

## **Annexure K**

# **Specification of Technical Support Vehicle**

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## ABBREVIATIONS

A	Ampere
AC	Alternating Current
Ah	Ampere-hour
BMS	Battery Monitoring System
CAN	Controller Area Network
CFE	Customer Furnished Equipment
cm	centimetre
CSIR	Council for Scientific and Industrial Research
DC	Direct Current
DCP	Dry Chemical Powder
kg	kilograms
L	Litre(s)
LED	Light-Emitting Diode
LS	Landward Sciences
m	metre
mm	millimetre
Nm	Newton-metre
OEM	Original Equipment Manufacturer
USB	Universal Serial Bus
V	Volt(s)
W	Watt

# 1 Background

This document describes the minimum requirements for a Fleet Support Vehicle. The base vehicle requires enhancements and installation of purchased equipment as well as Client Furnished Equipment (CFE) as detailed in this document. The baseline vehicle is a Mercedes Benz Sprinter 519, see Figure 1. Rear area detail of the Sprinter Panel Van 519 is shown in Figure 2 and Figure 3.



**Figure 1: Sprinter Panel Van 519 CDI Extra Long**



**Figure 2: Mercedes-Benz Sprinter 2.0 519 – Detail**



**Figure 3: Mercedes-Benz Sprinter 2.0 519 Side Wall**

List of CFE to be provided:

- Two mobile (vehicle mounted) radios (refer to item 2.3, a)
- Handheld radio multi-unit charger bases (refer to item 2.4.4, a)
- Fire extinguishers (refer to item 2.7)
- Additional wheels to be transported (refer to item 2.10.1)

## 2 Requirements

### 2.1 Vehicle Layout

All generated images and drawings in the document are for conceptual design only. The final layout of the vehicle compartments will be done by the selected supplier.

The vehicle layout shall be divided into three compartments as follows:

- a) Cabin
- b) Forward lounge and light storage area
- c) Rear main storage area

A schematic layout of the vehicle is presented in Figure 4.

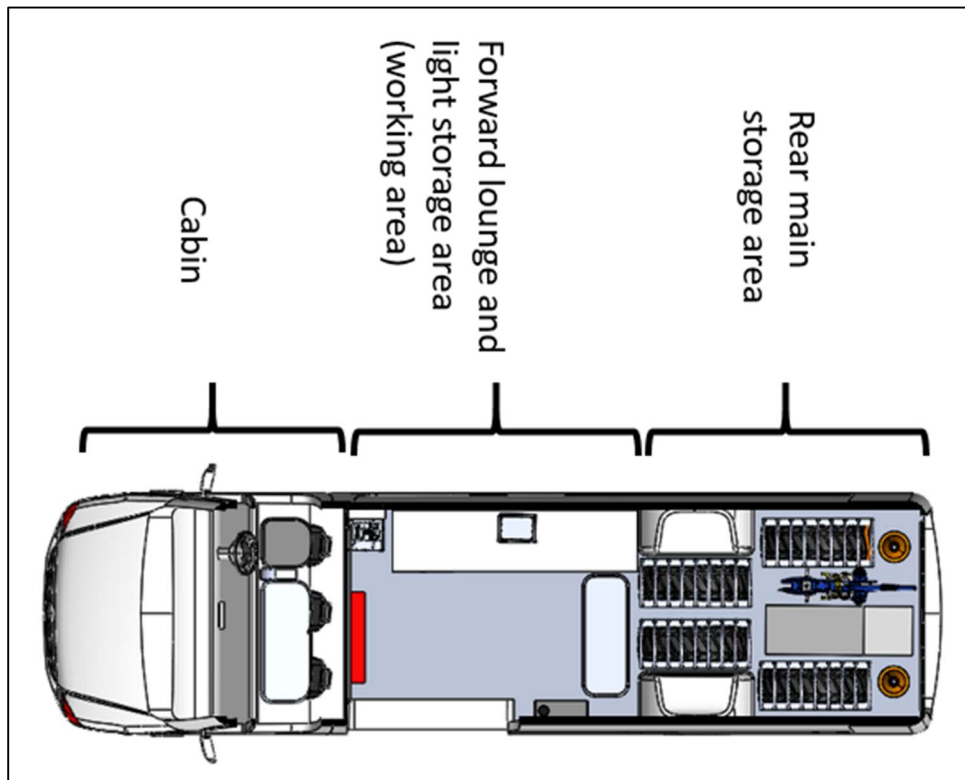


Figure 4: Vehicle Compartments

### 2.2 Vehicle Systems Requirements

#### 2.2.1 Miscellaneous

The baseline vehicle is to be enhanced with the following:

- a) The maximum speed of the vehicle shall not be restricted subject to approval by Mercedes Benz.
- b) The vehicle shall be fitted with an additional 45 litre OEM fuel tank.
- c) Two USB type-3 ports shall be installed in the cabin
  - i) The power source of the USB ports shall be powered from the secondary battery. (Refer to item 2.4.3).

#### 2.2.2 Driver Aids

The baseline vehicle is to be enhanced with the following OEM approved systems:

- a) Vehicle shall be fitted with a blind spot monitoring system.
- b) The vehicle shall be fitted with a reverse camera system.
- c) The vehicle shall be fitted with a navigation system.

### 2.2.3 Display Units

- a) The cabin shall be fitted with a tyre pressure monitoring display unit. (Refer to Item 2.2.4.1).
- b) The cabin and forward lounge area shall be fitted with dual battery monitoring display units. (Refer to Item 2.4.3)
  - i) Battery status of the primary as well as secondary battery shall be displayed.

### 2.2.4 Wheels

#### 2.2.4.1 Tyre Pressure Monitoring System

- a) The vehicle shall be fitted with a tyre pressure monitoring system. The system must be of the internal fitted type (not the external type fitted at the air-inlet cap).
- b) The tyre pressure monitoring system shall have a display unit mounted inside the cabin. (Refer to Item 2.2.3, a).
  - i) The system shall display inflation pressure information for each wheel, with an alarm that indicates when a wheel is below allowable limits.

#### 2.2.4.2 Run Flat Inserts

- a) All wheels, including the spare wheel, shall be fitted with run-flat inserts (seven in total).

### 2.2.5 Windows

- a) The vehicle shall be fitted with a sliding window in the bulkhead.
- b) The vehicle shall be fitted with a window in the side panel of the "forward lounge", opposite to the sliding door.
- c) The vehicle shall be fitted with a window in the sliding door.
- d) Tinted smash and grab protection shall be fitted on all side windows:
  - i) Driver and passenger windows of the cabin.
  - ii) Window in sliding door.
  - iii) Window in side panel of forward lounge.

## 2.3 Communication Equipment

Dedicated interface hardware shall be provided for communication equipment, including mounting of radios, chargers, and power supply points.

- a) Vehicle mounted mobile radio:
  - i) The vehicle shall be fitted with two mobile radios supplied by the client.
    1. Tait Electronics T2000 ii
    2. Mototrbo DM4000e
  - ii) The mobile radios shall be installed under the seat, and raised from the floor.
  - iii) The antennas for these radios shall be installed on the roof.
  - iv) Cables shall be protected by means of sleeves or trunking.
  - v) Brackets shall be provided in the cabin to accommodate the handsets of the radios.
- b) Power source:
  - i) 12 V Input power shall be provided for the mobile radios.
  - ii) Power for the mobile radios must be supplied from the secondary battery.



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## 2.4 Power Source

### 2.4.1 General Electrical Supply Requirements

- a) Dual Power Supply:
  - i) The vehicle shall be fitted with a power supply that can supply both 220 V as well as auxiliary 12 V from a secondary battery.
- b) Safety Features:
  - i) The power supply shall be fitted with the necessary safety features (fuses/trip switches/etc) according to industry standards.

### 2.4.2 220 V Requirements

- a) Flush Body Mounted 220 V Plug Box:
  - i) The vehicle shall be fitted with a flush body mounted 220 V plug box to allow for grid power supply to the vehicle when available.
- b) Pure sine wave inverter:
  - i) The vehicle shall be fitted with a 12 V, continuous 3000 W inverter to supply 220 V power when not connected to grid power.
  - ii) The inverter shall provide pure sine wave output.
- c) Power Points:
  - i) The vehicle shall be fitted with two (2) 220 V, 15 A three-point plugs. Power to these plugs will be supplied via the inverter.
- d) Power Distribution Box:
  - i) The vehicle shall be fitted with a power distribution box for AC distribution.
  - ii) The vehicle shall be fitted with a power distribution box for DC distribution.

### 2.4.3 Dual Battery System

- a) The vehicle shall be fitted with a dual battery system.
- b) The dual battery system shall be charged from the vehicle as well as from externally 220 V power supply.
  - i) The secondary battery system shall be charged from the vehicle when the engine is running.
  - ii) When the engine is not running, the secondary battery must automatically disconnect from the main battery.
  - iii) Charging of the secondary battery shall not compromise the battery level of the primary battery.
- c) Minimum capacity for the secondary battery shall be 200 Ah.
- d) Battery type shall be a lithium type battery with an integrated Battery Monitoring System (BMS).
- e) The secondary battery shall be housed and secured in a spill container. Refer to Figure 5 for placement.
- f) Battery status of the primary as well as secondary battery shall be displayed in the cabin of the vehicle as well as the forward lounge and light storage area. (Refer to Item 2.2.3)
- g) Items to be powered by primary battery:
  - i) OEM vehicle installations only.
- h) Items to be powered by the secondary battery:
  - i) Auxiliary lights, refer to item 2.5.2 and 2.5.3.
  - ii) Emergency lights, refer to item 2.6, a), i) and ii).
  - iii) Vehicle identification accessories, refer to item 2.6, a), iii) and iv).
  - iv) Chargers:
    - 1. Two 6-way charger bases for portable radios, refer to item 2.4.4, a) (100 W each)
    - 2. Two USB type-3 chargers, refer to item 2.2.1, c)
    - 3. Stand-alone flood lights, refer to item 2.8.8, c)
- v) Vehicle mounted radios, refer to item 2.3 (174 W each)

## 2.4.4 Charging Points

Dedicated interface hardware shall be provided for mounting of radios, chargers, and power supply points.

- a) Handheld Radio Chargers:
  - i) The forward lounge shall be fitted with two (2) CFE handheld radio multi-unit charger bases supplied by the client:
    1. Motorola Mototrbo Ion 6-way charger base
    2. Motorola Mototrbo R7 6-way charger base
- b) USB Charge Points:
  - i) The cabin shall be fitted with two (2) USB type 3 charge points. (Refer to item 2.2.1, c)

## 2.5 Illumination and Lighting

### 2.5.1 Electrical Installation

- a) Electrical Installation Standards:
  - i) All electrical equipment shall be installed according to industry standards and safety regulations.
- b) Cable Housing:
  - i) Cabling shall be housed in trunking to allow for easy access and maintenance.
- c) Fuse for 12 V installations:
  - i) All 12 V installations shall be fused.
- d) Power Source for Lights:
  - i) All power for additional lights shall be supplied from the secondary battery.

### 2.5.2 Internal Lights

Internal lights shall adhere to the following:

- a) Additional LED Lights:
  - i) The vehicle shall be fitted with additional LED type internal lights in both the forward lounge and light storage area compartment and the rear loading storage compartment.
- b) Required Illumination:
  - i) Required illumination shall be between 300 and 400 lux (Measured 300 mm above the floor).
- c) Light Mounting:
  - i) The LED lights shall be fitted to the roof pillars of the vehicle.
- d) Switch Positions:
  - i) The switches for the lights shall be positioned at the side and the rear doors.
- e) Trunking:
  - i) The wiring to the switches and lights shall be housed in trunking according to automotive standards.

### 2.5.3 Vehicle Entrance Illumination Lights

- a) 12 V Work Lights:
  - i) The vehicle shall be fitted with 12 V work lights positioned at rear doors and sliding side door (facing outwards) that will illuminate the areas in front of the doors.
- b) LED Work light Capacity:
  - i) The LED work lights shall have a maximum capacity of 10 W.
- c) Switch Integration:
  - i) The switches for the work lights shall be housed in the same switch box as the internal lights (Refer to item 2.5.2, d).

## 2.6 Vehicle Identification Accessories

- a) The following accessories shall be installed:
  - i) Blue light
  - ii) Strobe light
  - iii) Siren
  - iv) Announcement system
- b) Vehicle identification light mounting
  - i) All external vehicle identification lights shall be flush or low profile mounted.
- c) Visibility
  - i) Vehicle identification lights shall be visible from all sides of the vehicle.
- d) Power Source
  - i) Vehicle identification lights shall be powered from the secondary battery.
  - ii) Siren and announcement system shall be powered from the secondary battery.

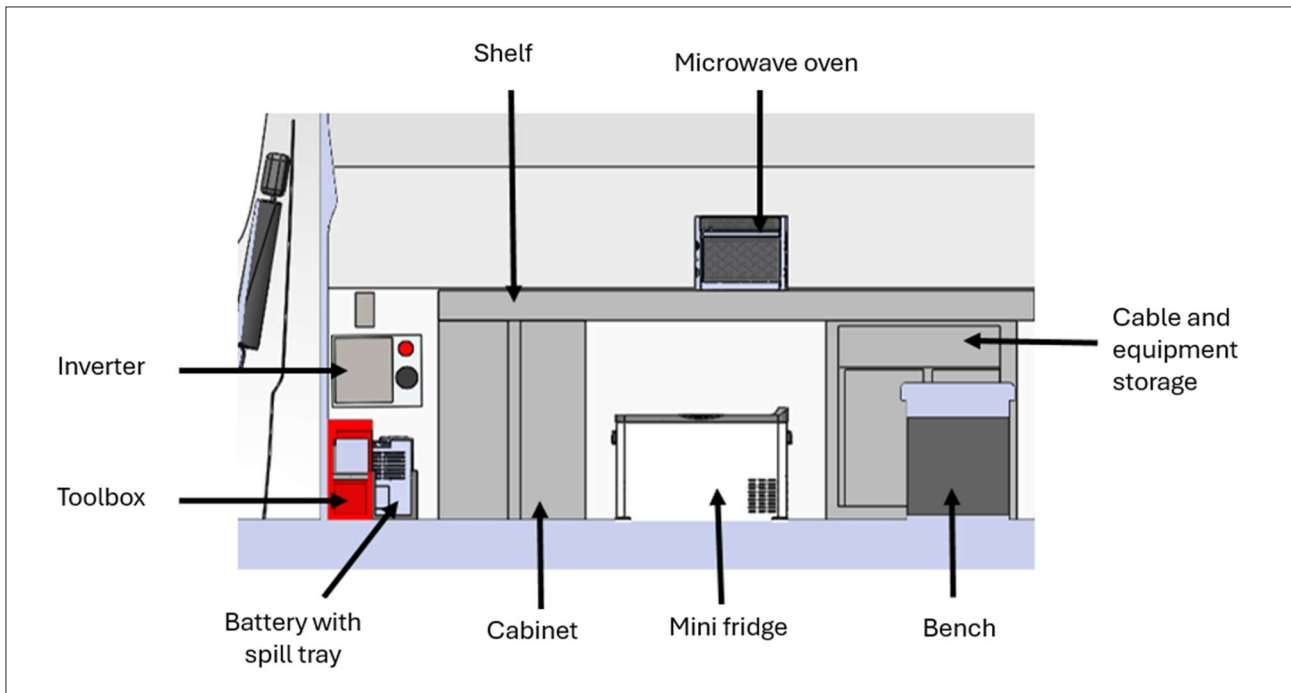
Note: Authorization for installation of vehicle identification lights shall be supplied.

## 2.7 Fire Extinguisher Requirements

- a) One (1) 4.5 kg Dry Chemical Powder (DCP) fire extinguisher shall be installed in the cabin.
- b) One (1) 4.5 kg DCP fire extinguisher shall be installed in the forward lounge and light storage area.
- c) The fire extinguishers shall be easily accessible.
- d) The fire extinguishers shall be secured by means of a heavy-duty bracket.

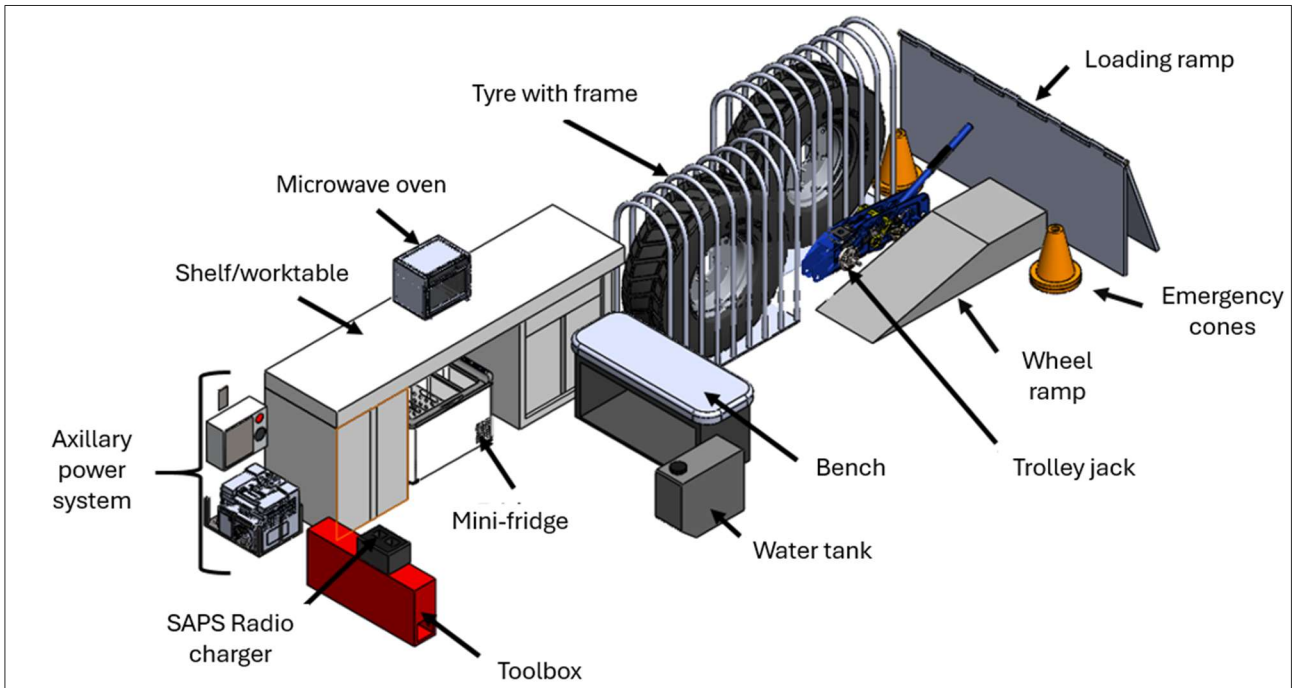
## 2.8 Forward Lounge and Light Storage Area Requirements

A conceptual layout of the forward lounge and light storage area is depicted in Figure 5. Also refer to Figure 4 for the various vehicle compartments. The internal layout of configurable items in the respective areas of the van, as depicted in the various figures, are concepts only for demonstration, and should not be considered as the selected design. The available internal space of van should be optimized for maximum storage space.

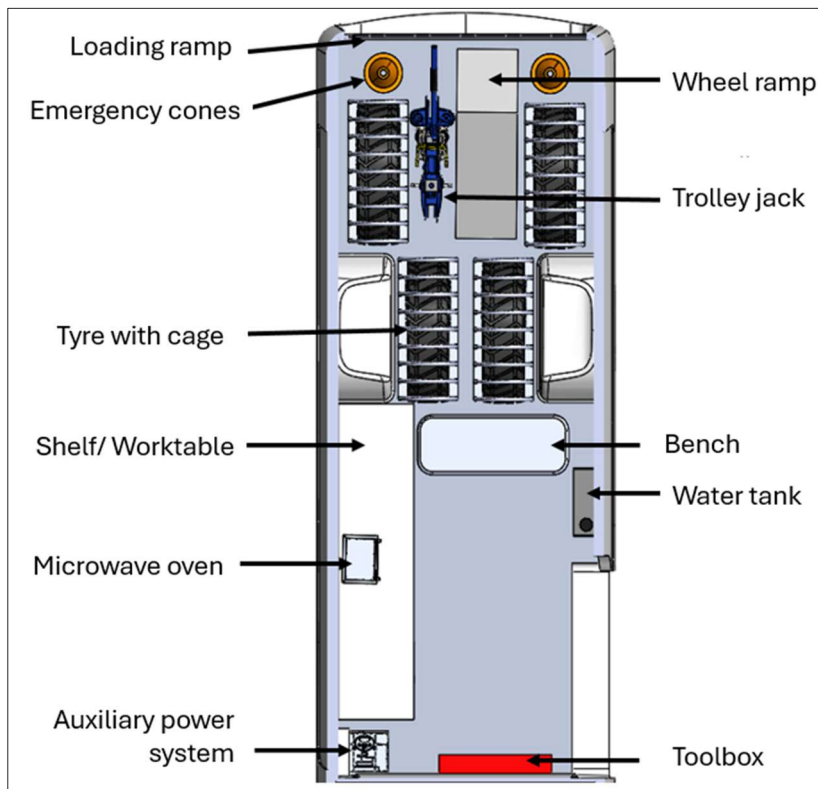


**Figure 5: Forward Lounge and Light Storage Area (Side View)**

A conceptual layout of the rear area of the vehicle is depicted in Figure 6 and Figure 7.



**Figure 6: Rear Area Layout**



**Figure 7: Rear Area Layout (Top View)**

### 2.8.1 Flooring

- a) The forward lounge and general storage area shall be fitted with a non-slip flat floor section to allow for easy cleaning.

### 2.8.2 Worktable

- a) Table Size:
  - i) The forward lounge and light storage area shall be fitted with a working table for food preparation.
  - ii) The size of the table should be adequate to accommodate a microwave, a kettle, and sufficient space for food preparation.
- b) Positioning:
  - i) For the position, refer to schematic in Figure 7 for detail.
- c) Surface Material:
  - i) The worktable shall be fitted with an easy to clean stainless steel surface.
- d) Storage:
  - i) The Forward lounge and general storage area shall be fitted with storage space for basic groceries. (W 300 mm x H 500 mm x D 300 mm).

### 2.8.3 Bench Seating

- a) The forward lounge and general storage area shall be fitted with bench seating for at least two people. Refer to schematic for detail Figure 5 and Figure 7.

Note: No passengers are to be seated on the bench during driving.

### 2.8.4 Fridge

- a) Fridge size:
  - i) The forward lounge and light storage area shall be fitted with a 35 L portable fridge.
- b) Mounting:
  - i) The fridge shall be secured in a mounting frame.
  - ii) The frame shall be securely mounted to the floor section of the vehicle using existing hardpoints.
  - iii) Load spreaders and spacers shall be used to allow for even mounting position.
- c) Power supply:
  - i) The power for the fridge shall be supplied from the inverter.

### 2.8.5 Water Supply

- a) The forward lounge and general storage area shall be fitted with a removable 20 L water tank to allow for washing of hands and general cleaning.
- b) The water tank shall be secured in a mounting frame.
- c) The water tank shall be fitted with a recessed tap.

### 2.8.6 Food and Water Heating

- a) The forward lounge shall be fitted with a microwave:
  - i) Maximum power output of 700 W (220 V)
  - ii) Volume of 20 L
  - iii) Flatbed type (turntable free)
  - iv) The microwave shall be secured to the working table with shock absorbing mounts.
  - v) Installation should allow for effective ventilation of the microwave.
- b) The forward lounge shall be equipped with a kettle:
  - i) The forward lounge and light storage area shall make provision for storage space for the kettle.

- ii) The kettle shall be secured in the storage space during transport.
- iii) Minimum 1 L capacity
- iv) Maximum power output of 1 500 W (220 V)
- c) Power supply
  - i) Power to the microwave and the kettle shall be supplied through the inverter system.

## 2.8.7 Tools and Accessories

Tools and Accessories Specifications:

- a) Impact Tool
  - i) The vehicle shall be fitted with a battery powered impact tool ½ inch drive 18 V.
  - ii) The impact tool shall be stored in the light storage area.
  - iii) Impact socket set, sizes 24 to 34 mm, including power bar.
- b) Torque wrench
  - i) ¾-inch or 1 inch torque wrench with a capacity of 1000 Nm.
  - ii) Correct adaptors to use the torque wrench.
- c) General Toolbox:
  - i) The storage area shall be fitted with a Blue Gedore 61 Piece Tool Assortment general toolbox.
- d) Extension Cable:
  - i) The vehicle will be supplied with a 30 m (2.5 mm<sup>2</sup>) extension cable mounted on a reel.
  - ii) The light storage area shall be fitted with a secure storage position for the extension cable.

## 2.8.8 Stand-Alone Flood Lights

Stand-Alone Rechargeable Work Light Specifications:

- a) Supply of Stand-Alone Lights:
  - i) The vehicle shall be supplied with two (2) stand-alone rechargeable work lights
  - ii) These lights shall be portable and cordless
- b) Minimum 1 500 Lumens.
- c) Recharging Options:
  - i) The Work lights shall be able to be recharged using 12 V or USB type input supply.
- d) Storage Provision:
  - i) Storage for the stand-alone lights shall be supplied.
- e) Securing Mechanism:
  - i) Securing mechanism during transport for the stand-alone lights shall be supplied.
- f) Power Supply and Charging:
  - i) Power supply to the stand-alone lights shall be supplied to allow for charging during transport/movement.
  - ii) Power for charging the stand-alone lights shall be supplied from the secondary battery.

## 2.9 General Storage and Emergency Equipment

Storage and Emergency Equipment Specifications: Refer to Figure 6 and Figure 7.

- a) Wheel Spanners and Power/Lift tyre lever compartment:
  - i) The storage area shall be fitted with a storage compartment for wheel spanners.
    - a) This storage compartment shall be fitted with a set of wheel spanners.
    - b) The wheel spanner shall accommodate sizes 32 mm socket for larger nuts and 28 mm socket for smaller nuts.
  - ii) The storage compartment shall be fitted with two (2) Power/Lift tyre levers (heavy duty lock-ring tool, length 94 cm for trucks).

- b) The storage area shall be fitted with a tyre inflation capability:
  - i) The storage compartment shall be fitted with a 12 V tyre inflation pump capable of inflating tyres up to 10 bar.
  - ii) The tyre inflation system shall be supplied with a 15 m tyre inflation hose and in-line gauge (minimum 10 bar).
  - iii) The storage area shall be fitted with a spare loose tyre inflation gauge (minimum 10 bar).
- c) Emergency Triangles:
  - i) The vehicle shall be fitted with two additional emergency triangles.
- d) Ground Sheet:
  - i) The vehicle shall be fitted with heavy duty waterproof tarpaulin.
- e) Jump Start Capability:
  - i) The vehicle shall be supplied with a portable jump starter for 12 V and 24 V with a capacity of 20 000 A.
- f) Foldable Gazebo:
  - i) The gazebo must be at least 2 x 2 m (when folded open).
  - ii) The gazebo must be able to withstand rain and windy weather.
  - iii) Storage space to be secured in during transport (or mounting brackets).

## **2.10 Rear Main Storage Area**

The schematic in Figure 8 illustrates the back view of the vehicle. The layout of the main storage area is depicted in Figure 7.

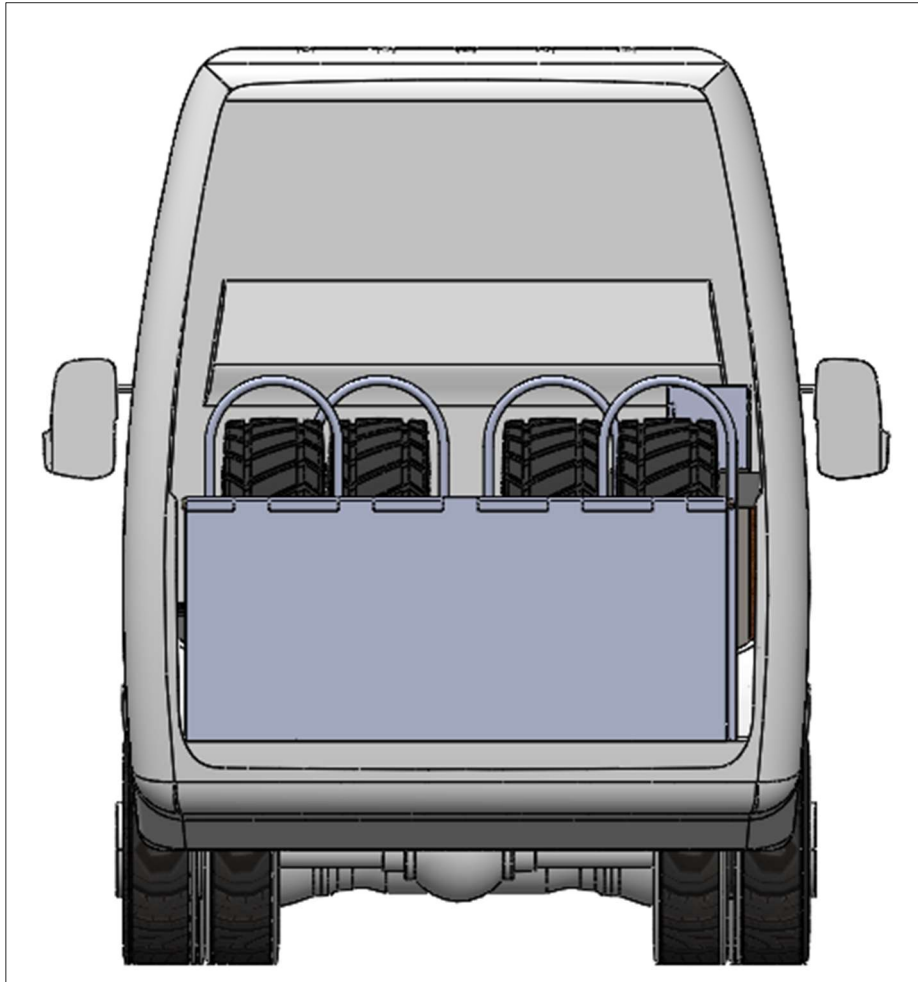
### **2.10.1 Spare Wheel Storage**

The spare wheel storage area must adhere to the following:

- a) Spare Wheel Mounting Frame:
  - i) The vehicle shall be fitted with a spare wheel mounting frame (1200 mm x 1100 mm x 410 mm minimum) to accommodate four (4) spare wheels supplied by the client.
  - ii) The mounting frame shall be secured to the vehicle hard points.
  - iii) If required, pacers and spreader plates shall be part of the installation.
  - iv) The storage frame shall be fitted with a wheel securing mechanism for each wheel.
  - v) The storage frame shall allow for easy access and removal of the wheels to the rear of the vehicle.
  - vi) Refer to Appendix A for dimensions.

### **2.10.2 Loading Ramp**

- a) The vehicle shall be fitted with a loading ramp.
- b) The loading ramp shall be hinged to the vehicle and be of folding design.
- c) The ramp shall have tread plate on the upper surface.
- d) The loading ramp shall be attached to the floor at the rear of the storage area.



**Figure 8: Rear View of Vehicle**

### **2.10.3 Support Equipment Storage**

- a) Bottle Jacks:
  - i) The storage area shall be fitted with 12 ton and 25 ton Bottle jacks.
  - ii) A dedicated storage area shall be provided for the bottle jacks.
  - iii) The bottle jacks shall be secured during transport.
- b) Air Hydraulic Trolley Jack:
  - i) The storage area shall be fitted with a minimum 22 ton air hydraulic trolley jack.
- c) Trolley Jack Storage:
  - i) The trolley jack shall be stored and secured in the middle of the storage area.
- d) Lubricants and Cleaning Rags Compartment:
  - i) The storage area shall be fitted with storage compartment for general lubricants and cleaning rags.
- e) Emergency Cones:
  - i) The vehicle shall be fitted with six (6) emergency cones. The cones must be securely stored in this area.
- f) Wheel Chocks:
  - i) The vehicle shall be fitted with two (2) wheel chocks.
- g) Jack Block:
  - i) The vehicle shall be fitted with a jack block to accommodate a 25 ton bottle jack.
- h) Wheel Ramp for Sprinter van wheel change:



The storage area shall be fitted with a ramp to allow for easy changing of a wheel.

- i) The functional dimensions of the ramp shall be as specified in Appendix B.

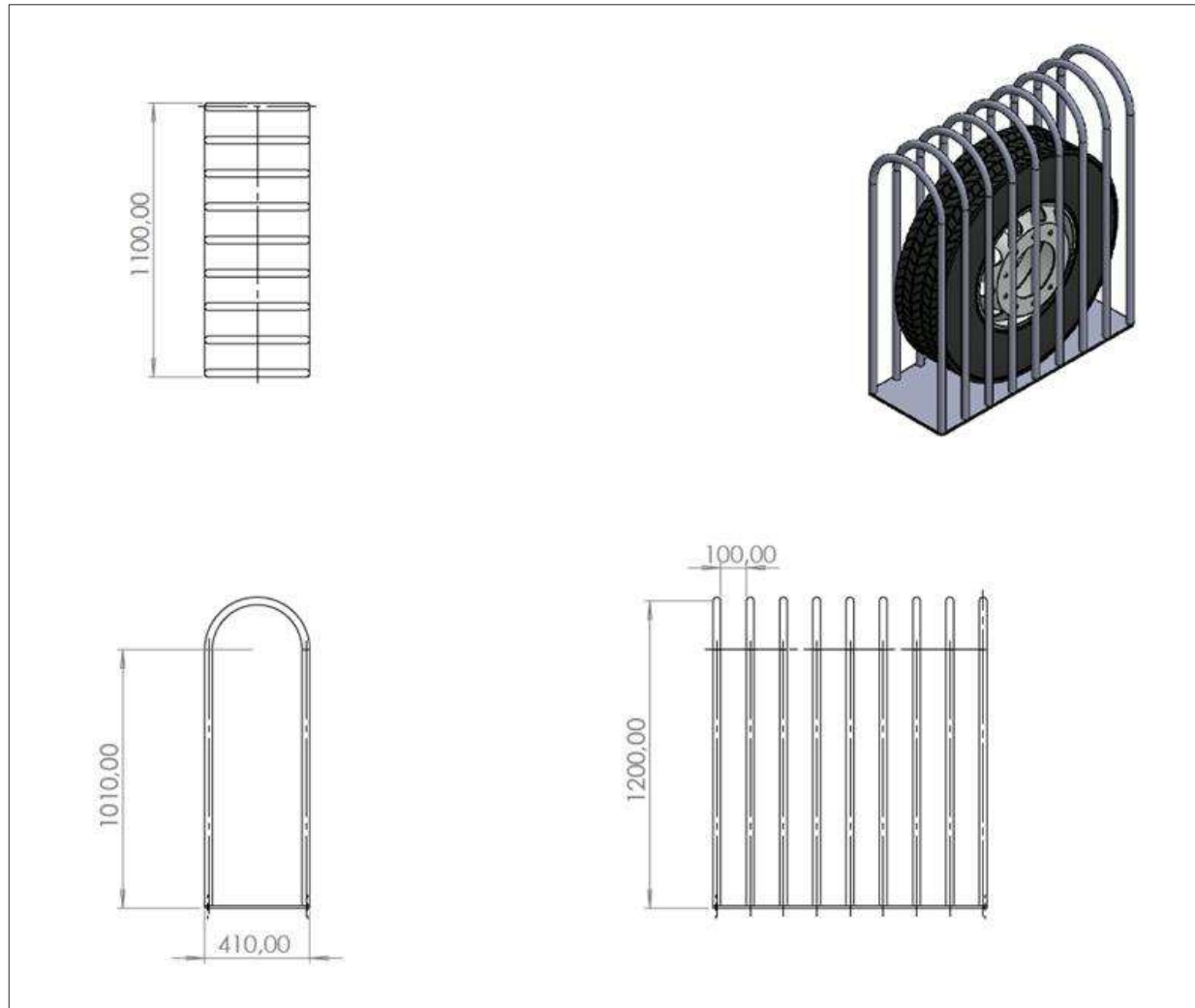
Note: Figure 10 depicts external recommended dimensions, not the physical design.

- ii) The wheel ramp shall have wheels at the bottom to allow easy movement.
- iii) The ramp shall be secured and stored in the rear storage area.

## **2.11 Warranty**

The supplier shall warrant that all modifications, installations and workmanship performed on the vehicle shall be free from defects for a period of 12 months.

## Appendix A Tyre Frame



**Figure 9: Tyre Frame Dimensions**

## Appendix B Wheel Ramp Dimensions

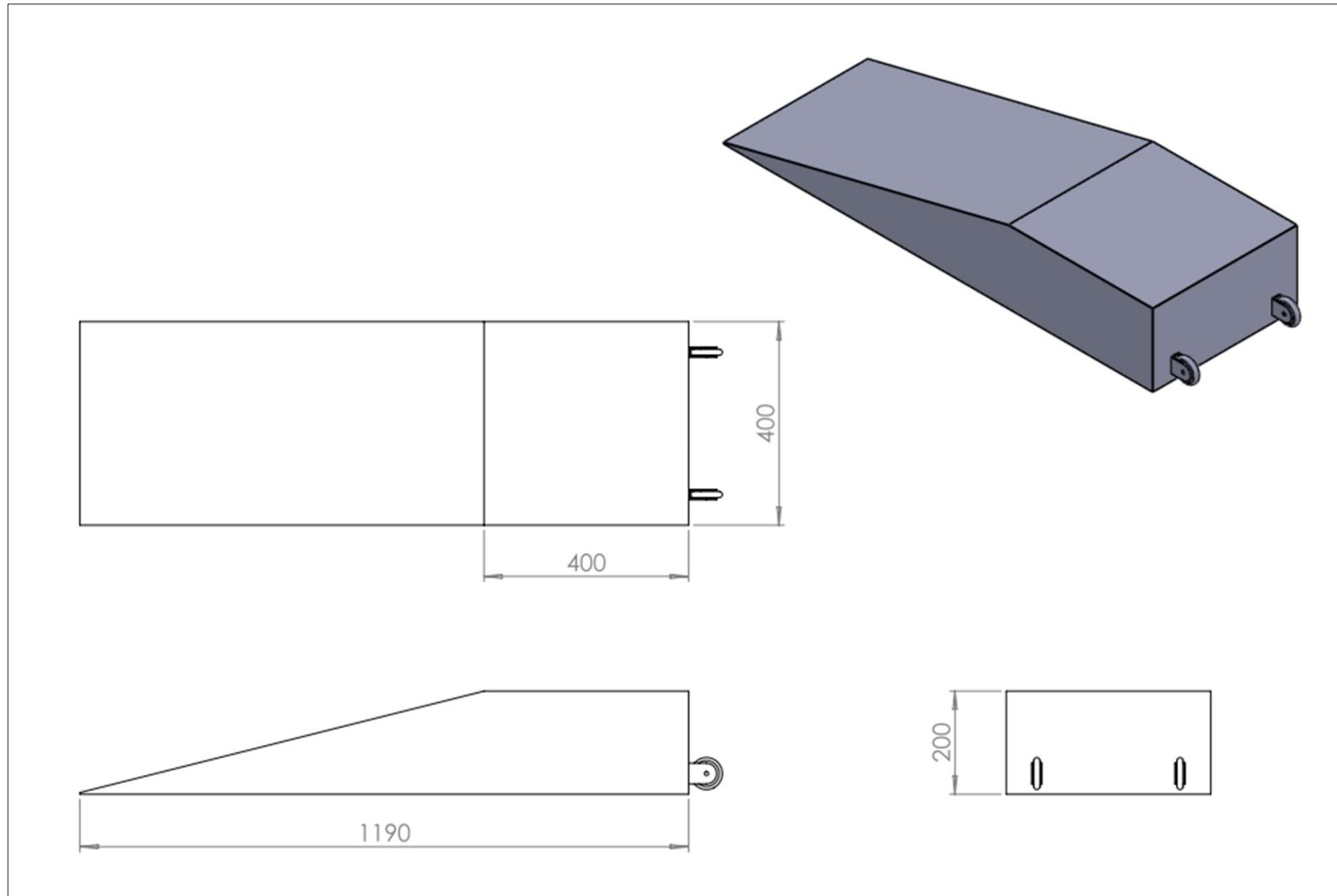


Figure 10: Wheel Ramp Dimensions