



***Rail Trailer Operation &
Maintenance Manual
(RT 2014 : Issue 04 : 08-2015)***



***Vehicle Types: RT4M Rail Trailer,
RT5M Rail Trailer & RT6M Rail Trailer***

WARNING

Unsafe use of this product may cause death or serious injury. All users must read this manual before working with this trailer or before carrying out routine maintenance procedures on this trailer.

Information:

This manual is produced to help use this Predator Rail Trailer in a safe and effective manner. Keep this manual in a safe place that is accessible to all users and operators. All users and operators should make themselves familiar with this manual with frequent reading on a regular basis.

If additional information is required that is not available in this manual then please call our technical desk for assistance (phone number as below).

Please quote the trailer serial number which can be found on the serial plate located on the outside of the chassis beam underneath the floor of the trailer.

Manufacturer: PREDATOR EQUIPMENT LIMITED

**Address: 61 Dungormon Road
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Co Tyrone
N Ireland
BT71 7GG**

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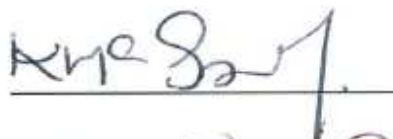
Trailer Serial Number: _____

Trailer Model Number: _____

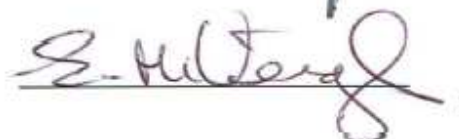
(Please fill in these details when you receive your trailer)

You can request PDF versions of this manual by contacting our main office on the telephone number shown above.

Reviewed : K McSorley



Authored : E McVeigh



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1 : Introduction

Predator Equipment Ltd have designed a range of rail maintenance trailers that can be used to suit particular applications within the rail industry. The trailers are available in lengths of 4, 5 and 6 meters and are a standard 2.5 meters wide with a bed height of 650mm. All the trailers are based on the same chassis design but differ in lengths and all trailers are compliant with the W6A load gauge.

The trailers are built to a very high standard and they are designed to carry payloads of up to 22000kg (Ref: 5.1 - General Specification). A multi-leaf suspension is used for strength and stability as this is a tried and tested component used in the commercial and agri trailer industries. The trailer axles are standard issue commercial axles with commercial drum brakes that have an excellent brake efficiency rating. There are multiple tying, lashing and lifting points all around the trailer offering greater versatility and functionality.

These trailers can also have a range of optional attachments fitted to the trailer bed and fixed via twist locks. These attachments include loading ramps, load retaining posts, drum guards and ballast boxes.



RT5M Rail Trailer complete with Ballast Box.

2 : Revision Record

Issue Number:	Date:	Description:	Authorised By:
01	12-8-14	RIS-1530-PLT Issue 4 compliance	E McVeigh
02	10-12-14	RIS-1530-PLT Issue 5 compliance	E McVeigh
03	15-5-15	Wheel Profile changed to S1002 profile & Loading Ramps instructions	E McVeigh
04	18-8-15	Combined manual for RT4M, RT5M & RT6M	E McVeigh
Notes:			

All revisions and updates must be recorded in the table above in the format provided. This must be kept up to date at all times.

3 : Document Review

This Operating and Maintenance Manual should be reviewed on a minimum 12 month period by a competent engineer.

The review should include:

- **Review of the manual with potential to improve its effectiveness.**
- **Record all decisions made at each review.**
- **“In Process” reviews of maintenance activities.**
- **Performance of the vehicles and the components covered by the plan including relevant national incident reports.**
- **Changes in the pattern of use and operating environment.**
- **Manufacturer’s advice.**
- **Directives from Network Rail.**
- **The vehicle’s 7 year review.**

All changes to this manual are subject to review by Predator Equipment Ltd and a nominated VAB.

The frequency and content of each job description shall be reviewed and the records retained for audit purposes.

Each component failure should be assessed if there is a failure of maintenance that either caused or contributed to the failure. The maintenance plan should then be amended to reflect the lessons learnt.

Regular reviews of the vehicles performance, reviews of maintenance activities, changes of use or frequency of use of the vehicle, and external information could lead to changes in the plan.

4 : Safe Working Information

It is the owner's responsibility to ensure that this trailer and/or attachments remain fit for service at all times. It is vital that they are regularly maintained in accordance with this maintenance manual.

Unauthorised modifications and/or changes to the trailer may also invalidate the Certificate of Engineering Acceptance.

All modifications must me be authorized by a VAB.

Failure to maintain this product may invalidate the Certificate of Engineering Acceptance.

4.1 : Risks

There is always going to be a certain level of risk involved using this rail trailer. With the proper care, attention and maintenance, these risks will be minimized as far as possible.

4.1.1 : Potential Risks

- **Trailer Run-away:**
Maintenance on the trailer brake system is critical to the safe working of the trailer brakes.
- **Derailment:**
Regular checks and maintenance of brakes, wheels, axles and suspension will minimize this risk.
- **Oil leaks:**
This can occur where there are hydraulic lines on the trailer. It can be prevented by adequate checks for leaks through the whole hydraulic system.
- **Abnormal Loading:**
If the trailer is loaded improperly then there is a risk that the trailer will become unstable and possibly derail. Attention must be paid to proper loading procedure.
- **Load securing:**
The operator must ensure that the load on the trailer is properly tied to the trailer by the appropriate tying apparatus using the lashing points supplied on the trailer.
- **Collisions:**
There is always the possibility that the trailer may collide with another rail vehicle or person. Making sure that the trailer lights are always clean and working properly will minimize this risk.
- **ON – OFF Tracking:**
When lifting the trailer on or off the track, there is a risk that the trailer can detach from the lifting vehicle and cause damage to the track and/or rail personnel. Care and attention must be used when carrying out this task making sure that all lifting apparatus is approved for the job in hand. The operator of the lifting vehicle must be aware of all rail personnel at all times.

4.2 : Safety Information

- **Do not exceed the max trailer speed of 10 mph(16 km/h).**
- **Do not immerse the trailer in water above the bottom of the brake drum.**
- **Be aware of overhead lines and equipment.**
- **Be aware of personnel around the trailer at all times.**
- **Be aware of passing traffic.**
- **This trailer is not permitted to travel on track outside a possession.**

5 : Specifications:

Below is a list of general specifications for the Predator range of rail trailers.

5.1 : General Specification

Lengths available = 4000mm, 5000mm & 6000mm

Width = 2500mm

Platform Height = 650mm (trailer only)

Trailer Height = 1300mm (Including Ballast Box @ 650mm high)

Trailer Weights – Standard Trailers(changes with spec)

	Unladen	Max Load	Ballast Box Unladen	Max Laden
4m Trailer	2750kg	22250kg	1200kg	25000kg
5m Trailer	3000kg	22000kg	1500kg	25000kg
6m Trailer	3250kg	21750kg	1800kg	25000kg

Maximum Speed on Rails = 10 mph (16 km/h)

Maximum Rail Gradient = 1 : 25

Maximum Rail Cant = 200mm

Brake Line Pressures:

Park Brake Line = Minimum 5.6 Bar - Maximum 8.5 Bar

Service Brake Line = Minimum 4.0 Bar - Maximum 8.5 Bar

Axles & Suspension:

Axles – 2 no Granning Commercial Spec, 8 Stud, 300x135 Brake

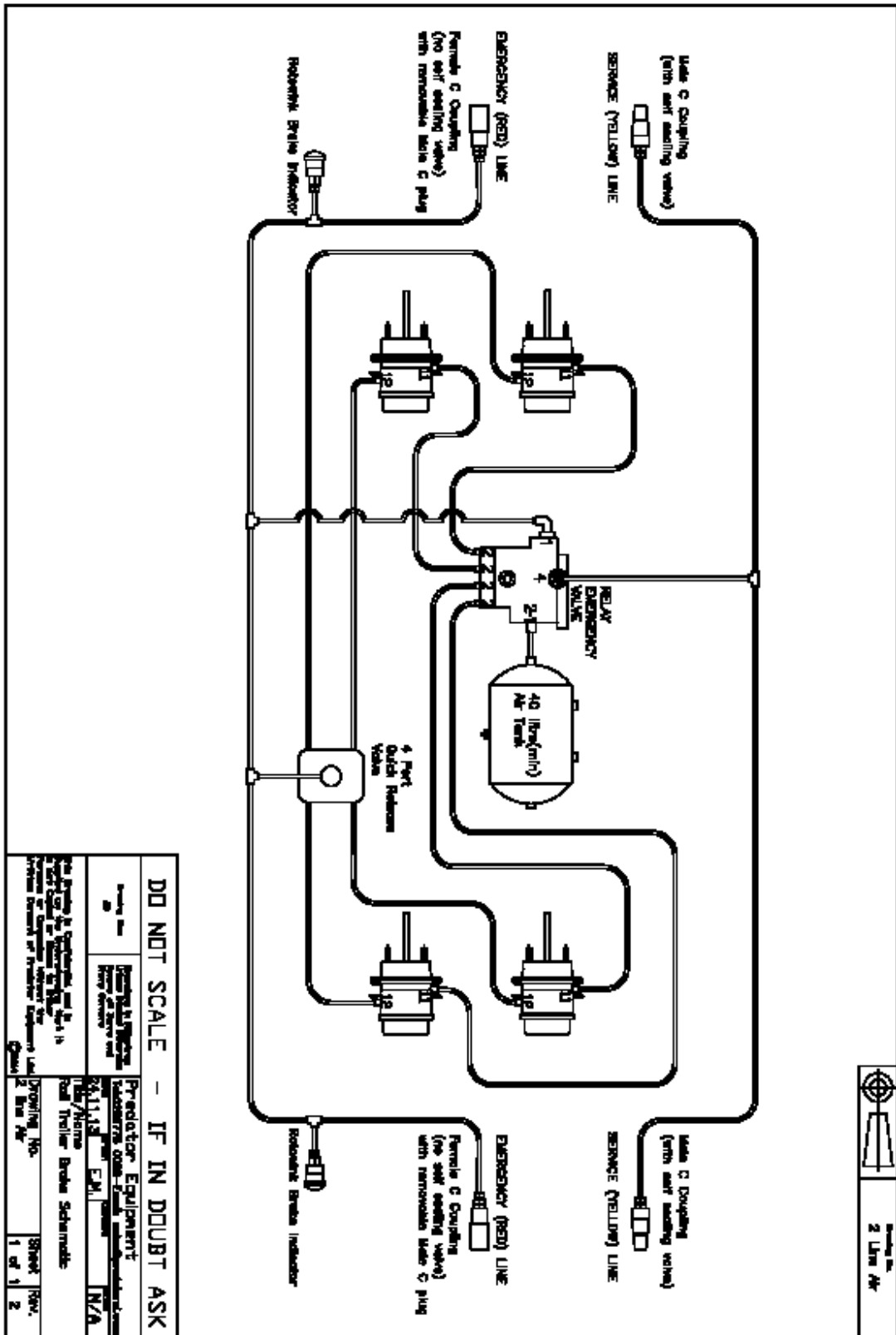
Suspension – 4 no 7 leaf heavy duty standard trailer springs

OEM Manuals:

Granning 300x135 AXLE Manual

Ringfeder 40mm Trailer Coupling Manual

5.2 : Two Line Air Schematic

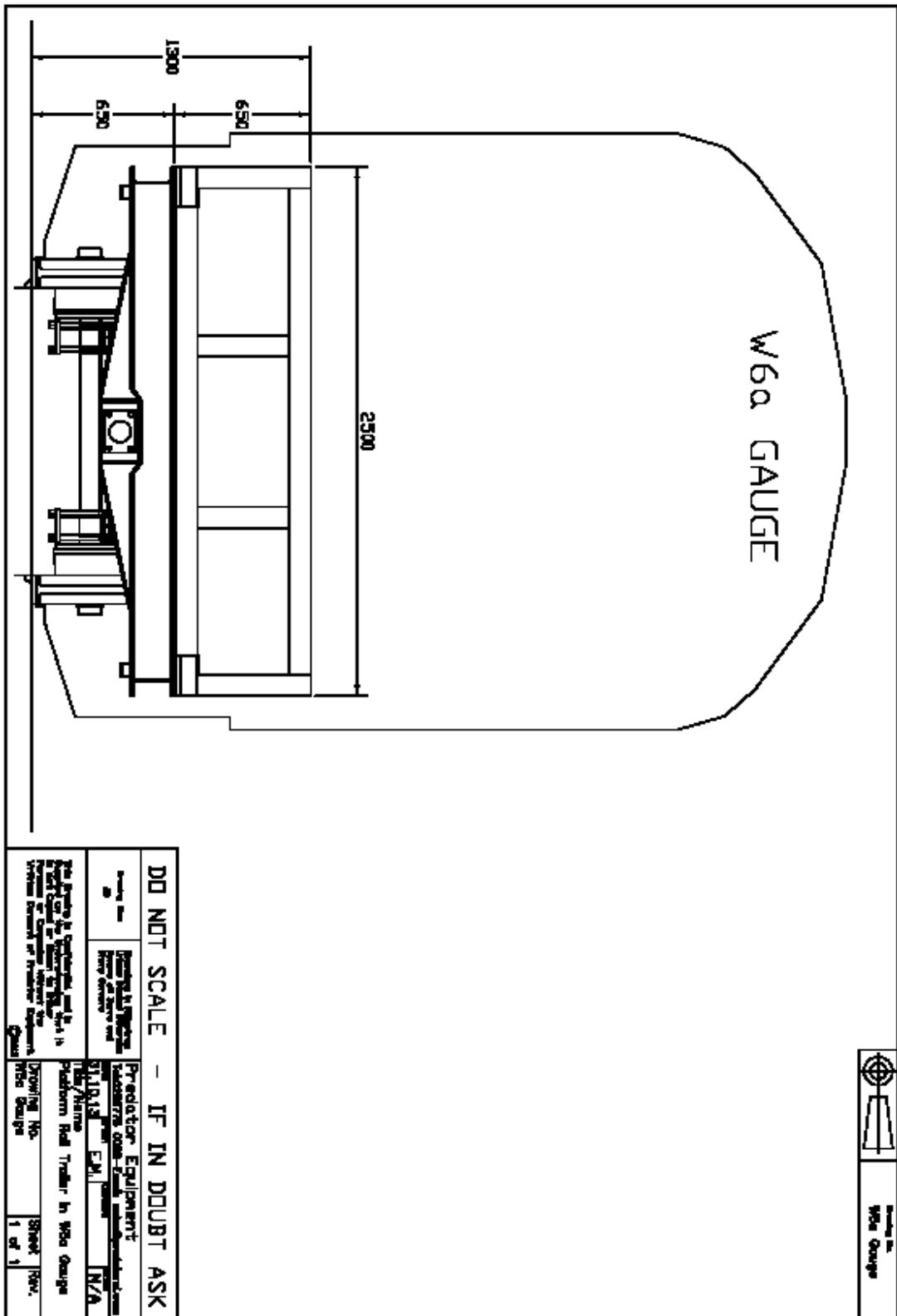


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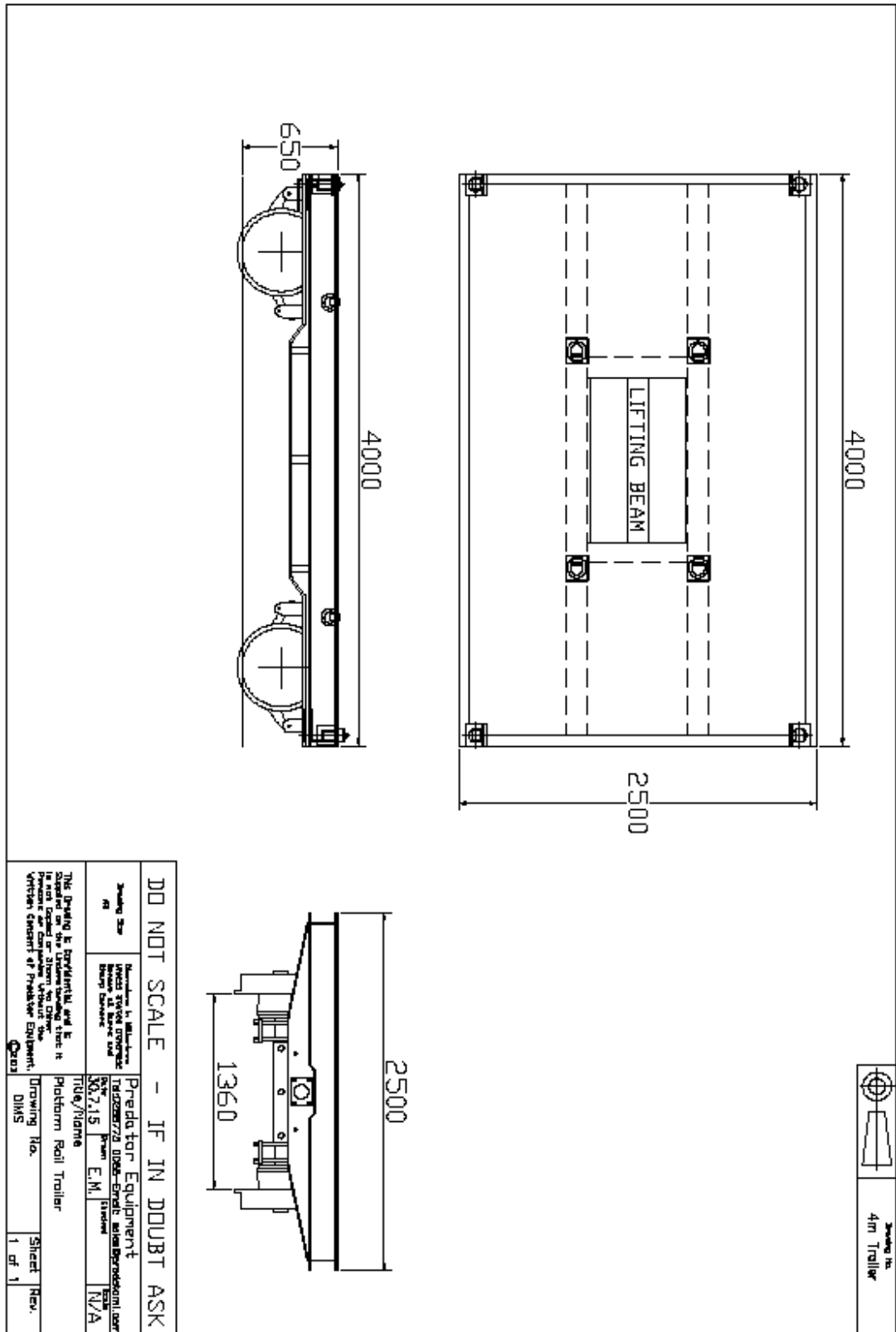
Drawing No. 2 Lin Air	Revision None shown	Particulars None shown	Particulars None shown
Drawing No. 2 Lin Air	Drawing No. 2 Lin Air	Drawing No. 2 Lin Air	Drawing No. 2 Lin Air

For Details of Symbols, and to
 Report on the Symbols, see 1.1
 and 1.2 of the Symbols Manual.
 The Symbols Manual is available
 from the Office of Technical
 Services, Department of Defense,
 4800 Rawlins Drive, Fort
 Belvoir, Colorado 80504-5001.
 (GPO)

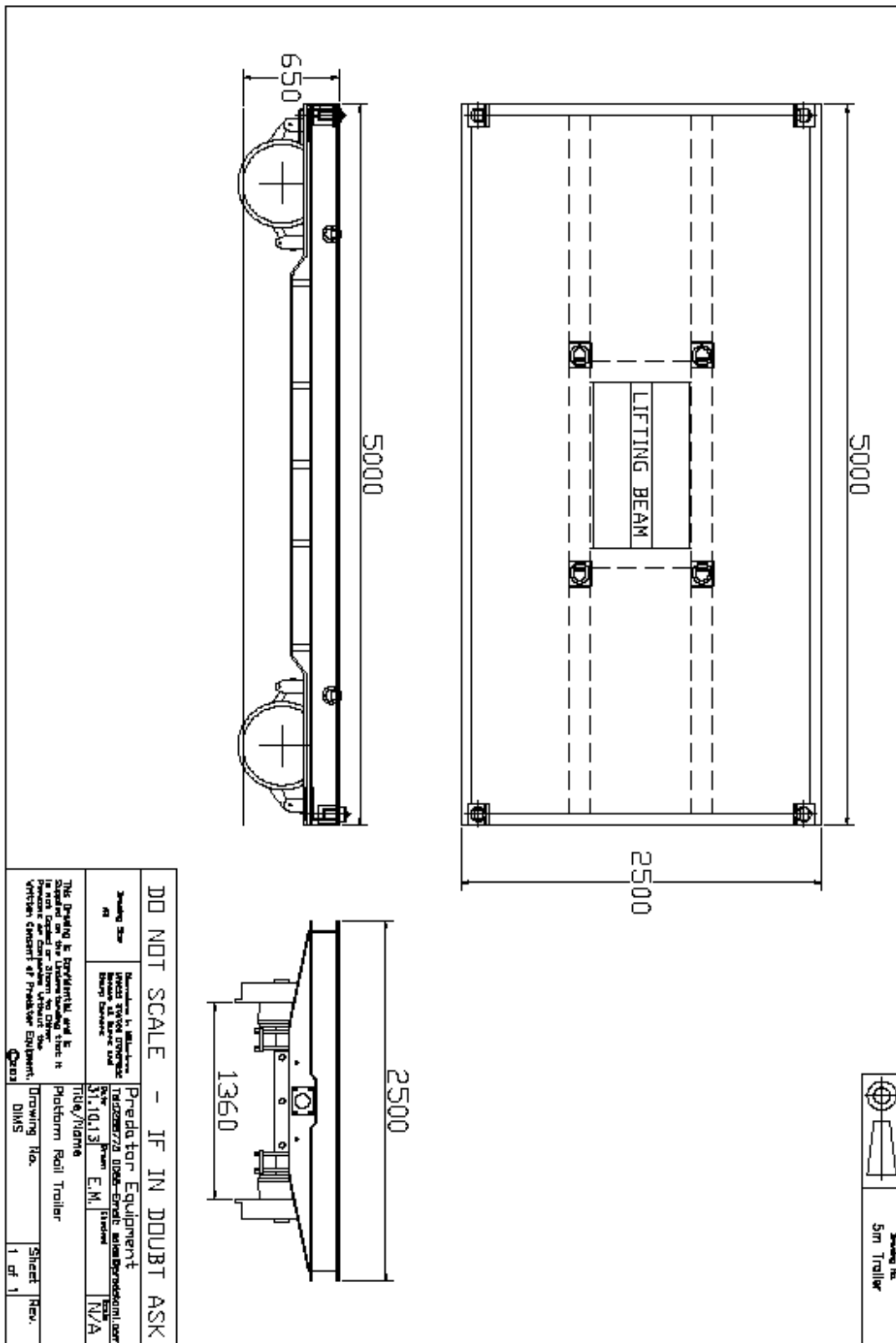
5.3 : RT4M, RT5M & RT6M in Gauge



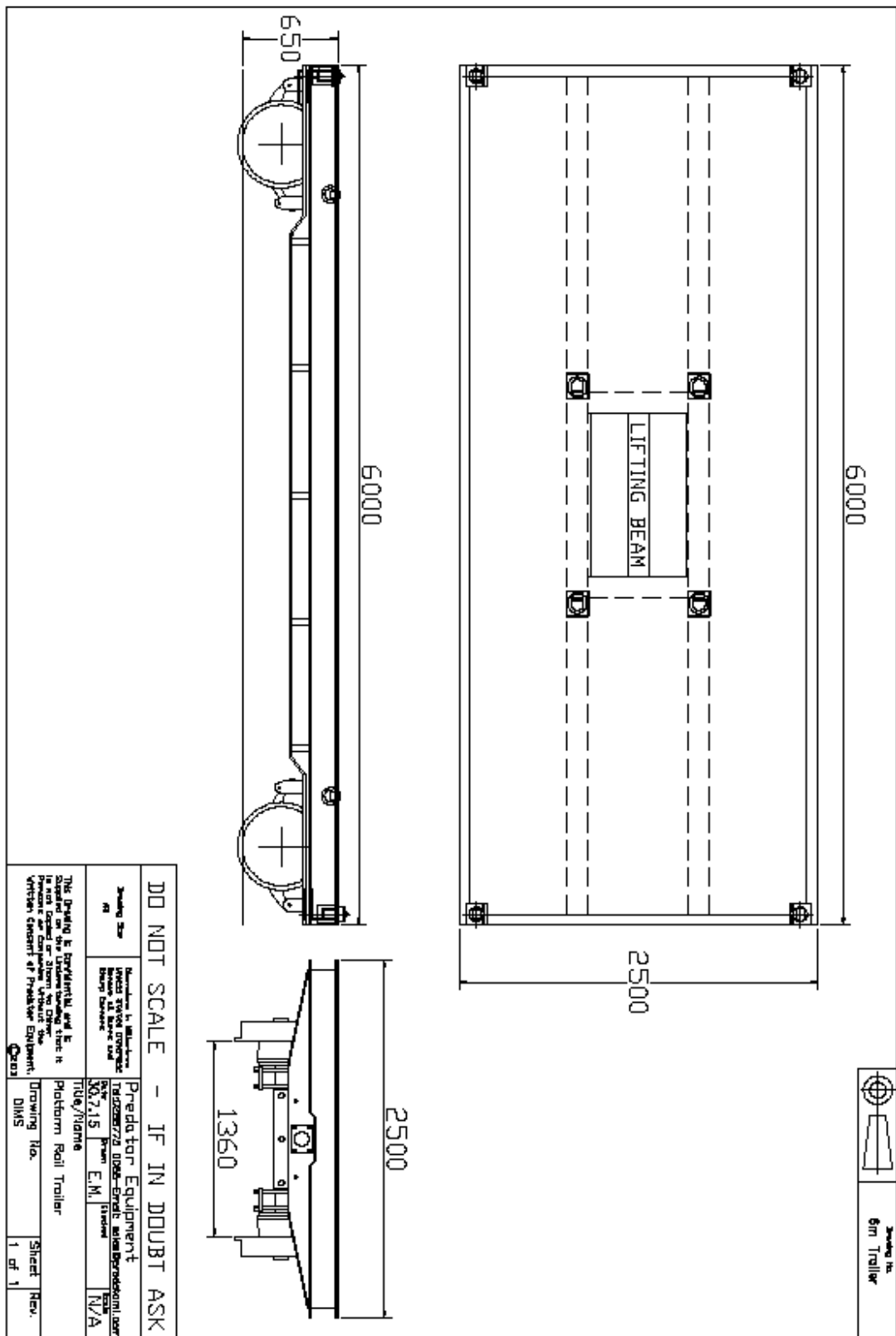
5.4 : RT4M Dimensions



5.5 : RT5M Dimensions



5.6 : RT6M Dimensions



6 : Optional extra equipment

A range of extra optional attachments are available for all Predator Rail Trailers.

6.1 : Ballast Boxes

There are 3 different lengths of ballast box available. They are 4m, 5m and 6m and they are a standard 2.5m wide. They are a quick-fit attachment fixed to the trailer bed using integrated corner twist locks. The ballast box height can vary according to specification although all boxes will be within the W6A Gauge.

6.2 : Loading Ramps

Loading ramps can be supplied to suit each trailer and they can be removable or fixed, long or short and narrow or wide depending on specification.

6.3 : Loading Jack Legs

The loading jack legs are used to support the loading of machinery on to the trailer. They help prevent unstable loading and derailment when loading. They are usually operated manually but hydraulic versions are available.

6.4 : Trailer Load Restraint Posts

These posts are used to help prevent loads from falling off a trailer. They can be different lengths and there can be as many as required per trailer bed. These posts can be removed from the trailer bed and stored in the center tool box in the trailer floor.

6.5 : Draw Bars

There are a variety of drawbars available for each trailer and these include straight and Z bars. They are a standard 1.5m long but can be made to specification.

6.6 : Floor Wells

The trailers can be fitted with a floor well to accommodate trailer load restraint posts, lifting chains & tools amongst other items. The well is below the floor of the trailer.

6.7 : Drum Guards

The axle drums can be protected from damage when On/Off Tracking. 20mm plate can be attached to the underside of the spring plates at each wheel and they extend under the brake drum providing protection against collision with the rail head.

6.8 : Centre Loading Beam

The centre loading beam is used to lift the trailer on and off track(See section 7.1 for instructions).

7 : Operation

- **It is imperative that these trailers are used in accordance with the M&EE Industry Code of Practice COP00014.**
- **It is important that preliminary checks are carried out before initiating the On/Off Tracking process.**
- **Only trained personnel are allowed to undertake the On/Off Tracking process and also the coupling and uncoupling of trailers.**
- **The On/Off Tracking process must be carried out on a suitably level surface with no obstructions close by.**
- **There must be no steep embankments near the access point and the rail must be as level as possible with adequate visibility for maximum safety.**
- **The operator must at all times be aware of all rail personnel during this process.**
- **There must be a qualified Crane Controller on site to aid with the positioning/lifting of the trailer on/off the track.**
- **Obtain a suitably rated lifting machine to lift and slew the rail trailer to/from the track.**
- **Ensure that the lifting chains/pincer grab are certified and are fit for purpose.**

7.1 : On/Off Tracking

- **Attach the lifting chains to the 4 lifting shackles located on the trailer floor bed. In the case of the pincer grab, grab the centre lifting beam securely ensuring the grab has a complete grip on the lifting beam (see photograph below).**



- **Make sure the lifting machine and the rail trailer transport vehicle are both on level ground before lifting can take place.**
- **Attach the centre-ring of the lifting chains to the lifting vehicle's hook.**
- **Lift the rail trailer off the transport vehicle and carry to the railhead. Maximum Speed when carrying = 3km/h (2mph).**
- **Place the trailer on the track.**
- **Before releasing the lifting chains/pincer grab, make sure the rail trailer brakes are applied. Visual checks to confirm the brake chambers are fully extended and also checking that the brake indicator is RED as well as trying to move the trailer on the track(push/pull with lifting machine) will let the operator know if it is safe to release the lifting chains/pincer grab.**

Note

When lifting the rail trailer off the track, make sure that the brakes are applied before attaching the lifting chains/pincer grab.

7.2 : Coupling Procedure

The RRV operator must be aware of all rail personnel at all times during the coupling and uncoupling procedures.

Care must be taken to ensure that no personnel become trapped between the road-rail vehicle (RRV) and the rail trailer.

- **Attach the drawbar (located under the side chime of the trailer) to the RRV first.**
- **Move the RRV slowly toward the rail trailer while one person aligns the loose end of the drawbar with the trailer coupling.**
- **The trailer coupling should be in the fully opened position (push the handle fully up and back towards the centre of the trailer where it will automatically lock into primed position). When engaged with the drawbar, the coupling will automatically close and lock into towing position.**
- **Perform a push/pull test on the trailer with the brakes applied to make sure the coupling process is carried out correctly.**
- **Before connecting the air lines, make sure they are clean and free from defects.**
- **Attach the air lines to the RRV (Refer to the brake schematic for correct connections – 5.2).**
- **Perform a push/pull test again on the trailer with the brakes applied to make sure the coupling process is carried out correctly.**

Note

When coupling multiple trailers to an RRV, make sure to start the coupling procedure on the trailer that is closest to the RRV at all times. Carry out the coupling procedure as detailed above for each individual trailer.

7.3 : Un-Coupling Procedure

The RRV operator must be aware of all rail personnel at all times during the coupling and uncoupling procedures.

Care must be taken to ensure that no personnel become trapped between the road-rail vehicle (RRV) and the rail trailer.

- **Apply the park brake on the RRV.**
- **Allow time for the brake pressure to dissipate from the rail trailer brake system. This may take approximately 30 seconds.**
- **Make sure the rail trailer brakes are applied. Visual checks to confirm the brake chambers are fully extended and also checking that the brake indicator is RED as well as trying to move the trailer on the track (push/pull with lifting machine) will let the operator know if it is safe to proceed with the uncoupling procedure.**
- **Uncouple the air brake lines from the RRV.**
- **Carry out another push/pull test to ensure brakes are applied before detaching the drawbar.**
- **When brakes are confirmed as applied on the trailer it is safe to uncouple the drawbar from the trailer first.**
- **On the coupling, push the handle fully up and back towards the centre of the trailer where it will automatically lock into primed position). The drawbar will now be free to uncouple from the coupling. The coupling should automatically close when the drawbar is removed.**
- **Move the RRV slowly away from the trailer and detach the drawbar from the RRV.**

Note

When uncoupling multiple trailers from an RRV, make sure to start the uncoupling procedure on the trailer that is furthest from the RRV at all times. Carry out the uncoupling procedure as detailed above for each individual trailer.

7.4 : Network Rail Operating Conditions

- **Maximum Working Gradient** **1:25**
- **Maximum Working CANT** **200mm**
- **Plain Line** **10mph (16km/h)**
- **Switches & Crossings mph(km/h)** **5mph (8km/h)**

7.5 : Loading/Unloading trailer using Predator Loading ramps(Ref: Network Rail Plant Manual NR/PLANT/0200, Module 518)

It is imperative that the loading and unloading of the trailer is carried out by a competent and trained operator. The RRV Operator must be aware of all rail personnel at all times during the loading and unloading procedures. Care must be taken that the ramps are securely attached to the ramp bracket pin on the trailer and also make sure that the bottom of the ramps are placed on level compact ballast. Do not load/unload the trailer with the ramps resting on the rail sleepers. They must rest on level compact ballast.

The maximum weight of any machine that can be loaded on to this trailer is 12,500kg.

- Apply the park brake on the RRV.
- Attach the ramps to the trailer(2 person lift) making sure that the hook end of the ramp is securely attached to the trailer ramp pin and the bottom of the ramps are resting on solid compacted ballast(See photo's below).
- **WARNING:** Care must be taken not to trap hands or fingers between the ramp pin and the ramp hook when attaching the ramps to the trailer.



- Lower jack legs into their vertical work position and secure in loading position using the pins and spring pins supplied(See photo's on page 26 showing jack legs in loading/unloading position). Make sure the jack legs are resting on solid compacted ballast. The jack legs can be adjusted in height to reach the ground. For additional safety, use a piece of hardwood timber(approx 250mm x 250mm) under each jack leg for padding for the ramp(optional).
- Slowly track the machine onto the trailer avoiding sudden jerking movements. If loading an excavator to this trailer, extend the boom so that it hovers approximately 50mm to 100mm just above the trailer floor bed during the loading process. This will help prevent the excavator transfer from the loading ramps to the trailer bed without a sudden drop. It will aid a cushioned

transfer of weight to the trailer bed. Position the machine so that the fully loaded trailer is within the W6a gauge.

- Fasten and secure the machine to the trailer using suitable fastening devices(straps, chains, etc).
- Remove the ramps from the trailer and store and fasten them to the trailer bed.
- Raise the jack legs back to the transport position making sure that they are safely locked into position using the available pins and spring pins supplied(See photo on page 26 showing jack legs in transport position).
- To unload, repeat this process. If an excavator is being unloaded, extend the boom over the ramp end of the trailer so that it hovers just above the track ballast outside of the tracks(50mm to 100mm). This will help prevent the excavator transfer from the trailer bed to the loading ramps without a sudden drop. It will aid a cushioned transfer of weight to the loading ramps.

CAUTION

It is vitally important to make sure that all wheels on the trailer remain on the track at all times during the loading/unloading process paying particular attention to the two wheels further most away from the ramp end of the trailer.



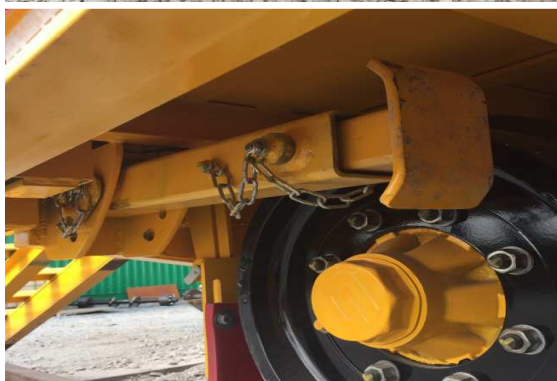
Ramps in loading/Unloading position



Ramp storage when not in use



Jack legs in loading/Unloading position



Jack legs in transport position

All Pins and Spring Pins are attached to the trailer permanently with chains. All pins and spring pins must be in their transport position before the trailer moves off and ramps must be securely fastened to the trailer bed(see photo on page 25 showing ramp storage when not in use).

Where suitable, use the boom of the RRV that is towing the trailer to help secure the trailer to the track when loading/unloading. To do this, place the boom lightly on the trailer floor approximately 300mm from the end of the trailer that is closest to the towing RRV. Make sure to only just touch the trailer floor with the boom to avoid raising the RRV rail wheels off the track and possible RRV derailment.

CAUTION

Due to the extra stress applied to the rear axle and wheels when loading/unloading, it is advisable to carry out more stringent checks and examinations on the ramps, ramp brackets, all locking pins & chains, jack legs, jack leg brackets, axles, axle suspension components and all wheels.

Please see section 9.13 : Scheduled Maintenance.

8 : Equipment

8.1 : 40mm Towing Coupling

- **This coupling device is located at the front and rear of each trailer that is semi-automatically operated.**
- **Open the coupling by pushing the side handle towards the centre of the trailer. When fully back, the main towing pin will lock into position (primed position).**
- **When the drawbar towing eye is fully inserted into the coupling jaws, the pin will automatically drop down into the locked position.**
- **To release the drawbar, push the side handle towards the centre of the trailer. The main towing pin will lock into position (primed). When the drawbar is removed from the coupling jaws, the main locking pin will return down to the locked position.**



Coupling Opened (PRIMED)



Coupling Closed (Pin Locked)



Drawbar Locked position in coupling

8.2 : Rail Scrapers

This trailer is fitted with a rail scraping device at each wheel. They are attached to the chassis at the front and rear headboards just in front of each wheel. There is a heavy duty strip of scraper rubber attached to the bracket that is adjustable in height from the rail head. The rail scraper can be used in 2 positions. The first position is the storage position and is when the trailer is not on the rail track. The second position is the working position where the scraper is dropped down from storage position to working position.

The scrapers must be set a maximum 30mm from the rail head at all times when in working position.



Rail Scrapers attached to the trailer headboard.

8.3 : Trailer Light Operation

There are 2 types of lighting circuits available on the Predator Rail Trailers. One is the Auto Sensing Operated light circuit and the second is the Manually Operated light circuit.

The Auto Sensing Operated light circuit is a stand-alone system that can be 12 volt or 24 volt with long life and deep cycle battery(s). There are two 12volt solar panels to continually supply a trickle charge to the battery(s) and the circuit is protected by a 20amp fuse. There is also an ON/OFF switch located on the front headboard of the trailer along with a 3 way toggle switch for light direction setting.

The battery(s) are secured and stored within a lockable plastic toolbox(s) located under the side chime of the trailer. There is one white light and one red led light on each of the four corners of the trailer.

When using the trailer on track the lights must be turned on. To do this for the Auto Sensing Light Circuit, simply go to the front of the trailer and turn the light switch to the ON position. Initially all the white lights will light up and after approximately 5 seconds all the red lights will light up.

When the trailer moves along the track, the 2 white lights at the front of the trailer will light up and the 2 red lights at the rear of the trailer will also light up. When the trailer travels in the opposite direction, then the sensor on the sensing wheel will recognize the change of direction and change the lights accordingly. This will leave the lights at the front of the trailer turning to red and the lights on the rear of the trailer turning white.

When the trailer comes to a stop, the sensor will turn on all the red lights only on the trailer.

When using the Manually Operated Light Circuit, turn the light switch to the ON position. Then using the 3 Way Toggle Switch, set the lights to the relevant position to suit requirements(see below).

There is an optional 12v/24v auxiliary supply socket available for each trailer that can provide alternative power to the trailer lights in the event of a breakdown.

Turn the light switch off when using the auxiliary supply socket.

Please remember light sequences:

When trailer is moving forward, the front of the trailer must have WHITE lights and the rear of the trailer must have RED lights. When stationery, the trailer must have all RED lights showing.



Trailer Light Switch on the trailer headboard(Auto Sensing).



3 Way Toggle Switch & Trailer Light Switch (Manual).

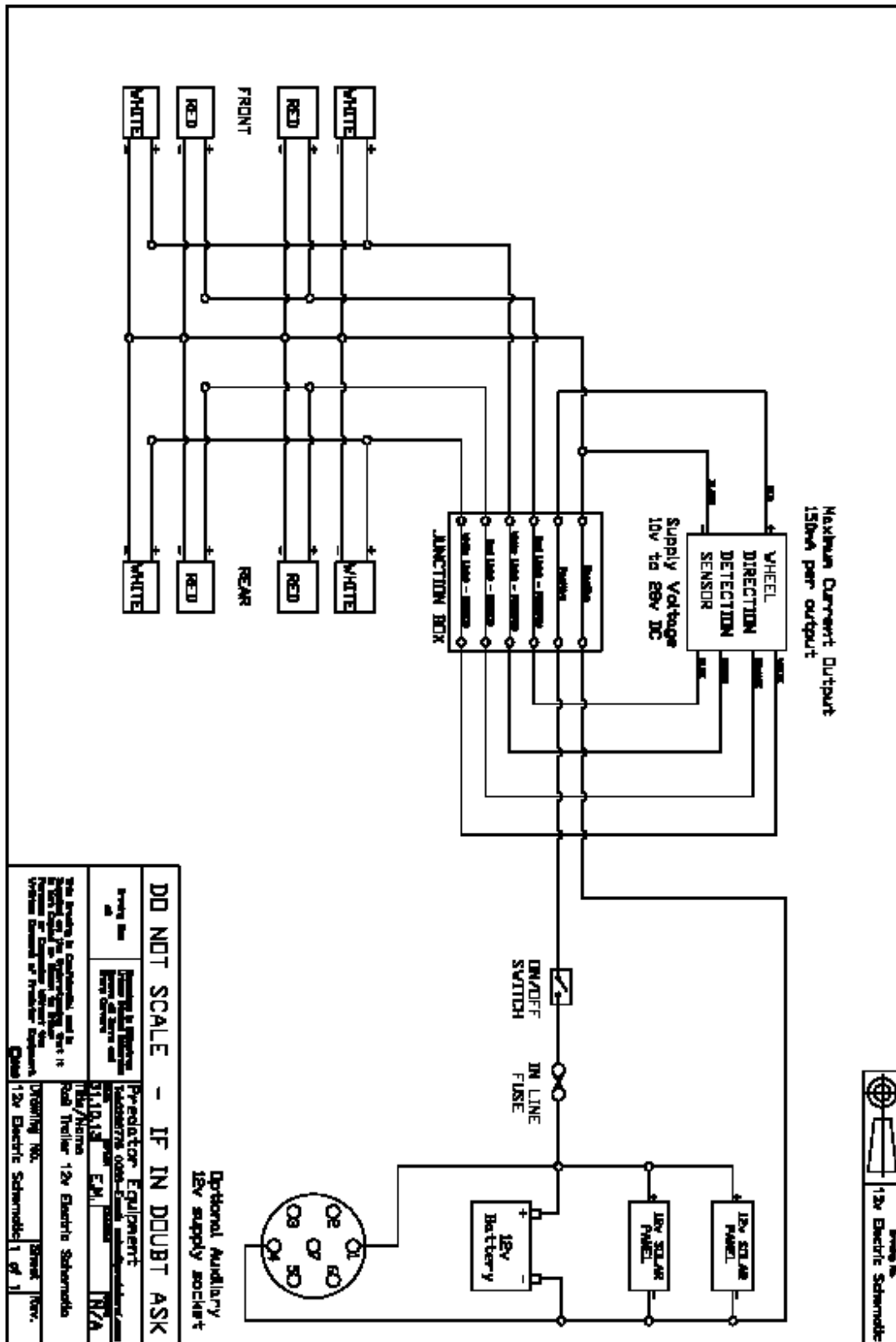
A : trailer front – WHITE lights & trailer rear – RED lights

B : front & rear lights are RED only

C : trailer front – RED lights & trailer rear – WHITE lights

A & C can be swapped depending on operator requirements

8.3.1 : 12v Rail Trailer Schematic

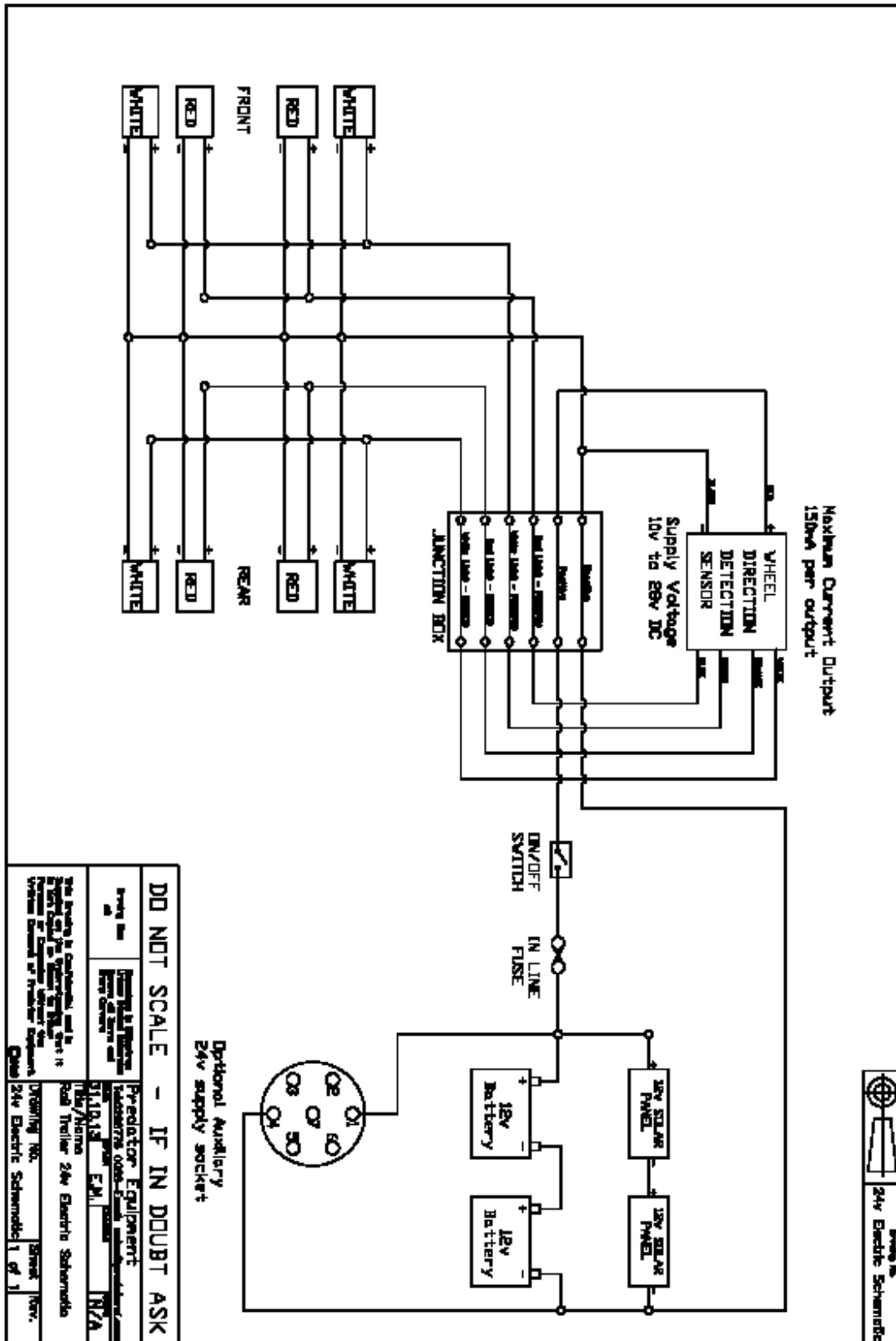


DO NOT SCALE - IF IN DOUBT ASK

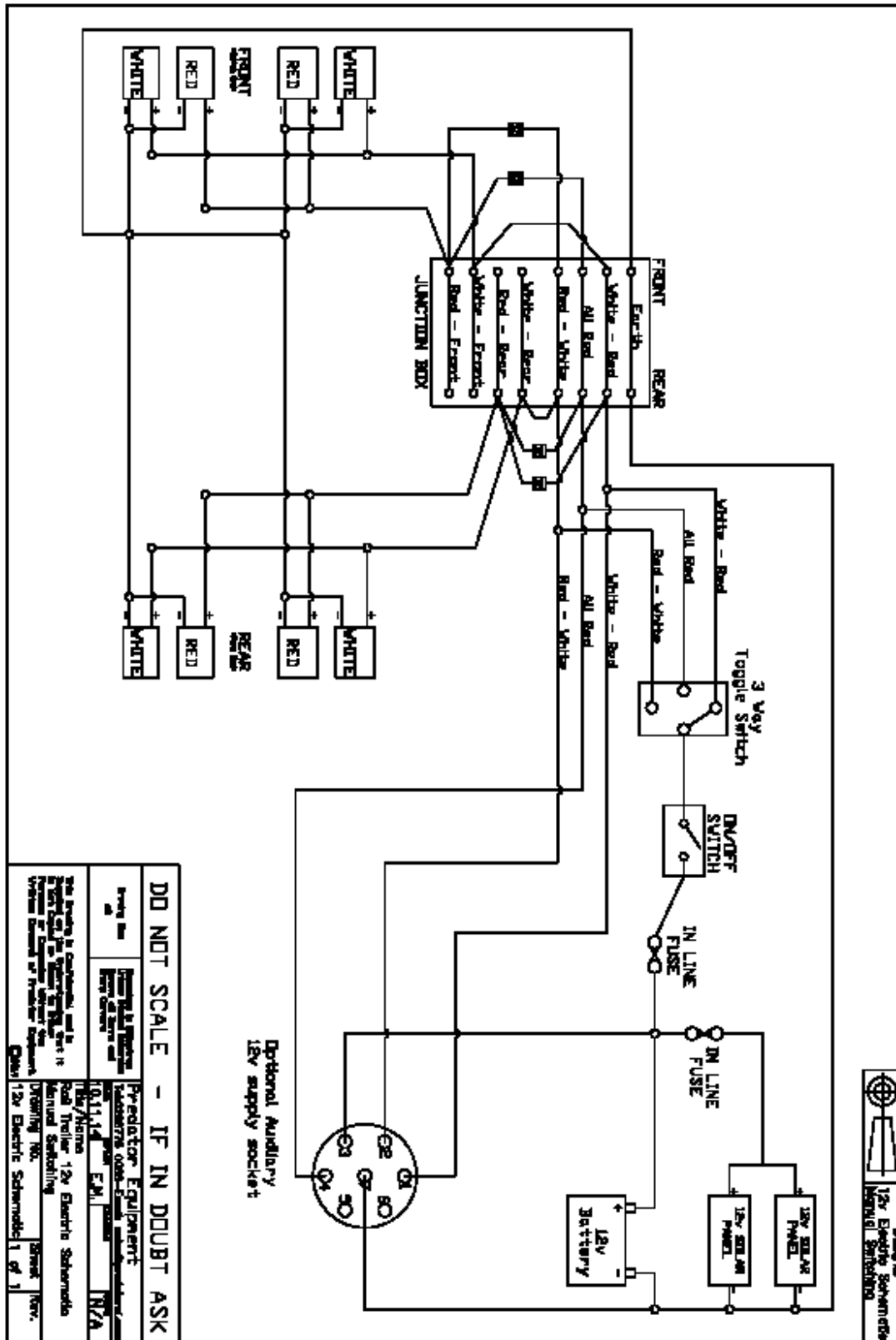
Project No.	3110418	Preparator Equipment:	
Rev/Issue	01/01	Customer Code/Equip	N/A
Drawn/Issued		Drawn/Issued	
Checked/Approved		Checked/Approved	
Project Name	Rail Trailer 12v Electric Schematic		
Drawing No.	12v Electric Schematic 1 of 1		

This drawing is confidential and its contents are not to be disclosed to any third party without the written consent of the project engineer.

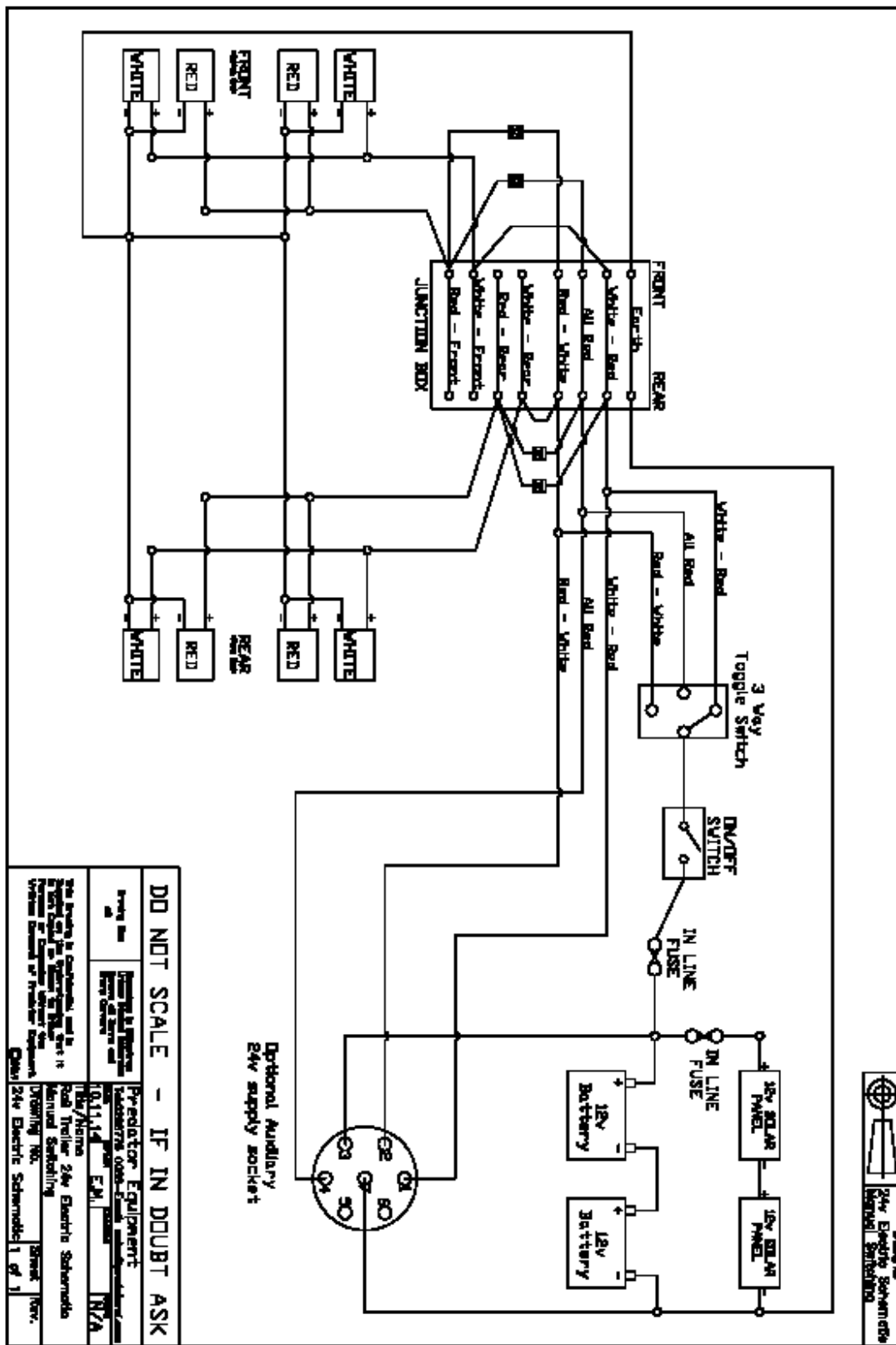
8.3.2 : 24v Rail Trailer Schematic



8.3.3 : 12v Rail Trailer Schematic - Manually Operated



8.3.4 : 24v Rail Trailer Schematic - Manually Operated



8.3.5 : The Direction Detection Sensor

The trailer directional lighting is operated by a Direction Detection Sensor which is mounted close to one wheel on the trailer. There is a small magnet fixed to the inner wheel surface which is approximately 10mm away from the sensor which is mounted to a fixed steel bracket. When the wheel moves from one direction to another then the sensor picks up the direction change and changes the lights accordingly. The sensor will also sense when the trailer comes to a stop and also change the lights to all red.

The sensor must be positioned so that the magnet travels along the white line molded in the sensing face of the direction sensor. The magnet can be spaced 3mm to 12mm from the sensor.

There are two LED's (one green, one amber) next to the cable opposite the white line. As the magnet passes over each of the two sensing elements the corresponding LED is illuminated. The sequence of these LED's determines which end of the trailer has white lights when travelling. If the white lights are at the wrong end of the trailer then rotate the direction sensor through 180 degrees (half a turn) in its mounting hole in the steel bracket. The sequence will be reversed and the lights will be correct.

The unit can be mounted on either side of the trailer as long as the amber/green sequence is set correctly.

If the magnet has a north pole outwards the sensing elements will not function.

The unit is designed for driving LED lamps. If used to operate a relay then a diode must be connected in parallel with the relay coil to suppress the back emf.

9 : Maintenance

Scheduled maintenance is mandatory for all rail vehicles. It is essential that all maintenance records are recorded properly with the date and examination type of the last maintenance carried out.

The trailers host vehicle must be maintained in accordance with its approved/certified maintenance plan.

Following any maintenance being carried out the vehicle log book must be updated with the date and exam type.

9.1 : Safety Precautions & Instructions

- **Your safety and those people who work with you are your responsibility.**
- **All applicable safety precautions must be carried out with particular attention paid to the safety of all personnel.**
- **Where the occasion arises that a particular job can't be finished, the job must be made safe. If this is not possible, a supervisor must be informed.**
- **If there is a requirement to release the brakes on the trailer, all wheels must be chocked in both directions of travel.**
- **Ensure that all air connections are tight. Relieve the pressure in all air lines by draining the air reservoir before disconnecting air pipes.**
- **Care must be taken when handling fluids. Avoid contact with skin with oils or cleaning agents. Always use appropriate Personal Protection Equipment (PPE) when working with fluids.**
- **After all examinations have been carried out and completed, the vehicle log must be updated and completed with details of all work undertaken, date and exam type, then the trailer can be released for use after all safety checks are carried out as detailed below.**

9.2 : Safety Checks after Examination

- **Make sure the parking brake is applied.**
- **Make sure all tools and equipment have been removed from the trailer.**
- **Check that all pins, safety latches and access panels (doors) are secure.**

9.3 : Required Equipment

In order to carry out the maintenance plan for this trailer, the following facility provisions should be made according to the job in hand:

- **A dry, clean workshop.**
- **Adequate lighting for inspection of all trailer components under the trailer bed.**
- **Appropriate cleaning equipment for the job in hand**
- **Handling equipment/Tools for the job in hand**
- **A suitable length of level track for carrying out the annual brake tests.**

9.4 : Staff Competence

All staff carrying out the maintenance plan as laid out in this manual must have been trained and hold the following certificates of competency:

- **SCW ID**
- **Re-assessment of competency in accordance with RPA standards.**
- **Certificate issued by a CITB/CTA approved body (operation for maintenance purposes only).**

Training in aspects of railway operation, including Personal Track Safety (PTS) is essential for staff undertaking repairs or maintenance on Network Rail infrastructure. Appropriate PPE should be worn when carrying out maintenance of this trailer.

In order to carry out this maintenance plan in a manner that will achieve the required safety and quality, the following is a minimum level of competence required:

- **For all activities the person leading the task must be able to follow and carry out the instructions detailed in the plan.**
- **All work of a safety critical nature must be carried out by persons assessed as competent in accordance with:
ORR Railway Safety Publication 1 “Developing and Maintaining Staff Competence” March 2007; ORR Railway Safety Publication All work relating to the maintenance and overhaul of axle bearings shall be carried out by persons assessed as competent.**

9.5 : Battery Precautions

- Remember to use full PPE when working with batteries, in particular eye protection.
- Ensure that all maintenance tasks on batteries are not carried out when the battery is on charge or being discharged – **ISOLATE THE BATTERY.**
- Do not place tools or equipment on a battery as they may cause a short circuit.
- Only use insulated tools when working on battery connections.
- Do not tilt the battery on its side as this may cause battery acid to escape.
- Keep all naked flames away from the battery.
- Only use pure distilled or de-ionised water for topping up the battery cells.
- Ensure the battery connections and battery cables are kept in good condition.

9.6 : Record Keeping

All records of maintenance or repair work carried out on any machine MUST be maintained in accordance with the Rail Industry Standard Document RIS-1530-PLT Engineering Acceptance of Possession only Rail Vehicles.

9.7 : Nuts & Bolts – Renewal Schedule

All Nyloc Lock nuts, washers and split pins must be RENEWED during maintenance / repairs. Any other damaged or worn fasteners must also be removed and RENEWED before returning the trailer to service.

All nuts must show at least 2 full bolt threads after torque process.

9.8 : Remedial Work

- All equipment or changed must be tested for correct operation after fitting to the trailer.
- All work shall be carried out in accordance with the job descriptions as laid out in this schedule.
- Equipment removed for repair must be handled with due care and attention and protected against damage.
- Only authorized and approved parts shall be used for repairing the trailer.
- Following any reported accident or incident involving the trailer a thorough examination must take place of the full trailer.

9.9 : Definitions:**Term****Action required****Adjust****Correct to defined limits****Change****Remove the original and fit a new or overhauled part or assembly in its place****Check****Determine a particular nominated condition before, during or after repair, for example completeness, security, position****Clean****Remove all dirt and deposits****Defective****Any fault or faults in a component or assembly, for example structural fractures or weld fractures, which may prevent the component or assembly from fulfilling its designed purpose****Dismantle****Take to pieces****Examine****Determine general condition before repair, for example wear, cracks, splits, leaks, scoring, erosion, breaks, distortion, looseness****Gauge****Determine a nominated dimension by using suitable measuring equipment, for example ruler, micrometer, callipers, feeler gauges or Go / No-Go gauge****Inspect****Determine general condition after repair and attention, that is, conformity to required standards**

Lubricate	Apply lubricant
Overhaul	Do what is necessary to make an assembly or sub-assembly re-usable, that is dismantle, strip, clean, examine, fit new parts, repair, re-assemble, test and inspect as required
Paint	To impart colour to a surface
Re-assemble	Put together
Record	Put down in writing a finding from examination, test, inspection or special checks
Rectify	To set right
Refit	Put back and re-connect
Remove	Disconnect and take off
Renew	Remove, scrap the original part and put a new part in its place
Repair	Restore an original part to the required condition by hand tooling, machining, build-up, welding, patching, bending, setting, heat-treating, re-securing etc
Strip	Remove covering, that is, paint, polish, fabric
Test	Prove correct operation by trial

9.10 : General Maintenance When Required

- **A Drawbar Pull Test in accordance with job BR2 shall be carried out following any repair or renewal of brake system components. Record brake stopping distances.**
- **Thorough examination of the lifting chains in accordance with 9 (3) (a) I, LOLER 1998, at intervals specified by the current certificate of thorough examination.**
- **The axle bearings are designed to last the life of the trailer and require no scheduled maintenance at the 10mph speed limit. However, there are directions available in the axle manual for periodical maintenance on the axle.**

9.11 : Torque settings

All Wheel nuts and U-Bolt nuts must be torqued to the correct setting by using a calibrated torque wrench.

U-Bolts to be torqued to 270NM (200lb/ft).

Wheel nuts to be torqued to 550NM (400lb/ft) – See Axle Service Manual.

9.12 : Categories of Work & Safety Precautions

- **Scheduled Maintenance is mandatory and shall be done at the intervals defined in Section 9.14.**
- **Arising Work is that work which is to be done to rectify defects found in the course of carrying out scheduled work.**

Each job has been allocated a “Safety Precaution” which is related to each job and to the working conditions of each job.

9.12.1 : Safety Precaution Moving (SPM)

Trailer is moving/liable to move to meet requirements of job. Ensure non essential personnel are kept clear.

9.12.2 : Safety Precaution Parked (SPP)

Trailer is secured by park brake and/or wheel chocks.

9.12.3 : Safety Precaution Isolated (SPI)

Isolate the battery so that all electrical circuits are not live.

9.13 : Scheduled Maintenance

The table below provides a comprehensive scheduled maintenance regime for this trailer.

The trailer should be examined at frequencies no greater than the limits as below:

Examination Code	Calendar Time
A	Daily or Pre-Use
B	Monthly
C	6 Monthly
D	12 Monthly

9.14 : Maintenance Categories

9.15 : BRAKES

Exam Code

JOB	ACTIVITY	A	B	C	D
BR1	Service & Park Brake - Check	x	x	x	x
BR2	Service, Park Brake & Pull Test				x
BR3	Brake Chambers - Examine		x	x	x
BR4	Brake Piping & Hoses - Examine		x	x	x
BR5	Brake Slack Adjusters – Examine		x	x	x
BR6	Air Leaks - Check	x	x	x	x
BR7	Brake Pads – Check			x	x
BR8	Air Tank – Examine		x	x	x

9.16 : Electrics

Exam Code

JOB	ACTIVITY	A	B	C	D
EL1	Trailer Marker Lights & Socket - Check	x	x	x	x
EL2	Battery Box & Battery - Check		x	x	x
EL3	Battery Charge – Test		x	x	x
EL4	Solar Panels - Check	x	x	x	x
EL5	Electric Wiring & Junction Box - Check		x	x	x

9.17 : Chassis & Suspension**Exam Code**

JOB	ACTIVITY	A	B	C	D
CS1	Main Chassis - Examine		x	x	x
CS2	Suspension Springs - Examine		x	x	x
CS3	Spring Eye Bolts - Check		x	x	x
CS4	Slipper End Bolts - Check		x	x	x
CS5	Spring U-Bolts - Check		x	x	x

9.18 : Wheels**Exam Code**

JOB	ACTIVITY	A	B	C	D
WH1	Rail Wheel - Check	x	x		
WH2	Rail Wheel Examine & Bearings - Check			x	x
WH3	Rail Wheel Nuts - Check	x	x	x	x
WH4	Rail Wheel Back to Back Gauge - Check			x	x

9.19 : General Equipment**Exam Code**

JOB	ACTIVITY	A	B	C	D
GE1	Towing Couplings - Examine	x	x	x	x
GE2	Drawbar - Check	x	x	x	x
GE3	Safety Labels - Check		x	x	x
GE4	Twist Locks - Check	x	x	x	x
GE5	Loading Ramps - Examine	x	x	x	x
GE6	Rail Scrapers - Check	x	x	x	x
GE7	Floor Wells - Check	x	x	x	x
GE8	Ballast Box - Check	x	x	x	x
GE9	Load Restraint Posts - Check	x	x	x	x
GE10	Loading Jack Legs - Check	x	x	x	x
GE11	Loading Jack Legs - Examine	x	x	x	x
GE12	Drum Guards - Check	x	x	x	x

9.20 : Detailed Job Specification

9.20.1 : BRAKES

JOB Number	<p style="text-align: center;">BR1</p> <p style="text-align: center;">Safety Precaution(s) – SPM</p>
JOB Title	<p style="text-align: center;">9.20.1.1 : Service & Park Brake – Check</p>
Scheduled Work	<p>Couple the trailer to a suitable RRV with service and park brake controls. Verify the service and park brakes operate in sync with the service and park brake on the towing RRV. Check this by travelling a few metres in both directions.</p>
Work Arising	<p>If the brakes are ineffective then the trailer must be removed from the track (off tracked). Refer to brake schematic (page 13). Use this schematic to detect and rectify all faults. Contact Predator Equipment for further assistance.</p>

JOB Number	<h1 style="text-align: center; color: red;">BR2</h1> <p style="text-align: center;">Safety Precaution(s) – SPM</p>
JOB Title	<p style="text-align: center;">9.20.1.2 : Service, Park Brake & Pull Test (in accordance with the latest issue of COP0014)</p>
Scheduled Work	<p>To carry out this job, the following equipment is required:</p> <ul style="list-style-type: none"> • A suitable RRV to be attached to the trailer • Level & dry track where possible with good access. • A load cell rated to at least 5000kg. • Trailer ballast weight – 22000kg(varies) <p>The trailer brake cylinders are spring applied brakes with air release (type 24/30). Therefore both the Service Brake and the Park Brake on the trailer are both Spring Applied and Air Release.</p> <p>Service Brake: Connect the trailer to a suitable RRV with service and park brake controls. Attach both the service brake air line and the park brake air line on the trailer to the RRV. The trailer brakes should release when the system is charged. Apply the service brake at least 3 times on the RRV and check that the trailer brakes are applied in sync with the RRV.</p> <p>Park Brake: Connect the trailer to a suitable RRV with service and park brake controls. Attach the park brake line only from the trailer to the RRV. The trailer brakes should release when the system is fully charged. Apply the handbrake at least 3 times on the RRV and check that the trailer brakes are applied in sync with the RRV.</p>

	<p>Drawbar Pull Test:</p> <p>Connect the trailer to a suitable RRV with service and park brake controls. Attach both the service brake air line and the park brake air line on the trailer to the RRV. Apply the park brake on the RRV and check that the brakes have been applied on the trailer. Having fitted a load cell between the RRV and the fully loaded trailer, move the RRV away from the trailer. The load cell should read at least 6% of the gross trailer weight before the trailer moves on the track.(eg: trailer gross weight is 25000kg - load cell should read minimum 1500kg).</p> <p>Record the results of the test (see record sheet in appendix).</p> <p>Mark the date of the next Pull Test (12 month intervals) on the label attached to the trailer with indelible ink.</p>
<p>Work Arising</p>	<p>If the minimum 6% pull forces are not achieved then check that the wheels are not slipping due to poor rail conditions. Then check if there are any leaks in the brake system. If the problem persists, contact Predator Equipment Ltd.</p>

JOB Number	<h1 style="color: red; margin: 0;">BR3</h1> <p style="margin: 0;">Safety Precaution(s) – SPP</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.1.3 : Brake Chambers - Examine</h2>
Scheduled Work	<p>Check that the brake chamber is fixed securely to the holding bracket on the axle.</p> <p>Check the air fittings are secure and tight in the brake chamber and the air pipe is secure in the brake fitting.</p> <p>Check for any damage or defects to the chamber and any evidence of air leaks.</p>
Work Arising	<p>Renew any loose or damaged fasteners and tighten securely.</p> <p>Renew any damaged or defective chambers.</p> <p style="color: red; text-align: center;">DO NOT OPEN OR ATTEMPT TO OPEN THE 24/30 SPRING BRAKE CHAMBER. THEY ARE “SEALED FOR LIFE” CHAMBERS AND IF OPENED CAN CAUSE SERIOUS INJURY.</p>

JOB Number	<h1 style="color: red; margin: 0;">BR4</h1> <p style="color: blue; margin: 0;">Safety Precaution(s) – SPP</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.1.4 : Brake Piping & Hoses – Examine</h2>
Scheduled Work	<p>Check all the brake system brake pipes and hoses for cracks, splits, kinks, wear and abrasion and damage to the fittings.</p> <p>Ensure all pipes are fitted securely to the brake fittings by pushing the pipe in firmly and then attempt to pull it back out again.</p> <p>Ensure the hoses are free from defects and damage.</p>
Work Arising	<p>Renew any damaged or defective pipe, hose or fitting.</p> <p>If pipe pulls out of fitting then renew fitting and refit pipe.</p> <p>Pressurise the system and check for leaks.</p>

JOB Number	<h1 style="color: red; margin: 0;">BR5</h1> <p style="color: blue; margin: 0;">Safety Precaution(s) – SPP</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.1.5 : Brake Slack Adjusters – Examine</h2>
Scheduled Work	<p>Check all 4 of the brake slack adjusters on the 2 axles. Ensure the bolts/clevis pins are secure to the brake chamber.</p> <p>Ensure that grease nipple is not defective or damaged.</p> <p>Ensure that the slack adjuster is secured to the splined cam shaft on the axle by checking that the cir-clip is seated in the cam shaft cir-clip slot correctly.</p> <p>Adjust the brake pads by raising each wheel off the track/ground. Using a suitable spanner turn the nut on the slack adjuster clockwise until tight. Then turn the same nut anti-clockwise and try to spin the rail wheel at the same time. When the rail wheel becomes free and the brake pads can just vaguely be heard rubbing against the inner hub face then the brakes are set.</p> <p>Grease the slack adjuster through grease nipple.</p>
Work Arising	<p>Renew grease nipple if damaged or defective.</p> <p>Renew slack adjuster if damaged or defective.</p> <p>Renew slack adjuster cir-clip if damaged or missing.</p>

JOB Number	<h1 style="color: red;">BR6</h1> <p style="color: blue;">Safety Precaution(s) – SPP</p>
JOB Title	<h2 style="color: blue;">9.20.1.6 : Air Leaks – Check</h2>
Scheduled Work	<p>Check the full brake system for air leaks including all pipes, pipe fittings, air tank, RE valve, brake chambers, quick release valves, air c-type couplings and air susies.</p>
Work Arising	<p>Renew any damaged pipes, fittings, valves, couplings, brake chambers.</p> <p style="color: red;">DO NOT OPEN OR ATTEMPT TO OPEN THE 24/30 SPRING BRAKE CHAMBER. THEY ARE “SEALED FOR LIFE” CHAMBERS AND IF OPENED CAN CAUSE SERIOUS INJURY.</p>

JOB Number	<h1 style="color: red;">BR7</h1> <p style="color: blue;">Safety Precaution(s) – SPP</p>
JOB Title	<h2 style="color: blue;">9.20.1.7 : Brake Pads – Check</h2>
Scheduled Work	<p>Raise the trailer off the ground/track and remove the wheel. Remove the brake drum and check the brake pad condition. Ensure that the pad is at least 2.5mm thick. Check the brake pad mechanism and parts for any damage or defects. Check the brake drum for any signs of damage or defects. Refit the brake drum and wheel and torque as required.</p> <p style="color: red;">(See Axle Service Manual for in depth information-10.2)</p>
Work Arising	<p>Renew brake pads if less than 2.5mm thick.</p> <p>Renew any defective mechanism parts if defective or damaged.</p> <p>Renew brake drum if defective or damaged.</p>

JOB Number	<h1 style="color: red; margin: 0;">BR8</h1> <p style="color: blue; margin: 0;">Safety Precaution(s) – SPP</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.1.8 : Air Tank – Examine & Drain</h2>
Scheduled Work	<p>Check the tank for any visible signs of damage. Ensure all the air pipe fittings are not damaged or defective. Ensure the air is completely out of the system by pulling the ring on the drain valve located on the bottom of the tank. This will drain both the air and also any water resting in the bottom of the tank.</p>
Work Arising	<p>Renew the tank if damaged or defective. Renew any air pipe fittings that are damaged or defective.</p>

9.20.2 : Electrics

JOB Number	<h1 style="color: red; margin: 0;">EL1</h1> <p style="margin: 0;">Safety Precaution(s) – SPP & SPI</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.2.1 : Trailer Marker Lights, Direction Detection Sensor & Socket – Check</h2>
Scheduled Work	<p>Clean all trailer lights and check for damage or defects. Ensure that the light switch works properly and is free from damage and defects. Check that the direction detection sensor is securely attached to the holding bracket and is properly aligned with the magnet on the wheel and free form damage and defects.</p> <p>Check the auxiliary power socket for defects or damage. Switch the trailer light switch to the ON position. Ensure the lights work properly in all travel sequences (see Trailer Light Operation – page 23).</p>
Work Arising	<p>Renew any defective or damaged light. Renew the light switch if defective or damaged. Replace the direction detection sensor if defective or damaged(see 8.3.1 or 8.3.2). Renew the auxiliary power socket if defective or damaged. If light circuit is not working properly, refer to Trailer Light Operation – page 29.</p>

JOB Number	<h1 style="color: red; margin: 0;">EL2</h1> <p style="color: blue; margin: 0;">Safety Precaution(s) – SPP & SPI</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.2.2 : Battery Box & Battery - Check</h2>
Scheduled Work	<p>Check the battery box and the battery for any signs of damage or defects.</p> <p>Ensure the battery is firmly secured to the battery box and the battery box is firmly secured to the trailer chassis.</p> <p>Check the battery connections are clean, firm and secure.</p> <p>Check battery for leaks.</p> <p>See Battery Precautions (9.5).</p>
Work Arising	<p>Clean battery connections and renew if defective or damaged. Renew battery if defective or damaged. Top up battery acid if low. Renew battery box if damaged or defective.</p>

JOB Number	<h1 style="color: red; margin: 0;">EL3</h1> <p style="color: blue; margin: 0;">Safety Precaution(s) – SPP & SPI</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.2.3 : Battery Charge – Test</h2>
Scheduled Work	<p>Check the battery charge status by using a multi-meter or a battery charge indicator.</p>
Work Arising	<p>Charge or Renew battery if flat. If battery is completely flat, check and top up battery acid levels where necessary. Recharge again. If battery then fails to hold charge, renew battery.</p>

JOB Number	<h1 style="color: red; margin: 0;">EL4</h1> <p style="margin: 0;">Safety Precaution(s) – SPP & SPI</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.2.4 : Solar Panels – Check</h2>
Scheduled Work	<p>Examine solar panels and check for any visible sign of damage or defects. The LED light should flash to indicate that the solar panel is trickle charging the battery.</p>
Work Arising	<p>Renew the solar panel if there are any visible signs of defects or damage. Renew the solar panel if the LED does not flash in daylight hours.</p>

JOB Number	<h1 style="text-align: center; color: red;">EL5</h1> <p style="text-align: center;">Safety Precaution(s) – SPP & SPI</p>
JOB Title	<h2 style="text-align: center; color: blue;">9.20.2.5 : Electric Wiring & Junction Box – Check</h2>
Scheduled Work	<p>Examine all electric wiring on the trailer. Ensure that all wire is free from cuts, abrasion, breaks and fowling edges. Check all wiring is securely cable tied to the trailer chassis. Ensure that the junction box is fixed firmly to the trailer chassis. Check that the door and the door lock work properly. Check that all connections inside the box are tight and secure. Ensure that all wires are pruned and there are no loose wires or connections. Ensure that there is no water trapped inside the box.</p>
Work Arising	<p>Renew the junction box if defective or damaged. Renew any wire connections if defective or damaged. Re-crimp any loose wire connections. Remove any dirt or water if applicable. Renew any defective or damaged wire. Renew any damaged or defective cable ties that secure the wiring to the trailer chassis.</p>

9.20.3 : Chassis & Suspension.

JOB Number	<h1 style="color: red; margin: 0;">CS1</h1> <p style="margin: 0;">Safety Precaution(s) – SPP & SPI</p>
JOB Title	<h2 style="margin: 0;">9.20.3.1 : Main Chassis - Examine</h2>
Scheduled Work	<p>Examine the trailer chassis for defects such as corrosion, cracks, broken welds, distortion and any signs of damage. Examine all lashing points and lifting points for any sign of defects or damage.</p> <p>Examine the trailer lifting beam (where fitted) thoroughly for any signs of cracks, fatigue or visual defects.</p>
Work Arising	<p>Renew any damaged or defective lifting points, lashing points and minor chassis damage in accordance with good workshop practice and procedures.</p> <p>For more serious chassis damage, contact Predator Equipment Ltd for advice.</p>

JOB Number	<h1 style="color: red; margin: 0;">CS2</h1> <p style="color: blue; margin: 0;">Safety Precaution(s) – SPP</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.3.2 : Suspension Springs - Examine</h2>
Scheduled Work	<p>Examine the trailer suspension springs for any sign of defects or damage. Check that there are no broken or bent leaves or cracks in the spring. Check that the leaf brackets on the spring are secure and that the bolts on top are tight.</p>
Work Arising	<p>Renew any damaged or defective spring.</p>

JOB Number	<h1 style="color: red; margin: 0;">CS3</h1> <p style="color: blue; margin: 0;">Safety Precaution(s) – SPP</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.3.3 : Spring Eye Bolts - Check</h2>
Scheduled Work	<p>Check that the spring eye bolts are tight and secure and free from any defects or damage.</p> <p>Grease bolt through centre located grease nipple and ensure grease comes out through the spring eye.</p>
Work Arising	<p>If the bolts are defective or damaged, renew them with new bolts and nuts.</p> <p>If the grease nipple is missing or damaged, renew it.</p>

JOB Number	<h1 style="color: red; margin: 0;">CS4</h1> <p style="margin: 0;">Safety Precaution(s) – SPP</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.3.4 : Slipper End Bolts - Check</h2>
Scheduled Work	<p>Check the slipper end spring bolt is free from any defects or damage. Ensure that it is secure and tight.</p>
Work Arising	<p>Renew if damaged or defective.</p>

JOB Number	<h1 style="color: red; margin: 0;">CS5</h1> <p style="color: blue; margin: 0;">Safety Precaution(s) – SPP</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.3.5 : Spring U-Bolts – Check</h2>
Scheduled Work	<p>Check that all the U-Bolt nuts are tight and secure. Check for any movement in the whole U-Bolt assembly. Check for any signs of defects or damage to the whole U-Bolt assembly. Ensure there are at least 2 threads showing</p>
Work Arising	<p>Renew and defective or damaged U-Bolt or bottom 20mm fixing plates. If loose, re-torque the U-Bolts to 270NM(200lb/ft).</p>

9.20.4 : Wheels

JOB Number	<h1 style="color: red;">WH1</h1> <p>Safety Precaution(s) – SPP</p>
JOB Title	<h2>9.20.4.1 : Rail Wheel – Check</h2>
Scheduled Work	<p>Check the rail wheels for signs of scoring, pitting, flat spots and any other damage.</p>
Work Arising	<p>See job WH2</p>

JOB Number	<h1 style="color: red;">WH2</h1> <p style="color: blue;">Safety Precaution(s) – SPP & SPI</p>
JOB Title	<h2 style="color: blue;">9.20.4.2 : Rail Wheels Examine & Bearings – Check</h2>
Scheduled Work	<p>1Lift the rail wheels off the ground as far as possible.</p> <p>2Clean the entire wheel flange and tread, removing any grease, corrosion and debris.</p> <p>3Rotate the wheel and check that there is no sign of axial or radial play in the bearings, or noises or harshness. If float is detected, check that it does not exceed 0.05 mm.</p> <p>4Rotate the wheel slowly by hand, and examine all surfaces of the wheel, checking for cracks, cavities, metal migration and flats. The limits for each will be found on Table 1. A description of the types of defects will be found in clauses A, B & C below. Record findings on Table 1.</p> <p>5Use an S1002 profile gauge(HB472) and feeler gauges (HB011-FT10) to check the following:</p> <p>5.1The hollow-wear on the tread is less than 6 mm. See Clause 7 if doubt exists.</p> <p>5.2Flange wear is less than 4 mm.</p> <p>5.3There are no steps in the flange profile greater than 1.5 mm.</p> <p>5.4The tread to the outside of the wheel is not more than 2 mm above the running tread surface (a false flange). See Figure 2.</p>

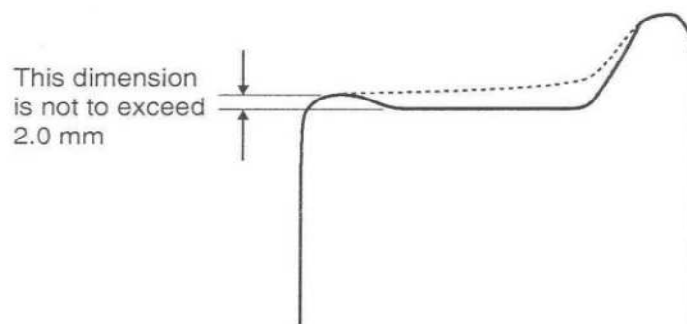


Figure 2 : Limit for false flange

5.5 Measure rail wheel diameters and back-to-back dimensions (with 4 min figures) - see table 1 below for dimensions.

5.6 Wheel Wear Limit Table

Tread Profile	Drawing Number/ Specification	Network Rail Drawing Number	Flange Thickness Details (mm) W		Flange Height Details (mm) Y	
			As New	Minimum (Worn)	As New	Maximum (Worn)
S1002	BS EN 13715	N/A	31	24	28	33

5.7 Gauge References:

S1002 Profile Identification Gauge = HB472
(S1002/h28/e31/15%)

Adjustable Flange Thickness and Height Gauge (Flange thickness measured at 10mm height from 70mm tread datum position) = HB011-FT10

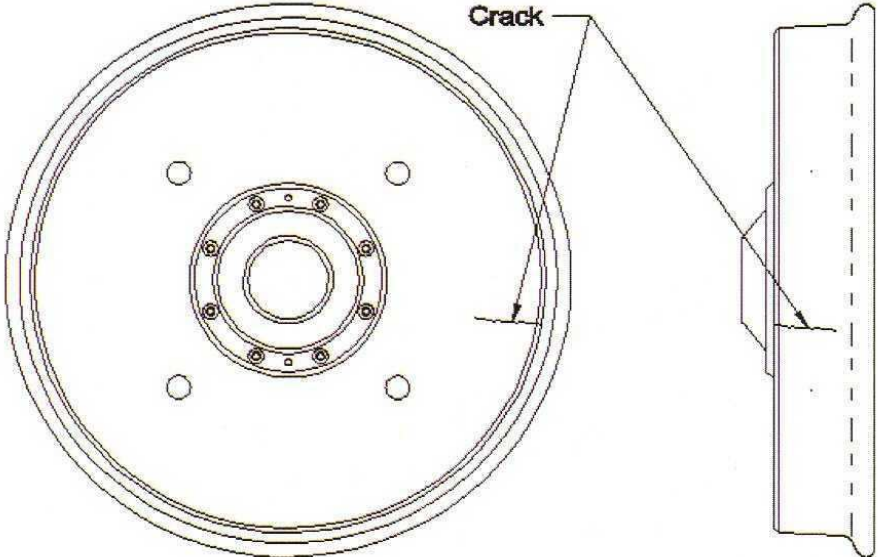
Wheelset Back to Back Gauge(1358mm Go and 1362mm No Go as new) = HB018 (1358x1363 in service)

The above Gauges can be obtained from:
COMECH Metrology Ltd, Derby, DE23 8YL.
Tel : 01332 867700

Vehicle Number:		Date:			
Location:		Examiner:			
Type of Defect	Allowable Limit	Record Findings Here			
		Tick if none found		Record details if found	
Cracks See Section 3	None Allowed				
Cavities See Section 4	15mm Length				
Migration See Section 5	5mm Tread Roll over, otherwise NO				
Flats	30mm				
Tick if Wear less than limits or record amount limit					
Wear /Defect	Limit (mm)	Front Axle		Rear Axle	
		Left	Right	Left	Right
Tread Hollow	6				
Flange	4				
Steps	1.5				
False Flange	2				
Wheel Ø	550				
Back to Back	1358 - 1362 (new/ manufactured)				
Back to Back	1358 - 1363 (re-profiled)				

Table 1

	<p>7 A more accurate method of gauging flange height is to use an Adjustable Flange Thickness and Height Gauge (Flange thickness measured at 10mm height from 70mm tread datum position) = HB011-FT10</p> <p>Refer to Gauge Manufacturer/Supplier for instructions on each of the Gauges.</p>
<p>Work Arising</p>	<p>If axial or radial play in the bearing exceeds 0.05mm, or noise or harshness is detected, dismantle the bearings and rectify the defects.</p> <p>Bearings can be changed by a competent person. Instructions on how to change the axle bearing are in the axle manual.</p> <p>This work must be carried out in a covered workshop.</p> <p>Assess amount of metal to be turned off to remove defect(s).</p> <p>If wheels will not be turned below minimum diameter of 515mm arrange for wheels to be re-profiled, otherwise renew wheels as a pair.</p> <p>The difference in diameters of wheels on the same axle must not exceed 2mm.</p>

JOB Number	<h1 style="color: red;">WH2(cont'd)</h1>
JOB Title	Rail Wheels Examine & Bearings – Check (Cont'd)
Scheduled Work	<p>A - Cracks</p> <p>Cracks normally have a jagged saw tooth-type of surface profile with sharp edges. Cracks will normally form at the tread chamfer in an axial direction (across the thread) see Figure 4.</p>  <p>Figure 4 Wheel with crack</p> <p>No cracks are permitted, but see clauses B and C overleaf. Renew wheels unless the cracks can be completely removed by re-profiling.</p>

B - Cavities

Rolling contact fatigue causes microscopic subsurface cracks which develop into a localised network. (See Figure 5.)

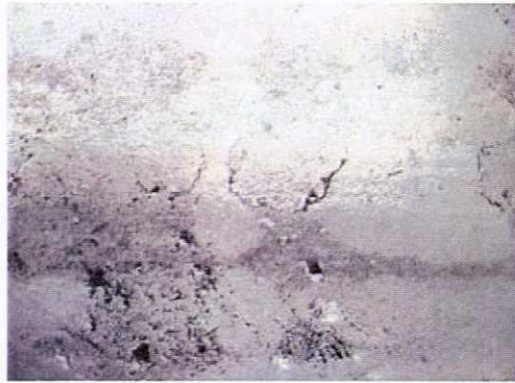


Figure 5 Microscopic cracks



Figure 6 Cavities

Over a long period small sections or spalls break away leaving cavities (see Figure 6). Record the number and length of the cavities. Take action if the length of any cavity exceeds 15 mm, or if two cavities are within 50mm of each other and their combined length exceeds 15 mm. Re-profile wheels to remove cavities and cracks, otherwise renew the wheels.

C - Migration

Material migration results from a rolling action that forces the surface material sideways. This can occur in two places:

C1. Tread Rollover.

This forms on the tread chamfer (see Figure 9). The maximum allowable is 5 mm. Associated with this are circumferential cracks (see Figure 7) which do not affect the integrity of the wheel



Figure 7 - Circumferential cracking associated with rollover

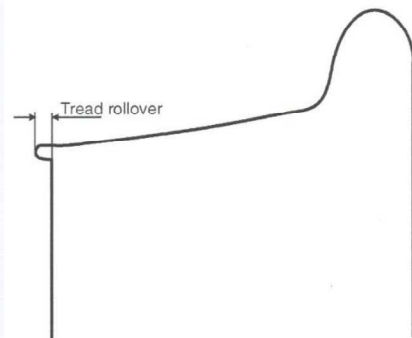


Figure 9 - Rollover limit

C2. Migration down the flange, is shown in Figure 9 where the extreme edges have flaked off.



Figure 9 Migration down the flange

This does not affect the integrity of the wheel. These defects are removed when re-profiling becomes necessary to restore the wheel profile.

JOB Number	<h1 style="color: red; margin: 0;">WH3</h1> <p style="margin: 0;">Safety Precaution(s) – SPP</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.4.3 : Rail Wheel Nuts & Studs – Check</h2>
Scheduled Work	<p>Check the rail wheel nuts are tight and secure and free from damage or defects. Check the wheel nut studs for damage or defects.</p>
Work Arising	<p>Renew any damaged or defective wheel nuts or wheel studs (see axle manual for renewal of wheel studs).</p>

JOB Number	<h1 style="color: red;">WH4</h1> <p style="color: blue;">Safety Precaution(s) – SPP & SPI</p>				
JOB Title	<h2 style="color: blue;">9.20.4.4 : Rail Wheel Back-to-Back Gauge – Check</h2>				
Scheduled Work	<p>Check the rail wheel Back-to-Back dimension using a calibrated gauge(HB018). Check this dimension in 4 locations around the wheel.</p> <p>Back-to-Back Tolerances</p> <table border="1" data-bbox="427 967 1401 1176"> <tr> <td style="text-align: center;">Back to Back New/Manufactured)</td> <td style="text-align: center;">1358mm – 1362mm</td> </tr> <tr> <td style="text-align: center;">Back to Back Re-Profiled)</td> <td style="text-align: center;">1358mm – 1363mm</td> </tr> </table>	Back to Back New/Manufactured)	1358mm – 1362mm	Back to Back Re-Profiled)	1358mm – 1363mm
Back to Back New/Manufactured)	1358mm – 1362mm				
Back to Back Re-Profiled)	1358mm – 1363mm				
Work Arising	<p>Reset dimension if outside the given tolerances.</p> <p>Check Wheel nuts for tightness and security.</p> <p>Check axle bearings.</p> <p>Contact Predator Equipment for further advice.</p>				

9.20.5 : General Equipment

JOB Number	<h1 style="color: red; margin: 0;">GE1</h1> <p style="margin: 0;">Safety Precaution(s) – SPP & SPI</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.5.1 : Towing Coupling - Examine</h2>
Scheduled Work	<p>Check the trailer towing couplings are correctly secured and fastened to the trailer chassis.</p> <p>Also ensure the large nut at the back of the coupling is secure and tight.</p> <p>Measure the gap between the two retaining cups and make sure the gap is 18mm.</p> <p>Ensure the rubber sandwich pad is not split or defective.</p> <p>Check the flange for any cracks or damage.</p> <p>Check the lever for damage or defects and ensure it is working properly (see coupling manual).</p> <p>Check the coupling for any signs of damage or defects.</p> <p>Before leaving the workshop, apply grease to the grease nipple on the coupling.</p> <p>See coupling manual in appendix – 10.3.</p>
Work Arising	<p>Renew all worn, damaged or defective parts.</p>

JOB Number	<h1 style="color: red; margin: 0;">GE2</h1> <p style="color: blue; margin: 0;">Safety Precaution(s) – SPP</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.5.2 : Drawbar – Check</h2>
Scheduled Work	<p>Check for any visual signs that the drawbar is damaged or defective.</p> <p>Ensure that the storage pins on the trailer are not damaged and that the spring pins are in place.</p>
Work Arising	<p>Renew any missing or defective spring pins.</p> <p>Renew drawbar if damaged or defective.</p>

JOB Number	<div style="text-align: center;">  <p>Safety Precaution(s) – SPP</p> </div>
JOB Title	<div style="text-align: center;"> <p>9.20.5.3 : Safety Labels – Check</p> </div>
Scheduled Work	<p>Ensure that all safety labels are present on the trailer and that they are clean and legible.</p> <p>Check that the paint work on the trailer is not discoloured or faded.</p> <p><u>Labels Required:</u></p> <p>Air Service – front & rear</p> <p>Air Park – front & rear</p> <p>Park Brake On/Off – front & rear</p> <p>Blue Circle on Air Park coupling – front & rear</p> <p>Network Rail DATA Panel – front & rear</p> <p>Documents – 1 side</p> <p>Next Brake Test Due – 2 sides</p> <p>Engineering Acceptance expiry – 2 sides</p> <p>Trailer Weights – 2 sides</p> <p>Network Rail Trailer Serial Number – 2 sides</p> <p>Service Brake Fitted – 2 sides</p> <p>Tighten Wheel Nuts – each corner (2 sides)</p> <p>Grease Regularly – each corner (2 sides)</p> <p>Max Speed – 2 sides</p> <p>Trailer dimensions – 2 sides</p>
Work Arising	<p>Renew any missing or defective labels.</p> <p>Clean and repaint trailer at affected areas.</p>

JOB Number	<h1 style="color: red;">GE4</h1> <p>Safety Precaution(s) – SPP & SPI</p>
JOB Title	<h2 style="color: blue;">9.20.5.4 : Twist Locks – Check</h2>
Scheduled Work	<p>Examine the twist lock thoroughly for signs of damage or defects. Check that the twist lock opens and closes properly by turning the handle clockwise and anticlockwise while the twist lock is in the raised receptive position above the trailer floor.</p>
Work Arising	<p>Renew all damaged or defective parts. If welded twist lock body is damaged, contact Predator Equipment for advice.</p>

JOB Number	<h1 style="color: red; margin: 0;">GE5</h1> <p style="color: blue; margin: 0;">Safety Precaution(s) - SPP</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.5.5 : Trailer Loading Ramps – Examine</h2>
Scheduled Work	<p>Ensure that the loading ramps are free from any visual signs of defects or damage. Ensure that there is not excessive wear on the ramp head where it overlaps the 40mm pin on the trailer headboard.</p>
Work Arising	<p>Renew ramps if there are any signs of excessive wear, damage or defects.</p>

JOB Number	<h1 style="color: red;">GE6</h1> <p style="color: blue;">Safety Precaution(s) - SPP</p>
JOB Title	<h2 style="color: blue;">9.20.5.6 : Rail Scrapers - Check</h2>
Scheduled Work	<p>Ensure that the rail scraper brackets are securely attached and fastened to the trailer chassis. Ensure that the rubber rail scraper is firmly attached to the scraper bracket. Check that both the bracket and the rubber scraper are free from any visual signs of defects or damage. Set the rubber scraper at a distance of 30mm from the bottom of the rubber to the top of the rail head before returning to service.</p>
Work Arising	<p>Renew brackets and/or nuts and bolts if there are any signs of excessive wear, damage or defects. Renew the rubber scrapers if there are any signs of excessive wear or damage.</p>

JOB Number	<p style="text-align: center;">GE7</p> <p style="text-align: center;">Safety Precaution(s) - SPP</p>
JOB Title	<p style="text-align: center;">9.20.5.7 : Floor Wells - Check</p>
Scheduled Work	<p>Ensure that the floor well is free from any visual signs of defects or damage. Do not fill with debris or non essential items.</p>
Work Arising	<p>Renew torn or damaged floor well plates if there are any signs of excessive wear, damage or defects.</p>

JOB Number	<h1 style="color: red;">GE8</h1> <p style="color: blue;">Safety Precaution(s) - SPP</p>
JOB Title	<h2 style="color: blue;">9.20.5.8 : Ballast Box - Check</h2>
Scheduled Work	<p>Ensure that the ballast box is free from any visual signs of defects or damage. Check lifting shackles are secure and free from damage and defects. Check the corner twist lock castings are free from damage and defects.</p>
Work Arising	<p>Renew torn/damaged plates and lifting shackles if there are any signs of excessive wear, damage or defects. Replace corner castings if there are any signs of excessive wear, damage or defects.</p>

JOB Number	<h1 style="color: red; margin: 0;">GE9</h1> <p style="color: blue; margin: 0;">Safety Precaution(s) - SPP</p>
JOB Title	<h2 style="color: blue; margin: 0;">9.20.5.9 : Load Restraint Posts - Check</h2>
Scheduled Work	<p>Ensure that the load restraint posts are free from any visual signs of defects or damage. Make sure the post socket in the trailer bed is free from debris before fitting.</p>
Work Arising	<p>Replace any damaged or defective load restraint posts.</p>

JOB Number	<h1 style="color: red;">GE10</h1> <p>Safety Precaution(s) - SPP</p>
JOB Title	<h2 style="color: blue;">9.20.5.10 : Loading Jack Legs - Check</h2>
Scheduled Work	<p>Ensure that the loading jack leg is able to travel from its storage position to its working position. Check for visible signs of damage, excessive wear or defects.</p>
Work Arising	<p>Renew the loading jack leg, pins, spring pins and safety chains if there are any signs of excessive wear, damage or defects.</p>

JOB Number	<h1 style="color: red;">GE11</h1> <p style="color: blue;">Safety Precaution(s) - SPP</p>
JOB Title	<h2 style="color: blue;">9.20.5.11 : Loading Jack Legs - Examine</h2>
Scheduled Work	<p>Examine all parts of the jack leg, pins, spring pins and jack leg brackets on the trailer chassis. Make sure that the inner leg is free and able to travel up and down the inside of the outer leg. Check that the loading jack leg, pins, spring pins and jack leg brackets on the trailer chassis are free from damage or defects. Ensure the safety chains on the pins and spring pins are free from defects and damage.</p>
Work Arising	<p>Renew the loading jack leg, pins, spring pins and safety chains if there are any signs of excessive wear, damage or defects. If the jack leg brackets are damaged or defective, consult Predator Equipment.</p>

JOB Number	<h1 style="color: red;">GE12</h1> <p>Safety Precaution(s) - SPP</p>
JOB Title	<h2 style="color: blue;">9.20.5.12 : Drum Guards - Check</h2>
Scheduled Work	<p>Ensure that the drum scrapers are free from debris and are not fouling against the drums and ensure the fixing bolts and locknuts are secure and tight.</p>
Work Arising	<p>Renew brackets and/or nuts and bolts if there are any signs of excessive wear, damage or defects.</p>

10 : APPENDIX

10.1 : Drawbar Pull Test Record Sheet (in accordance with the latest issue of COP0014).

Company:		Person responsible for Maintenance or Safety is the only person allowed to confirm below.
Address:		
Telephone Number:		
Email Address:		

Trailer ID. No & make.								
Gross Weight(kg)								
Max permitted speed								
Brake System Type (Air etc)								
Number of Wheels Braked								
Pull Test Load Required(kg)								
Pull Test Load Achieved(kg)								
Date Tested								
I confirm the trailers listed have been tested and are compliant to COP 0014	Signature							
	Print Name and Title							

