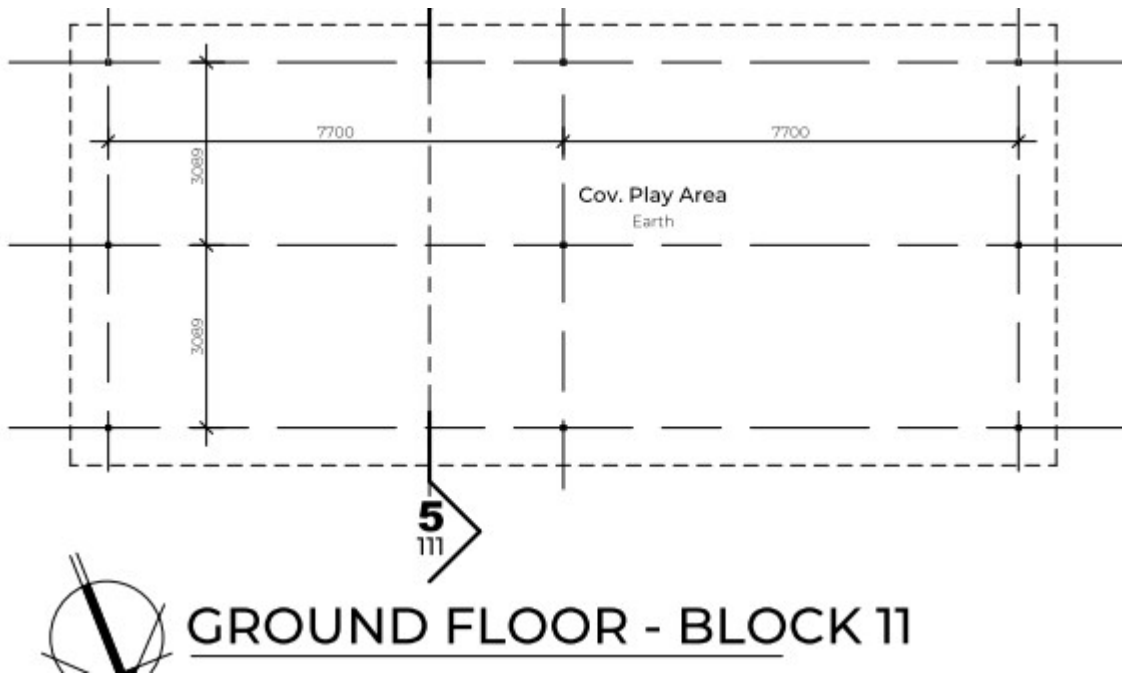
<p>1 Block 8, 9 & 10</p>	<p>Replace 18x fluorescent light fittings with 182x (1200mm 2x LED Open Channel fitting) complete with LED "1200mm tubes" 15W / ± 2 400 Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p>  <p>Replace, re-conduit and re-wire with 2.5mm² PVC GP wire, 9x light fitting with 9x Round Indoor bulkhead light fitting complete with LED 9W / ± 1 900 Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p>  <p>Dispose safely of old / defective / faulty fittings and lamps.</p>
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		<p>Replace 2x Single lever, 1x Two lever, and 2x (1 lever 2 way) light switches with Steel cover plate classic light switch</p>  <p>Replace 12x Switched Socket Outlet with Steel Cover plate 12x Double Switched Socket Outlet 4x (1 "Old" + 2x New SA Outlet) and 4x Double Switched Socket Outlet (2x "Old" SA Outlet)</p> 
2	Exterior	<p>Replace 12x light fittings with 12x (Outdoor round bulkhead light fittings) complete with LED 9W / ± 1 900 Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p> <p>Install, including 2.5mm² PVC GP wire, and galvanized steel conduit, 4x (Outdoor round bulkhead light fittings) complete with LED 9W / ± 1 900 Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours. On the back of the building for perimeter lighting.</p>  <p>Dispose safely of old / defective / faulty fittings and lamps.</p> <p>Install 3x daylight switches / photocells then wire to switches for outside lights</p> <p>Replace galvanized steel conduit and re-wire all electrical circuits. Light circuits 2.5mm².</p>

	Distribution Board	<ul style="list-style-type: none"> • 3x Clean DB • Identify and Label Circuits • Labelling <ul style="list-style-type: none"> ○ DB Name ○ Supply from ○ Supply cable size ○ Fault level ○ Outgoing Circuits • New printed/typed legend • CoC
	Building	Produce detailed “As Built” drawings clearly identifying all circuits, light switches, Socket outlets, Light fittings, isolators, loads (stove / AC / geyser) etc.

2.1.8 Block 11: 1x Covered play area

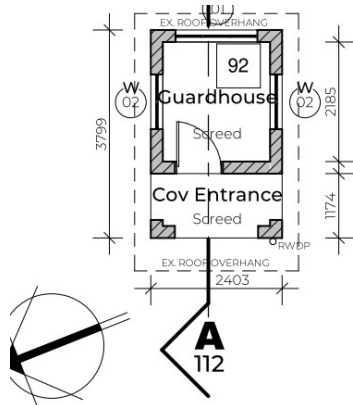
Provisional: 300 lux average illumination.






1	Block 11	<p>Install, including 2.5mm² PVC GP wire, and galvanized steel conduit, 9x Surface mounted weatherproof 1,2 m – (1200mm 2x LED fitting) complete with LED “1200mm tubes”, each LED “Tube” shall comply with the following: 15W / ±2 400 Lumen, ±190° Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p>  <p>Install, including 2.5mm² PVC GP wire, and galvanized steel conduit, 1x Two lever light switches with Steel cover plate classic light switch</p> 
	Distribution Board	<ul style="list-style-type: none"> • Supply for above from nearest DB Block 9 or Block 10 • Add: 1x 10A, 5kA, 1-pole CB for “Covered play area” • CoC


	Building	Produce detailed "As Built" drawings clearly identifying all circuits, light switches, Socket outlets, Light fittings, isolators, loads (stove / AC / geyser) etc.
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2.1.9 Block 12: Guard House: 1 x room



GROUND FLOOR - GUARD HOUSE

1	Block 1	<p>Replace 1x light fitting with 1x Round Indoor bulkhead light fitting complete with LED 9W / ± 1 900 Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p>  <p>Replace 1x light switch with Steel cover plate classic 2 lever light switch</p>  <p>Replace 1x Switched Socket Outlet with Steel Cover plate 1x Double Switched Socket Outlet 1x (1 "Old" + 2x New SA Outlet)</p> <p>Replace conduit and re-wire all electrical circuits. SSO circuits 4mm². Light circuits 2.5mm².</p> <p>Replace 1x Isolator Steel cover plate classic.</p> 
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6	Walkway / Exterior	<p>Replace 4x light fittings with 4x (Outdoor round bulkhead light fittings) complete with LED 9W / ± 1 900 Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p>  <p>Dispose safely of old / defective / faulty fittings and lamps.</p> <p>Install a daylight switch / photocell then wire to switches for outside lights</p> <p>Replace galvanized steel conduit and re-wire all electrical circuits. Light circuits 2.5mm².</p>
	Distribution Board	<ul style="list-style-type: none"> • None. Use Isolator as Local Main Switch • Identify and Label Circuits • Labelling <ul style="list-style-type: none"> ○ DB Name ○ Supply from ○ Circuit on Supply DB • CoC
	Building	Produce detailed "As Built" drawings clearly identifying all circuits, light switches, Socket outlets, Light fittings, etc.

3 Technical Requirements

3.1 Light Switch

Samples shall be submitted to the Engineer for approval and before ordering.

3.1.1 Flush and surface mounted switches

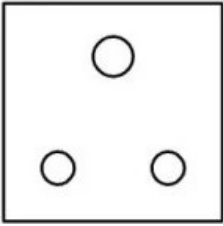
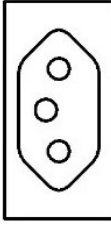
- a. All switches shall be suitable for mounting in 100 x 50 x 50mm boxes shall comply with SANS 1663 and shall bear the SANS mark
- b. Switches shall be of tumbler operated microgap type rated at 16A, 220/250V
- c. Switches shall have protected terminals for safe wiring
- d. Contacts shall be of silver material
- e. On multi-lever switches, it shall be possible to individually change any of its switches
- f. The yoke strap shall be slotted to allow for easy alignment
- g. The covers of surface mounted switches shall have toggle protectors
- h. Cover plates shall be finished in ivory coloured baked enamel, anodised bronze or aluminium unless otherwise specified
- i. Cover plates shall overlap the outlet to cover wall imperfections
- j. Cover plates shall comply with SABS 1084:1976 Cover plates for wall outlet boxes

3.2 Switched Socket Outlets and Isolators

Samples shall be submitted to the Engineer for approval and before ordering.

3.2.1 Flush and surface mounted switched sockets and isolators

- a. All switched socket-outlets and isoaltors shall be suitable for mounting in 100 x 100 x 50mm or 100 x 50 x 50mm boxes
- b. Switched sockets shall comply with SANS 164

<p>SANS 164-1</p>  <p>SANS 164-1 Standard 16A socket and plug top that has been used in South Africa for more than 70 years.</p> <p>164-1 plug tops are re-wireable socket</p> <p><u>Note:</u> This document refers to the Type 1764-1 Socket Outlets as "Old" SA Socket Outlets</p>	<p>SANS 164-2</p>  <p>SANS 164-2 The new 16A 3 pin socket which is also capable of taking your 6A and 16A 2 pin euro plugs.</p> <p>164-2 plug tops are re-wireable Small 6A 3 Pin socket</p> <p><u>Note:</u> This document refers to the New Type 164-2 Socket Outlets as "New" SA Socket Outlet</p>
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- c. Switches shall be of the tumbler operated microgap type rated at 16A, 220/250V
- d. Terminals shall be enclosed for safe wiring
- e. Contacts shall be of silver material
- f. Safety shutters shall be provided on live and neutral openings.
- g. The yoke strap shall be slotted to allow for easy alignment
- h. The covers of surface mounted switched socket shall have toggle protectors.
- k. Miniature circuit-breakers shall be used in lieu of a switch where specified
- l. The covers of surface mounted switches shall have toggle protectors
- m. Cover plates shall be finished in ivory coloured baked enamel, anodised bronze or aluminium unless otherwise specified
 - a. Where specified: RED cover shall be accompanied by a RED Switch and a Standard (white) SANS 164-1 16A Outlet. Not a dedicated socket outlet, no

shaved / dedicated earth pin)

- n. Cover plates shall overlap the outlet to cover wall imperfections
- i. Cover plates shall comply with SABS 1084:1976 Cover plates for wall outlet boxes


3.3 Photo cell:

Samples the Photo cell and base shall be submitted to the Engineer for approval and before ordering.

The outside lighting on the buildings must be switched directly by photo cell. The circuit wiring shall be routed through the photocell.

The photocell supplied shall include the actual photo cell and the associated NEMA (suitable for wall mounting) base.

Table 2 The photo cell must comply to the following:

Item	
1	Switch rating 16A
2	Switch ON when the illumination dropped to 50 lux
3	Switch OFF when the illumination raised to 90 lux
4	It must be weatherproof and must have a built in time delay of approximately 40 seconds
5	Built in protection against voltage surges must be provided
6	Wall mounted NEMA base The connectors on the bottom of the photocell must be identical to those in the image below 

3.4 Light Fittings:

Samples of all light fittings, LEDs and lamps shall be submitted to the Engineer for approval and before ordering.

3.4.1 Fluorescent lamp requirements

Where general purpose existing fluorescent lamps are replaced with similar Florescent Lamps the following shall apply:

3.4.1.1 9W Compact fluorescent lamp (CFL) requirement

- | | |
|----------------------------------|---------------|
| a. Life To 10% Failures (Nom) | ≥ 6 500 hours |
| b. Lamp life depreciation to 80% | ≥ 8 000 hours |
| c. Colour temperature | ± 4 100 K |
| d. Colour rendering index | ≥ 80 |
| e. Lumen output | ≥ 810 lumen |
| f. Rated nominal power | 9W |

3.4.1.2 1.2m 36W fluorescent lamp requirement

- | | |
|----------------------------------|----------------|
| a. Life To 10% Failures (Nom) | ≥ 10 000 hours |
| b. Lamp life depreciation to 80% | ≥ 5 000 hours |
| c. Colour temperature | ≥ 4 100 K |
| d. Colour rendering index | > 80 |
| e. Lumen output | ≥ 3 250 lumen |
| f. Rated nominal power | 36W |

3.4.1.3 1.5m 54/58W fluorescent lamp requirement

- | | |
|----------------------------------|-----------------------|
| a. Life To 10% Failures (Nom) | ≥ 10 000 hours |
| b. Lamp life depreciation to 80% | ≥ 5 000 hours |
| c. Colour temperature | ≥ 4 100 K |
| d. Colour rendering index | > 80 |
| e. Lumen output | ≥ 4 900 / 5 200 lumen |
| f. Rated nominal power | 54/58W |

3.4.2 Discharge lamp requirements

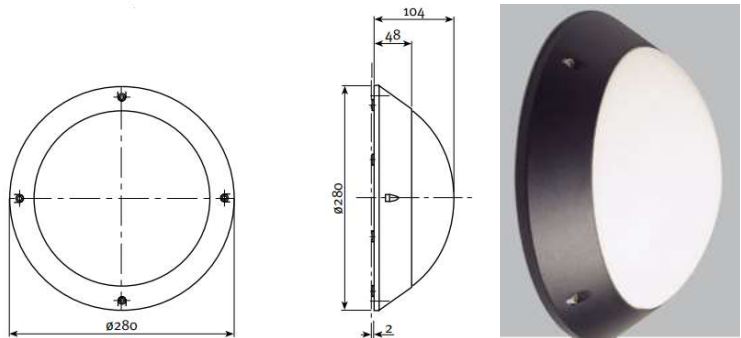
Where general purpose discharge lamps are replaced with similar the following shall apply:

3.4.2.1 70W High pressure sodium (HPS/SON) lamp requirement

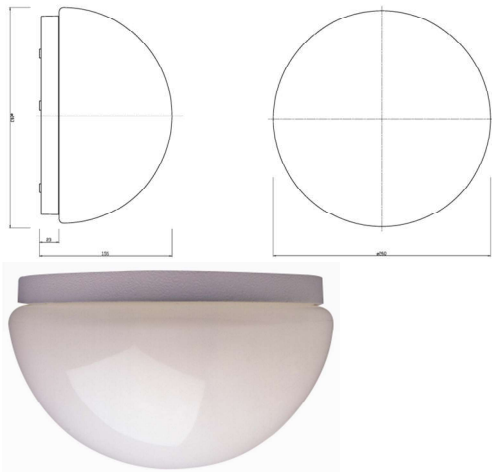
- | | |
|----------------------------------|----------------|
| a. Life To 10% Failures (Nom) | ≥ 13 000 hours |
| b. Lamp life depreciation to 80% | ≥ 10 000 hours |
| c. Colour temperature | ± 2 000 K |
| d. Colour rendering index | ≥ 25 |
| e. Lumen output | ≥ 6 300 lumen |
| f. Rated nominal power | 70W |

3.4.3 Bulkheads


3.4.3.1 F1: Outdoor and wall mounted bulkheads:

TYPE	DESCRIPTION	LAMP
Type F1	<p>Round surface mounted light fitting with cast aluminium base with round bulkhead light fitting, complete with LED 9W / $\pm 1\,900$ Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours a matt polycarbonate diffuser. Complete with silicone gasket in groove, and lamps. Colour of the decorative trim ring shall be "White". The fitting shall have a power factor of at least 0.95. 230V 50Hz.</p> <p><i>Similar to the illustrations</i></p> 	15W LED

3.4.3.2 F2: Indoor bulkheads (Preferred)

TYPE	DESCRIPTION	LAMP
Type F2	<p>: White round surface mounted light fitting with cast aluminium base with round bulkhead light fitting, complete with LED 15W / $\pm 1\,900$ Lumen, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours a matt polycarbonate diffuser. Complete with silicone gasket in groove, and lamps. Colour of the base shall be "White". The fitting shall have a power factor of at least 0.95. 230V 50Hz.</p> <p><i>Similar to the illustrations</i></p> 	15W LED

3.4.3.2.1 F2B Indoor Bowl Fitting (Alternative to F2)

TYPE	DESCRIPTION	LAMP
Type F2B	<p>: Indoor bulkhead light fitting) complete with 1x LED "Classic bulb" (BC/ES) 10W / $\pm 1\,000$ Lumen, $\pm 200^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p> <p><i>Similar to the illustrations</i></p> 	10W LED

3.4.4 LED light fittings

Channel luminaires shall consist of a ventilated, enclosed channel body with one or more lamps as specified in the project specification. The channel body shall house the control gear, terminals and internal wiring.


- a. Three sets of mounting slots and knock-outs suitable for mounting onto standard round conduit boxes and/or 20mm diameter conduit pendant rods, shall be provided in the rear of the channel, one in the centre and one approximately one sixth from each end
- b. A knockout suitable for a 20mm diameter conduit entry shall be provided at each end of the channel. The distance between the back of the luminaire and centre of the knockout shall be approximately 25mm
- c. The knockouts shall be positioned on the centre line of the channel
- d. The body channel shall incorporate a removable cover acting as a reflector, manufactured of cold rolled steel, not less than 0,8mm thick, designed and mounted to completely cover the interior of the body channel and its contents and extending over the full length of the luminaire up to the lamp holders
- e. The reflector shall be firmly held in position with a latching device consisting of knurled, coin slot, captive screws. Plastic, used as a spring mechanism, is not acceptable as a fixing device for reflectors. The action of the latching device shall not deteriorate due to use and/or ageing

3.4.4.1 F3: 1.2m x 1 lamp, 1x 15W LED

Open channel: 1.2m (4ft), 1 x 15W "T5/T8" lamp, including control gear.

Suitable for mounting onto suspended ceiling, plaster ceiling, or concrete slab.

Including all accessories, screws, brackets, clips etc. required to fit and install

TYPE	DESCRIPTION	LAMP
Type F3	<p>: Surface mounted 1,2 m – (1200mm 1x LED Open Channel fitting) complete with 1x LED "1200mm tube", , each LED "Tube" shall comply with the following: 15W / ± 2 400 Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours luminaire consisting of a ventilated, enclosed channel body. The body channel shall incorporate a removable cover acting as a reflector, manufactured of cold rolled steel, not less than 0,8 mm thick, designed and mounted to completely cover the interior of the body channel and its contents and extending over the full length of the luminaire up to the lamp holders. The electronic ballast shall be SABS or equivalent approved. The fitting shall have a power factor of at least 0.95.</p> <p>Provide 20mm diameter entries at each end of the fitting and on the back. The internal wiring shall be heat resistant with 105°C 600 V insulation. PF ≥ 0.95, 230V 50Hz.</p> <p><i>Similar to the illustration</i></p> 	1 x 15W LED

3.4.4.2 F4: 1.2m x 2 lamp, 2x 15W LED

Open channel: 1.2m (4ft), 2 x 15W "T5/T8" lamp, including control gear.

Suitable for mounting onto suspended ceiling, plaster ceiling, or concrete slab.

Including all accessories, screws, brackets, clips etc. required to fit and install.


TYPE	DESCRIPTION	LAMP(S)
Type F4	<p>: Surface mounted 1,2 m – (1200mm 2x LED Open Channel fitting) complete with 2x LED "1200mm tube", each LED "Tube" shall comply with the following: 15W / ± 2 400 Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours luminaire consisting of a ventilated, enclosed channel body. The body channel shall incorporate a removable cover acting as a reflector, manufactured of cold rolled steel, not less than 0,8 mm thick, designed and mounted to completely cover the interior of the body channel and its contents and extending over the full length of the luminaire up to the lamp holders. The electronic ballast shall be SABS or equivalent approved. The fitting shall have a power factor of at least 0.95.</p> <p>Provide 20mm diameter entries at each end of the fitting and on the back. The internal wiring shall be heat resistant with 105°C 600 V insulation PF ≥ 0.95, 230V 50Hz.</p> <p><i>Similar to the illustration</i></p> 	2 x 15W LED

3.4.4.3 F5: 1.5m x 1 lamp, 1x 23W LED

Open channel: 1.5m (5ft), 1 x 23W "T5/T8" lamp, including control gear.

Suitable for mounting onto suspended ceiling, plaster ceiling, or concrete slab.

Including all accessories, screws, brackets, clips etc. required to fit and install.


TYPE	DESCRIPTION	LAMP
Type F5	<p>: Surface mounted 1,5 m – (1500mm 1x LED Open Channel fitting) complete with 2x LED "1500mm tube", each LED "Tube" shall comply with the following: 23W / ± 3 700 Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours luminaire consisting of a ventilated, enclosed channel body. The body channel shall incorporate a removable cover acting as a reflector, manufactured of cold rolled steel, not less than 0,8 mm thick, designed and mounted to completely cover the interior of the body channel and its contents and extending over the full length of the luminaire up to the lamp holders. The electronic ballast shall be SABS or equivalent approved. The fitting shall have a power factor of at least 0.95.</p> <p>Provide 20mm diameter entries at each end of the fitting and on the back. The internal wiring shall be heat resistant with 105°C 600 V insulation. PF ≥ 0.95, 230V 50Hz.</p> <p><i>Similar to the illustration</i></p> 	1 x 23W LED

3.4.4.4 F6: 1.5mx 2 lamp, 2x 23W LED

Open channel: 1.5m (5ft), 2 x 23W "T5/T8" lamp, including control gear.

Suitable for mounting onto suspended ceiling, plaster ceiling, or concrete slab.

Including all accessories, screws, brackets, clips etc. required to fit and install.

TYPE	DESCRIPTION	LAMP
Type F6	<p>: Surface mounted 1,5 m – (1500mm 2x LED Open Channel fitting) complete with 2x LED "1500mm tube", , each LED "Tube" shall comply with the following: 23W / ± 3 700 Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours luminaire consisting of a ventilated, enclosed channel body. The body channel shall incorporate a removable cover acting as a reflector, manufactured of cold rolled steel, not less than 0,8 mm thick, designed and mounted to completely cover the interior of the body channel and its contents and extending over the full length of the luminaire up to the lamp holders. The electronic ballast shall be SABS or equivalent approved. The fitting shall have a power factor of at least 0.95.</p> <p>Provide 20mm diameter entries at each end of the fitting and on the back. The internal wiring shall be heat resistant with 105°C 600 V insulation. PF ≥ 0.95, 230V 50Hz.</p> <p><i>Similar to the illustration</i></p> 	2 x 23W LED

3.4.5 Safe in Use Warning / Pilot Light

TYPE	DESCRIPTION	LAMP
Type F7	<p>: Safe in Use Warning / Pilot Light</p> <p>The Contarctor shall propose a suitable high efficiency LED based surface mounted 230V 50Hz luminiare, complete with 2-spare LED “lamps” which shall be handed to the User Client upon completion of the project as “Maintenance Spares”. The LED / LED Cluster service life shall be in eccess of 15 000hours. No fitting with separate controgear shallbe acceptable. The LENS / LED Colour shall be RED.</p> <p><i>Below is a image of an existing indication light, a bulkead lift fitting with a red diffuser (not painted red) is also a possibility.</i></p> 	

3.4.6 Post top light fitting and pole

TYPE	DESCRIPTION	LAMP
Type F8	<p>: Post top mounted area light complete with fibreglass pole and fitted with 70W HPS lamp. A clear prismatic UV stabilised polycarbonate or high impact acrylic diffuser shall be used which shall be vandal proof. The die cast aluminium lower section comprising 79mm diameter x 75mm deep spigot entry, lamp holder and control gear, IP65. The fitting shall have a power factor of at least 0.95. 230V 50Hz. The post top luminaire shall be finished in a hammer tone green colour.</p> <p>Each fitting shall be sourced (may be form different suppliers) together with a suitable galvanized steel post top pole.. <u>Mounting Height</u> 3.5m. Including base and 5A/3kA CB, complete with all wiring and accessories to complete the installation, access door, circuit breaker and small wiring. The pole exterior finish shall be hammer tone green, identical in colour to the light fitting.</p> <p><i>Similar to the illustrations below</i></p> 	70W HPS

3.4.7 Moisture (Dust and Vapour) proof fluorescent light fitting

3.4.7.1 IP65: 1.2m x 2 lamp, 2x 15W LED

Weatherproof, IP65, 1.2m (4ft), 2 x 15W “T5/T8” lamp, including control gear.

Suitable for mounting onto suspended ceiling, plaster ceiling, or concrete slab.

Including all accessories, screws, brackets, clips etc. required to fit and install

TYPE	DESCRIPTION	LAMP
Type F9	<p>: Moisture proof light fitting</p> <p>Surface mounted weatherproof 1,2 m – (1200mm 2x LED fitting) complete with 2x LED “1200mm tube”, each LED “Tube” shall comply with the following: 15W / ± 2 400 Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p> <p>Provide 20mm diameter entries at each end of the fitting and on the back. The internal wiring shall be heat resistant with 105°C 600 V insulation PF ≥ 0.95, 230V 50Hz.</p> <p><i>Similar to the illustration</i></p> <p>.</p> 	2 x 15W LED

3.4.7.2 IP65: 1.5m x 2 lamp, 2x 54/58W

Weatherproof, IP65, 1.5m (5ft), 2 x 23W “T5/T8” lamp, including control gear.

Suitable for mounting onto suspended ceiling, plaster ceiling, or concrete slab.

Including all accessories, screws, brackets, clips etc. required to fit and install

TYPE	DESCRIPTION	LAMP
Type F10	<p>: Moisture proof light fitting</p> <p>Surface mounted weatherproof 1,5 m – (1500mm 2x LED fitting) complete with 2x LED “1500mm tube”, , each LED “Tube” shall comply with the following: 23W / ± 3 700 Lumen, $\pm 190^\circ$ Beam, LED colour 4 000K (Neutral white 840), CRI (Ra) ≥ 80, Luminaire efficacy shall exceed 105 lm / W, LED and Driver Lifespan 50 000 hours</p> <p>The internal wiring shall be heat resistant with 105°C 600 V insulation. . 230V 50Hz</p> <p>Provide 20mm diameter entries at each end of the fitting and on the back. The internal wiring shall be heat resistant with 105°C 600 V insulation PF ≥ 0.95, 230V 50Hz.</p> <p><i>Similar to the illustration</i></p> 	23W LED

3.5 Power skirting

Samples of the Power Skirt shall be submitted to the Engineer for approval and before ordering.

The Electrical Contractor shall supply and install 2-cover-3-compartment power skirting . The bottom at 300mm above floor level, measured to the bottom of the power skirt, complete with conduit links.

The power skirting shall be manufactured from 1,0mm thick sheet steel, rolled and welded to form three compartments fitted with a common clip-on cover plate of 0,8mm thick cold rolled steel. The upper compartment shall be used to accommodate flush mounted 16A, 3-pin switch socket outlets and power cables whilst the lower two compartments shall be used to accommodate telephone and data cabling as well as RJ11 and RJ45 outlets.

The power skirting shall be provided with a baked epoxy powder finish in a colour which will be selected by the Architect from the standard colours available. The power skirt and accessories shall conform to the specification and prior approval shall be obtained from the engineer with respect to the quality specification and from the architect regarding the standard colour before supply is commenced.

Provision for fitting flush mounted, 16A, 3-pin switched socket outlets of the standard round pin type as well as dedicated red and purple (violet) shaved pin type, telephone and data outlets shall be made.

Each type of outlet shall be mounted on an individual carrier and shall be provided with a separate cover plate. All electrical accessories shall conform to the specification and prior approval shall be obtained from the engineer before supply is commenced.

Note:

For each 1 (one) meter of power skirt a RJ11 outlet and individual carrier shall be provided with a separate cover plate. For each 1 (one) meter of power skirt a RJ45 outlet and individual carrier shall be provided with a separate cover plate the cover plate shall be pre manufactured for a standard RJ11 / RJ45 outlet and provided with a "blank" outlet cover no RJ11 or RJ45 outlet socket is required as will be installed by others.

The power skirting shall be secured to the wall at intervals of not more than 1m by means of approved patented plastic wall plugs and screws. The contractor shall supply and install all necessary junction pieces, elbows, end caps, removable cover, etc., for the complete installation of the power skirting. Any screws, nuts, washers, etc., employed shall be corrosion proofed to approval.

3.6 Ceiling Fan

Sample shall be submitted to the Engineer for approval and before ordering.

Pendant length, top to bottom of fan:	±500mm
Rotor diameter:	±1 450m
Construction:	Metal body and blades with plastic cup
Speed controller:	5 Speed
Power required:	230V, 50Hz, ±75W