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PARTICIPATE IN THIS RFT AND THEN BECOME A PROSPECTIVE
TENDERER**

Please read and Note:

This file is provided on the Commerce tenders web site when the Request For Tender (RFT) document is issued in Dmax Lite format.

This file contains (below) a brief scope statement and extracts from the RFT documents, but is not a complete RFT document and does not contain the responsible questions.

To participate in this tendering process you MUST first return to the Commerce tenders web site:

<https://tenders.nsw.gov.au/commerce>

Then from the RFT web page (see RFT number below) download a full copy of the RFT documents, including the responsible components, and also any addenda issued to date; and also during the tender period.

Copy/Save the RFT documents to your own computer drive or network location – the blue “DOWNLOAD A SOFT COPY” link at the bottom provides access to the page from which you can do this.

DmAX Lite Software

You will need to have a current licensed copy of the Dmax Lite 5.1 software to read, complete, and respond to the RFT with your tender. If you do not currently have such a licensed copy it can be optionally purchased and downloaded when downloading the full RFT documents from the tenders web site.



**NSW Procurement – Contracting Services is a Business Unit of the NSW
Department of Commerce**

**NSW Procurement – Contracting Services invites this tender for and on behalf of
the
NSW Government State Contracts Control Board**

**Request for Tender 0700155
Supply and Delivery of Class One (4X4) Hazmat
Tanker Vehicles for NSW Fire Brigades**

**Stage 1 - Development Vehicle – commencing from
date of contract acceptance**

**Stage 2 - Production Vehicles – commencing from
date of acceptance of Development Vehicle for a
period of 3 years
Plus 2 X 1 Year Extension Options**

Tender Issue Date: 26/11/2007

Closing Date: Thursday 07/02/2008

Closing Time: 9:30 am Sydney Time

Note: In order to respond to this RFT tenderers must have a current license for DMax Lite software. Licenses can be purchased through NSW Procurement | eBusiness Solutions SupportDesk at:

eBS_SupportDesk@commerce.nsw.gov.au or 1800 003 985

at a cost of \$110 (inclusive of GST) (representing the DecisionMax license fee). This provides 12 months unlimited application to any Tender formatted in TenderMax Pro. It is anticipated that most RFTs released by the SCCB will be in this format.

Alternatively, in downloading the document/s for this RFT you can also follow the prompts to confirm your request and purchase of the DMax Lite software and be issued with your Digital Registering Key to commence preparing your tender submission in the appropriate format.

Please note that the DMax Lite software is only supported on a Microsoft Windows 9X and above operating system. Other operating systems are not compatible. You are responsible for ensuring the operating system you use is appropriate for DMax Lite.

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For the purposes of this RFT, inquiries should be directed to the Contact Officer nominated in Part A of this RFT.

Other matters should be directed to:

Group General Manager
NSW Procurement – Contracting Services
NSW Department of Commerce
McKell Building
2-24 Rawson Place
Sydney NSW 2000
Tel: (02) 9372 7504
Fax: (02) 9372 7533

Supply and delivery of Class One (4X4) Hazmat Tanker Vehicles for NSW Fire Brigades

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PART A Tender Conditions - The Requirement and Specifications

1. Outline Description of the Requirement

1.1 Introduction

This Request For Tender ("RFT") is made by the State Contracts Control Board ("the Board") for the supply of the Deliverables defined in this RFT and detailed in the Specification.

The Board is responsible for the conduct of the tender process, assisted by NSW Procurement – Contracting Services.

1.2 Outline of the Requirement

This RFT covers the supply and delivery of Class One (4X4) Hazmat Tanker Vehicles for NSW Fire Brigades' for a period of three (3) years plus two one year extension options.

- 1.2.1 Although not bound to order any vehicles, it is envisaged that the NSWFB will require the supply and delivery of around thirty (30) vehicles over the period of the contract.
- 1.2.2 The Class One Hazmat vehicle is based on a diesel, automatic 4X4 cab/chassis capable of seating six (6) personnel including the driver and having a six (6) locker stowage configuration.
- 1.2.3 The vehicle is a NSWFB emergency response vehicle designed to provide fire fighting support at structure fires, hazmat and rescue incidents, bush and grass fires.
- 1.2.4 The successful tenderer shall take at its own expense whatever reasonable steps are necessary for the Class One Hazmat Vehicle as a whole to be made ready to be commissioned for operational service in accordance with the NSWFB Fire Fighting Specification No ENG/00135 Version 01.10 2007 attached to this document.
- 1.2.5 The equipment characteristics specified generally describe the nature and extent of the NSWFB requirement. However, the NSWFB shall consider and reserves the right to select alternative equipment to that specified, where such alternatives are deemed to provide more satisfactory solutions to NSWFB needs.

1.3 Development Vehicle (Stage 1) of the Requirement

- 1.3.1 Stage 1 of the contract will be for the manufacture, supply and delivery of one (1) wholly complete vehicle of the agreed design to prove it is suitable for the NSWFB, and will be known as the 'development' vehicle.
- 1.3.2 NSWFB, may at its discretion, waive the requirement for a development vehicle where any offered vehicle is a modified version of an existing vehicle design having proven service with any recognised Australasian fire agency.
- 1.3.3 The NSWFB will determine if the development vehicle can be waived based on testimony from fire agencies currently using the offered vehicle design, and on the level of modifications necessary to meet NSWFB requirements.

- 1.3.4 While there is no specific time period for the manufacture of the development vehicle and consideration will be given to the complexity and component Original Equipment Manufacturer (OEM) delivery schedules, NSWFB requires the vehicle to be manufactured within 12 months of contract execution.
- 1.3.5 The development vehicle will be subjected to full acceptance testing to ensure that the completed vehicle satisfies all technical requirements and performance expectations (refer to Clause 19 Condition of Contract).
- 1.3.6 The development vehicle, by its very nature, is most likely to be subjected to changes during the build following an inspection or acceptance test, to ensure the vehicle satisfies the expectations of NSWFB.
- 1.3.7 When the development vehicle passes the acceptance test and is delivered to the NSWFB, it should be tested in operational service for a period of not less than six (6) weeks, or as otherwise determined by the NSWFB.

Note: The vehicle will undertake the rigours of operational service using numerous crews and at various stations.

- 1.3.8 If the development vehicle meets the specified technical and performance criteria and is approved by the NSWFB, the next stage (stage 2) of the contract, the manufacture of production vehicles, will commence.

Note: The NSWFB has no responsibility for any costs or expenses incurred by the tenderer for production build vehicles prior to the commencement of stage 2 of the contract.

- 1.3.9 If the development vehicle clearly fails to meet the specified technical and performance criteria, the NSWFB reserves the right to cancel stage 2 of the contract.
- 1.3.10 If stage 2 of the contract has been cancelled due to the development vehicle being rejected, the Contractor will be entitled to payment of the stage 1 contract price if in the opinion of the NSWFB, the Contractor has made a reasonable attempt to meet the requirements of the specification.
- 1.3.11 If the parties enter into a two (2) stage Contract, the Contract will include relevant clauses from this Clause 1.3.

1.4 Production Vehicles (Stage 2) of the Contract

- 1.4.1 Stage 2 of the contract, the manufacture, supply and delivery of a specified number of production vehicles, will only proceed after approval has been granted in writing by the NSWFB Contract Administrator.
- 1.4.2 Stage 2 of the Contract will be for a term of three (3) years from date of Acceptance of the development vehicle and may be extended by two (2) further terms, each of one (1) year duration.
- 1.4.3 Any contract extension agreement must be signed by both the Contractor

and the NSWFB Contract Administrator prior to the expiration of the existing contract period.

1.5 Procurement Objective

The objective of this RFT is to put in place a contract for NSW Fire Brigades' that will meet their requirements as set out in the Specification that forms part of the RFT.

2 Summary information for tenderers

2.1 Interpretation

2.1.1 Definitions of terms used in Parts A-C are contained in cl.6 of Part B

2.2 Structure of Request for Tender

2.2.1 This Tender is structured in the TenderMax Pro format.

TenderMax Pro is an e-sourcing application designed to fully automate the traditional paper-based tendering process introducing best practice processes in Electronic Tender production, submission and evaluation

2.2.2 This RFT is made up of four Parts as follows:

Tender Conditions

Part A: The Requirement and Specification;
Part B: The Tender Process;

Response to be completed by Tenderer

Part C: Tender Response, to be completed by the Tenderer, using Dmax Lite software.

Conditions of Contract

Part D: Agreement

Part C and other responses, once completed forms the Tender, and is to be submitted in accordance with Parts A, B and D.

2.3 Contact Officer

2.3.1 Refer requests for information or advice regarding this RFT to:

Name: Steve Diekman
Phone: (02) 9372 7524
Fax: (02) 9372 7799
E-mail: steve.diekman@commerce.nsw.gov.au

2.3.2 Any information given to a tenderer to clarify any aspect of this RFT will also be given to all other tenderers if in the Board's opinion the information would unfairly favour the inquiring tenderer over other tenderers.

2.4 Pre-Tender briefing

- 2.4.1 A pre-Tender briefing will be held on the date, and at the time and place, nominated in the advertisement or listed below. The Contact Officer or another officer of NSW Procurement – Contracting Services will be available at that time to answer any queries regarding this RFT and the tender process generally.

A briefing to be held commencing at 13:30 pm on Wednesday 28 November 2007 at:

***The Training Room
NSW Fire Brigades
Logistics Support Centre
Amarian Avenue
Greenacre NSW 2190***

to discuss all aspects of this tender. It is highly recommended that all tenderers attend the briefing in order that they fully acquaint themselves of the tender requirements. It is also expected that all tenderers will have thoroughly read this document prior to the briefing.

2.5 Nature and duration of agreement

- 2.5.1 The Requirement is to be met by an agreement between the Principal and the successful tenderer(s) on the terms of Part D.
- 2.5.2 The agreement will be for a term of three (3) years and may be extended by two further terms, each of one year duration.

2.5 Non-exclusive one off agreement

- 2.5.1 NSW Fire Brigade's preference is to enter into a Standing Offer agreement with one Contractor only – a Contractor which can meet all NSW Fire Brigade's requirements in relation to this Requirement.
- 2.5.2 Notwithstanding the terms of sub-clause 1, the Board reserves the right to appoint more than one Contractor to supply the Requirement or part of the Requirement

2.7 Eligibility to tender

- 2.7.1 Tenders must be submitted by a legal entity or, if a joint Tender, by legal entities, with the capacity to contract. The Board will only contract with the relevant legal entity or entities.
- 2.7.2 The Board may submit any financial information provided by the tenderer for independent financial assessment of the Tenderer's business.
- 2.7.3 The Board may ask a tenderer to provide evidence of its legal status or capacity to contract. If Tenders from entities propose to contract in their capacity as trustees, such evidence may include copies of the relevant trust deeds. Any evidence requested is to be provided within 3 working days of the request.

- 2.7.4 The Board reserves the right to reject any Tender if the Board judges the tenderer not to have appropriate financial assets.
- 2.7.5 If the Board judges the tenderer's financial position to be marginal, the Board reserves the right to make acceptance of any Tender conditional upon the tenderer entering into a bank or parent company guarantee, or an unconditional performance bond in a form satisfactory to the Board.
- 2.7.6 Tenderers must read, understand and comply with the requirements of the Commerce Business Ethics Statement, which is available at the link below. Tenderers must disclose any potential conflict of interests (including any relevant relationships) in the Tender Response.

The Board will consider any disclosure and will only enter into an agreement with tenderers that do not have improper conflict of interests. If the Board becomes aware of improper conflict of interests by a successful tenderer at the time an agreement has already been entered into the Board reserves the right to terminate the agreement.

<http://www.commerce.nsw.gov.au/About+Commerce/Business+ethics+statement/Business+ethics+statement.htm#commerce>

2.8 Other Eligibility Requirements

- 2.8.1 The Board will not enter into an agreement with a company that does not have an Australian Business Number and is not registered for GST. Normally, Tenderers must be registered for GST and state their ABN in their Tender Response.
- 2.8.2 Tenders from Tenderers that do not have an ABN and/or are not registered for GST, such as Tenderers commencing business in Australia, may be considered at the Board's discretion if the Tenderer demonstrates that it will obtain an ABN and GST registration before entering into an agreement with the Board. Such Tenderers must state how and when they intend to obtain an ABN and register for GST in their Tender Response.
- 2.8.3 Tenders for the whole of the requirement may be considered.

2.9 NOT USED

3. Submission of Tenders

3.1 General instructions for submission of Tenders

- 3.1.1 A Tender must be fully received by the Closing Date and Closing Time.
- 3.1.2 In order to prepare and lodge a response, tenderers must have a current license for the DMax Lite software being used. DMax Lite is the application required to participate and respond to any RFT published in the TenderMax Pro format.
- 3.1.3 A Tender must be lodged into the designated tender box/es, and must be lodged by:
 - a) **electronic lodgement** to the **electronic tender box for this RFT**, in accordance with Section 8 of this RFT, through the NSW Department of Commerce eTendering website at:

<https://tenders.nsw.gov.au/commerce>

Locate the web page for RFT 0700155, and follow the instructions, to lodge the tender through the blue LODGE A RESPONSE link

4. Evaluation of Tenders

4.1 General

- 4.1.1 Tenders will be assessed against the selection criteria listed below, which are not necessarily exhaustive, in order of significance or to be given equal weight.
- 4.1.2 The selection criteria for this RFT that do not relate to price will account for (50)% of the total evaluation score. The selection criteria for this RFT that relate to price will account for (50)% of the total evaluation score.
- 4.1.3 Information supplied by the tenderer in Part C will contribute to the assessment against each criterion. Tenderers are advised to respond clearly to all the selection criteria listed in this RFT.
- 4.1.4 If any criterion or sub-criterion is stated to be “mandatory” a failure by the Tender to fully comply with that criterion or sub-criterion will result in automatic exclusion of the Tender without further consideration. Mandatory criteria include those in which mandatory language such as “must” or “shall” is used.

4.2 Selection criteria

- (a) Price
- (b) Degree of compliance with functional requirements of the specification
- (c) Capacity to perform the agreement including:
 - (i) *Tenderers previous performance demonstrated by recent and successful supply of identical or similar equipment.*
 - (ii) *Demonstrated contract management/project management capability.*
 - (iii) *Tenderer's profile, infrastructure, engineering capacity and personnel.*
 - (iv) *Tenderer's Quality control procedures and Systems*
- (d) Proposed lead time and delivery of the unit and demonstrated ability to meet Tendered delivery times.
- (e) Life of vehicle consideration
 - (i) *Warranty, equipment reliability and on-going support*
 - (ii) *Demonstrated ability to meet the special needs of the NSWFB by reference to: effective vehicle design, reliable performance, high in-service availability, easy workshop maintenance and maximum safety protection to the fire fighters carried in the vehicle.*
- (f) Financial capacity and stability of tenderer.
- (g) Quality of Referee Reports.

- (h) Compliance with the proposed conditions of the agreement, as stated in Part D.
- (i) Compliance with NSW Government procurement policy and other applicable NSW Government policies, including:

- (a) OH&S

It is the tenderers responsibility to read in Part C policy considerations relevant to this RFT. Tenderers are required to respond to the policy questions provided in Part C.

- (j) Compliance with relevant legislation and standards.

5. PREPARATION OF TENDER - PRICE SCHEDULE

5.1 Price Schedule

5.1.1 Complete the Price Schedule at Part C Question 14.

5.2 Calculating the Tender Price

5.2.1.1 The Tender Price must:

- (a) be in Australian dollars;
- (b) cover all costs of performing the agreement, including packing and delivery (if applicable);
- (c) include Goods and Services Tax if it is payable and all other applicable taxes, duties and charges at the rates applicable at the Closing Date and Time for Tenders;
- (d) include all costs associated with the preparation and submission of the Tender;

5.3 Price Variation

5.3.1 The tenderer may determine the Tender Price on the basis of one of the three options below. The tenderer will be asked to indicate which option(s) is or are selected in Part C.

- (1) FIRM for the entire duration of the Contract including any optional extension periods; or
- (2) FIRM for the initial three (3) year period of the Contract, then subject to adjustment, in accordance with the provisions of clause 5.3.1.1 below, for any optional extension periods; or
- (3) FIRM for the first year of the Contract, then subject to adjustment, in accordance with the provisions of clause 5.3.1.1 below for the subsequent year and any optional extension periods.

5.3.1.1 Price Variation Formula

The price variation formula set out below is intended to cover offers whose content is sourced from Australia and up to three different overseas countries of origin.

Tenderers whose offer(s) contain no imported content (all-Australian content) need not concern themselves with any of the formula right of "AB1".

Tenderers whose offer(s) contain imported content from only one overseas country need not concern themselves with any of the formula right of "EA0".

Tenderers whose offer(s) contain imported content from only two overseas countries need not concern themselves with any of the formula right of "EB0".

Tenderers whose offer(s) contain imported content from three overseas countries will have to use the whole formula.

$$PP = TP \times \left[\frac{(LC \times AB_1)}{AB_0} + \frac{(IA \times YZ_1)}{YZ_0} \times \frac{(IB \times \frac{WX_1}{WX_0} \times \frac{EB_0}{EB}) + (IC \times \frac{UV_1}{UV_0} \times \frac{EC_0}{EC})}{EA} \right]$$

Where:

PP = **Price payable** at the time of delivery of the vehicle

TP = **Tendered price**

LC = Percentage of tender price representing local (Australian) content **expressed as a decimal. Local Content** includes:

- All Australian-sourced materials
- Costs directly associated with Australian sub-contracts
- Tenderer's costs including local labour, local freight and insurance, and administration
- Tenderer's profit

Tenderer to Nominate Local Content expressed as a decimal: _____

AB = Appropriate Australian Bureau of Statistics (Industry) Index used by the tenderer to calculate price movement of Local Content:

AB₀ = ABS index at time of tendering

Tenderer to nominate: ABS Index Used: _____
Index at time of tendering: _____

AB₁ = ABS index at time of delivery of the vehicle

IA = Percentage of tender price representing imported content from the first (if more than one) country of origin, expressed as a decimal

Tenderer to nominate: Country of Origin: _____
Imported Content expressed as a decimal: _____

YZ = ABS-equivalent Index in the first country of origin, used to determine price movement in the cost of the imported content:

YZ₀ = Country of origin's index at time of tendering

Tenderer to nominate: ABS Index Used: _____
Index at time of tendering: _____

YZ₁ = Country of origin's index at date of export

*

EA₀ = The exchange rate relevant to the imported content from the first country of origin, published in the Sydney Morning Herald at the base date (ie. seven days prior to close of tenders), expressed as "selling price \$A1.00 ="

Tenderer to nominate: the exchange rate used: _____
the base date: _____

EA = The exchange rate relevant at the date of payment by the Contractor for the imported content from the first country of origin, published in the Sydney Morning Herald, expressed as "selling price \$A1.00 ="

IB = Percentage of tender price representing imported content from the second (if more than one) country of origin, expressed as a decimal

Tenderer to nominate: Country of Origin: _____

Imported Content expressed as a decimal:_____

WX = ABS-equivalent Index in the second country of origin, used to determine price movement in the cost of the imported content:

WX₀ = Country of origin's index at time of tendering

Tenderer to nominate: ABS Index Used: _____
Index at time of tendering: _____

WX₁ = Country of origin's index at date of export

EB₀ = The exchange rate relevant to the imported content from the second country of origin, published in the Sydney Morning Herald at the base date, expressed as "selling price \$A1.00 ="

Tenderer to nominate : **the exchange rate used:** _____
the base date: _____

EB = The **exchange rate** relevant at the date of payment by the Contractor of the imported content from the second country of origin, published in the Sydney Morning Herald, expressed as "selling price \$A1.00 ="

IC = Percentage of tender price representing imported content from the third country of origin, * expressed as a decimal

Tenderer to nominate: **Country of Origin:** _____
Imported Content expressed as a decimal: _____

UV = ABS-equivalent Index in the third country of origin, used to determine price movement in the cost of the imported content:

UV₀ = Country of origin's index at time of tendering

Tenderer to nominate: **ABS Index Used:** _____
Index at time of tendering: _____

UV₁ = Country of origin's index at date of export

EC₀ = The exchange rate relevant to the imported content from the third country of origin, published in the Sydney Morning Herald at the base date, expressed as "selling price \$A1.00 ="

Tenderer to nominate : **the exchange rate used:** _____
the base date: _____

EC = The **exchange rate** relevant at the date of payment by the Contractor for the imported content from the third country of origin, published in the Sydney Morning Herald, expressed as "selling price \$A1.00 ="

Notes: LC + IA + IB + IC must equal 1.0

Tenderers are to provide documentation with their tenders verifying relevant indices and exchange rates used at time of tendering.

5.3.2 The price applicable to each order placed under the contract shall be the contract price rate as published by the Principal at the date the order is placed.

5.3.3 When claiming payment for variations in accordance with clause 5.3.1(ii) above, the Contractor shall provide the NSWFB evidence of:

(i) the level of the relevant Australian Bureau of Statistics (Industry) index applying at the date of completion of manufacture of the vehicle;

- (ii) the level of the relevant country-of-origin (Industry) index/indices applying at the date of export of the imported content and
- (iii) the exchange rate(s) relevant at the date of payment by the Contractor for the imported content

5.4 GST Free or Input Taxed Supplies

Tenderers must identify and state the value of any GST Free or Input Taxed Supplies to be made under the agreement.

5.5 Not Used

5.6 Not Used

5.7 Minimum Tender validity period

- 5.7.1 Tenders must remain open for acceptance for a period of at least six (6).months from the Closing Date and Time for Tenders. Tenderers must state in Part C if their Tenders will remain open for any longer period.

ANNEXURE 1 TO PART A

SPECIFICATION:

SEE CLASS 1 (4X4) HAZMAT TANKER SIX LOCKER SPEC V01.PDF ATTACHED

(NB: Specification is also attached as a zip file at Question 1.3 in Part C)

ANNEXURE 2 TO PART A

Other Information Supplied By The Board

PART B Tender Conditions -The Tender Process

6. Definitions of terms used in Parts A-C

6.1 Unless the context indicates otherwise, the following terms, where used in Parts A-C of this RFT, shall have the meanings set out below. Note the defined terms below will not all necessarily appear in this RFT.

“ABN” means an Australian Business Number as provided in the GST law.

“Addendum” means an addendum or addition to this RFT made by the Board before the Closing Date and Time under cl. 7.5.

“Alternative Tender” means a Non-Conforming Tender that is intended to offer a different method of meeting the object and intent of the Requirement.

“Board” means the State Contracts Control Board established under the *Public Sector Employment and Management Act 2002* whose responsibilities include:

- Inviting and accepting tenders;
- Determining the conditions under which tenders are invited or accepted;
- Entering into contracts on behalf of Departments and other public sector agencies ; and
- On-going contract administration and management,

and includes the duly authorised delegates of the Board, including officers of NSW Procurement – Contracting Services.

“Closing Date and Time” means the Closing Date and Time for receipt of tenders, specified on the cover sheet to this RFT.

“Code” means the NSW Government Code of Practice for Procurement as amended from time to time, together with any other codes of practice relating to procurement, including any amendments to such codes that may be applicable to the particular RFT. The code can be viewed and downloaded from:

http://www.treasury.nsw.gov.au/procurement/pdf/code_of_prac-curr.pdf

“Conforming Tender” means a Tender that:

- (a) conforms to the Requirement;
- (b) is in the prescribed form;
- (c) conforms to the terms and conditions of Part D, and
- (d) conforms to all of the other requirements of this RFT.

“Contractor” means the tenderer as a party to the proposed agreement.

“Deliverables” means the goods and services or goods or services sought under this RFT, as detailed in the Specification.

“Government Businesses” means in general, entities which:

- (a) have some form of public sector ownership;
- (b) are engaged in trading goods and/or services;

- (c) have a large measure of self sufficiency; and
- (d) are subject to Executive control.

In this context, the term Government business includes Public Trading Enterprises, State Owned Corporations and General Government Businesses.

“GST” is a goods and services tax and has the same meaning as in the GST Law.

“GST Free Supplies” and **“Input Taxed Supplies”** have the same meaning as in the GST Law.

“GST Law” means any law imposing a GST and includes *A New Tax System (Goods & Services Tax) Act 1999* (C'th) or if that Act does not exist, means any Act imposing, or relating, to a GST and any regulation made under those Acts.

“Late Tender” means a Tender received after the Closing Date and Time for tenders and includes a Tender, which is only partly received by the Closing Date and Time.

“Non-Conforming Tender” means a Tender that:

- (a) does not conform to the Requirement;
- (b) is not in the prescribed form;
- (c) does not substantially conform to any one or more of the terms and conditions of Part D, including a Tender which seeks to substantially qualify or amend these conditions, or
- (d) does not conform to any of the other requirements of this RFT.

“OHS&R” means occupational health, safety and rehabilitation.

“On Request Items” means any Deliverables nominated as On Request Items.

“Price” includes a price expressed as a lump sum or a rate per unit of quantity, calculated in accordance with cl.5.3.

“Price Schedule” means the list of Deliverables offered by the tenderer, together with the corresponding pricing information. The Price Schedule forms, or is to be attached to, Part C3 of the RFT.

“Principal” means the party named as Principal in the proposed agreement.

“Requirement” means the requirement for the Deliverables to be met by the Tender, outlined in cl.1 of the RFT and detailed in the Specification.

“RFT” means the Request for Tender.

“Specification” means the detailed description of the required goods and services or goods or services contained in Annexure 1 to Part A.

“NSW Procurement – Contracting Services” means a business unit of the NSW Department of Commerce representing the Board and authorised to arrange and administer contracts on behalf of the Board.

“Tender” means the offer to supply the Deliverables submitted in response to the RFT.

“Tender Price” means, in respect of each Deliverable offered, the Price nominated in the Price Schedule for that Deliverable.

7 Tender Process – General

7.1 Conformity of Tenders

- 7.1.1 The Board seeks Conforming Tenders.
- 7.1.2 Non-Conforming Tenders that do not include a fully completed Part C, in particular those Tenders which do not contain sufficient information to permit a proper evaluation to be conducted, or, in the case of electronic tenders, which cannot be effectively evaluated because the file is not in the required format, or is not prepared using the required software, or has become corrupt, may be excluded from the tender process without further consideration at the Board's discretion.
- 7.1.3 Tenderers may, if they choose, submit an Alternative Tender. Tenderers are encouraged to offer options or solutions that contribute to the Principal's ability to carry out its business in a more cost-effective manner.
- 7.1.4 Alternative Tenders will only be considered if submitted in conjunction with a Conforming Tender.
- 7.1.5 The Board may assess an Alternative Tender against the evaluation criteria where submitted with a Conforming Tender.
- 7.1.6 An Alternative Tender must be clearly marked "Alternative Tender".
- 7.1.7 The Board expressly reserves the right to accept, in its discretion, either or both of the following:
 - (a) Any Alternative Tender or part of an Alternative Tender, where submitted with a Conforming Tender; and
 - (b) Any other Non-Conforming Tender or part of a Non-Conforming Tender (not, in either case, being an Alternative Tender or part of an Alternative Tender) that, in the Board's opinion, is substantially a Conforming Tender.

7.2 Prescribed form of Tender

- 7.2.1 The Tender, including any Alternative Tender, must comprise a completed Part C and any attachments to Part C, as may be necessary. Any attachments should be labelled to identify those clauses of the RFT to which they relate.
- 7.2.2 The Tender will be taken to be for the supply of the Requirement on the terms and conditions stated in Part D except to the extent that these are amended by the Tender.

7.3 General instructions for completion of Tenders

- 7.3.1 Prices, responses and other information provided in the Tender are to be in writing and in English.
- 7.3.2 Tenderers must complete ALL of Part C of this RFT, as directed and must not amend any of the questions provided.
- 7.3.3 Tenderers should notify the Contact Officer in writing on or before the Closing Date and Time if they find any discrepancy, error or omission in this RFT.

- 7.3.4 All tenders must be provided in the TenderMax Pro format, using the DMax Lite software. The tender responses in Part C must be included in one or more files with an extension of *.dtr. The DMax Lite software is only supported on a Microsoft Windows 9X and above operating system; other operating systems are not compatible. Tenderers must ensure access to a Microsoft Windows compatible computer is used to prepare the tender.
- 7.3.5 Product samples, models and other supporting items that are required to be delivered must be identified in the tender and delivered in accordance with arrangements made with the Contact Officer before lodgement of tender.
- 7.3.6 Tenderers must ensure that all excel or word attachments can be opened and viewed by Microsoft Excel 2003 or Microsoft Word 2003. Other formats for the attachments are only to be submitted if an arrangement has first been made with the Contract Officer prior to lodgment of the tender.

7.4 Tenderers to inform themselves

- 7.4.1 Before submitting its Tender, a tenderer must:
 - (a) Examine all information relevant to the risks and contingencies and other circumstances having an effect on its Tender; and
 - (b) Satisfy itself:
 - (i) that the Tender, including the Tender Price is correct; and
 - (ii) that it is financially and practically viable for it to enter into and perform the proposed agreement.
- 7.4.2 The following must be considered:
 - (a) The eTendering system is at peak use on the morning prior to Tenders closing.
 - 1) Due to communication traffic via this means of communication it may take longer to lodge a Tender near Closing Date and Closing Time than at other times.
 - 2) When lodging through the NSW Department of Commerce *eTendering* website, it is recommended that a Tender be lodged well in advance of the Closing Date and Closing Time.
 - (b) The NSW Department of Commerce *eTendering* system may experience difficulties in accepting a large Tender. A tender lodged via the NSW Department of Commerce *eTendering* website should ideally be below 7 megabytes (MB) in total file size. Responses totalling more than 7MB may experience difficulties in lodgement. In this case Tenderers may break down the lodgement into smaller packages if clearly identified eg. package 1 of 3; 2 of 3; 3 of 3. A tenderer is referred to cl. 8.1.4(b) for instructions as to compressing electronically submitted Tenders.
 - (1) If submitting an electronic tender with supporting items:
 - a) The complete Tender, including the required supporting items unless otherwise directed, must be submitted by Closing Date and Closing Time, and

b) Supporting items should be clearly designated as “Supporting Items to...” the RFT to which they relate.

c) Supporting items not required to be lodged as part of the initial Tender by the RFT should not be lodged in the tender box, and arrangements should be made with the Contact Officer.

7.4.3 A tenderer is not required to provide multiple copies of a Tender. Any “Alternative Tender” under clause 7.1 must be attached to the Conforming Tender at Part C of this RFT.

7.4.4 If a tenderer provides multiple lodgements, the latest complete tender received in a NSW Department of Commerce Tender Box will be the tender evaluated.

7.5 Addenda to RFT

7.5.1 If, for any reason the Board, at its sole discretion, requires the RFT to be amended before the Closing Date and Time, an Addendum will be issued.

7.5.2 In each case, an Addendum becomes part of the RFT.

7.5.3 The Board, during the tender period may issue Addenda altering the RFT. In such cases, it is the obligation of the tenderer to verify if any addenda were issued prior to closing date, even if a tender has already been submitted. They must obtain a copy of all addenda as given in clause 7.5.4 or 7.5.5 as applicable.

7.5.4 Tenderers must check the web site address, <https://tenders.nsw.gov.au/commerce> and download the Addendum.

7.5.5 Failure to complete tender response 21.7 in Part C may result in your tender not being considered.

7.6 Late Tenders

7.6.1 In accordance with the requirements of the [NSW Government Code of Practice for Procurement](#), Late Tenders will not be considered except when the Board is satisfied that the delay is not the fault of the tendering party.

7.7 Extension of the Closing Date and Time

7.7.1 The Board may, in its discretion, extend the Closing Date and Time.

8. Tender Process – Submission of Tenders

8.1 Electronic Tenders to the NSW Department of Commerce *eTendering* website

8.1.1 A tenderer is required, to lodge its Tender electronically through the NSW Department of Commerce *eTendering* website at

<https://tenders.nsw.gov.au/commerce>. A tender submitted electronically will be treated in accordance with the *Electronic Transactions Act 2000* (NSW), and given no lesser level of confidentiality, probity and attention than Tenders lodged by other means.

- 8.1.2 A tenderer, by electronically lodging a Tender, is taken to have accepted conditions shown in the Conditions of Tendering and rules on the NSW Department of Commerce *eTendering* website.
- 8.1.3 A tenderer must follow the following directions:
- (a) RFT for which electronic lodgement is available through the website can be identified by the blue “Lodge a Response” link on the web pages for the RFT.
 - (b) To lodge a Tender electronically, the files containing the Tender Response must be up-loaded through the website. Access to the up-loading process is through the blue “Lodge a Response” link, then follow the steps and instructions on the NSW Department of Commerce *eTendering* website and any instructions which may have been supplied with the RFT.
- 8.1.4 A tenderer must observe the following format for lodgements:
- (a) An electronically lodged Tender must be lodged in a file format required by the RFT.
 - (b) If a tenderer compresses files, it must be possible to decompress them using WinZip. A tenderer must not submit self-extracting (*.exe) zip files.
 - (c) A tenderer must not change pre-existing text in the RFT other than to insert the required information.
 - (d) The file/s name/s must have an extension and not have invalid characters or file names/loading pathnames too long for the system, as detailed on the NSW Department of Commerce *eTendering* website
- 8.1.5 Signatures are not required for a Tender submitted to the NSW Department of Commerce *eTendering* website. A tenderer must ensure that a Tender is authorised by the person or persons who may do so on behalf of the Tenderer and appropriately identify the person and indicate the person's approval of the information communicated.
- 8.1.6 Electronically submitted Tenders may be made corrupt or incomplete, for example by computer viruses. The Board may decline to consider for acceptance a Tender that cannot be effectively evaluated because it is incomplete or corrupt. Note that:
- (a) To reduce the likelihood of viruses, a tenderer must not include any macros, applets, or executable code or files in a Tender.
 - (b) A tenderer should ensure that electronically submitted files are free from viruses by checking the files with an up to date virus-checking program before submission.
- 8.1.7 If a tenderer experiences any persistent difficulty with the NSW Department of Commerce *eTendering* website in submitting a Tender or otherwise, it is encouraged to advise the Contact Officer promptly in writing.
- (a) If there is a defect or failure of the NSW Department of Commerce *eTendering* website and the Board is advised, the Tender Closing Date and

Closing Time may be extended provided that, in the view of the Board, the tender process will not be compromised by such an extension.

9. Tender Process – Evaluation of Tenders

9.1 Variation of Tenders

- 9.1.1 At any time before the Board accepts any Tender received in response to this RFT, a tenderer may, subject to cl.9.1.2, vary its Tender:
- (a) by providing the Board with further information by way of explanation or clarification;
 - (b) by correcting a mistake or anomaly; or
 - (c) by documenting agreed changes to the Tender negotiated under cl.10.2 of this Part.
- 9.1.2 Such a variation may be made either:
- (a) at the request of the Board, or
 - (b) with the consent of the Board at the request of the tenderer;
- but only if,
- (c) in the case of variation requested by the tenderer under cl.9.1.1(a)-(b), it appears to the Board reasonable in the circumstances to allow the tenderer to provide the information or correct the mistake or anomaly; or
 - (d) in the case of variation under cl.9.1.1(c), the Board has confirmed that the draft-documented changes reflect what has been agreed.
- 9.1.3 If a Tender is varied in accordance with cl. 9.1.1(a) or (b), the Board will provide all other tenderers whose Tenders have similar characteristics with the opportunity of varying their Tenders in a similar way.
- 9.1.4 A variation of a Tender under cl. 9.1.1 will not be permitted if in the Board's view:
- (a) it would substantially alter the original Tender; or
 - (b) in the case of variation under cl.9.1.1(a) or (b), it would result in the revising or expanding of a Tender in a way that would give a tenderer an unfair advantage over other tenderers.

9.2 Corrupt or unethical conduct

- 9.2.1 If a tenderer, or any of its officers, employees, agents or sub-contractors is found to have:
- (a) offered any inducement or reward to any public servant or employee, agent or subcontractor of the Board, the Client Agency or the NSW Government in connection with this RFT or the submitted Tender;
 - (b) committed corrupt conduct in accordance with the provisions of the *Independent Commission Against Corruption Act 1988*, or

- (c) a record or alleged record of unethical behaviour,
- (d) not complied with the requirements of Commerce Business Ethics Statement available at:
<http://www.commerce.nsw.gov.au/About+Commerce/Business+ethics+statement/Business+ethics+statement.htm>

this may result in the Tender not receiving further consideration.

- 9.2.2 The Board may, in its discretion, invite a relevant tenderer to provide written comments within a specified time before the Board excludes the tenderer on this basis.

9.3 Exchange of information between government agencies

- 9.3.1 Lodgement of a Tender will itself be an authorisation by the tenderer to the Board to make available, on request, to any NSW government agency information, including but not limited to, information dealing with the tenderer's performance on any contract that may be awarded. Such information may be used by the recipient NSW Government agency for assessment of suitability for pre-qualification, selective tender lists, expressions of interest or the award of a contract or termination of contract.
- 9.3.2 The provision of the information by the Board to any other NSW Government agency is agreed by the tenderer to be a communication falling within section 22(1) of the *Defamation Act 1974* (NSW), and the tenderer shall have no claim against the Board and the State of New South Wales in respect of any matter arising out of the provision or receipt of such information, including any claim for loss to the tenderer arising out of the communication.
- 9.3.3 In the evaluation of Tenders, the Board may take into account any information about the tenderer that the Board receives from any source.
- 9.3.4 To avoid doubt, information that may be collected, exchanged and used in accordance with this provision includes "personal information" about the tenderer for the purposes of the *Privacy and Personal Information Protection Act 1998*. Lodgement of a Tender will be an authorisation by the tenderer to the Board to collect such information from third parties, and to use and exchange such information in accordance with this cl. 9.3.
- 9.3.5 The tenderer's attention is drawn to the *Freedom of Information Act 1989* which may confer rights, subject to the terms of that Act, to access, and to require the correction of, information held by certain agencies.
- 9.3.6 During the course of the agreement, the successful tenderer's performance will be monitored and assessed. Performance assessment reports, including substantiated reports of unsatisfactory performance, can be taken into account by NSW government agencies and may result in future opportunities for NSW government work being restricted or lost.

10. Outcomes

10.1 Acceptance or rejection of Tenders

- 10.1.1 The Board may accept all or any part or parts of any Tender or Tenders, including, in accordance with cl. 7.1, any Alternative Tender or other Non-Conforming Tender.
- 10.1.2 The Board is not bound to accept the lowest or any Tender.
- 10.1.3 If the Board rejects all the Tenders received it may:
 - (a) invite fresh Tenders based on the same or different criteria (specifications and details contained in Alternative Tenders will not be used as the basis for the calling of new Tenders), or
 - (b) conduct post-tender negotiations in accordance with cl. 10.3.

10.2 Negotiations before determination of outcome

- 10.2.1 Before making any determination as to acceptance or rejection of Tenders the Board may, at its discretion, elect to conduct limited negotiation with preferred tenderers, including those who have submitted Alternative Tenders or who have submitted substantially Conforming Tenders, to mutually improve outcomes.
- 10.2.2 The Board will generally not enter into negotiations on the standard conditions of contract contained in Part D.

10.3 Post Tender negotiations in the event all Tenders are rejected

- 10.3.1 If the Board rejects all Tenders on the basis that all Tenders are Non-Conforming, but considers that conformity with the requirements of this RFT is achievable, it may enter into negotiations with the least non-conforming tenderer with a view to achieving a Conforming Tender and entering into an agreement. If such negotiations are unsuccessful the Board may then enter negotiations with the next most acceptable tenderer. This process may be repeated with each of the rejected Tenders in order of potential acceptability. However, the Board is not obliged to enter into negotiations with any tenderer.
- 10.3.2 The purpose of the negotiations will be advised by the Board and made clear to the participants before the commencement of negotiation. Negotiations will not seek to play off tenderers' prices against other tenderers' prices.

10.4 Custody of Tenders after receipt

- 10.4.1 All tenders lodged are kept in a NSW Department of Commerce Tender Box, which is a secure tender box, until after the Closing Date and Closing Time.
- 10.4.2 Tenders lodged electronically to the NSW Department of Commerce Tenders website will be treated in accordance with the *Electronic Transactions Act 2000* (NSW) and given no lesser level of confidentiality, probity and attention than Tenders lodged by other means.
 - (a) On receipt of Tenders lodged electronically to the NSW Department of Commerce *eTendering* website, Tenders are encrypted and stored in a secure "electronic tender box."
 - (a) For reasons of probity and security, NSW Department of Commerce is prevented from interrogating the electronic tender box to ascertain whether

tenders have been received or for any reason, until after the Closing Date and Closing Time.

- (b) The e-mail receipt that is sent to the Tenderer after successfully up-loading and lodging the Tender electronically is the only evidence of Tender lodgement provided.

10.5 Ownership of Tenders

- 10.5.1 All Tenders become the property of the Board on submission.
- 10.5.2 The Board may make copies of the Tenders for any purpose related to this RFT.

10.6 Discontinuance of the Tender process

- 10.6.1 Where the Board determines that awarding a contract would not be in the public interest, the Board reserves the right to discontinue the tender process at any point, without making a determination regarding acceptance or rejection of Tenders.
- 10.6.2 The Board will not be liable for any losses suffered by a tenderer as a result of discontinuance of the tender process, including costs of tendering.

10.7 Notification of outcome

- 10.4.1 Following the Board's decision, all tenderers will be notified in writing of the outcome of their Tenders.

10.8 Complaints

- 10.8.1 It is the NSW Government's objective to ensure that industry is given every opportunity to win Government contracts. Should any entity feel that it has been unfairly excluded from tendering or unfairly disadvantaged by the Conditions in Part D or the Requirement, it is invited to write to:

Chairman, State Contracts Control Board
Level 22, McKell Building
2-24 Rawson Place
SYDNEY NSW 2000

10.9 Entry into agreement

- 10.9.1 The Board may enter into an agreement with the successful tenderer either by letter of acceptance or by execution of a formal agreement in terms of Part D. If the Board chooses to proceed by way of formal agreement it will indicate in any notification of acceptance that such acceptance will be formalised by execution of a formal agreement.

10.10 Disclosure of information concerning tenderers and outcome of the tender process

- 10.10.1 Details of tenderers and the outcome of the tender process may be disclosed in accordance with the NSW Government Tendering Guidelines, available at:
<http://www.dpws.nsw.gov.au/Government+Procurement/Procurement+Policy+Framework/NSW+Government+Tendering+Guidelines.htm>

An outline of these requirements can be found in Annexure 1 of Part B of this RFT.

10.11 Monitoring of Contractor Performance

- 10.11.1 During the course of the agreement the Contractor's performance will be monitored and assessed. For details refer to the NSW Government Procurement Guidelines on Service Provider performance management which is available on request from the Contact Officer, the NSW Department of Commerce or can be viewed and downloaded from

<http://www.ogp.commerce.nsw.gov.au/NR/rdonlyres/eucuz2722gdb54776cyhkw7ntoj4cpiw5iga5ztwvtvjethi2xjujwd4zrgsfte4cye7lgoqtlf4wxywdioutedaph/Service+Provider+Performance+Management.pdf>

- 10.11.2 The terms and conditions of the proposed agreement, set out in Part D, detail the performance criteria to be applied in the monitoring of Contractor performance.

ANNEXURE 1 TO PART B (Disclosure of Information)

Disclosure of information concerning tenderers and outcome of the tender process

1. In accordance with the NSW Government Tendering Guidelines referred to in clause 10.10.1 and found at <http://www.dpws.nsw.gov.au/Government+Procurement/Procurement+Policy+Framework/NSW+Government+Tendering+Guidelines.htm>, the following **tender information** is required to be disclosed -

Tender Type	Level of disclosure	Basis of disclosure
For all public calls for tender, expressions of interest or other such public calls which may result in a contract with the private sector.	As a minimum: a concise description of the proposed works, goods or services the subject of the tender call; the date responses to the tender call close and where responses are lodged; and location of the tender call documents. The names and addresses of all entities which submit responses.	Routine public disclosure at the time tender calls are advertised. Routine public disclosure within 7 days of the date tender calls closed.
In a multi-stage tender process.	The names and addresses of the shortlisted entities, except where such disclosure is likely to compromise the competitiveness of the subsequent tender process.	Routine public disclosure within 7 days of these entities being advised of their shortlisting.

2. In accordance with the NSW Government Tendering Guidelines referred to in clause 10.10.1 above, the following **contract** information is required to be disclosed -

Contract size and type	Level of disclosure	Basis of disclosure
Class 1 contracts All government contracts with estimated value \$150,000 or above).	(a) The name and business address of the contractor; (b) Particulars of any related body corporate (within the meaning of the Corporations Act 2001 of the Commonwealth) in respect of the contractor, or any other private sector entity in which the contractor has an interest, that will be involved in carrying out any of the contractor's obligations under the contract or will receive a benefit under the contract; (c) The date on which the contract became effective and the duration of the contract; (d) Particulars of the project to be undertaken, the goods or services to be provided or the real property to be leased or transferred under the contract; (e) The estimated amount payable to the contractor under the contract; (f) A description of any provisions under which the amount payable to the contractor may be varied;	Routine public disclosure within 60 days after the contract becomes effective.

	(g) A description of any provisions with respect to the renegotiation of the contract; (h) In the case of a contract arising from a tendering process, the method of tendering and a summary of the criteria against which the various tenders were assessed; and (i) A description of any provisions under which it is agreed that the contractor is to receive payment for providing operational or maintenance services.	
Class 2 contracts Class 1 contracts (i.e government contracts with estimated value \$150,000 or above) which also: - result from a direct negotiation where there has not been a tender process; or - have been the subject of a tender process and where the final contract terms and conditions are substantially negotiated with the successful tenderer (this includes alliance type contracts); or - involve operation or maintenance obligations for 10 years or longer; or - involve a privately financed project as defined by relevant Treasury guidelines; or - involve a transfer of land or other asset to a party in exchange for the transfer of land or other asset to an agency.	The information required for class 1 contracts and (a) Particulars of future transfers of significant assets to the State at zero, or nominal, cost to the State, including the date of their proposed transfer; (b) Particulars of future transfers of significant assets to the contractor, including the date of their proposed transfer; (c) The results of any cost-benefit analysis of the contract conducted by the agency; (d) The components and quantum of the public sector comparator if used; (e) Where relevant, a summary of information used in the contractor's full base case financial model (for example, the pricing formula for tolls or usage charges); (f) Where relevant, particulars of how risk, during the construction and operational phases of a contract to undertake a specific project (such as construction, infrastructure or property development), is to be apportioned between the parties, quantified (where practicable) in net present-value terms and specifying the major assumptions involved; (g) Particulars as to any significant guarantees or undertakings between the parties, including any guarantees or undertakings with respect to loan agreements entered into or proposed to be entered into; and (h) Particulars of any other key elements of the contract.	Routine public disclosure within 60 days after the contract becomes effective.
Class 3 contracts Class 2 contracts where the estimated value of the government contract is \$5 million or more.	The information for class 1 and 2 contracts and the complete contract, less confidential information. Note: if some or all of a class 3 contract is not disclosed for reasons of confidentiality, the agency is to disclose: - the reasons for not publishing the contract or provisions; - a statement as to whether the contract or provisions will be published and, if so, when; and - where some but not all of the provisions of the contract have been disclosed, a general description of the types of provisions that have not been published.	Routine public disclosure within 60 days after the contract becomes effective.

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3. Requests for disclosure of additional contract information

Tenderers must acknowledge that any person may make a specific request to the State Contracts Control Board for any item of contract information contained in schedules 1 or 2, or for a copy of a contract, which is not required to be routinely disclosed under section 15A of the FOI Act. The State Contracts Control Board must provide the requested contract information or the requested copy of the contract to the requesting person (less any confidential information) within 60 days of receiving the request.

Where a copy of a contract has been requested and some or all of the contract is not provided for reasons of confidentiality, the State Contracts Control Board will disclose:

- the reasons for not providing;
- a statement as to whether the contract or provisions will be provided and, if so, when; and
- where some but not all of the provisions of the contract have been provided, a general description of the types of provisions that have not been provided.

4. Disclosure of amendments or variations to contract information under the FOI Act

The FOI Act requires that, if there is an amendment to the contract terms or a material variation made under the contract that changes information already routinely disclosed under the FOI Act, the State Contracts Control Board must ensure that the information concerning the change is routinely disclosed within 60 days after such amendment or variation becomes effective, less any confidential information. In the case of class 3 contracts, the full amendment or material variation, less any confidential information, must be disclosed within the 60 day timeframe.

5. Confidential information

None of the disclosure obligations contained in the FOI Act, or the requirements for disclosing tender information or a copy of a contract or information in relation to a contract under these guidelines, require the disclosure of:

- the commercial-in-confidence provisions of a contract (as defined in schedule 3 to the Freedom of Information Act) (the contractor's financing arrangements; the contractor's cost structure or profit margins; the contractor's full base case financial model; any intellectual property in which the contractor has an interest; or any matter whose disclosure would place the contractor at a substantial commercial disadvantage in relation to other contractors or potential contractors, whether at present or in the future.);
- details of any unsuccessful tender;
- any matter that could reasonably be expected to affect public safety or security; or
- information which would be exempt from disclosure if it were the subject of an application under the Freedom of Information Act.

Where such confidential information is withheld, the State Contracts Control Board must inform the requesting person that access to that information may be sought in accordance with the Freedom of Information Act. This will enable a person seeking the information to have the appeal rights available under the Freedom of Information Act.

6. Tenderers are invited to nominate items they consider are confidential and why.



SPECIFICATION

CLASS ONE (4X4) HAZMAT TANKER

SIX LOCKER

**ENG 00135
VERSION 01**

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Volt) Wiring, Control and Monitoring Circuits**Annex C NSWFB Reference Drawings****Annex D Code of Practice - Automotive Mobile Radio Installation (OS-E-95/03)****Annex E Delivery Handover Sheet - Class 1 (4x4) Hazmat Tanker Six Locker****Annex F Vehicle Information Data Sheets****Annex G Class 1 (4x4) Hazmat Tanker Six Locker Vehicle Inventory****Annex H Class 1 (4 x 4) Hazmat Tanker Six Locker Stowage Layout****Annex I External Signs and Labels**

ABBREVIATIONS

	DESCRIPTION		DESCRIPTION
4WD	Four Wheel Drive	ISO	International Standards Organisation
ACS	Auxiliary Control System	LED	Light Emitting Diode
ADR	Australian Design Rules	LP	Long-term Paint (protection plan)
AIRAH	Australian Institute of Refrigeration Air-conditioning and Heating	NB	Nominal Bore
		NS	Near Side (on left looking from rear)
AS	Australian Standard	NSW	New South Wales
BA	Breathing Apparatus	NSWFB	New South Wales Fire Brigade
BCC	Body Control Console	OEM	Original Equipment Manufacturer
CB	Citizen Band (radio)	OS	Off Side (on right looking from rear)
CPS	Cabin Protection System	PPE	Personal Protective Equipment
CPCV	Cabin Protection Control Valve	PTO	Power Take Off
COP	Code of Practice	RF	Radio Frequency
EAC	Electrical Auxiliary Compressor	RP	Rear Panel
EWS	Emergency Warning System	RTA	Roads and Traffic Authority (of NSW)
GOM	Gross Operational Mass	SAA	Standards Association Australia
GRN	Government Radio Network	SCBA	Self Contained Breathing Apparatus
GRP	Glass Reinforced Plastic	SI	Systems International
GVM	Gross Vehicle Mass	SWL	Safe Working Load
HVAC	Heating, Ventilation & Air Conditioning	UHF	Ultra High Frequency
IP	International Protection (ratings)	UV	Ultra Violet

GLOSSARY OF TERMS

Appliance	a purpose designed vehicle for fire service emergency incidents.
Auxiliary Control System (ACS)	a system of integrated units providing control, switching, power distribution and circuit protection for auxiliary electrical equipment. NOTE: The ACS is segregated from the cab/chassis electrical system for easy maintenance and fault finding.
Body Control Console (BCC)	Controls for pump operation and ancillary electrics.
Conspicuity	external vehicle finish which displays as an emergency vehicle (e.g. retro-reflective tape, emergency lights).
Effective service life	the length of service for a vehicle e.g 15 years.
Emergency Warning System (EWS)	vehicle warning system comprising of emergency lights, siren unit and speaker/s and associated switching controls.
Equivalent	having the same fit and function.
Fully laden	the vehicle having all equipment stowed and operating fluids (e.g. water, fuel, oils) full, but no crew.
Fully operational	the vehicle is ready for operation including all equipment stowed, all crew members seated and operating fluids (e.g. water, fuel, oils) full.
Gross Operating Mass (GOM)	the mass of the vehicle when fully operational.
Gross Vehicle Mass (GVM)	the maximum permissible (legal or rated) mass of the vehicle.
Light Emitting Diode (LED)	Light emitting diodes used for various electronic displays and indications. e.g. warnings and equipment operation.
Manufacturer	the company having the responsibility of manufacturing the complete vehicle (i.e. the contractor).
Near Side (NS)	left side of the vehicle when looking forward (i.e. kerbside).
Noise level	the level of sound whether wanted or unwanted (refer also to 'A-weighted noise exposure' definition in AS 1269.1).
Off Side (OS)	right side of the vehicle when looking forward (i.e. roadside).
Original Equipment Manufacturer (OEM)	the recognised manufacturer of individual equipment (at component level).
Rear Panel (RP)	the rear facing section or sections at the rear of an appliance.
Retro-reflective	material where light is reflected from various sources back to an observer.
Strobes	are lights which emit a high intensity and high frequency flashing light to attract attention from a long distance.

PART 1 GENERAL REQUIREMENTS

1.1 Scope

- 1.1.1 The Class 1(4x4) Hazmat Tanker is based on a 4x4 cab/chassis seating six (6) personnel including the driver and having a six (6) locker stowage configuration (refer to Annex H).

1.2 Function

- 1.2.1 The Class 1(4x4) Hazmat Tanker (referred to in this specification as 'the vehicle'), is a specialised appliance designed to provide fire fighting support at structure fires, hazmat and rescue incidents, bush and grass fires.
- 1.2.2 The vehicle must be capable of deployment in cross country operations in addition to traversing unmade, made and sealed surface roads.
- 1.2.3 The pump shall be fitted to facilitate continuous pump and roll operation independent of the vehicle's drive line.

 NOTE

NSWFB pump and roll operations are conducted with the operators walking adjacent to the vehicle.

1.3 Overall Requirements

- 1.3.1 Notwithstanding the NSWFB requirements for an appropriate cab/chassis to carry the vehicle body, the following overall parameters are required for the completed and fully laden vehicle (refer to definitions of dimensions in Annex F):
- (a) overall height - 3,100mm (max);
 - (b) overall length - 7,900mm (max);
 - (c) overall width (excluding mirrors) - 2,500mm (max);
 - (d) wheelbase - 4,300mm (max);
 - (e) clearance height under body - 450mm (min);
 - (f) clearance height under differential - 240mm (min);
 - (g) entry angle - 30° (min);
 - (h) exit angle - 20° (min);
 - (i) ramp angle of 22° (min);

- (j) wall to wall turning circle diameter (left and right arcs) - 20,200mm (max);
- (k) minimum static roll over threshold of 30°.

- 1.3.2 A power to weight ratio of at least 12.5kW per tonne minimum is preferred.
- 1.3.3 The vehicle shall be designed to ensure a minimum effective service life of 15 years.
- 1.3.4 Maximum safety protection to the end-user (refer to section 1.7 and simplified workshop maintenance shall be provided (refer to section 2.10).
- 1.3.5 The Gross Operating Mass (GOM) of the fully operational vehicle shall not exceed 100% of the Gross Vehicle Mass (GVM).
- 1.3.6 All signs, labels and markings shall be suitable for the application including resistance to weathering, heat, solvents and UV exposure and shall be permanently fixed.

 NOTE

Labels must use a heavy duty adhesive layer which is resistant to peeling and lifting. The NSWFB prefers the labels to be engraved, etched or embossed.

- 1.3.7 All signs, labels and markings shall comply with AS 1319 whether mounted internally or externally, and all other signs shall comply with the principles outlined in this standard.

 NOTE

Final positioning of all signs is to the determination of the NSWFB.

1.4 Rules and Regulations

- 1.4.1 The vehicle must comply with:
 - (a) all relevant NSW statutory requirements;
 - (b) all relevant statutory requirements for electrical installations;
 - (c) all relevant ADRs applicable at the time of the complete vehicle manufacture;
 - (d) all NSWFB Code of Practice (COP) documents which are provided as annexes to this specification;
 - (e) any other Act, regulation or standard which is relevant to the vehicle and/or its operating equipment at the time of complete vehicle manufacture.

- 1.4.2 Compliance plates (including the second stage manufacturer) shall be affixed to each vehicle detailing the relevant ADRs which are applicable to the complete vehicle and shall be certified by an RTA listed engineer who is approved to certify such work for the purposes of vehicle registration.

1.5 Rust and Corrosion Protection

- 1.5.1 Corrosion protection should last for 15 years minimum.
- 1.5.2 Rust and corrosion protection for the cab/chassis shall conform to an appropriate standard and accepted industry practices.
- 1.5.3 Rust and corrosion protection for the body shall conform to Australian Standard AS 2312, with atmospheric classification of Industrial (ISO category 3, 4).
- 1.5.4 The vehicle shall be constructed so that metals in contact have a potential difference no greater than 0.25V.
- 1.5.5 There should be no face-to-face contact between dissimilar metals or other incompatible materials which may be chemically or electrically reactive.
- 1.5.6 For electroplated components the potential difference between the plating metal and the base metal shall not exceed 0.4V.

1.6 Time Sensitivity Compliance

- 1.6.1 Embedded chip-sets shall not be susceptible to malfunctioning due to date or time sensitivity and shall be certified (prior to vehicle construction) as compliant.

1.7 Occupational Health and Safety (OHS)

- 1.7.1 Nothing in this specification shall be construed to waive or modify any obligations imposed by the Occupational Health and Safety Act 2000 and the Occupational Health and Safety Regulation 2001, or any associated legislation or standards which are requested by the Act and Regulation.
- 1.7.2 The following OHS issues must be addressed when designing the vehicle:
- (a) possible injury from inappropriately placed valves, switches and connectors;
 - (b) physical characteristics of users, e.g. the stature and position of an operator relative to the equipment;
 - (c) control and monitoring devices shall be ergonomically designed and not exacerbate fatigue, confusion or error, and shall be readily accessible and visible to the operator;

- (d) manual handling, including lifting, bending, pulling or stretching as may be required to access or stow equipment;
- (e) noise levels.

1.7.3 The NSWFB requires copies of documentation for hazard identification, risk assessment and risk control associated with the completed appliance and all associated equipment from all designers, manufacturers and suppliers.

1.8 Standards, Regulations and Reference Documents

1.8.1 All units of measurement shall be stated in accordance with the metric system (SI) as accepted in Australia.

1.8.2 Notwithstanding the requirements detailed by this specification, the latest version of the following documents shall be complied with where appropriate:

- (a) AS 1100.101-401, 1992-1994 & amds., - Technical drawing;
- (b) AS 1101.1, 1993 & 1101.3, 2005 - Graphic symbols for general engineering;
- (c) AS 1102.101-113, 1995-1997 - Graphic symbols for electro technology;
- (d) AS 1269 set, 2005 - Occupational noise management;
- (e) AS 1319, 1994 - Safety signs for the occupational environment;
- (f) AS 1470, 1986 - Health and safety at work - principles and practices;
- (g) AS 1554.1, 2004 & amds., 2005 - Structural steel welding (SAA Structural Steel Welding Code) - Welding of steel structures;
- (h) AS 1627.0-9, 1997-2005 - Metal finishing, preparation and pre-treatment of metal surfaces;
- (i) AS 1657, 1992 - Fixed platforms, walkways, stairways and ladders - Design, construction and installation;
- (j) AS 1665, 2004 - Rules for the welding of aluminium structures (SAA aluminium welding code);
- (k) AS/NZS 2080, 1995 & amdt., 1 1996 - Safety glass for land vehicles;
- (l) AS 2312, 2002 & amdt., 2004 - Guide to the protection of iron and steel against exterior atmospheric corrosion;
- (m) AS 4100, 1998 - Steel structures;
- (n) Australian Institute of Refrigeration Air Conditioning & Heating (AIRAH) Handbook;

- (o) National Standard for Manual Handling (NOHSC: 1001 -1990) and National Code of Practice for Manual Handling (NOHSC: 2005 - 1990);
- (p) NSW Occupational Health and Safety Act 2000;
- (q) NSWFB Code of Practice - Automotive Electrical Systems, Extra Low Voltage (10 - 32 Volt), OS-E-94/01-004216 (Annex B to this Specification);
- (r) NSWFB Code of Practice for Automotive Radio Installation OS-E-95/03 (Annex D to this Specification);
- (s) The National Code of Practice - Heavy Vehicle Modifications (seat belts) VSB6;

PART 2 CHASSIS & CABIN

2.1 Chassis

2.1.1 General

- 2.1.1.1 The vehicle shall be based on a cab chassis with a 4x4 axle configuration suitable to stand fully laden throughout its effective service life.
- 2.1.1.2 The nominal weight of equipment is 1495kg plus personnel of 600kg.
- 2.1.1.3 Chassis rails which have been reinforced shall be sealed to prevent the ingress of water between the mated sections.

2.1.2 Chassis Modification

- 2.1.2.1 Where chassis modification is required to meet this specification, written proof shall be supplied to the NSWFB of compliance approvals from the vehicle manufacturer prior to any modification work being carried out.
- 2.1.2.2 Any cab/chassis modification work shall be carried out by either the manufacturer or an OEM approved subcontractor, and all relevant vehicle model specifications shall be maintained.
- 2.1.2.3 The cab/chassis OEM must approve modification work undertaken by the subcontractor and written proof shall be provided to the NSWFB.
- 2.1.2.4 The chassis rails shall be protected from rust and other forms of corrosion by the application of an inhibitor and paint protection (refer to section 1.8.2 (l)), giving particular attention to areas where modification has been undertaken.

NOTE

The NSWFB may appoint an independent representative to inspect any work performed by the vehicle manufacturer or the subcontractors.

2.1.3 Towing

- 2.1.3.1 Four (4) towing hooks shall be fitted to the vehicle, two (2) at the front and two (2) at the rear.
- 2.1.3.2 All towing hooks shall be positioned and rated to ensure that the vehicle can be recovered from uneven ground without obstruction (e.g. cabin, body or plumbing).

NOTE

Towing hooks are primarily used for vehicle recovery purposes.

- 2.1.3.3 A permanent label shall be fitted above each hook and shall indicate the Safe Working Load (SWL) and maximum pull angles in relation to the vehicle's longitudinal centre line.

2.1.3.4 The SWL shall be confirmed in writing by the cab/chassis OEM and provided with the first vehicle.

2.1.3.5 Rectangular clips shall be provided with each hook to prevent loss of towing line/chain.

2.1.4 Under Vehicle Protection

2.1.4.1 Off road mechanical protection (e.g. bash plate) shall be fitted to the underside of the front chassis to provide protection to cab/chassis components (e.g. axle, steering, suspension) during off road use.

2.1.4.2 The cab/chassis manufacturer shall approve in writing the installation of the off road under chassis protection onto the vehicle.

2.1.4.3 Critical brake, fuel and electrical components including those items of the cabin protection (CPS) shall be protected from fire under run by thermal lagging material.

NOTE

Critical components are those necessary for the vehicle to remain mobile and controllable and the pump able to operate (the NSWFB prefers engine stop motor covers, fuel/water separator covers and hose/pipe covers from *Parker Hannifin Corporation*).

2.2 Engine

2.2.1 General

2.2.1.1 The vehicle shall be fitted with a diesel engine.

2.2.1.2 The vehicle shall have sufficient power and torque to allow the completed vehicle to meet the road performance requirements as specified in section 2.3.5 of this specification.

2.2.2 Engine Cooling

2.2.2.1 The engine's cooling system shall be designed to allow the vehicle to operate at full capacity in an ambient air temperature of 50°C for a minimum of eight (8) hours without overheating.

2.2.2.2 Where fitted, auxiliary heat exchangers and fittings shall be constructed from stainless steel, and shall be approved for installation by the engine manufacturer.

2.3 Drive Line

2.3.1 Manual Transmission

The vehicle shall be fitted with a manual transmission (gearbox) and syncromeshed gears.

 NOTE

Non-synchromesh first gear will be accepted.

2.3.2 Transfer Case

2.3.2.1 A two (2) speed transfer case (high/low ratios) shall be fitted to the driveline.

2.3.2.2 A warning light shall be installed on the dash panel to indicate when Low range has been selected.

2.3.3 Driveshaft Protection

2.3.3.1 A steel encircling loop (safety guard) of minimum section 30mm x 6mm shall be provided and fitted around the driveshaft/s towards their front, so that should the front driveshaft coupling fail, the driveshaft will not contact the ground.

 NOTE

The encircling loop must not deny access to any maintenance or lubrication points.

2.3.4 Electronic Control Units

Electronic control and/or management systems shall be guaranteed not to be adversely affected by RF radiation at airports or other extraneous RF fields e.g. boosted cellular phones, two-way radios, strobe lights or radar, and shall meet the following minimum requirements:

- (a) resistance to electromagnetic interference of 100mV/m (10kHz-1GHz);
- (b) vibration resistance 10g (10Hz-1kHz);
- (c) ambient temperature range -10°C to +45°C;
- (d) environment protection degree IP66.

2.3.5 Road Performance

2.3.5.1 The vehicle shall meet the following performance requirements on a dry, level sealed surface and when fully operational with crew and equipment:

- (a) an attainable speed of 100km/h;

- (b) the vehicle (with the engine at operating temperature) shall maintain the following speeds on up hill sections:

65km/h	for a 1:25 gradient
45km/h	for a 1:20 gradient
35km/h	for a 1:15 gradient
25km/h	for a 1:10 gradient
10km/h	for a 1:5 gradient

- (c) from a standing start (with the engine at operating temperature), the vehicle shall attain minimum speeds of:

35km/h within	12.0secs
60km/h within	30.0secs
80km/h within	40.0secs
100km/h within	60.0secs

- 2.3.5.2 A certificate shall be provided to the NSWFB (refer to clause 6.12.2.2 detailing the vehicle's performance at the expected GOM (e.g. a vehicle performance scan).

 NOTE

The NSWFB may have a third party assess the suitability of the proposed engine and transmission configuration.

- 2.3.5.3 The first completed vehicle shall have a dynamometer test to establish the driveline performance of each vehicle (refer to clause 6.12.2.2).

2.4 Suspension

The suspension shall provide good stability and response to handling under any situation, including off road usage, heavy acceleration, hard cornering, braking, and negotiating of traffic calming devices (i.e. speed humps and median strips) as would be expected under emergency service response conditions.

 NOTE

The suspension is expected to maintain original performance over the entire service life of the vehicle with appropriate maintenance.

 NOTE

Anti-roll suspension is preferred.

2.5 Steering

- 2.5.1 The vehicle shall be fitted with a power steering system.
- 2.5.2 The steering shall remain stable under all operating conditions including emergency lane changing, acceleration, braking, cornering and off-road conditions.
- 2.5.3 All completed vehicles shall have the steering system and wheel alignment certified as being within the cab/chassis manufacturer's specification and appropriate for Australian road conditions.

 NOTE

The wheel alignment should be adjusted with the water tank full.

2.6 Wheels and Tyres

- 2.6.1 Six (6) disc type wheels complete with tyres shall be fitted on the vehicle.
- 2.6.2 One (1) spare disc type wheel shall be provided to the NSWFB with each vehicle.

 NOTE

The spare wheel is not carried on the vehicle.

 NOTE

The NSWFB requires a cost option to supply spare wheels.

- 2.6.3 The rims shall be ISO eight (8) stud tubeless type or an equivalent alternative approved by the NSWFB.
- 2.6.4 The wheels shall include easy access to all tyre inflation valves from the outside of the vehicle and shall be provided with either long tube valves or extension tubes.
- 2.6.5 All tyre inflation valves shall be fitted with sealing caps coloured safety yellow.
- 2.6.6 With the tyres fitted a minimum road clearance of 240mm to the ground shall be maintained under the bowl of the differential and the lowest part of the front subframe and axle assembly.
- 2.6.7 Engraved decals are to be placed on the front and rear mud guards stating the recommended tyre pressures and wheel nut torque tension.

2.6.8 Wheel Mist/Spray Suppression

Suppression material shall be fitted around the interior edge of the mudguards to minimise the mist and spray generated by the tyres on a wet road surface, thus improving visibility for other road users.

NOTE

The material should be non-flammable and must not be unaffected by radiant heat (refer also to 4.3.6.1) Materials consisting of multiple strands of filaments are not considered suitable because of their tendency to trap burning embers.

2.7 Brake System

2.7.1 General

The vehicle shall be fitted with an air or air-over-hydraulic service brake system and a park brake system complying with ADR.

2.7.2 Compressed Air System

2.7.2.1 Loss of air pressure over a 24 hour period shall not exceed 200kPa, without back up air from any compressor.

2.7.2.2 The compressed air system shall be provided with a suitable engine driven air compressor and air storage tanks of adequate volume to supply both the vehicle and the compressed air outlet simultaneously.

2.7.2.3 A compressed air outlet shall be fitted in an easily accessible position with a quick release female adaptor (*CEJN* 320 series or equivalent) and shall operate only when the vehicle engine is running and the air pressure is 600kPa (6 bar) or over.

2.7.2.4 A 10m pressure line complete with male quick release adaptor (*CEJN* 320 series or equivalent), tyre inflation valve and pressure gauge shall be provided.

2.7.2.5 Worm drive hose clamps are not permitted.

2.7.2.6 Where compressed air hose lines are joined, permanently crimped or swaged hose ends and tapered seats shall be used.

2.7.3 Air Storage Tanks

The vehicle's air storage tanks shall be installed with:

- (a) a wet tank (for initial air reception from the compressor) fitted with an automatic moisture drain valve;
- (b) an air hold back valve rated at 70% of stored air tank pressure;

- (c) an efficient air drier, *NABCO* or equivalent

2.8 Intake and Exhaust

- 2.8.1 Should there be a need to modify the existing intake and/or exhaust system of the cabin/chassis, this shall be carried out in accordance with the OEM standard and quality of workmanship.
- 2.8.2 The intake shall be designed to restrict any ingestion of water or burning embers.
- 2.8.3 The exhaust discharge shall be directed away from the cabin openings, operating panels, bodywork and equipment and shall exit to the outside of the vehicle while keeping the top deck clear of exhaust emissions.
- 2.8.4 The exhaust outlet shall be positioned at the lowest permissible height above the cabin.
- 2.8.5 The exhaust system shall be fitted with a spark arresting device.

2.8.6 Heat Shields

- 2.8.6.1 Adequate heat shields shall protect be provided to all points near the exhaust system where cables, hoses, wiring or components could suffer heat damage.
- 2.8.6.2 Exposed parts of the exhaust system shall be suitably guarded to prevent personnel receiving burns.
- 2.8.6.3 The exhaust system shall be insulated from heat transfer and shall keep the walls of the lockers below 55°C.
- 2.8.6.4 A **HOT EXHAUST** warning marking shall be fitted in a prominent position adjacent to the exhaust (refer to clause 1.3.7).

2.9 Fuel System

- 2.9.1 The vehicle fuel tank shall have a minimum useable capacity capable of providing eight (8) hours continuous operation under all operating conditions (including operation of the auxiliary diesel engine - refer to section 3.2).
- 2.9.2 Fuel tanks shall not be painted internally.
- 2.9.3 A fuel tank shall be fitted in an easily accessible position and shall have a large diameter fuel tank cap complete with fusible plugs and attached by a securing chain.

NOTE

The fusible plugs must allow the tank to vent when exposed to flames.

- 2.9.4 The fuel tank shall be fitted with a second fuel supply outlet to supply the auxiliary diesel engine (refer also to clause 3.2.8 and 3.2.9).

 NOTE

Pick up to be located centrally in the fuel tank to overcome loss due to road slope.

- 2.9.5 A DIESEL FUEL ONLY label shall be fitted adjacent to the fuel tank inlet filler [refer also to clause 1.8.2(e)].
- 2.9.6 All fuel lines shall be of a non corrosive metal, excepting where flexibility is required and flame resistant silicone or similar materials may be used.

2.10 Routine Maintenance

- 2.10.1 Routine maintenance points including engine and transmission oil levels, radiator coolant, windscreen washer tank and batteries shall be readily accessible without the need for any tools.
- 2.10.2 Adequate engine accessibility shall be provided to allow all repair and maintenance operations on and about the engine to be readily performed, and accessibility to all filters shall be ensured.

 NOTE

Remote filters may need to be fitted.

- 2.10.3 Oil fill, lubrication and service/inspection points rendered inaccessible by bodywork, shall be extended to the nearest appropriate access point.
- 2.10.4 Where applicable, removable covers and hatches allowing ease of access to spring hangers, pins and bushes shall be provided, and shall be sealed to prevent the ingress of moisture.
- 2.10.5 Any changes to the OEM positions of the items detailed in clauses 2.10.1 to 2.10.4 inclusive, shall be approved in writing by the OEM and submitted to the NSWFB prior to implementation.
- 2.10.6 All engine oil drain plugs (including auxiliary diesel engine) shall be **Sump Ace** plugs or equivalent and fitted with dust caps.
- 2.10.7 All other oil drain plugs shall be magnetic e.g. transmission, differentials and transfer case.

2.11 Crew Cabin

2.11.1 Cabin Structure

- 2.11.1.1 The cabin shall be a forward control design crew cabin fitted with laminated and tinted windscreen glass.
- 2.11.1.2 Cabins employing forward tilt for engine access shall have a minimum tilting angle of 35° and shall be tilted by an automatic cabin tilt motor capable of tilting the estimated cabin load once fitted out.
- 2.11.1.3 The cabin shall be designed to provide passengers with maximum roll over protection.
- 2.11.1.4 The cabin layout shall reflect sound ergonomic practice with due allowance for fire fighter comfort.

 NOTE

The cabin layout must be approved by the NSWFB Engineering Services Unit prior to manufacture.

- 2.11.1.5 The minimum clearance from the seat pad to the roof shall not be less than 1000mm.
- 2.11.1.6 A step and grab handle shall be fitted for cleaning the front windscreen.

2.11.2 Access Steps

- 2.11.2.1 The cabin shall be designed to meet OHS requirements with regard to cabin access, with particular emphasis being placed on the cabin access steps.

 NOTE

All access steps will be used by operators wearing Personal Protective Equipment (PPC/PPE).

- 2.11.2.2 Adequate handrails and/or grab handles shall be fitted and painted in safety yellow.

 NOTE

Final positioning is to the determination of the NSWFB.

- 2.11.2.3 All access handles and access step edges shall be coloured safety yellow.
- 2.11.2.4 The access steps shall be of adequate strength to prevent sagging and shall provide a minimum slip finish.

 NOTE

The rear step dimensions should be approximately 500mm by 230mm.

- 2.11.2.5 All first steps shall be at the lowest possible level and at a height from the ground that is comfortable for the operator to use.

 NOTE

The first step height shall be to the determination of the NSWFB. Swing steps may be necessary to maintain required ground clearances.

- 2.11.2.6 The access steps should not restrict the vehicle's entry and ramp angles or impede on the minimum body clearance height.
- 2.11.2.7 Automatic fold down access steps shall comply with section 9.7 of Annex B.
- 2.11.2.8 The access steps shall be illuminated by means of a light or lights fitted in or adjacent to the steps and shall be switched individually by opening the respective cabin door and using the OEM circuit.
- 2.11.2.9 **WATCH YOUR STEP** warning labels shall be displayed alongside all cabin access steps [refer to clause 1.8.2 (e)].

2.11.3 Roof /Floor Area

- 2.11.3.1 All additional wiring inside the cabin's roof space shall use cable ducting to ensure ease of access for servicing and replacement of wiring.
- 2.11.3.2 The cabin floor shall be fitted with a durable matting which is suitably secured and adequately sealed against the ingress of water.

2.11.4 Doors

- 2.11.4.1 The vehicle shall have four (4) cabin doors.
- 2.11.4.2 All cabin doors shall be forward hinged with minimum 70° opening capability and fitted with a restraining mechanism and robust anchor points.
- 2.11.4.3 Door hinges and/or retainers shall not protrude from the cabin in a manner which can cause injury to the vehicle operators.
- 2.11.4.4 All windows shall be tinted.
- 2.11.4.5 The doors shall be lockable from outside using a key and lockable from inside.
- 2.11.4.6 The cabin door striker plates shall be suitably mounted to allow for adjustment.

2.11.5 Cabin Seating

- 2.11.5.1 Seating shall be provided for six (6) fire fighters, two (2) in the front and the remainder in the rear.
- 2.11.5.2 The driver's seat shall have adjustable fore/aft movement, height, back rake (must not interfere with rear cabin egress) and also have adequate lumbar support.

- 2.11.5.3 The front passenger's seat shall have adjustable back rake which does not interfere with rear cabin egress.
- 2.11.5.4 All seats shall be provided with head restraints/pads to prevent whiplash.
- 2.11.5.5 Non OEM fitted seats and head restraints shall comply with relevant ADRs and certification must be provided regarding proof of compliance.
- 2.11.5.6 Seats shall be covered in hard wearing, transport industry quality material.

2.11.6 Seat Belts

- 2.11.6.1 Inertia reel, lap sash type seat belts shall be provided for all seating positions.
- 2.11.6.2 The seat belt shall include a stalk at the female end to facilitate ease of fitting of the male end at all times.
- 2.11.6.3 All non OEM seat belts and mountings shall be certified to ADR.
- 2.11.6.4 All seat belt rewind mechanisms shall be padded where required, to protect cabin occupants from injury.

2.11.7 Noise Levels

- 2.11.7.1 An average noise level in the cabin of less than 85dB(A) is mandatory (80dB(A) or less is preferred) with the noise level being measured under operational conditions (i.e. vehicle travelling at 60km/h with the windows closed and siren operating).
- 2.11.7.2 Noise level test measurements shall be carried out according to AS 1269.1.
- 2.11.7.3 A certificate of compliance for noise levels shall be by an independent testing authority and supplied with the first vehicle.
- 2.11.7.4 If applicable, a suitable absorption barrier insulation layer shall be incorporated in the cabin of the vehicle to alleviate external noise (including that radiated or otherwise transmitted by the siren).

2.12 Cabin Internal Fixtures

2.12.1 Driving Controls

Driving controls will be consistent with modern ergonomics so that all essential controls are easily visible to the driver's forward vision and are within easy reach.

2.12.2 Instrumentation

- 2.12.2.1 Cabin instrumentation shall be ergonomically laid out, evenly backlit and shall include in addition to OEM instruments the following:

- (a) an electric 24 hour digital clock display which includes engine hours and auxiliary engine hours (refer to COP in Annex B of this specification);
- (b) a suitably sized solid state dimmer switch to carry the full instrument current load (including above mentioned digital clock display) without overheating;

⚠ NOTE

Final positioning of all instrumentation is to the determination of the NSWFB.

- 2.12.2.2 To ensure conformity, any additional instrumentation shall emulate the OEM equipment as closely as possible.
- 2.12.2.3 All gauges, valves, indicators, monitors, engagement controls, switches and operating controls within the cabin shall be clearly marked by way of unambiguous, permanently affixed labels.
- 2.12.2.4 Identification shall either be written English or by symbols complying with International Standards, minimum size 4mm where possible, and the location and wording of all such labels shall be approved by the NSWFB.

2.12.3 Interior Lighting

- 2.12.3.1 An OEM interior cabin light shall be operated by a three (3) way switch (**OFF/DOOR/ON**).
- 2.12.3.2 An interior fluorescent light shall be installed as per section 9.3 in Annex B of this specification.

⚠ NOTE

Fluorescent lights will be supplied by the NSWFB on a free issue basis.

- 2.12.3.3 A low intensity night operations cabin lighting (NOCL) system shall be installed as per section 9.4 in Annex B of this specification.
- 2.12.3.4 A map light shall be installed as per section 9.8 in Annex B of this specification.

2.12.4 Heating, Ventilation and Air Conditioning (HVAC) System

- 2.12.4.1 The cabin shall have a fully integrated OEM HVAC system with a multi-speed fan using both fresh and re-circulated air.

⚠ NOTE

A non OEM HVAC system may be fitted to the determination of the NSWFB

- 2.12.4.2 HVAC system shall provide windscreen and door window demisting and in wet weather shall be able to dehumidify the cabin containing six (6) occupants in wet weather uniforms.

- 2.12.4.3 The HVAC shall be capable of normal operation regardless of the operation of the engine driven auxiliary systems.
- 2.12.4.4 The HVAC system fresh air make up shall be set to a minimum 10% according to the Australian Institute of Refrigeration Air Conditioning and Heating (AIRAH) standard.

2.12.5 Auxiliary Control System (ACS) Console

- 2.12.5.1 An ACS console shall be fitted in the cabin as per section 5 in Annex B of this specification.

NOTE

The NSWFB currently use the *Impart* System (ELS6211).

- 2.12.5.2 The bottom right switches on the ACS console shall be used to switch ON/OFF and start the pump engine and shall be labelled 'STOP/PUMP/START'.
- 2.12.5.3 A manual throttle control to the pump shall be provided in the crew cabin in a location to be approved by the NSWFB.
- 2.12.5.4 A warning light on the ACS console shall illuminate and flash to indicate low water level and simultaneously a (low level) warning shall sound.

2.12.6 Internal Signs and Labels

- 2.12.6.1 A permanent label shall be fixed in a position easily visible to the driver and shall include (refer to clause 1.3.7):

- (a) vehicle travel height,
- (b) length,
- (c) width,
- (d) Gross Operating Mass (GOM).

- 2.12.6.2 A **FASTEN SEAT BELT** label shall be fitted (refer to clause 1.3.7).
- 2.12.6.3 A **NO SMOKING** label shall be fitted (refer to clause 1.3.7).
- 2.12.6.4 **WATCH YOUR STEP** warning labels shall be above each cabin door (refer to clause 1.3.7).

2.12.7 Miscellaneous Internal Fixtures

- 2.12.7.1 All cabin internal fixtures must be secured in accordance with ADR requirements including securing straps to fully secure stowed equipment (refer Annex C).

- 2.12.7.2 A lockable container for the stowage of fire fighters' personal possessions e.g. wallets and watches, shall be provided.

⚠ NOTE

The NSWFB prefers a compartment measuring not less than 300 x 200 x 150mm being securely attached to the vehicle.

- 2.12.7.3 A latchable container (approximately 350 x 270 x 150mm) shall be fitted for the stowage of A4 sized books.

⚠ NOTE

The NSWFB prefers this container space to be a moulded centre console.

- 2.12.7.4 A latchable container shall be fitted in the cabin to hold and protect standard NSWFB hand held radios.

⚠ NOTE

The NSWFB currently use the container (part No. ELSF208X12) and insert (part No. ELSF208iX12) supplied by *Impart Special Products*.

- 2.12.7.5 The colour of containers shall match or blend with the cabin trim

- 2.12.7.6 A hand held spot light shall be installed in the cabin (refer to section 9.10 in Annex B of this specification).

- 2.12.7.7 One (1) *Wolfrite* torch and charging base shall be fitted (refer to section 9.11 in Annex B of this specification).

- 2.12.7.8 The cabin shall include provision to securely stow firefighter tunics and helmets for each seated person.

- 2.12.7.9 The cabin shall include provision to securely stow six (6) rolled/folded NSWFB emergency fire protection blankets, one per each operator, which are able to be quickly accessed in an emergency situation.

2.13 Cabin External Fittings

2.13.1 Air Horn

- 2.13.1.1 A NSWFB approved electric operated air horn shall be installed unless OEM provided.

- 2.13.1.2 Horn operation shall be via the existing OEM horn control.

- 2.13.1.3 A backlit air horn ON/OFF switch shall be provided on the dash panel, and an indicating light shall be provided to indicate when the air horn is active.

2.13.2 Lights

2.13.2.1 Headlights shall be protected by removable polycarbonate (or equivalent) covers.

2.13.2.2 Two (2) fog lights shall be fitted to the front of the vehicle.

 NOTE

The NSWFB currently use *Hella* part no. 1107 front fog lights when OEM fog lights are not available.

2.13.2.3 Two (2) tail fog lights (*Hella* part number 2300) shall be fitted to the rear of the vehicle.

2.13.2.4 The cabin shall be fitted with an Emergency Warning System (EWS) (refer to clauses 5.5.10, and 5.5.11).

2.13.3 Mirrors

2.13.3.1 Electrically heated and remote controlled external rear view mirrors which include convex blind spot mirrors shall be fitted in accordance with ADR requirements.

2.13.3.2 Mirror brackets shall have two (2) arm detent positions which will permit the mirrors to be moved either to a position parallel to, or forward of, the vehicle body, as well as the normal operating position.

2.13.3.3 An overhead convex mirror for close proximity viewing of the area adjacent to the near side front door shall be fitted to the passenger side cabin by a separate bracket.

PART 3 FIRE PUMP AND WATER SYSTEM

3.1 Fire Pump

- 3.1.1 A firefighting pump powered by an auxiliary diesel engine shall be provided and mounted to minimise noise, vibration and excessive wear through chassis/body movement.
- 3.1.2 The pump shall be installed at the rear of the body. The NSWFB requires a *Hatz 3L41C/GAAM MK 500* assembly to be mounted to continue user type for this vehicle group.

 NOTE

The pump assembly is currently available on Government contract number 0400273.

- 3.1.3 The pump shall be capable of providing 2200l/m @ 700kPa (rated); 1500/m @ 900kPa (rated); and 400l/m @ 1100kPa (rated).
- 3.1.4 Notwithstanding the pump rating capacity, the pump shall also satisfy the performance requirements of Section 3.10 Pump Testing.
- 3.1.5 Adequate accessibility shall be provided to the pump and engine for maintenance operations throughout the life of the vehicle, with preference for the pump and plumbing being removable as a modular unit.
- 3.1.6 The pump shall be fitted with a Class A foam system (refer to clause 3.7.1 Note).
- 3.1.7 The pump shall be able to maintain prime and positive pressure when at idle and with a 3m water lift.

3.1.8 Pump Primer System

- 3.1.8.1 The pump shall be provided with a manual electric oilless primer having a priming capacity of not less than -85kPa.
- 3.1.8.2 The primer shall be activated from the rear pump panel as well as from the crew cabin (to the approval of the NSWFB).
- 3.1.8.3 All piping to and from the primer shall minimise friction loss and be of adequate size to ensure that the primer operates under all conditions.

3.2 Auxiliary Diesel Engine

- 3.2.1 An air cooled auxiliary diesel engine shall be installed to drive the pump.

- 3.2.2 The engine shall have a 24V electrical system which is integrated into the Auxiliary Control System and is powered from the vehicle batteries.

⚠ NOTE

An auxiliary battery is not required.

- 3.2.3 The auxiliary engine shall be fitted in a position which provides adequate air flow for cooling as recommended by the auxiliary engine manufacturer.
- 3.2.4 The cooling air from the engine shall be directed to the ground by duct extensions.
- 3.2.5 The engine exhaust shall be positioned to discharge upwards and clear of the vehicle body and away from the pump control panel and any access steps.
- 3.2.6 Exposed parts of the exhaust system shall be suitably guarded to prevent personnel receiving burns.
- 3.2.7 A **HOT EXHAUST** warning marking shall be fitted in a highly visible position (refer to clause 1.3.7).
- 3.2.8 A separate fuel supply outlet shall be fitted to the vehicle's fuel tank for the auxiliary engine and an electric fuel booster pump shall be fitted to this fuel supply line.

⚠ NOTE

The fuel booster pump must not restrict the flow of fuel if it fails.

- 3.2.9 The fuel supply outlet for the auxiliary engine shall be fitted in a position which reserves approximately 25% of the fuel for the vehicle's main engine.

⚠ NOTE

The fuel pick up point is to be centrally located in the tank to maintain fuel supply when the vehicle is on a slope or uneven ground.

- 3.2.10 The fuel level indication on the Rear Pump Panel shall indicate available fuel for pumping operations (i.e. The fuel gauge to be calibrated so that when the fuel gauge shows empty, it is $\frac{1}{4}$ full).
- 3.2.11 A NSWFB approved engine oil drain plug shall be fitted (refer to clause 2.10.6 and shall be readily accessible).

⚠ NOTE

An oil drain pipe extension may be required for better accessibility.

- 3.2.12 The auxiliary engine must be able to be switched ON and OFF, started and throttle controlled both from the pump panel and from within the cabin (refer to clause 3.3.3.1 and section 2.12.5 respectively).

3.2.13 The auxiliary engine shall continue operating when electrical power is lost i.e. the fuel supply shall not be cut off.

3.2.14 Any inbuilt engine protection device which has been designed to cause the engine to shut down shall be replaced with an audible and visual warning for the operator so that the engine continues operating during emergency situations.

3.2.15 Noise Levels

3.2.15.1 Noise shall be minimised using active noise reduction measures (refer to AS1269).

3.2.15.2 The average noise level of the auxiliary engine and pump shall be measured under operational conditions with maximum pumping output and at the expected operator's ear position, 1m from the pump panel.

NOTE

The lowest noise level possible is preferred.

3.2.15.3 Noise level test measurements shall be carried out according to AS 1269.1 - 2005.

3.2.15.4 A certificate of pump noise levels shall be by an independent testing authority and supplied with the first vehicle.

3.3 Pump Panel

3.3.1 General

3.3.1.1 A pump panel constructed from robust materials shall be fitted at the rear panel of the vehicle and shall be easily opened to provide access to all panel components for maintenance.

NOTE

The panel must be able to be fully opened without the need for special tools and without physical impediment by any fixture.

3.3.1.2 The panel components shall be ergonomically arranged, including logical segregation of electrical and hydraulic instrumentation.

3.3.1.3 The pump panel electrical components assembly shall be protected to IP56 to prevent the ingress of water and contaminants to the instrumentation.

3.3.1.4 The pump panel shall have a black non glare finish.

3.3.1.5 The pump panel and panel components shall be corrosion resistant against commercially available foam concentrates (synthetic and/or organic) and resist oxidation or chemical reaction.

- 3.3.1.6 An engraved panel shall be located near the rear pump panel using the following colours in the line diagram (refer to Annex A concept drawing ENG00135-HYD-10205).

⚠ NOTE

The NSWFB currently use the following colours on pump panel line diagrams:

Supply- Green

Delivery - Light Blue

Foam systems - Yellow

Engine controls - Orange

- 3.3.1.7 The pump panel and all pump, water and foam system controls shall be clearly labelled (refer also to clause 1.8.2(e)).
- 3.3.1.8 The entire area around the pump and pump panel shall be provided with adequate illumination for night operation by a fluorescent light/s individually switched at the rear pump panel (refer to 5.5 and section 11 in Annex B of this specification).

⚠ NOTE

Fluorescent Lights will be supplied as free issue by the NSWFB.

- 3.3.1.9 A concept drawing of the proposed pump panel shall be provided to the NSWFB before vehicle manufacture so that the final layout can be agreed upon between the NSWFB and the manufacturer.

3.3.2 Panel Components

- 3.3.2.1 The pump panel shall include the following components plus any other deemed necessary:
- (a) a liquid filled and dampened 100mm diameter delivery pressure gauge (pressure scale of 0 to 2500kPa);
 - (b) a liquid filled and dampened 100mm diameter zero centred compound gauge fitted to the suction side of the pump (vacuum scale of 0 to -100kPa and pressure scale of 0 to 2500kPa);
 - (c) a pump line diagram (refer to clause 3.3.1.6);
 - (d) an engine ON/OFF switch for the auxiliary engine;
 - (e) A Micro Throttle Control cable shall be provided, so that rotating the knob clockwise increases the engine RPM and rotating the knob anticlockwise reduces the engine RPM, to control the pump output;

- (f) an emergency shut down release knob to reduce the auxiliary engine to idle;
- (g) Rear Pump Panel (refer to Annex A);
- (h) foam system display panel/controls;
- (i) a tachometer for the auxiliary engine;
- (j) UHF/GRN radio speaker (refer to section 5.6.4 Note).

3.3.2.2 All panel gauges, switches, lighting and controls shall be waterproofed to IP56.

3.3.2.3 Panel wiring shall terminate in an approved multi-pin connector (IP56 or higher) fitted to the base of the electrical panel, and internal cables shall be positioned/secured in a manner that permits easy opening of the panel without undue tension being placed on the loom.

 NOTE

The connector to be easily accessible, connectible and disconnectible without interference or the need to remove an installed component (refer to Annex B - Appendix C for a list of approved connectors).

3.3.3 Rear Pump Panel

3.3.3.1 The engine oil pressure, temperature and fuel indicator lights on the Rear Pump Panel shall be used for the auxiliary engine and not the vehicle engine, and shall be labelled accordingly.

3.3.3.2 The switches on the Rear Pump Panel (refer to Annex B of this specification) shall be used for the following switch functions:

- (a) work lights, nearside;
- (b) work lights, offside;
- (c) body surround lights, nearside;
- (d) body surround lights, offside.
- (e) pump panel light;

3.4 Pump Plumbing

3.4.1 General

3.4.1.1 All pump plumbing including couplings, fasteners and fittings shall be 316 grade stainless steel.

- 3.4.1.2 All valves must be easily accessible by an operator (to the approval of the NSWFB), and all valves shall be stainless steel ball type valves unless stated otherwise.
- 3.4.1.3 The lines shall be kept as direct as possible with a minimum number of bends, and the overall design minimising restriction, turbulence and cavitation.
- 3.4.1.4 An automatic 25 mm NB thermal relief valve (or other approved means of pump case cooling) shall be fitted to the pump.
- 3.4.1.5 The thermal relief valve shall draw to ground and operate in accordance with the pump manufacturer's guidelines.

3.4.2 Tank to Pump Line

- 3.4.2.1 A tank to pump line of not less than 80mm NB shall be fitted, with final selection ensuring maximum flowrate to the pump.
- 3.4.2.2 The line shall be fitted with a ball valve controlled at the rear of the vehicle in a easily accessible position to the pump operator.
- 3.4.2.3 The tank to pump pipe shall have a flexible section at the tank end.
- 3.4.2.4 Couplings used for the tank to pump line shall be Camlock type (or equivalent) with the retention arms lock-wired in the shut position to prevent removal.

3.4.3 Tank Fill Inlet Line

- 3.4.3.1 A tank fill inlet line shall be fitted so that the tank can be refilled with pressurised water (from hydrant) through a 65mm inlet on the near side of the vehicle.
- 3.4.3.2 A full flow non return valve shall be fitted at the inlet to prevent backflow from the tank.
- 3.4.3.3 The 65mm tank fill inlet shall be fitted with *Storz* coupling and a blank cap secured by a retaining chain.
- 3.4.3.4 The tank fill inlet shall be clearly marked by a permanent label (refer to clause 1.3.7).

3.4.4 Pump to Tank Recirculation Line

- 3.4.4.1 A recirculation line shall be fitted to the manifold to discharge into the top of the tank, and shall be clearly marked by a permanent label (refer to clause 1.3.7).
- 3.4.4.2 The pump to tank recirculation line shall be fitted with a shut off ball valve in a position easily accessible the operator.

3.4.5 Pipe/Hose Fittings

- 3.4.5.1 Hose clamps shall be stainless steel *Band-It* roll band clamps or equivalent (automotive clamps are not acceptable).
- 3.4.5.2 Hoses shall be removable for ease of maintenance and repair.
- 3.4.5.3 All pipe fittings shall be of adequate diameter to avoid restrictions., and fabricated to resist deterioration.

3.4.6 Storz Couplings

- 3.4.6.1 The NSWFB require 65mm *Storz* couplings (two (2) lugs) to be capable of being coupled and uncoupled by gloved hands.
- 3.4.6.2 The torque required to couple and uncouple each coupling fitting shall be within the range of 1.5 - 7Nm.

 NOTE

Storz couplings are available under NSW State Government contract 292 at contract price on request.

3.5 Suction Inlets and Delivery Outlets

- 3.5.1 Inlets and outlets shall be angled down at least 15° to facilitate easy connection and removal of hoses, however they must not reduce the vehicle's departure angle.

 NOTE

Valve handles should be above their fitting.

- 3.5.2 Positioning of all inlets and outlets shall be agreed upon by the NSWFB and the manufacturer prior to construction
- 3.5.3 One (1) suction inlet of 100mm diameter shall be provided at the rear of the vehicle and shall be fitted with a 100mm diameter *Storz* coupling (two (2) lugs) and a standard blank cap secured by a retention chain.
- 3.5.4 Two (2) 65mm full flow suction inlets shall be supplied at the rear of the vehicle and shall be provided with:
 - (a) lever operated ball valves;
 - (b) full flow non-return valves between the inlet ball valve and pump inlet; and
 - (c) 65mm *Storz* couplings and blank caps with retaining chains.
- 3.5.5 All suction inlets (65mm and 100mm) shall be fitted with easily removable suction strainers having a maximum mesh size/pattern commensurate with the allowable ingested object size (as recommended by the pump manufacturer).

- 3.5.6 Two (2) 65mm delivery outlets with full flow lever operated ball valves shall be provided at the rear of the vehicle and shall have *Storz* couplings and blank caps with retaining chains.
- 3.5.7 A 25mm *Storz* outlet with full flow lever operated ball valve, blank cap and chain shall be fitted in an easily accessible position for knapsack filling and as a tanker protection outlet.
- 3.5.8 A 2mm diameter hole shall be drilled in the centre section of each outlet blank cap to prevent pressure build-up valve fail to seal.
- 3.5.9 All inlets and outlets shall be permanently labelled 1, 2, 3, 4 etc. (read from left to right when facing the pump panel) and referenced on the pump operation instruction plate and schematic.
- 3.5.10 Inlet and outlet adaptors shall be BSP screw threads and the large suction inlet adaptor shall be either bolted flange type or BSP screw thread.
- 3.5.11 Pipe work which protrudes beyond the rear of the body or is likely to sustain damage when the vehicle departs a high gradient descent shall be mechanically protected from possible damage, without restricting the departure angle.

3.6 Hose Reels

- 3.6.1 Two (2) electric rewind hose reels shall be fitted the rear of the vehicle.

 NOTE

The NSWFB currently uses *HANNAY NORDIC model Ep2400-23-24J10BSP*.

- 3.6.2 Operation of the hose reel rewind shall be by a push button located adjacent to the hose reels.
- 3.6.3 The hose reels shall both be fitted with 60m (2x30m) lengths of 19mm NB diameter low pressure rubber hose fitted with 25mm *Storz* couplings and approved by the NSWFB.

 NOTE

Low pressure rubber hose is available under NSW State Government contract and is available at contract prices upon request.

- 3.6.4 The end plates of the hose reel drum must not deform when the rewound hoses are fully charged with water.
- 3.6.5 The speed of hose rewind shall initially start slowly and increase to a maximum of approximately 0.7m/sec.
- 3.6.6 The hose reel rewind motor shall have sufficient torque to rewind the entire length of fully charged hoses unassisted.

- 3.6.7 The hose reel mechanism shall include a retardation device to control hose overrun as well as a brake to lock the hose reel in position.
- 3.6.8 Manual rewind shall be provided for the hose reels in case of electrical failure.
- 3.6.9 The manual rewind handle shall be stowed near the hose reel and when connected, the rewind handle shall extend past the body and be easily operated.
- 3.6.10 A flexible hose line with a diameter no less than the nominal bore of the firefighting hose shall be provided from the pump to the hose reel, and be controlled by a full flow stainless steel ball valve that is easily accessible for operation, and removable for maintenance.

 NOTE

The number and type of fittings utilised to be arranged to minimise frictional losses.

- 3.6.11 The hose must be able to be freely rewound without any obstruction or jamming.
- 3.6.12 A four roller fairlead shall be fitted to the hose reel to ensure that the hose is not obstructed during travel and to assist in guiding the hose onto the drum.
- 3.6.13 All moving parts of the hose reel assembly shall be suitably guarded to ensure safe operation.
- 3.6.14 The hose reel and assembly shall be easily removable for maintenance.
- 3.6.15 To enable the ends of individual hoses to be identified when rewinding, a 200mm band of contrasting colour eg black heat shrink, shall be applied 3m from each coupling.
- 3.6.16 A holder shall be provided within close proximity of the hose reel for securing the *Dial-a-Jet* nozzle (Velcro strap - Annex C).

3.7 Class A Foam System

- 3.7.1 A Class A foam system shall be installed to operate when the firefighting pump is operating from either the first aid tank, hydrant or static water supply.

 NOTE

The NSWFB currently uses the *Quenchmaster SA 300*.

- 3.7.2 The foam proportioning unit shall be capable of accurately proportioning between 0.1% and 1.0%, and shall be able to deliver pre-mixed solution to both the hose reels and/or 65mm deliveries.

 NOTE

Electronic proportioning and/or injection is not required.

- 3.7.3 All hose, valves and plumbing fittings shall utilise materials which are corrosion resistant against commercially available foam concentrates (synthetic and/or organic) and resist oxidation or chemical reaction.
- 3.7.4 The foam system shall cause minimum restrictions in the pump plumbing.
- 3.7.5 All equipment and controls shall be permanently and clearly labelled ensuring quick identification during operation (refer to clause 1.3.7).
- 3.7.6 Areas used to stow foam drums shall be designed and labelled to ensure that the area can be washed down immediately after any spills (refer to clause 1.3.7).

⚠ NOTE

The label should state that the area must be washed down immediately after any spill.

- 3.7.7 Foam supply shall be direct from foam drums, secured either in a locker compartment or cradle assembly.

⚠ NOTE

The foam drums will be supplied as a part of the NSWFB inventory.

- 3.7.8 An appropriately sized stainless steel pick-up tube shall be provided for insertion into the stowed foam drums and shall be connected to the proportioning unit by a hose.

3.8 Cabin Protection System (CPS)

- 3.8.1 The vehicle shall be fitted with a cabin protection system which protects the operators in a fire over-run or entrapment situation.
- 3.8.2 The CPS shall utilize the firefighting pump to supply water through nozzle outlets onto the cabin.

⚠ NOTE

The protection system must maintain cabin integrity and cooling of glass and external surfaces and fixtures that would otherwise decompose and releasing toxic smoke when exposed to elevated temperatures.

- 3.8.3 The nozzles shall have a spray pattern, flow rate and working pressure which with appropriate nozzle positioning, provides an even coverage over the cabin when at the pump's optimum output.

⚠ NOTE

A flow rate of between 80 - 100l/min for the entire protection system should provide suitable protection for between 4 - 5 minutes.

- 3.8.4 The Cabin Protection System (CPS) shall be supplied with water from the CPS tank via one bronze pump (*Tellarini* ECC 24/40 electric pumps) wired direct to the vehicle engine and *Hatz* engine and alternators and vehicle batteries.

 NOTE

Protection of the electronic pump circuit is mandatory.

- 3.8.5 The control of the electric pumps are to be located in an accessible position in the crew cabin.
- 3.8.6 A switch shall be mounted on the cabin dash panel with an indicator light to illuminate when the pump is switched ON.

3.9 Water Tank

3.9.1 General

- 3.9.1.1 A water tank with a minimum capacity of 3000 L shall be installed ensuring low centre of gravity and the tank shall be guaranteed against corrosion for a minimum of 10 years.

 NOTE

The NSWFB prefers the main tank be constructed from aluminium (details of the proposed tank design and materials to be provided to the NSWFB).

- 3.9.1.2 A separate CPS tank having a capacity of 500 L is to be provided below the main water tank under the chassis and behind the rear axle.
- 3.9.1.3 The CPS tank is to be filled with water from the main water tank via a pipe of 40 mm minimum diameter.
- 3.9.1.4 A 20 mm drain valve is to be installed below the CPS tank in an accessible location and piped to the rear near side of the vehicle.
- 3.9.1.5 All tank outlets shall be covered by a removable stainless steel strainer and having a maximum mesh size/pattern commensurate with the allowable ingested object size as recommended by the pump manufacturer.

3.9.2 Tank Design

- 3.9.2.1 The top of the tank shall be easily removable to allow access for inspection or maintenance.
- 3.9.2.2 To isolate the tank from road shock and vibration, the tank shall be attached to the vehicle chassis via anti-vibration captured mounts.
- 3.9.2.3 The tank shall be fabricated to withstand any torsional components transferred from the vehicle chassis.

- 3.9.2.4 Full height, longitudinal and transverse baffles shall be provided with staggered holes permitting controlled flow of liquids between compartments.
- 3.9.2.5 The top of the tank shall not be constructed higher than the top of the vehicle body.
- 3.9.2.6 The water tank shall be equipped with a vented 125mm diameter tank port secured by a chain and must be easily accessible at all times.

 NOTE

The NSWFB currently use *Fire Response* tank cap (Part No. NPN 111019).

- 3.9.2.7 The top of the tank shall be fitted with a 600mm hatch for quick inspection.
- 3.9.2.8 The inlets and the vent cap shall be clearly identified by a permanent label (refer to clause 1.3.7).

3.9.3 Overflow of Water Tank

- 3.9.3.1 An overflow pipe of not less than 90mm internal diameter shall be fitted to the tank, centrally located in the tank so there is no spillage when the vehicle is inclined.
- 3.9.3.2 The overflow system shall be constructed so that pressurisation does not occur when filling the tank, and backfilling or recirculating water does not escape through the overflow.
- 3.9.3.3 The overflow discharge shall be kept clear of the critical vehicle components and shall terminate in line with the bottom of the body and behind the rear wheels.

3.10 Pump Testing

- 3.10.1 Each vehicle shall have the pump and plumbing system comprehensively tested and a test certificate issued (refer to clause 3.10.5).
- 3.10.2 Delivery pipework shall be hydrostatically pressure tested to a pressure 1.5 times the maximum operating pressure.
- 3.10.3 Suction plumbing shall be hydrostatically pressure tested to a positive pressure of 1500kPa and a negative pressure of -95kPa.
- 3.10.4 The pump test shall be conducted for a minimum of eight (8) continuous hours for the first vehicle, and a minimum of four (4) hours for subsequent vehicles, and shall be able to achieve 1500l/min @ 900kPa at the delivery outlet with a 3m draft.
- 3.10.5 A test report shall be issued with each vehicle and shall include flow rates and a comparison between the following:

- (a) pressure readings at the pump panel gauge, delivery outlet and branch, with pressure and flow rate readings taken when the pump is at maximum capacity utilising one (1) length of NSWFB standard 70mm layflat hose from each of the nominated outlets, and fitted with 19mm straight bore nozzles;
- (b) pressure readings at the pump panel gauge, hose reel outlet connection and branch, with pressure and flow rate readings taken when the pump is at maximum capacity utilising the 19mm firefighting hose fitted with a 7.5mm straight bore nozzle.
- (c) a test of the CPS to confirm the total protection period under full flow conditions.

3.10.6 An independent testing authority shall certify the calibration of the testing equipment prior to pump testing, and the certificate shall be supplied to the NSWFB with the delivery of the first vehicle.

PART 4 BODYWORK

4.1 General

- 4.1.1 The body shall be of a design that utilises modern locker concepts, easy access drawers and where applicable, shelving with adjustable mountings.
- 4.1.2 All lockers, panels, decking and access ways shall be designed to facilitate ease of maintenance and repairs.
- 4.1.3 The six locker configuration is mandatory and the lockers shall be designed to the engineering drawings in Annex A.

4.2 Construction Materials

4.2.1 General

- 4.2.1.1 The choice of materials be used in the construction of the vehicle shall be selected with the aim of combining lightness, strength, durability and longevity, and must be suitable for use in extreme bushfire situations.
- 4.2.1.2 General hardware (bolts, screws, pop rivets) shall be high tensile.

⚠ NOTE

Attention is drawn to Section 1.5 regarding compatibility of materials and rust and corrosion (refer to clause 1.8.2 (l)).

- 4.2.1.3 All steel tubes utilised in the bodywork shall have their internal surfaces fully sprayed with internal corrosion protection (eg *Tectyl* or equivalent).
- 4.2.1.4 Wood shall only be used in non-loadbearing construction (e.g. shelf templates).

4.2.2 Aluminium Fabrication

Aluminium alloys shall be marine/aircraft grade with an appropriate finish for the intended application.

4.2.3 Steel Fabrication

- 4.2.3.1 The NSWFB prefers steel to be hot dip galvanised for corrosion protection, otherwise all rust, weld slag, scale and other extraneous deposits shall be removed from the complete framework by grit/bead blasting, rust converter applied, then zinc primer applied before painting.
- 4.2.3.2 All required holes shall be drilled (oversize where appropriate) before galvanising or protective painting commences.

4.3 Body Construction

4.3.1 Subframe and Body

- 4.3.1.1 The body shall be of lightweight construction and shall be capable of being easily removed.
- 4.3.1.2 The body frame shall be attached so as not to be adversely affected by chassis flexing, nor shall the body frame adversely restrict normal body flexing.

 NOTE

Consideration must be given to severe chassis twisting and flexing forces that are likely to be encountered when the vehicle is working in off road conditions. The cab/chassis manufacturer shall approve in writing the body mounting method.

- 4.3.1.3 Easily removable access panels shall be provided as required for all maintenance points to the satisfaction of the NSWFB and shall be suitably sealed against the ingress of water.

 NOTE

All body mounting points shall be accessible via access panels.

4.3.2 Equipment Lockers

- 4.3.2.1 Locker accommodation shall be provided so that the maximum possible internal space is available for equipment stowage.
- 4.3.2.2 The locker configuration shall be of such a design as to enable the stowage of the inventory listed and detailed in Annex G of this specification.

 NOTE

Refer to Annex H for stowage layout plan and shelf configuration.

- 4.3.2.3 All equipment stowed in the lockers must be easily reached by an operator of average height whilst standing on level ground.

 NOTE

The maximum height an average operator can comfortably reach is 2m from the ground.

- 4.3.2.4 Slide out access steps shall be installed to the underside of the N/S 1 and OS/1 lockers with a SWL of 300kg.

- 4.3.2.5 The lockers shall be designed and fitted in a manner which keeps the vehicle's centre of gravity as low as possible, while still maintaining the minimum body clearances required of this vehicle.

⚠ NOTE

Body movement must be considered when designing body lockers.

- 4.3.2.6 The NSWFB locker numbering principles shall be used when numbering each locker compartment.

⚠ NOTE

Refer to Annex H for naming and numbering conventions.

- 4.3.2.7 The top of all lockers shall have a gutter or lip fitted on the outside to prevent water from running down the body and into the locker compartment when open.

⚠ NOTE

The gutter/lip may not be necessary if the roller shutter is fitted with an equivalent lip on the bottom most slat of the shutter.

- 4.3.2.8 The bottom edge of all lockers shall have a lowered lip which impedes water from entering the locker area under the door/shutter.

- 4.3.2.9 Lockers shall be fitted with weatherproof seals along the top and side edges.

- 4.3.2.10 Lockers shall include a stainless steel strip on the lowered lip which is folded over the bottom edge to protect it from damage by equipment being stowed or unstowed, or from the closing of a roller shutter.

- 4.3.2.11 Each shelf and locker floor shall be fitted with non-slip synthetic flooring material, where applicable, to protect the stowed equipment and locker from rust, corrosion and offer some protection to the stowed equipment.

⚠ NOTE

To be determined during initial inventory stowage plan.

- 4.3.2.12 Fuel storage lockers shall be suitably ventilated and the locker ventilation system shall prevent the entry of water and dirt whilst the vehicle is in motion.

- 4.3.2.13 Lockers which do not allow natural draining shall have drain holes in the floor, designed or located so as not to permit ingress of water from the road surface (wheel spray) and allowing the water to drain away from the chassis.

- 4.3.2.14 Inside each locker a sign shall indicate the locker volume for that locker and each shelf shall have a label fitted indicating the maximum load capacity the shelf has been designed to accommodate (refer to section 1.3.7).

- 4.3.2.15 Each equipment locker roller shutter or door shall be fitted with a positive lock of heavy duty type, with all lockers/doors keyed alike.
- 4.3.2.16 One *Fiamma* awning, 4,400mm shall be installed to the N/S and a second *Fiamma* awning of 3,000mm shall be installed to the O/S of the locker body.

4.3.3 Roller Shutters

- 4.3.3.1 Roller shutters shall incorporate counter balanced anodised roller or slide over type shutters and an easily operated, full width external locking bar/handle.

 NOTE

The NSWFB currently use *Monsoon* roller shutters.

- 4.3.3.2 Means shall be provided to positively hold the shutters fully open or closed.
- 4.3.3.3 Shutters shall be installed to ensure smooth operation, with particular attention to the placement of guide rails and rollers.

4.3.4 Locker Doors/Steps

- 4.3.4.1 Where doors are used as locker openings, an acceptable means shall be provided to hold the doors fully open.
- 4.3.4.2 Locker door hinges which are mounted external to the body shall be of a slim but robust design and painted to the colour of the body.

 NOTE

Wherever practicable, the NSWFB would prefer to have hinges mounted on the inside of locker doors.

- 4.3.4.3 Locker doors and step doors shall be able to be opened/closed by a single handed operation by an operator wearing firefighting gloves.

 NOTE

Consideration should be given to the type and placement of the locker door opening mechanism, especially with the potential placement of conspicuity markings.

- 4.3.4.4 Locker doors which are designed to open to 180° shall be fitted with a rubber bump stop to protect the vehicle body.
- 4.3.4.5 Where provided, step doors shall hinge 90° from a bottom pivot, be capable of taking a weight of 300kg and shall utilise a centrally located lever mechanism.
- 4.3.4.6 All step doors shall be secured at both ends of the door.
- 4.3.4.7 Where a locker step door is positioned directly below a roller shutter, the locking of the roller shutter shall also serve to lock the step door.

- 4.3.4.8 If necessary, step doors shall be assisted (e.g. gas struts or springs) in raising and lowering so that a single operator can effortlessly open and close the door.

4.3.5 Access Steps

- 4.3.5.1 If applicable, safe access shall be provided to the top of the body including minimum slip surface on the steps and adequate handrails or grab handles.
- 4.3.5.2 The provisions of AS 1657 shall be observed as access steps will be used by operators wearing Personal Protective Equipment (PPE).
- 4.3.5.3 All access handles and access step edges shall be coloured safety yellow.
- 4.3.5.4 **WATCH YOUR STEP** warning label shall be displayed at all access steps to be seen when both ascending and descending the steps (refer to clause 1.3.7).
- 4.3.5.5 Access steps must not reduce the ramp or departure angle or ground clearance.

NOTE

Swing steps may be necessary to maintain required ground clearances.

- 4.3.5.6 Any steps which have a stowed and unstowed position shall be able to be locked in both positions.

4.3.6 Wheel Mist/Spray Suppression and Mudflaps

- 4.3.6.1 Suppression material shall be fitted around the interior edge of the rear wheel guards (refer to clause 2.6.8).

NOTE

The material should be non-flammable and unaffected by radiant heat. Materials consisting of multiple strands of filaments are not considered suitable because of their tendency to trap burning embers.

- 4.3.6.2 The NSWFB will supply one set of **NSWFB** insignia mudflaps on a free issue basis to be fitted behind the rear wheels of each vehicle.
- 4.3.6.3 A hook and chain shall be connected to the mudflaps so that the mudflaps can hooked in a raised position, clear of the wheels.

4.3.7 Body Deck

- 4.3.7.1 The body deck shall be of adequate thickness to prevent sagging and if applicable, shall have a non slip finish.

NOTE

Non-slip finishes applied to surfaces is preferred. The non slip finish must provide good traction when wet.

- 4.3.7.2 Suction hoses (and removable suction strainer) are provided with inventory and shall be stowed on the vehicle.

⚠ NOTE

Two (2) x 3.5m long of 100mm diameter are available. The NSWFB will provide on a free issue basis a set for stowage of the first vehicle.

- 4.3.7.3 An 8.5m extension ladder (5.22m retracted length) shall be stowed horizontally on the top of the vehicle's near side lockers.
- 4.3.7.4 The suction hose and ladder may be stowed on top of the body deck, however the NSWFB requires them to be easily removed by an operator standing on the ground.
- 4.3.7.5 The extension ladder shall be supported by rollers across its width at three (3) equally spaced points along the length of the ladder by rollers.
- 4.3.7.6 The ladder shall be secured to prevent vertical and longitudinal and lateral movement.
- 4.3.7.7 The clamping/securing mechanism shall be protected so that no damage occurs to the ladder under heavy braking and acceleration of the vehicle.
- 4.3.7.8 To ensure easy removal of the ladder from the vehicle, rollers manufactured from *Polyurethane 85 Duro* type material (or equivalent) shall be used.

4.4 Equipment Layout

4.4.1 General

- 4.4.1.1 The safety, ergonomics and operational convenience of the vehicle operators is of prime importance in the body layout.
- 4.4.1.2 Inventory equipment (refer to Annex G of this specification) shall be supplied and stowed in positions agreed to by the NSWFB and the body manufacturer during the vehicle build.

⚠ NOTE

The NSWFB will supply the body manufacturer with inventory equipment on a free issue basis for stowing the first vehicle only. In developing the stowage arrangement it is recommended that mock-up shelving be used (at the expected height) until the final stowage arrangement has been agreed.

- 4.4.1.3 Equipment shall not move from its stowed position when the vehicle is in motion.

⚠ NOTE

Refer to Annex H for stowage layout plans.

- 4.4.1.4 A 500ml dispenser (sunscreen with insect repellent) and wall bracket shall be fitted in a locker in an easily accessible position.

⚠ NOTE

The NSWFB currently use a wall bracket supplied by *Septone*, Product Code IZWB500.

- 4.4.1.5 Equipment shelving shall be able to support a weight of not less than twice the weight of the equipment to be stowed on the respective shelf.

4.4.2 Bracket Construction

- 4.4.2.1 Brackets shall be constructed of aluminium or steel.
- 4.4.2.2 All internal steel brackets may be nylon dipped, whereas externally mounted steel brackets shall be hot dipped galvanised or passivated.
- 4.4.2.3 Straps (if used) shall be 25mm webbing with over centre clips using stainless steel breeching dees as per drawings no. ENG00090-EQP-10004 and ENG00090-EQP-10005.
- 4.4.2.4 As an alternative, 50mm *Velcro* straps with stainless steel breeching dees may be used as shown in drawing no. ENG/GENR-1055.

⚠ NOTE

Refer to Annex C for details

4.4.3 Equipment Slides

- 4.4.3.1 Items of equipment over 15kg shall be stowed on slide-out shelves in such a manner that a team lift can be utilised, and such items shall be stowed at or below the average waist level height of an operator.

⚠ NOTE

The average waist level height is 1100mm from the ground.

- 4.4.3.2 Slides shall be rated at 150% of the expected equipment load that the corresponding shelf will carry.

⚠ NOTE

The NSWFB shall be provided with a data table for the proposed slides to determine the suitability of each slide in carrying the expected load.

- 4.4.3.3 As a minimum, all slide out shelves shall use a pair of slides equidistant from the centre of the shelf (e.g. at each end of the shelf) or positioned so each slide carries an equal proportion of the weight of the loaded shelf.

- 4.4.3.4 All slides and shelves shall be corrosion resistant.

 NOTE

The NSWFB currently uses *Marshall Fitzroy* slides which are passivated and have stainless steel ball bearings.

- 4.4.3.5 All slide-out shelves shall be capable of sliding out to a safe length and support the equipment load.
- 4.4.3.6 The slide-out shelf shall include a handle or handles easily accessible at the front, so that an operator can operate the slide whilst wearing protective gloves.
- 4.4.3.7 Slide-out shelves shall automatically latch in the extended and retraced positions and shall be able to be released from the latched position by a single handed operation at the front of the shelf.

4.4.4 Self Contained Breathing Apparatus (SCBA)

- 4.4.4.1 All SCBA sets shall utilise brackets which swing the set outside the line of the body to a height which allows fire fighters to easily don the backpack harness.
- 4.4.4.2 Provision shall be made to stow spare SCBA cylinders provided in the inventory.

 NOTE

The compartment/s shall be able to contain cylinders with a nominal measurement of 200mm diameter x 650mm long.

- 4.4.4.3 A Breathing Apparatus (BA) control board shall be stowed in the locker with the SCBA sets and shall be easily removable for relocation adjacent to the pump.

 NOTE

The removable BA board is supplied as part of the inventory.

4.4.5 Hose Trays

- 4.4.5.1 Suitable hose trays including retaining straps for the retention of all flaked hose shall be provided.

 NOTE

The hose trays should be located at the rear of the vehicle (refer to Annex H near side 3 lower locker).

- 4.4.5.2 Each hose tray shall have suitable handles/cut-outs to allow multiple lifting by fire fighters to remove and replace the tray easily into the locker.
- 4.4.5.3 Each hose tray shall display permanent labels stating 'multiple person lift'.

4.4.6 Wet Hose Stowage

- 4.4.6.1 An enclosure to hold wet firefighting hoses shall be provided and shall be of a simple design which can either be incorporated into, or fitted onto, the rear of the vehicle in a position which does not interfere with the departure angle.
- 4.4.6.2 The enclosure shall be capable of holding a minimum of six (6) 70mm lengths of rolled wet fire hose.
- 4.4.6.3 When the wet hose enclosure is fitted, the vehicle shall comply with all RTA and ADR regulations. The final design shall be to the approval of the NSWFB.

4.5 Finishes

4.5.1 General

- 4.5.1.1 Appropriate methods shall be used to inhibit corrosion arising from galvanic and/or electrolytic action and approved insulation shall be provided between dissimilar metals (refer to clause 1.8.2 (I)).
- 4.5.1.2 All parts of the vehicle shall be given adequate protective finishing by painting, plating or other approved means in accordance with *AS 2312 -2002 & amendment 1 - 2004*.

4.5.2 Paints

- 4.5.2.1 Prior to starting paint preparation and final finish coats, all areas shall be brushed and vacuumed, removing dirt, grit, drill swarf and other extraneous matter.
- 4.5.2.2 The NSWFB currently use *Two Pak Dulux 426-line 2K* in the following colours:

NSWFB New Red	426-ENF4 (DVP2) (426-31619)
Ice White	426-44413
Safety Yellow	426-19750

NOTE

Alternative paint may be used if approved by the NSWFB.

4.5.3 External Surfaces

- 4.5.3.1 The vehicle shall have the following fleet colour scheme:
- | | |
|---------------|---|
| White | upper cabin, upper body (if applicable), rear of body |
| Red | lower cabin, lower body, mudguards, wheels, hubs, pump (if not concealed) |
| Safety Yellow | grab handles, hand rails, safety rails and access step edges |

- 4.5.3.2 Wheel studs and stud flanges shall not be painted.
- 4.5.3.3 Preparation and painting shall conform to AS 1627.2 1997-2005 and as recommended by the paint manufacturer respectively.
- 4.5.3.4 The NSWFB may inspect each stage of painting prior to the commencement of the following stage.

 NOTE

The fleet colour scheme may be reviewed/changed at the discretion of the NSWFB.

4.5.4 Demarcation

- 4.5.4.1 The demarcation line which exists between the two colours red and white on the cabin shall be placed along the bottom edge of the agreed final position of the retro-reflective tape on the cabin (refer also to clause 4.5.4.2).

 NOTE

This means that the demarcation line is placed relative to the position of the retro-reflective tape and not vice versa. Conspicuity will need to be planned out before vehicle painting.

- 4.5.4.2 The placement of the demarcation line shall be approved by the NSWFB before painting begins.

4.5.5 Internal Lockers and Cabin

The vehicle shall have the following internal fleet colour scheme:

- (a) aluminium internal lockers - mill finished;
- (b) other internal lockers - *Berger Ivory Y261* (two pack DVN9-15458);
- (c) cabin interior - as supplied by OEM.

4.6 Vehicle Conspicuity

4.6.1 General

- 4.6.1.1 Insignia, retro-reflective tape, lettering and markings shall be fitted to the vehicle so that it conforms to NSWFB requirements.
- 4.6.1.2 All conspicuity shall be applied after consultation with the NSWFB who will advise and approve the final positioning and sizes of all conspicuity decals and striping on the first vehicle prior to painting (refer to concept drawing ENG00135-BDY-10196 in Annex A).

- 4.6.1.3 Final conspicuity shall be approved at an inspection at the contractor's or sub-contractor's premises prior to application.

 NOTE

The NSWFB will require a provisional conspicuity drawing prior to this inspection. The final position of the conspicuity decals will be determined by the vehicle design including consideration of any external fixtures on the completed vehicle.

- 4.6.1.4 The NSWFB shall supply the NSWFB insignia (logo) on a free issue basis and these shall be fitted in positions approved by the NSWFB.

 NOTE

Smaller sized insignias shall be used when space is restricted. An insignia to be placed on both front cabin doors and NS and OS rear panels.

- 4.6.1.5 All lettering shall be in upper case **HELVETICA MEDIUM** typeface.

- 4.6.1.6 No full stops are to be inserted between the NSW lettering.

- 4.6.1.7 All insignia, retro-reflective tape, lettering and markings shall be applied as per the respective manufacturer's recommended application method.

 NOTE

Overlapping, mismatching of tapes and excessive air bubbles are not acceptable.

4.6.2 Conspicuity Striping

- 4.6.2.1 Conspicuity striping shall consist of *3M Scotchlite* 981-32 ES diamond grade edge seal retro-reflective tape.

- 4.6.2.2 The standard NSWFB red/white-reflective tape shall be fitted to identify the vehicle to traffic with the tape applied in the following manner:

- (a) a 100mm horizontal band high around the body sides and rear;
- (b) a 50mm horizontal band low around the body sides and rear;
- (c) a 100mm horizontal band along both sides of the cabin at the paint demarcation line;
- (d) a 50mm horizontal band low along both sides of the cabin;

- (e) if possible and appropriate, a horizontal band on the front of the cabin of size as required (cut to template design if necessary) which is a horizontal extension of the bands on the sides of the cabin.

 NOTE

Alternative sizes of the tape and markings may be offered as an option where they will enhance visibility and safety of the vehicle or if physical placement is impossible. The band on the front of the cabin is determined by the design of the selected cab/chassis.

- 4.6.2.3 All slides, steps (including step doors) and swing out brackets that extend beyond the line of the body shall be fitted with strips of retro-reflective tape along the opened edges to enhance visibility of these hazards during night time operation.

4.6.3 Vehicle Identification Markings

- 4.6.3.1 Two (2) 150mm high white retro reflective **FIRE** decals shall be fitted to the front of the vehicle, evenly spaced, with the offside decal reading in reverse.
- 4.6.3.2 A 150mm high red retro reflective **NSW FIRE BRIGADES** decal shall be positioned along both sides of the vehicle body, with each word being complete and not truncated because of any external fitting.
- 4.6.3.3 A 200mm high black **NSWFB** decal shall be affixed to the cabin roof positioned so that it can be identified from the air when the vehicle is viewed from the rear.

 NOTE

A 350mm high, black four (4) digit station number including the prefix letter 'T' (for Tanker) will be provided by the NSWFB to be positioned on the roof by the NSWFB.

- 4.6.3.4 Two sets of three (3) digit 150mm high white retro reflective station number decals shall be provided to the NSWFB to be fitted to both cabin doors by the NSWFB.
- 4.6.3.5 A three (3) digit 150mm high red or white retro reflective station number decal shall be provided to the NSWFB to be fitted to the offside rear panel by the NSWFB.

 NOTE

Red decals shall be used on a white background and white decals on a red background.

- 4.6.3.6 Two (2) 80mm high white retro reflective station name decals shall be provided to the NSWFB to be positioned on both sides of the cabin by the NSWFB.

 NOTE

A minimum of fifteen digits per station name should be allowed.

- 4.6.3.7 A conspicuity drawing detailing the allocated space for station name and number decals shall be provided to the NSWFB (refer to concept drawing ENG00135-BDY-10196 in Annex A).

4.6.4 External Signs and Labels

- 4.6.4.1 Tyre inflation pressures signs shall be fixed in a position centrally above each wheel and minimum lettering height shall be 12mm.
- 4.6.4.2 All signs required for ADR compliance shall be supplied and fitted, including **DO NOT OVERTAKE TURNING VEHICLE** signs.
- 4.6.4.3 Each locker shall be identified externally by a black locker number decal being positioned on the lower left of each locker shutter/door and minimum lettering height shall be 15mm.

NOTE

The NSWFB locker numbering system shall be used where lockers are numbered from top to bottom while going from front to rear of the vehicle (refer to Annex H).

- 4.6.4.4 NSWFB approved 000 decals shall be applied on the OS and NS of the vehicle, and shall be provided by the NSWFB on a free issue-basis.

NOTE

Final positioning is to the determination of the NSWFB.

4.7 Name Plate

- 4.7.1 One (1) name plate shall be supplied and fitted and shall not exceed 250mm x 150mm.

NOTE

Final positioning is to the determination of the NSWFB.

- 4.7.2 The name plate shall include completion date of the vehicle, NSWFB Engineering reference number, specification number, contract number and body serial number (build number).
- 4.7.3 An area of 60mm x 40mm shall be allocated for the future placement of a NSWFB bar code on the name plate.

PART 5 ELECTRICAL SYSTEM

5.1 General

- 5.1.1 The NSWFB COP for Automotive Electrical Systems (12-24V) shall be followed when installing the electrical system (refer to COP in Annex B).
- 5.1.2 The cabin/chassis shall be equipped with a 24V negative earth system.
- 5.1.3 Wiring schematics shall be submitted for evaluation prior to fabrication and these diagrams shall indicate locations and pin configuration of all connectors.
- 5.1.4 The vehicle shall be equipped with NSWFB approved batteries which shall be shielded from radiant heat exposure (refer to section 8.7 of Annex B of this specification).
- 5.1.5 All vehicle batteries shall be replaced with newly purchased batteries when each vehicle is delivered.

NOTE

The NSWFB will require proof of purchase of replacement batteries. The replaced batteries may be retained by the contractor for re-use with successive build vehicles during their construction.

- 5.1.6 Electrical load calculations shall be supplied to the NSWFB as per section 14.5 of Annex B of this specification.
- 5.1.7 Critical under body electrical wiring shall be protected by thermal lagging material (refer to clause 2.1.4.3 Note).

5.2 Battery Charging System

The vehicle is to be supported by an OEM charging system for batteries as per section 9.1 of Annex B of this specification.

5.3 Auxiliary Battery Charging System

The vehicle is to be supported by an auxiliary battery charging system for all batteries as per section 13.3 of Annex B of this specification.

NOTE

An external vehicle battery charger for the auxiliary electrical system, complete with a 2m power input cable and 4m power output cable, will be provided by the NSWFB on a free issue basis for use by the manufacturer during build.

5.4 Auxiliary Control System (ACS)

The vehicle shall be fitted with segregated wiring system and ACS as per section 4 in Annex B of this specification.

NOTE

For specific requirements on the ACS console and BCC respectively, the NSWFB currently use *Impart Special Products* system ELS6211.

5.5 Body Electrical

5.5.1 Locker power supply shall be provided in each locker as per section 10.1 of Annex B of this specification.

5.5.2 All fluorescent lights, which are supplied by the NSWFB on a free issue basis, shall be installed and tested in the vehicle prior to delivery.

NOTE

Model numbers and lengths for fluorescent lights are listed in Annex B/ Appendix C.

5.5.3 Locker lighting shall be provided in each locker as per section 10.2 of Annex B of this specification.

5.5.4 Two (2) work lights shall be as per section 11.2 of Annex B of this specification.

5.5.5 A work light shall be positioned on both sides of the body, preferably one at the front and the other at the rear.

5.5.6 The vehicle shall be fitted with body surround lights as per section 11.3 of Annex B of this specification.

NOTE

A continuous bank of lights is not required.

5.5.7 The body surround lights shall be recessed into the body or fitted underneath the body in suitably strengthened guards to withstand damage from small trees, shrubs and branches that may be encountered in off-road environments.

5.5.8 The design of the body surround lights shall facilitate easy repair and replacement.

5.5.9 The vehicle shall be fitted with standard Emergency Warning System (EWS) lights and siren as per section 12 of Annex B of this specification.

5.5.10 *Federal Signals IVP 100* rotating beacons shall be used at the rear of the appliance instead of strobe lights.

- 5.5.11 Both grille strobes and intersection strobes shall be fitted in a manner where some protection is offered to the strobe lights from shrubs and bush.

 NOTE

NSWFB currently use *Federal Signals Micro LEDs*.

- 5.5.12 Two (2) Hella 2300 rear fog tail lights shall be fitted on the vehicle and wired into the OEM circuit.

- 5.5.13 The rear combination lamps shall be *Hella 2412*.

 NOTE

The NSWFB requires a costed option for rear combination *Hella 2424 LED-HR*.

5.6 Vehicle Radios

- 5.6.1 The NSWFB COP for automotive mobile radio installation is provided in Annex D and shall be followed when installing radio equipment.

- 5.6.2 A NSW Government Radio Network (GRN) UHF radio shall be fitted and incorporated into the ACS.

 NOTE

A GRN UHF radio unit will be supplied by the NSWFB on a free issue basis. The NSWFB currently use the *Motorola XTL 5000 UHF*.

- 5.6.3 An antenna base and whip antenna shall be provided on each vehicle along with all other necessary components and wiring to the ACS for the operation of the UHF GRN radio.

 NOTE

The NSWFB currently use the *RF Industries CSW 13 Phasemaster whip antenna* and *RF Industries MB 10 00 21-520 MHz antenna base*.

- 5.6.4 One heavy duty radio extension speaker (rated to IP54) for the GRN radio shall be provided and mounted at the rear panel (refer to COP in Annex D).

 NOTE

The NSWFB currently use an *Ashidavox Model BH-1*.

5.7 Mobile Phone

 NOTE

A mobile phone and antenna will be supplied and fitted on specific vehicles by the NSWFB.

- 5.7.1 Space shall be reserved for the installation of a mobile phone with charging base and the position to be agreed between the NSWFB and the manufacturer.
- 5.7.2 The ACS shall provide all necessary components and wiring (including a circuit breaker) for the operation of a mobile phone, irrespective of whether the phone is installed.
- 5.7.3 A mobile phone antenna base shall be fitted to the cabin roof and wired back to the ACS.

⚠ NOTE

The NSWFB currently use the *Nokia 6230i* mobile phone and install kit CK-7W, and the *RF Industries SW1685* antenna base and *M1813* 3dB gain roof mount antenna.

5.8 CB Radio

⚠ NOTE

A CB radio and antenna will be supplied and fitted on specific vehicles by the NSWFB.

- 5.8.1 Space shall be reserved for the installation of a CB radio and the position to be agreed between the NSWFB and the manufacturer.
- 5.8.2 The ACS shall provide all necessary components and wiring (including a circuit breaker) for the operation of a CB radio, irrespective of whether the CB radio is installed.
- 5.8.3 A CB radio antenna base shall be fitted to the cabin roof and wired back to the ACS.

⚠ NOTE

The NSWFB currently use the *GME Electrophone TX4400* series UHF transceiver and *CB-CSW15* antenna.

5.9 Crew Cabin Communications Equipment

- 5.9.1 The following additional equipment shall be installed in the vehicle's cabin:
- (a) Invertor: one *GSL* invertor, 600W nominal duty, 24V Model FB600-24 (Contractor to supply and fit);
 - (b) Fax: one *Panasonic* KX-FP 145AL (NSWFB free issue);
 - (c) Modem: one *Ericsson* FCT F221 (NSWFB free issue);
 - (d) Modem power supply: *Ericsson* P/N BML1611G2 RIA, Input: 10V to 32V, Output 7.5V DC, 2A (NSWFB free issue);

- (e) Printer: *HP Deskjet 450* wbt (NSWFB free issue).

5.10 Global Positioning System (GPS)

- 5.10.1 On vehicles nominated by the NSWFB, a GPS and antenna shall be fitted in a position agreed upon between the NSWFB and the manufacturer as a fully costed option.

 NOTE

The GPS, mounting bracket and antenna will be supplied by the NSWFB on a free issue basis.

- 5.10.2 The ACS shall provide all necessary components and wiring (including a circuit breaker) for the operation of a GPS, irrespective of whether the GPS is installed.

 NOTE

The wiring and circuit breaker for the GPS must be clearly labelled (refer to section 1.3.7). Pre installed wiring for the GPS antenna will not be necessary. The NSWFB currently use the *Garmin StreetPilot III* GPS.

- 5.10.3 Installation instructions for retro-fitting a GPS to the vehicle shall be included in the operation and maintenance manual (refer to clause 6.1.5), and shall include detailed drawings of all brackets necessary for the installation.

5.11 Equipment Layout

The equipment layout shall be submitted to the NSWFB for approval before commencing the work.

PART 6 DOCUMENTATION, INSPECTION AND ACCEPTANCE

6.1 Manuals

6.1.1 The following manuals shall be supplied in colour (where appropriate):

- (a) Vehicle Operator's Handbook (refer to section 6.1.4;
- (b) Operation and Maintenance Manual (refer to section 6.1.5);
- (c) OEM Workshop and Parts Manual/s (refer to section 6.1.6);

 NOTE

The NSWFB reserves the right to compile and produce the operator's handbook and the operation and maintenance manual (items (a) and (b) above) at their discretion.

6.1.2 The rights of the NSWFB shall be acknowledged to reproduce manuals and handbooks, in part or in whole, for inclusion into NSWFB training manuals which will be distributed within the organisation in hard copy and/or by electronic means (e.g. CD-rom, intranet) as necessary.

6.1.3 Following publication, any subsequent changes within the warranty period to either the Vehicle Operator's Handbook, Workshop Manual or Parts Manual shall be distributed to the NSWFB in the form of an Amendment Instruction Sheet.

6.1.4 Vehicle Operator's Handbook

6.1.4.1 A vehicle operator's handbook shall be compiled and kept in an A4 ring bound folder divided into the following sections, for easy referencing by the operators:

- (a) an amendment sheet;
- (b) a contents page (by section);
- (c) a diagram of vehicle detailing dimensions (full page landscape);
- (d) general specifications (on page facing vehicle diagram);
- (e) general description of vehicle ie. purpose, capacity etc;
- (f) instrumentation and controls (including communications equipment);
- (g) vehicle and auxiliary pump operating procedures;
- (h) locker layout;
- (i) equipment stowage;

- (j) vehicle inventory;
- (k) maintenance periodicity (including daily and weekly checks);
- (l) driving and operating advice.

6.1.4.2 One (1) vehicle operator's handbook shall be supplied for each vehicle and five (5) spare copies and one (1) electronic copy shall be provided to the NSWFB with the delivery of the first vehicle.

6.1.4.3 The vehicle operator's handbook shall be compiled using *Adobe FrameMaker 7.2* or higher, with page layouts to the requirements of the NSWFB.

 NOTE

The NSWFB will supply Adobe FrameMaker templates on request.

6.1.5 Operation and Maintenance Manual

6.1.5.1 An operation and maintenance manual shall be compiled as a reference manual for maintenance staff and shall be an A4 ring bound folder divided into the same sections as per the operator's handbook (refer to clause 6.1.4) and additionally shall include enhanced maintenance instructions on the following:

- (a) body components (including roller shutters/doors, slides, access panels, brackets, straps, and mounting system);
- (b) auxiliary systems fitted by contractor (including electrical, air and plumbing systems);
- (c) fault finding;
- (d) modifications page (for recording any future vehicle modifications);
- (e) parts list of equipment installed by contractor;
- (f) drawings (refer to section 6.2).

6.1.5.2 Five (5) hard copy sets and one (1) electronic copy of the operation and maintenance manual shall be provided to the NSWFB with the delivery of the first vehicle.

6.1.5.3 The operation and maintenance manual shall be compiled using *Adobe FrameMaker 7.2* (or higher) with page layouts to the requirements of the NSWFB.

6.1.6 Workshop and Parts Manuals

6.1.6.1 The following workshop and parts manuals shall be supplied to the NSWFB from the OEM:

- (a) workshop and parts manual/s for cabin/chassis;

- (b) workshop and parts manual/s for auxiliary engine and pump;
- (c) workshop and parts manual/s for all other OEM equipment as appropriate.

⚠ NOTE

Other OEM workshop manuals include manuals for other major equipment that may require routine maintenance or servicing, including the engine and transmission, if not from the cab/chassis manufacturer.

- 6.1.6.2 Five (5) hard copy sets of workshop and parts manuals shall be provided with the delivery of the first vehicle.

⚠ NOTE

Any significant change in installed equipment during successive builds shall include five (5) copies of the manuals for the changed equipment item.

6.1.7 Manual Amendment

Following publication, any subsequent changes within the warranty period to either the Vehicle Operator's Handbook, Operation and Maintenance Manual or Workshop and Parts Manual shall be distributed to the NSWFB in the form of an amendment instruction sheet and/or a recall sheet.

6.2 Drawings

- 6.2.1 Three (3) sets of the following engineering drawings and schematics shall be provided at the time of delivery of the first vehicle, or as may otherwise be agreed to by the NSWFB:

- (a) A general arrangement drawing detailing vehicle layout, weights (actual axle weights and centre of gravity) and an outline of vehicle specifications (e.g. dimensions, clearance angles and heights);
- (b) A body drawing detailing all dimensions, equipment bracket locations/layouts and equipment brackets in detail;
- (c) Hydraulic, pneumatic and waterway schematic drawings including all part numbers and suppliers (both OEM and contractor installed);
- (d) Electrical schematic to show OEM and all additional vehicle wiring fitted and the schematic shall include all part numbers and equipment suppliers.

⚠ NOTE

Separate parts lists may be provided in lieu of a parts list on the schematic.

- 6.2.2 Drawings shall be submitted in the following two (2) formats:

- (a) standard paper sizes (A0 to A4 inclusive); and

- (b) magnetic media, compatible with *Microsoft Windows XP* operating system and all drawings shall either be prepared in, or be fully compatible with *AUTOCAD 2006* in DWG format or DXF (approval by the NSWFB may be required for layering conventions and use of colour).

⚠ NOTE

Other drawing formats may be deemed acceptable for minor work, including the provision of accurate, carefully drawn diagrams prepared by hand, if prior written approval is obtained. Minimum acceptable sizes being A3.

- 6.2.3 All drawings shall comply with Australian Standards for technical drawing.
- 6.2.4 All drawings produced shall cross reference to OEM drawings where applicable.
- 6.2.5 The drawings shall include notes, instructions, part no. brands and suppliers.
- 6.2.6 Components which appear on more than one schematic drawing shall be identically named so that it is recognised as being the same component.
- 6.2.7 Final drawings and other supporting documentation shall be provided following acceptance of the completed work and formal acceptance of the drawings by the NSWFB is considered essential to the completion of the work.
- 6.2.8 At the completion of the work, as-built drawings, incorporating all changes, shall be submitted together with a request for final inspection.

⚠ NOTE

Final inspection requests may not be accepted if the drawings have not been submitted.

6.3 NSWFB Supplied Drawings

Where specification drawings are provided by the NSWFB these may be in the form of:

- (a) conceptual, general layout and fabrication information; and/or
- (b) overall design, layout and fabrication drawings as well as installation requirements; and/or
- (c) layout, including fabrication details, schematics, drawings and supporting documentation of NSWFB standard systems.

⚠ NOTE

Detailed design, proof of performance, provision of drawings and supporting documentation become the responsibility of the contractor.

6.4 Training

- 6.4.1 Comprehensive competency based training shall be provided to selected NSWFB staff by means of seminars and workshops at the NSWFB Logistics Support Centre, Greenacre.
- 6.4.2 The areas of training shall include:
- (a) vehicle safety;
 - (b) operation of the vehicle;
 - (c) maintenance and fault finding of the vehicle;
 - (d) warranty provisions.
- 6.4.3 The training sessions shall be held at a time mutually agreed upon between the NSWFB and the manufacturer.
- 6.4.4 A copy of the proposed training sessions including course content and any training manuals shall be submitted to the NSWFB for approval at least three (3) weeks prior to the training sessions being conducted.

6.5 Inspection

- 6.5.1 Having given reasonable notice of intention, approved NSWFB representatives shall have free access to the plant concerned with the manufacture of any materials, components or the vehicle itself.
- 6.5.2 The vehicle will be inspected during construction at designated target milestones as nominated in the timeline/chart and prior to the commencement of the next phase of manufacturing (e.g. after fitting body).

NOTE

A Gantt chart or similar documentation shall be supplied to the NSWFB in both paper and electronic forms, prior to commencing construction showing key tasks and amount of time to complete each (a timeline should also be provided showing target milestones on a time scale with estimated starting and finishing dates).

- 6.5.3 The NSWFB contract administrator shall be notified in writing of a request for inspection at a particular stage and this notice complete with all current working engineering drawings shall be made to the NSWFB at least five (5) working days prior to the inspection.

NOTE

A recognised *Quality System* may, following negotiation with the NSWFB, reduce the above inspection stages.

- 6.5.4 Drawings relevant to the stage of construction and purpose of each inspection shall be provided to the NSWFB prior each inspection.
- 6.5.5 Any tests required by the NSWFB to be carried out during an inspection, shall be conducted by the contractor and all the facilities and materials necessary for conducting such tests shall be furnished by the contractor at their expense.

6.6 Vehicle Pre-Delivery

The completed vehicle shall be trialed for a minimum of ten (10) elapsed engine hours in road mode, and the water pump tested for a minimum of four (4) hours, according to engine, chassis and pump manufacturer guidelines.

NOTE

The contractor is responsible for providing both the driver/operator and the fuel required to carry out these trials.

6.7 Acceptance Testing

- 6.7.1 The first vehicle and other vehicles nominated by the NSWFB (e.g. a vehicle incorporating a change in design), shall be subject to acceptance testing by the NSWFB at the manufacturer's premises, and shall cover:
- (a) construction requirements;
 - (b) final body/equipment layout;
 - (c) specification requirements;
 - (d) contractual requirements not necessarily covered by certification, including full operational testing.
- 6.7.2 All tests shall determine whether or not the vehicle conforms to this specification.
- 6.7.3 If the vehicle is found to be incomplete or has failed the acceptance test, the contractor shall rectify all identified faults prior to the next acceptance test on the same vehicle, and shall be responsible for all expenses incurred by the NSWFB officer/s conducting the test.
- 6.7.4 All materials necessary for conducting the acceptance tests shall be furnished by the contractor at their expense.

6.8 Registration

6.8.1 Registration

6.8.1.1 Registration shall be arranged by the contractor in compliance with the agreement between the NSWFB and the NSW *RTA*. The contractor shall arrange with the vehicle supplier for the pre-delivery inspection and registration.

6.8.1.2 This agreement allows for the *RTA* to process registration in conformity with pre-designated NSWFB registration numbers.

6.8.2 Green Slip

The Third Party green slip insurance shall be provided by the NSWFB. With the *RTA* agreement there is a registration fee and an inspection fee for which the contractor shall make allowances.

6.8.3 Number Plates

The NSWFB will supply FBY series number plates for each vehicle on a free issue basis and shall be affixed in accordance with the requirements of the NSW *RTA*.

6.9 Delivery

6.9.1 Acceptance of the vehicle shall be dependant upon the results of the tests set down in this specification.

6.9.2 The NSWFB shall be notified in writing of the date of acceptance trials.

6.9.3 The vehicle shall be delivered to the Assistant Director Contract and Supply, NSWFB Logistics Support Centre, Greenacre, complete with the following:

- (a) all test reports and other documentation (refer to section 6.12);
- (b) copy of the *Federal Office of Road Safety* compliance plate approval;
- (c) vehicle registration papers;
- (d) a completed delivery hand-over sheet (see Annex E);
- (e) fuel tank 3/4 full (minimum).

6.9.4 The whole of the interior (the entire inner space) of the vehicle cabin and stowage areas as well as under all removable mats and the like shall be free of dirt and to the satisfaction of the NSWFB.

6.9.5 The exterior of the vehicle shall be fully detailed for presentation to the NSWFB.

6.10 Replacement Spare Parts

- 6.10.1 The NSWFB shall be supplied with a detailed list of recommended replacement parts for all components and the list shall include availability and pricing in Australian currency at the time of tendering.
- 6.10.2 Where components and assemblies are manufactured to European or US Standards and equivalent Australian Standards exist, then the NSWFB after consultation with the manufacturer reserves the right to utilise equivalent spare parts without voiding the warranty.

6.11 Quality System

- 6.11.1 The contractor shall preferably have an established Quality System (e.g. AS/NZS ISO 9001) in place which shall reflect the methodologies for the design/development and manufacture of vehicles and full details and certification documents of any Quality System shall be provided to the NSWFB.

6.12 Contractor Supplied Documentation

6.12.1 Load Distribution and Stability

- 6.12.1.1 A Roll Threshold Test shall be conducted by a qualified engineering authority to identify the location of the Centre of Gravity (both longitudinal and transverse), and a test certificate shall be provided to the NSWFB.
- 6.12.1.2 The tests shall be conducted on a fully laden vehicle with equipment and simulated six (6) crew weight (100kg per person) and the results must be assessed by the approved testing authority as being comparable to similarly loaded vehicles tested by the authority.

NOTE

The static rollover threshold should not be less than 30° on both sides.

- 6.12.1.3 A copy of the test reports shall be provided with the delivery of the first vehicle.
- 6.12.1.4 Successive vehicles shall be subjected to testing if the design of the body or the specifications of the cab/chassis vary in a significant manner from the first vehicle.

NOTE

The NSWFB shall be advised of variations between successive vehicles and will decide if subsequent vehicles need testing.

6.12.2 First Vehicle Only

- 6.12.2.1 Upon completion of the first vehicle, a weighbridge certificate shall be provided showing laden masses for the front, rear and combined axle weights.

⚠ NOTE

Laden means the completed vehicle in roadworthy condition including full fuel tank, full water tank, all equipment and crew (100kg per seated position). The laden weight will be the vehicle's GOM.

- 6.12.2.2 The documentation listed below shall be provided with the delivery of the first completed vehicle only:

Ref	Description
1.7.2	Vehicle risk assessment
2.3.5.2	Vehicle performance tests
2.11.7	Cabin noise levels
3.2.15	Pump noise levels
3.10.6	Pump test equipment calibration
6.1.4	Copies of vehicle operators handbook.
6.1.5	Operation and maintenance manual.
6.1.6	Workshop and parts manuals.
6.2	Drawings.
6.12.1	Roll threshold/stability - certification
6.12.2.1	Weighbridge certificate - laden (GOM)
2.3.5.2	Dynamometer test

6.12.3 Each Vehicle

- 6.12.3.1 An inspection certificate shall be provided and completed for each vehicle, and shall be used to check the quality and workmanship of installation and manufacture as well as correct working functionality of the complete vehicle.
- 6.12.3.2 A sample of the inspection certificate shall be provided to the NSWFB for approval prior to the final build inspection of the first vehicle.

⚠ NOTE

Responsibility for Quality Control rests with the contractor. Omission of any item or function check from the inspection certificate does not void the contractor's responsibility to ensure the delivered vehicle is in full working order and free of defects.

- 6.12.3.3 Upon completion of each vehicle a weighbridge certificate shall be provided showing unladen masses for the front rear and combined axle weights.

⚠ NOTE

Unladen means the completed vehicle in roadworthy condition including a full fuel tank. This does not include water, equipment or crew.

- 6.12.3.4 Upon completion of each vehicle, a delivery hand over sheet shall be completed and provided (refer to Annex E of this specification).
- 6.12.3.5 The documentation listed below shall be provided for each vehicle upon that vehicle's delivery:

Ref	Description
2.5.3	Wheel alignment certificate.
1.8.2 (s)	Certification of seat and seat belt modifications.
3.10.6	Pump performance certificate.
6.1.4	Vehicle operators handbook.
6.12.2.1	Weighbridge certificate.
Annex E	Delivery handover sheet.
Annex F	Vehicle information data sheets.

6.13 NSWFB Supplied Equipment

The following equipment shall be provided by the NSWFB on a free issue basis:

Ref	Description
4.3.6.2	NSWFB insignia mudflaps.
4.6.1.3	NSWFB insignia (decals).
4.6.4.4	NSWFB 000 decals.
5.3	Vehicle battery charger and cable.
2.12.3.2, 3.3.1.8, 5.5.2	Fluorescent lights.
5.9.1	Fax: one <i>Panasonic</i> KX-FP 145AL
5.9.1	Modem power supply: <i>Ericsson</i> P/N BML1611G2 RIA, Input: 10V to 32V, Output 7.5V DC, 2A
5.9.1	Modem: one <i>Ericsson</i> FCT F221
5.9.1	Printer: <i>HP Deskjet 450 wbt</i>
4.4.1.2	Vehicle Inventory

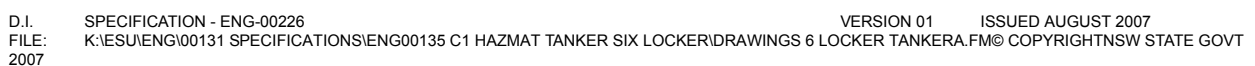
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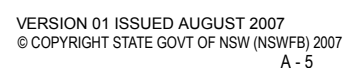
ANNEX A CLASS 1 (4 X 4) HAZMAT TANKER SIX LOCKER CONCEPT DRAWINGS

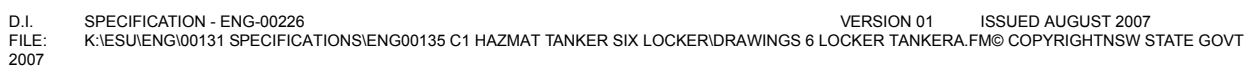
The following concept drawings will be supplied in hard copy A3 format. Graphics of the ACS console is also included below.

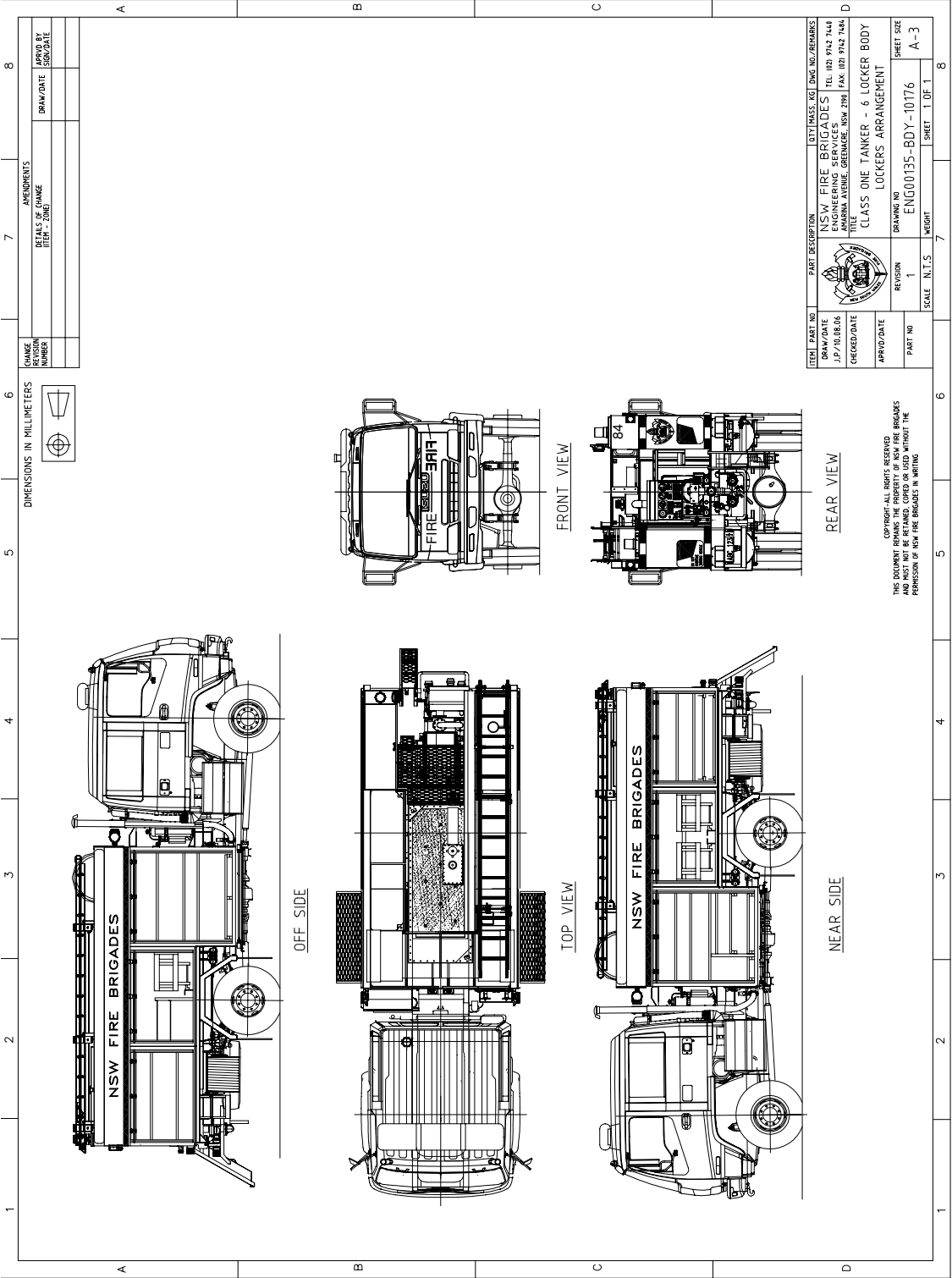
TITLE	DRAWING NUMBER
Wheel rim painting (typical)	ENG00220-BDY-10123
General arrangement	ENG00135-BDY-10127 Sheet 1
General arrangement	ENG00135-BDY-10127 Sheet 2
Typical Sub-frame for FTS 750 Composite Vehicle	ENG00135-BDY-10129
Class 1 Tanker - 6 Locker Body Lockers Arrangement	ENG00135-BDY-10176
6 locker Class 1 Composite Pump Control Panel	ENG00135-BDY-10131
Class 1 Tanker with 6 lockers - Pumping Schematic	ENG00135-HYD-10132
Lockers - General Arrangement	ENG00135-BDY-10133
Locker N/S1 - General Layout	ENG00135-BDY-10134
Typical locker outer shell & floor construction	ENG00135-BDY-10135
Locker N/S1 & O/S1 - Typical bottom frame & shelf support frame construction	ENG00135-BDY-10136
Locker N/S1 - Typical Tray 1 & Tray 2 construction	ENG00135-BDY-10137
Locker N/S1 - Typical Shelf 1 & Shelf 2 construction	ENG00135-BDY-10138
Locker N/S2 - General Layout	ENG00135-BDY-10139
Typical locker outer shell construction	ENG00135-BDY-10140
Locker N/S3 - General Layout	ENG00135-BDY-10141
Locker N/S3 - Typical Tray 4 & Shelf 3 construction	ENG00135-BDY-10142
Locker O/S1 - General Layout	ENG00135-BDY-10143
Locker O/S1 - Typical Tray 5 construction	ENG00135-BDY-10144

TITLE	DRAWING NUMBER
Locker O/S2 - General Layout	ENG00135-BDY-10145
Locker O/S2 Typical Shelf 4 & shelf support frame construction	ENG00135-BDY-10146
Locker O/S3 - General Layout	ENG00135-BDY-10147
Locker O/S3 - Typical outer shell & floor construction	ENG00135-BDY-10148
Locker O/S3 - Typical Shelf 5 construction.	ENG00135-BDY-10149
Class 1 Hazmat Tanker Conspicuity	ENG00135-BDY-10196
Class 1 Hazmat Tanker Instruction Label	ENG00135-HYD-10205

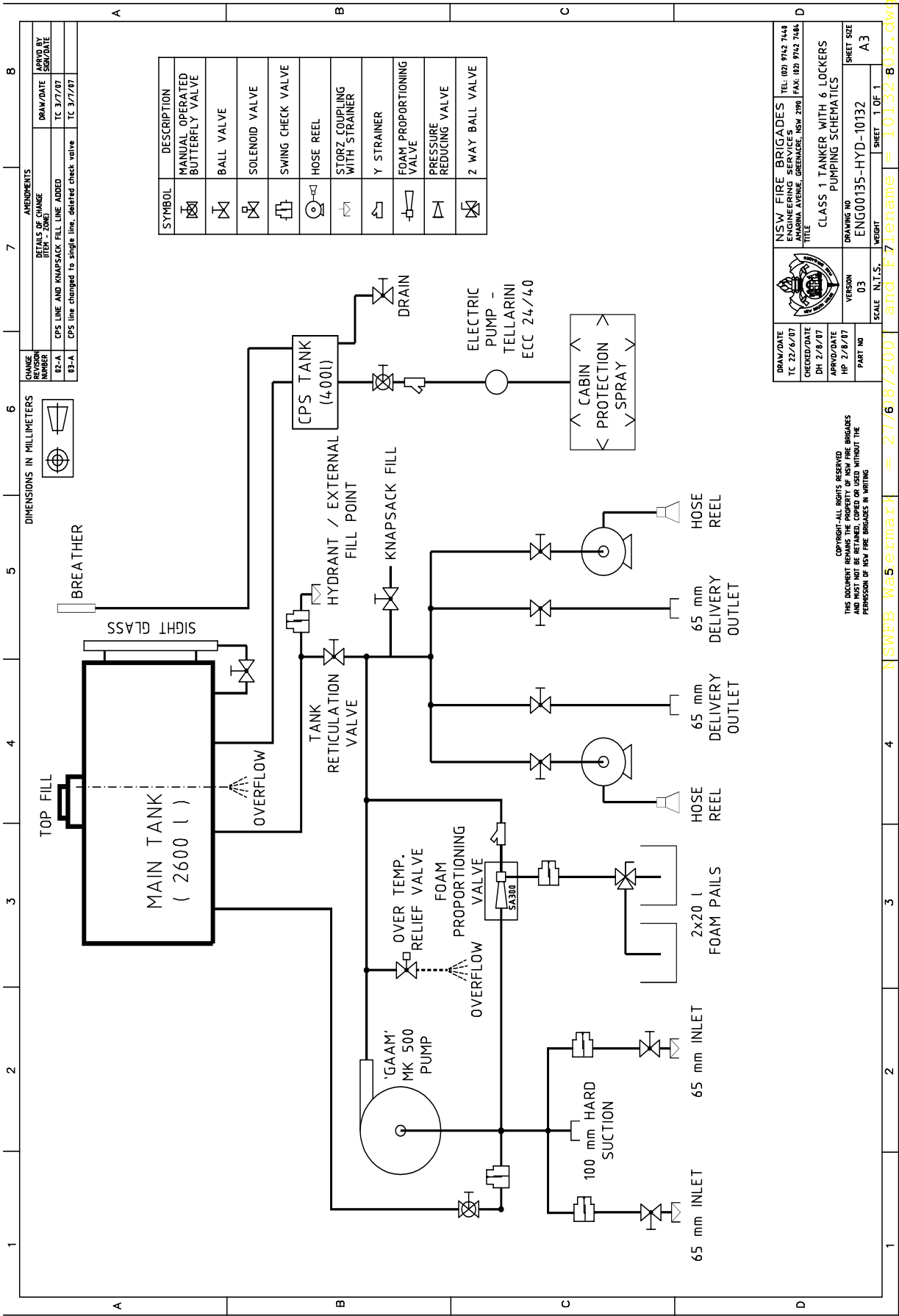


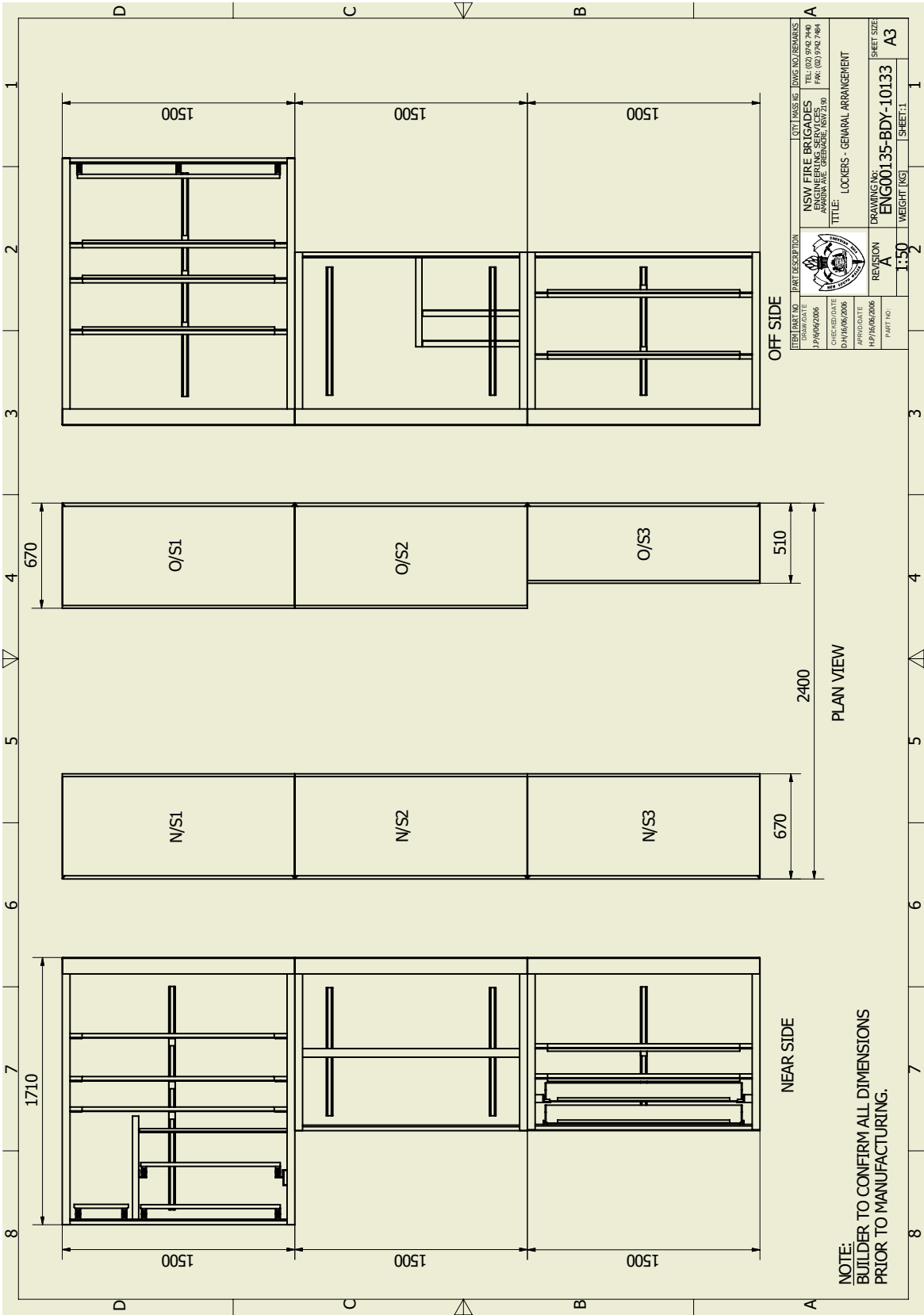


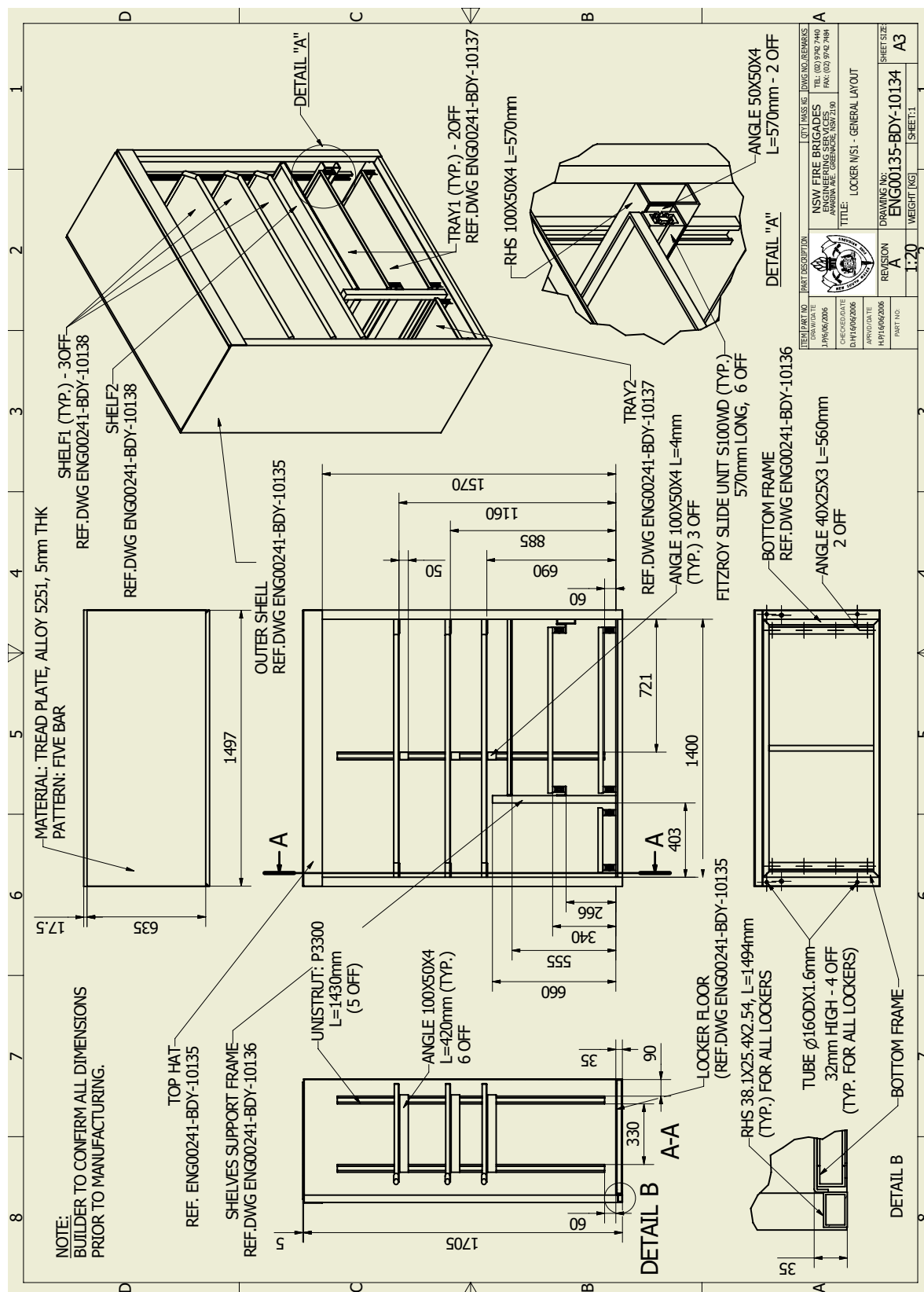


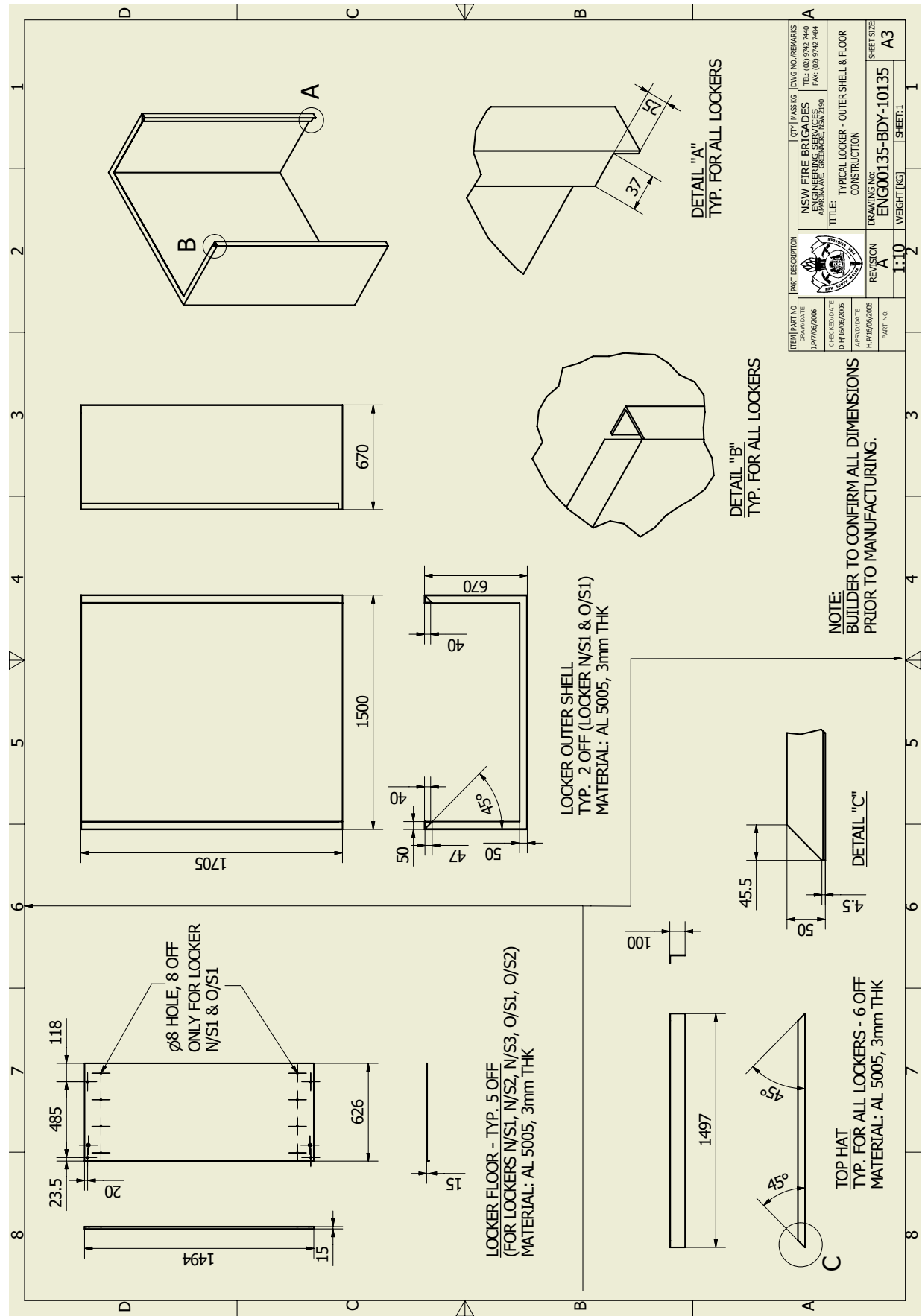


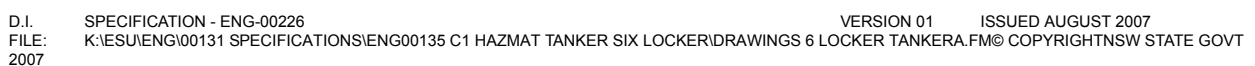
D.I. SPECIFICATION - ENG-00226 VERSION 01 ISSUED AUGUST 2007
FILE: K:\ESU\ENG\00131 SPECIFICATIONS\ENG00135 C1 HAZMAT TANKER SIX LOCKER\DRAWINGS 6 LOCKER TANKER.FM © COPYRIGHT NSW STATE GOVT
2007

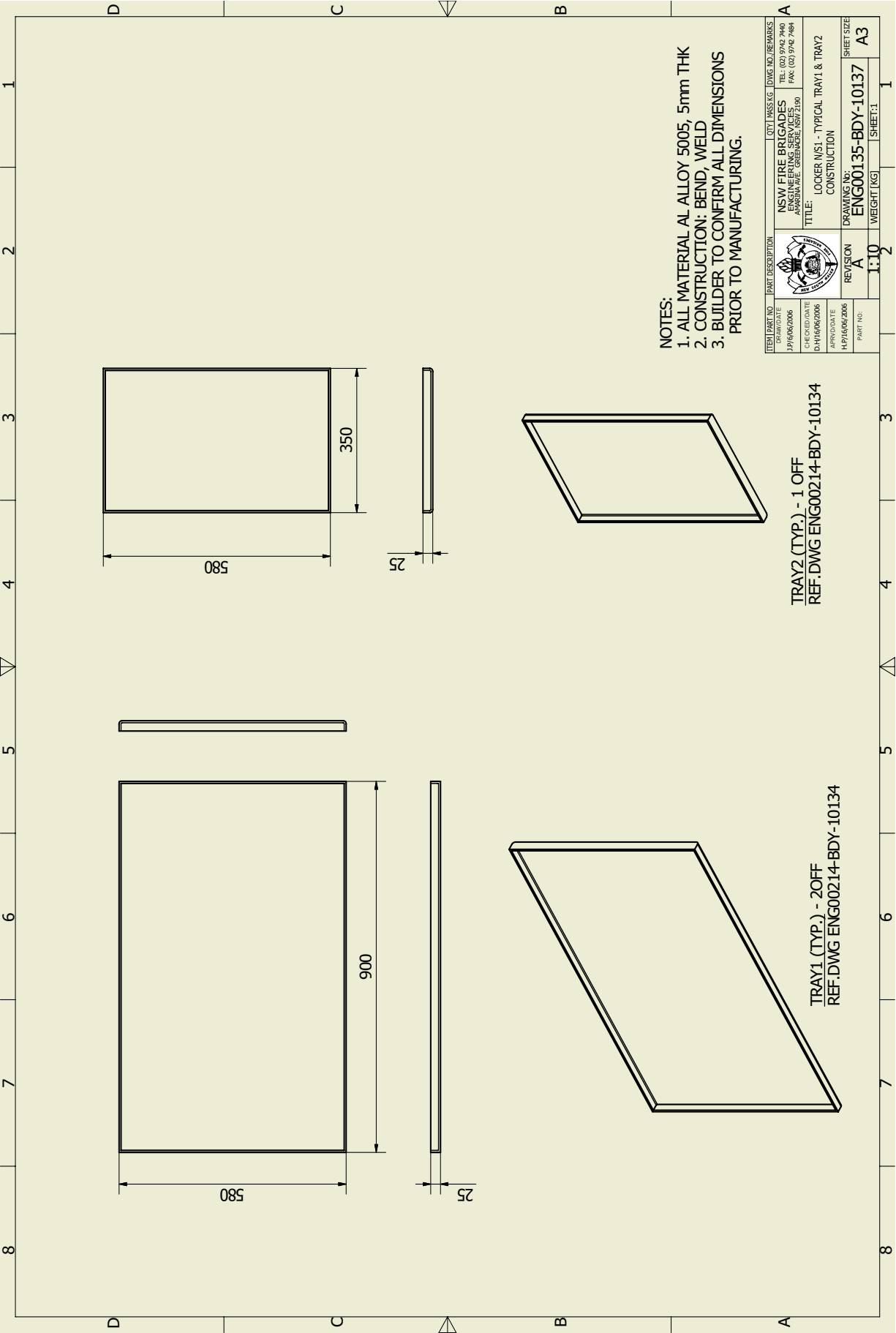


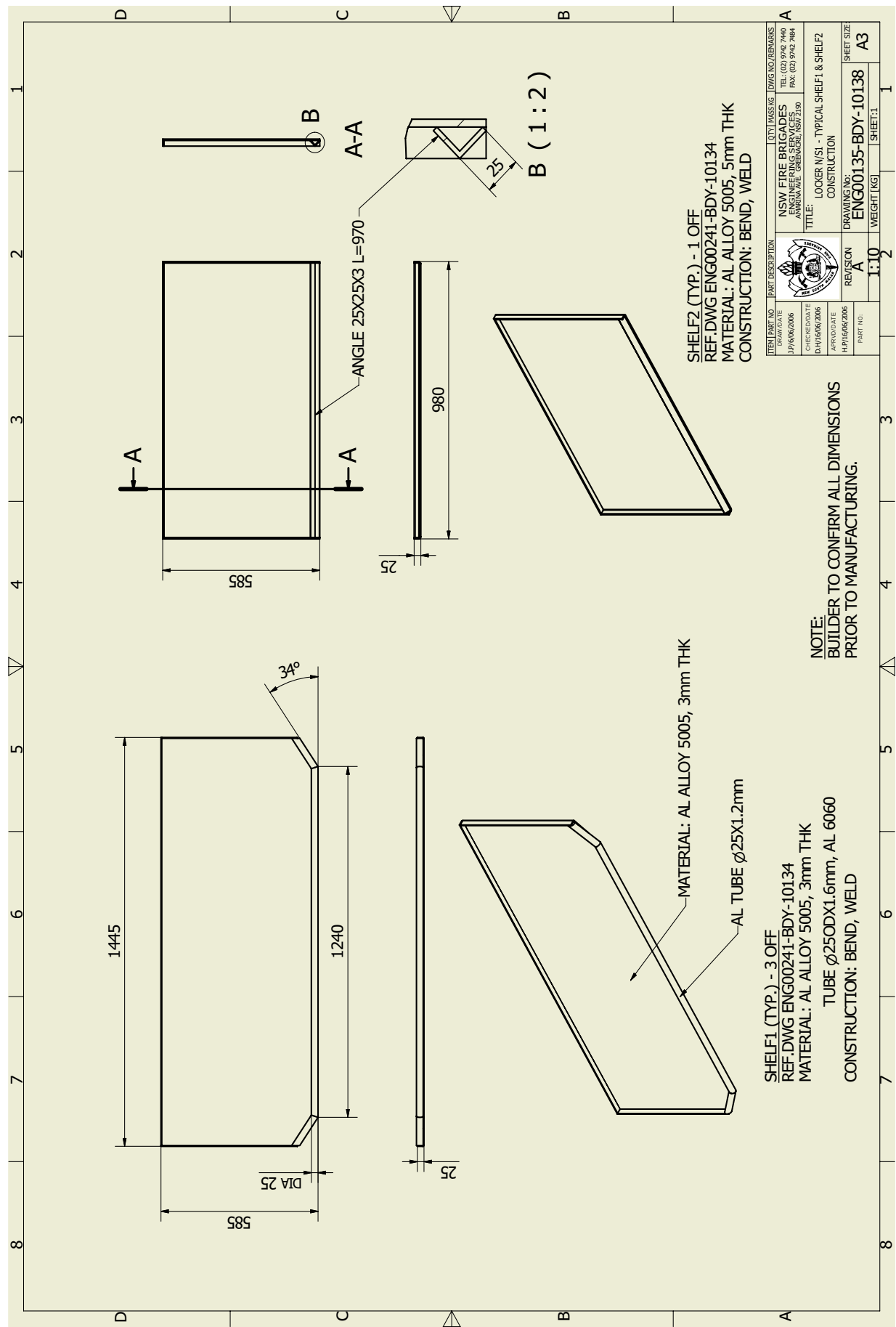


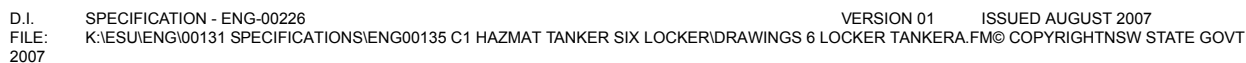


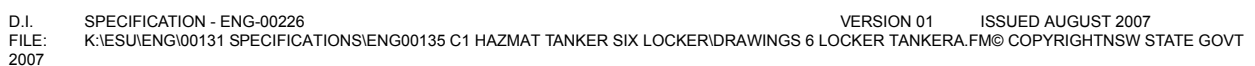




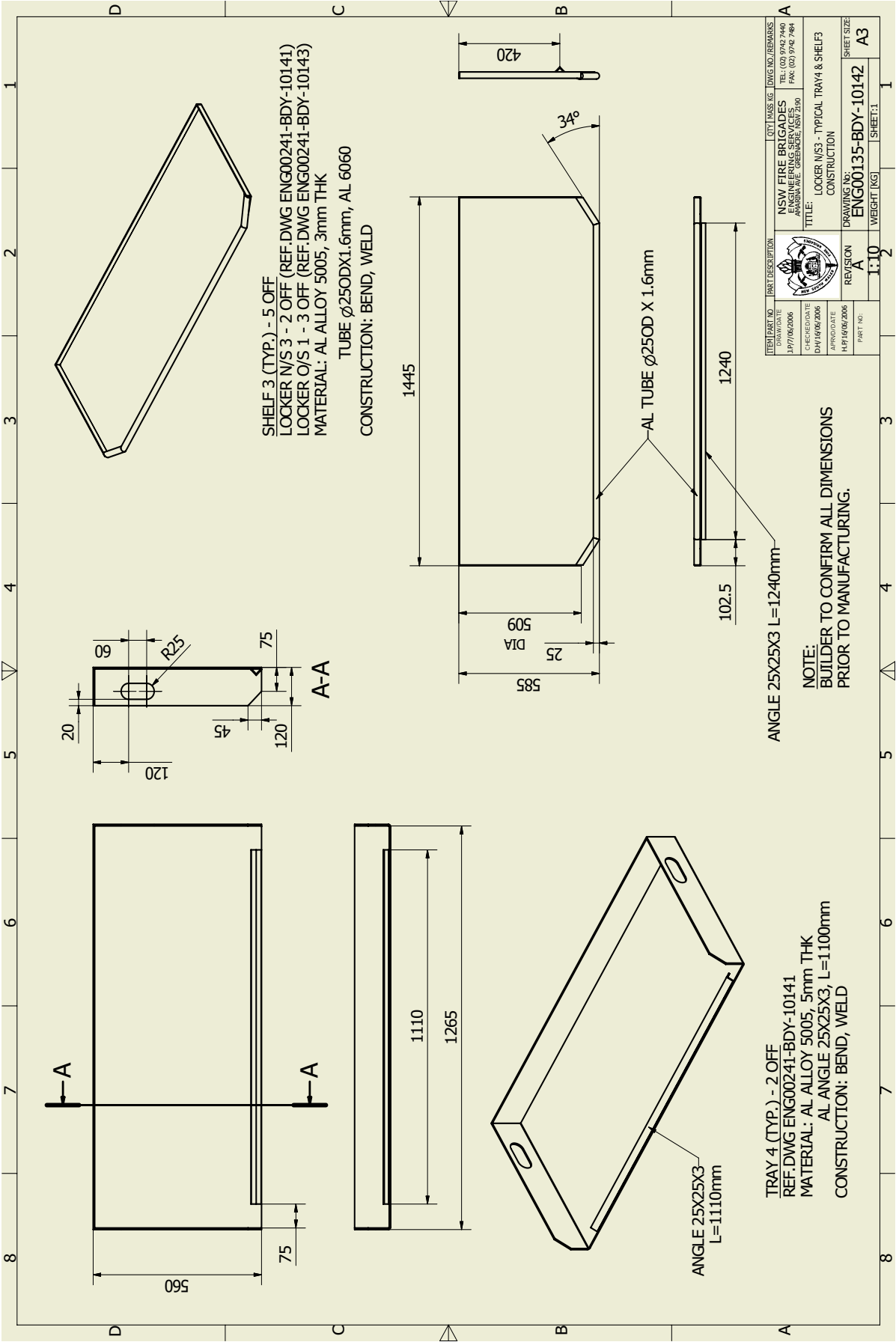


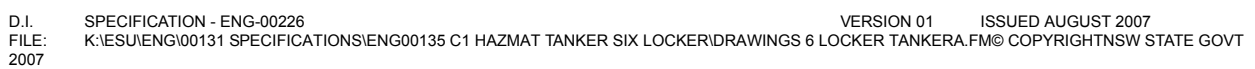


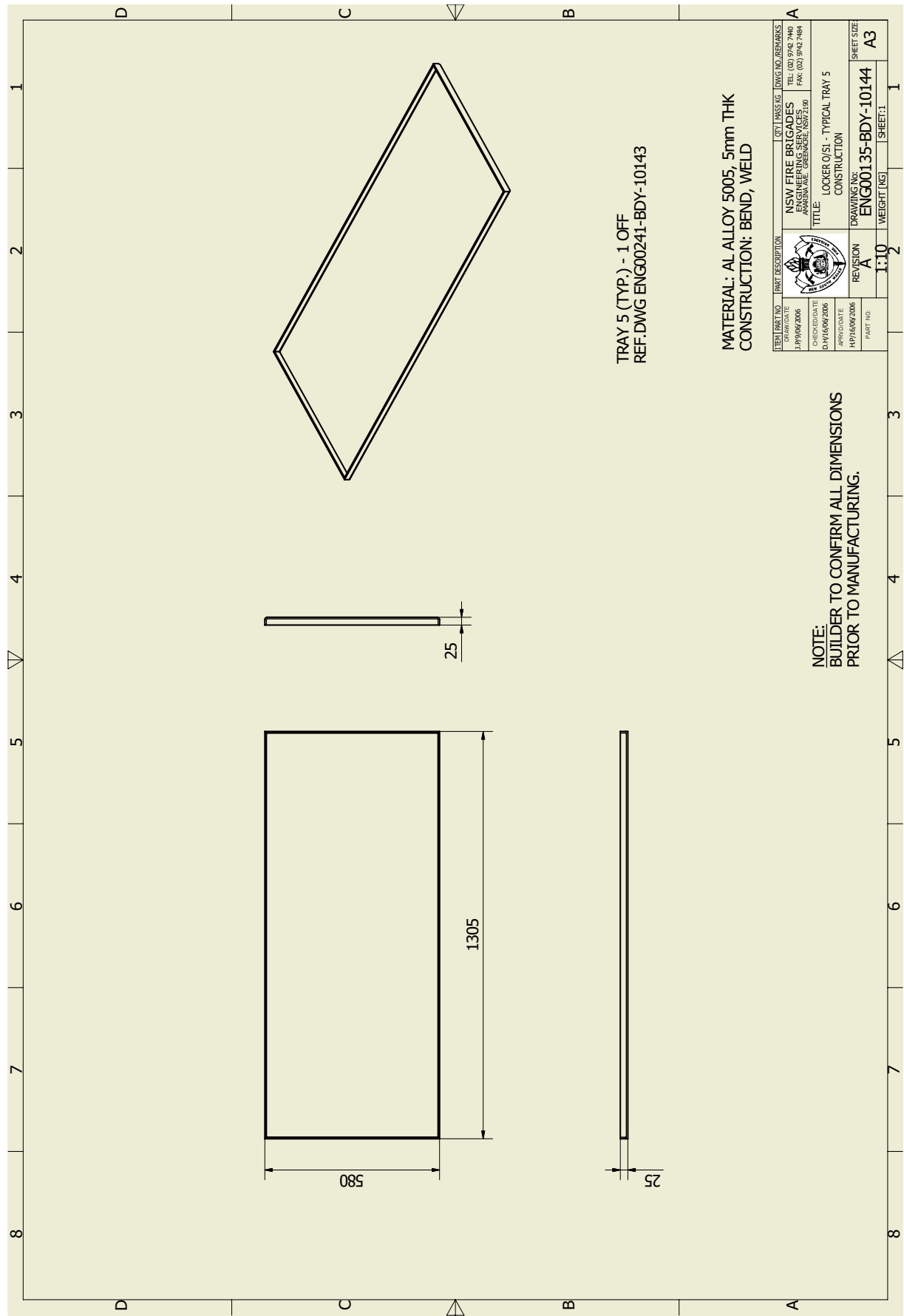


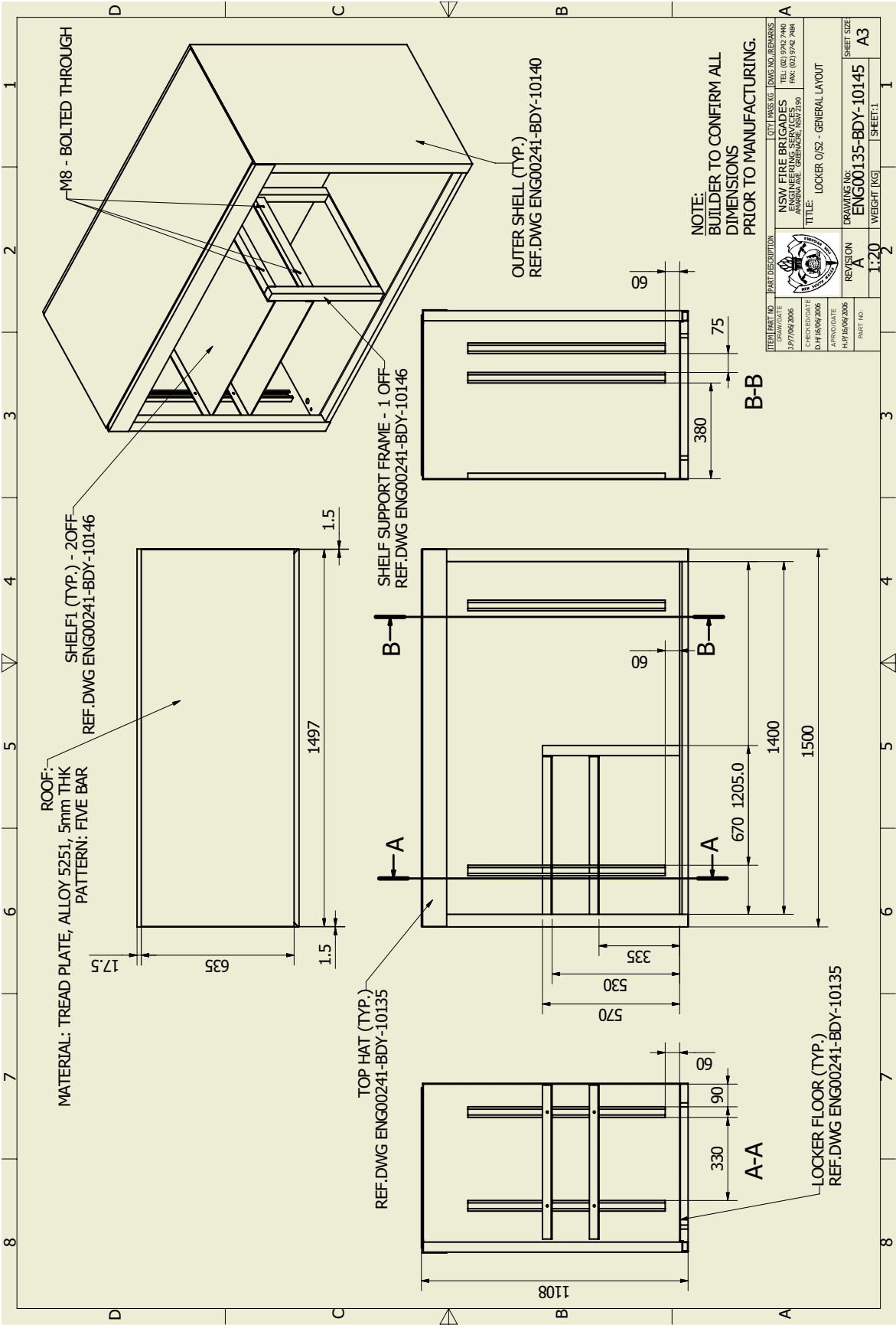


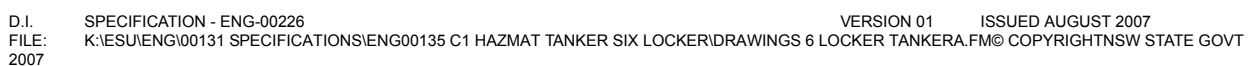


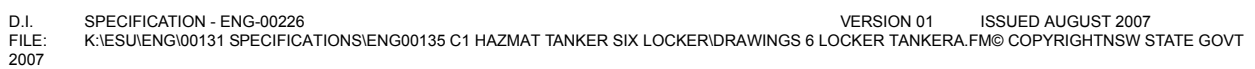


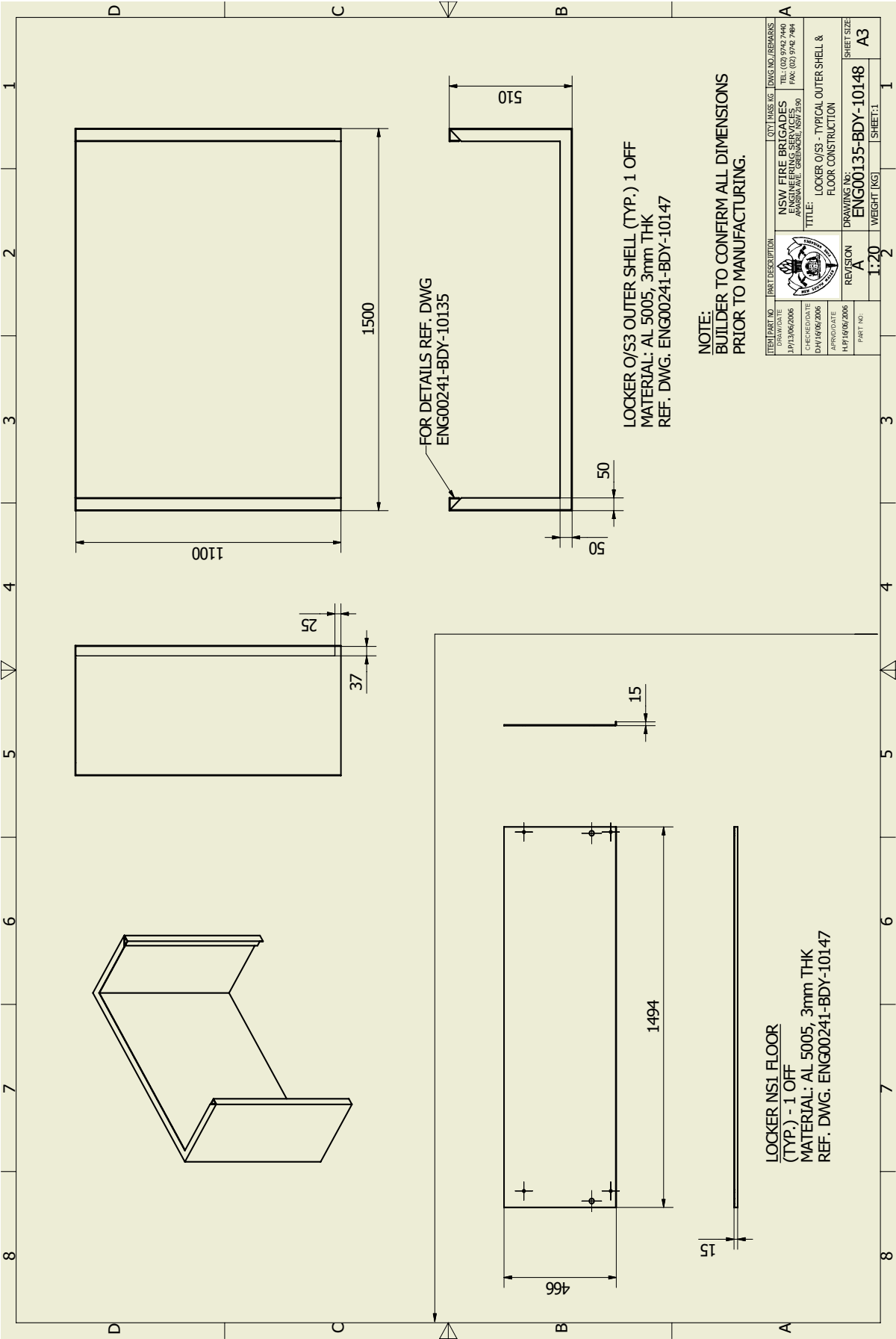


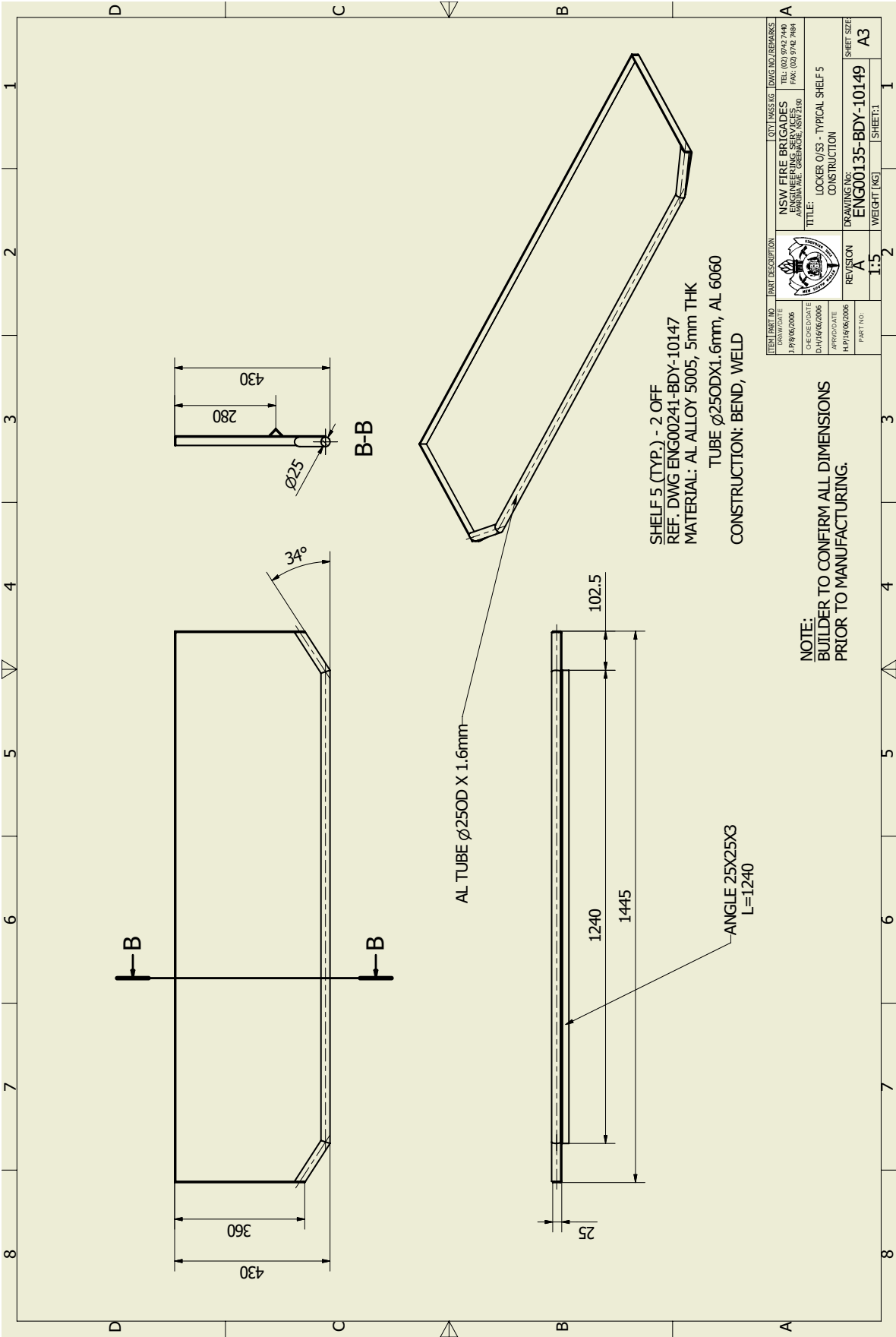


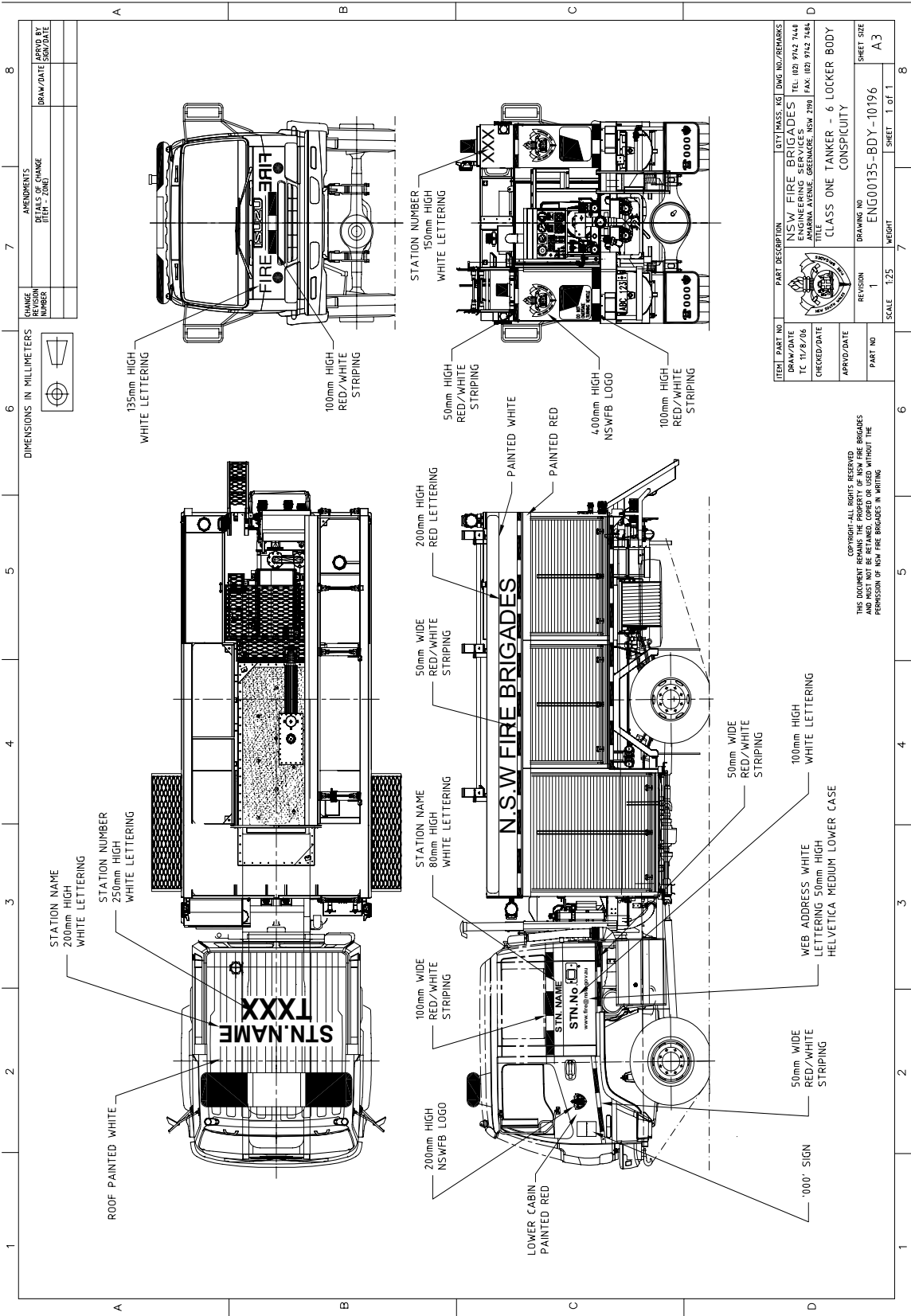


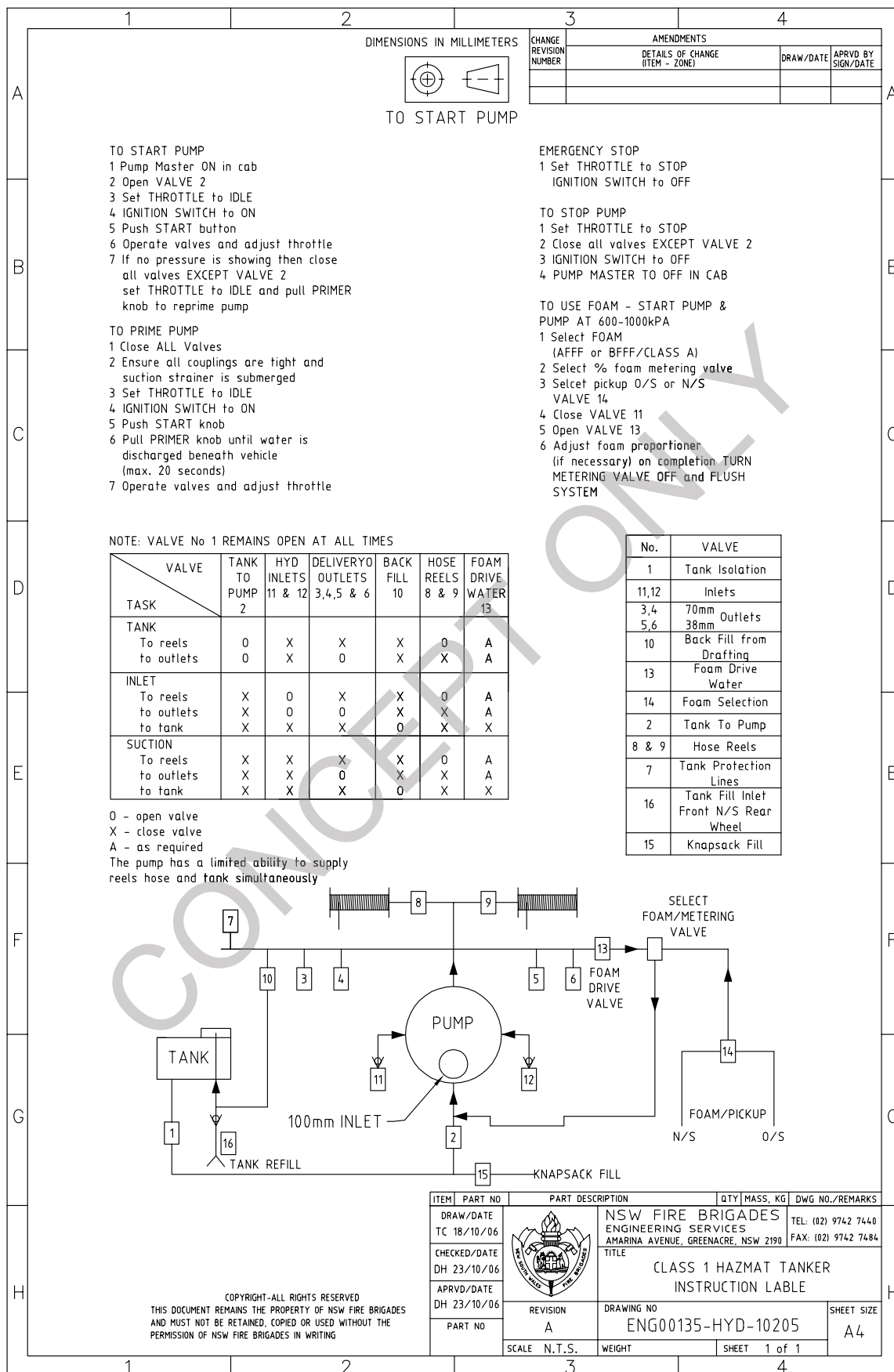








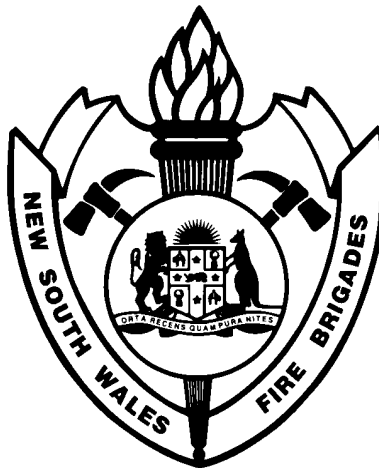




ANNEX B CODE OF PRACTICE - AUTOMOTIVE ELECTRICAL SYSTEMS LOW VOLTAGE (10-32 VOLT) WIRING, CONTROL AND MONITORING CIRCUITS

The installation of electrical wiring, control and monitoring circuits for the 10-32V system shall follow the latest version of this Code of Practice.

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CODE OF PRACTICE

EXTRA LOW VOLTAGE (10-32 VOLT)

AUTO-ELECTRICAL SYSTEM

OS-E-94/01-04216

Version B

ABBREVIATIONS

	DESCRIPTION		DESCRIPTION
ACS	Auxiliary Control System	HRC	High Rupturing Capacity
ADR	Australian Design Rules	IP	International Protection (ratings)
APD	Auxiliary Power Distribution	LCD	Liquid Crystal Display
AMC	Auxiliary Master Circuit	LED	Light Emitting Diode
AS	Australian Standard	NS	Near Side (on left looking from rear)
BCC	Body Control Console	NSWFB	New South Wales Fire Brigades
CB	Circuit Breaker	OEM	Original Equipment Manufacturer
COP	Code of Practice	OS	Off Side (on right looking from rear)
DC	Direct Current	PVC	Poly-Vinyl Chloride
EAC	Electrical Auxiliary Compressor	SAA	Standards Association Australia
ECN	Engineering Change Note	SI	Systems International
EWS	Emergency Warning System	UHF	Ultra High Frequency
GRN	Government Radio Network	UPVC	UV (resistant) Poly-Vinyl Chloride
HFT	Halogen (free) Fire (resistant) Temperature (stable)	UV	Ultra Violet (radiation)
		VSC	Voltage Sensing Circuit

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1 Scope

- 1.1 This Code of Practice (COP) details the New South Wales Fire Brigades (NSWFB) requirements for extra low voltage auto-electrical system.

2 Application

- 2.1 This COP applies to work done by NSWFB personnel and contractors to the NSWFB (including indirectly appointed subcontractors).
- 2.2 This COP applies to both new vehicles and equipment, and existing vehicles being upgraded through repairs, major overhaul, refit or enhancement.
- 2.3 Compliance with this COP may be a specific requirement of a contract.
- 2.4 The Manager Engineering Services may exempt any vehicle in part or completely from compliance with this COP with the exemption being given in writing.
- 2.5 Minor fleet vehicles (e.g. cars, 4WDs, utilities and commercial vehicles) are fitted with a simple auxiliary wiring system (a radio, torch, emergency warning lights and siren) and thus are excluded from the scope of this COP.

Note: Minor fleet vehicles are leased vehicles which have all auxiliary equipment removed after the vehicle is decommissioned.

- 2.6 All relevant Australian Design Rules for Motor Vehicles and Trailers shall be complied with.
- 2.7 If any conflict arises between this COP, the manufacturer's requirements and ADR requirements then the NSWFB shall be consulted before work commences.
- 2.8 Some sections of this COP only apply when the respective electrical equipment is specified in a technical specification or is otherwise fitted (e.g. if an auxiliary drive system is fitted for a pump or alternator, section 13.5 is applicable).

Note: Refer to the technical specification for variations to equipment or installation requirements and additional or non-standard equipment.

3 Applicable Standards

- 3.1 All units of measurement are in accordance with the metric system (SI) as accepted in Australia.
- 3.2 Notwithstanding the requirements detailed in this COP, all electrical work shall comply with the latest version of the following Australian Standards:
- (a) AS 1000 - The international system of units (SI) and its application;
 - (b) AS/NZS 1020 - The control of undesirable static electricity;

- (c) AS 1100 (full series) - Technical drawing;
- (d) AS 1101 (full series) - Graphic symbols for general engineering;
- (e) AS 1102 (set) - Graphic symbols for electrotechnology;
- (f) AS 1939 - Degrees of protection provided by enclosures for electrical equipment;
- (g) AS/NZS 2053 (full series) - Conduits and fittings for electrical installations;
- (h) AS 3000 - SAA Wiring Rules;
- (i) AS 3008.1 - Cables for alternating voltages up to and including 0.6/1kV;
- (j) AS/NZS 3013 - Electrical installations - Classification of the fire and mechanical performance of wiring systems;
- (k) AS 3100 - Approval and test specification - General requirements for electrical equipment;
- (l) AS 3859 - Guide to the effects of current passing through the human body;
- (m) AS 3865 - Calculation of the effects of short circuit currents;
- (n) AS/NZS 4251.1 - Electromagnetic compatibility (EMC) - generic emission standard; Part 1: Residential, commercial and light industry.

4 Segregated Wiring System

- 4.1 The electrical system fitted on NSWFB vehicles are grouped into the two (2) following defined areas:
- (a) Original equipment - vehicle and equipment electrical system as supplied by the Original Equipment Manufacturer (OEM) (e.g. a cab/chassis);
 - (b) Auxiliary equipment - electrical, electronic, electro-mechanical equipment installed to provide additional functionality and which is integrated into the completed vehicle (e.g. warning devices, lighting, communications).
- 4.2 NSWFB vehicles shall have auxiliary wiring segregated from the vehicle OEM electrical system to increase equipment reliability and simplify fault correction (refer to 'Segregated Wiring and ACS' drawing in Appendix B).

- 4.3 The integrity of the OEM wiring system shall be maintained, therefore the auxiliary system shall be connected to the vehicle battery terminals with a single connection (refer to drawing in Appendix B).

Note: A single cable shall be used each for both positive and negative terminals and shall be fixed to the battery post connectors independently from OEM wiring. Any changes to OEM connections to the battery terminals shall be approved by the cab/chassis OEM in writing.

- 4.4 All auxiliary circuits shall include a return wire to complete the circuit free of any bodywork or chassis connection. Frame/chassis connection shall only be provided by the vehicle battery to chassis/frame cable.

Note: Particular care must be taken in the selection, installation and maintenance of components and fittings to ensure that return currents are carried by the segregated wiring rather than the bodywork or chassis. Insulated component mountings may be required to ensure isolation of the return wiring. Using the bodywork or chassis as common earth or negative return shall not be permitted unless approved in writing by the NSWFB.

- 4.5 Existing vehicles with non-segregated electrical systems may be modified to provide a segregated system in part or whole, as approved in writing by the Manager of Engineering Services Unit, or other nominated NSWFB officer.

5 Auxiliary Control System (ACS)

5.1 General

- 5.1.1 The ACS is a system of integrated units which provide the control and switching for auxiliary operating systems.

- 5.1.2 The ACS receives power from the vehicle battery system via the APD and distributes this power (with secondary protective devices, control, interlock & monitoring circuitry installed) to individual circuits.

Note: The NSWFB currently use an *Impart Special Products* ACS which utilises CAN Bus communication protocol software. Alternative auxiliary control systems may be considered.

- 5.1.3 The ACS shall incorporate the NSWFB approved generic ACS console and Body Control Console (BCC) to ensure commonality of the operator interface units.

Note: Both generic designs allow for custom variation of functionality through the provision of spare control switches and indicator lights.

- 5.1.4 All auxiliary electrical equipment shall be controlled by the microprocessor(s) contained within the ACS console or body control console i.e. all input devices must operate input(s) on the microprocessor and all output devices must be controlled by the microprocessor.

Note: Functionality of the ACS shall be able to be changed via software changes

5.2 Auxiliary Power Distribution (APD)

- 5.2.1 An APD enclosure shall be provided in a NSWFB approved position to distribute power from the battery system to the ACS modules via circuit breakers or fuses contained within the enclosure.
- 5.2.2 The APD enclosure shall contain the necessary link-bars to facilitate the connection of return wiring from the auxiliary equipment.
- 5.2.3 All return circuit wiring shall terminate within the APD enclosure and a single heavy duty cable shall be used between the APD enclosure and the vehicle battery (refer to clause 4.3).
- 5.2.4 Where auxiliary circuits are not inter-connected via an approved APD enclosure (i.e. existing installation or when a fully segregated system is inappropriate), then a fully enclosed (IP56 or greater) fusible link, HRC fuse or other approved safety protective device shall be fitted.

Note: In this situation the approved safety protective device shall become the sole point of attachment for all auxiliary electrical circuits.

- 5.2.5 The 12V DC communication equipment shall be powered by a NSWFB approved voltage reduction and regulation system and an installed 12V fully sealed 17.2Ah lead acid battery which is charged via the regulation system.
- 5.2.6 Final placement and method of securing the 17.2Ah fully sealed type battery shall be approved by the NSWFB.

5.3 ACS Modules

- 5.3.1 The vehicle shall have one or more ACS modules installed in appropriate locations around the vehicle and shall be connected from the APD.
- 5.3.2 Each ACS module shall be an approved enclosure (refer to section 8.2) designed to receive power from the APD and re-distribute to individual final sub-circuits via circuit protective devices (refer to section 7).
- 5.3.3 The ACS modules shall control, switch, monitor and indicate on individual circuits through an appropriate designed circuit board and programmed microprocessor to achieve the functionality required by this COP and any specification requirement.
- 5.3.4 The ACS modules shall be interfaced with the ACS console, body control console and third party control systems (engine, governor, generator, foam system, aerial apparatus etc.).

5.4 ACS Console

- 5.4.1 The vehicle shall have an ACS console interfaced with the ACS to provide switching, control and fault indication of operating systems to the vehicle operators within the cabin.
- 5.4.2 The ACS console shall be designed as per drawing no. ENG00133/OS94-01/ACSC.PDF in Appendix B.
- 5.4.3 The ACS console shall be mounted on the dash or on the console between the driver and passenger in a NSWFB approved position so it is easily readable and accessible by both driver and passenger.

Note: A slight bias towards the driver is preferred as that person is considered the primary operator.

- 5.4.4 Spare indicator lights and switches on the ACS console shall be utilised as specified, otherwise shall not be provided.
- 5.4.5 The text on the ACS console shall be backlit and shall dim with the operation of a dimming control on the dash board or by the activation of the vehicle parking lights.

Note: The vehicle OEM dimmer control shall be used if provided, otherwise one shall be provided and installed.

- 5.4.6 A means shall be provided to test that all indicator lights are working.

Note: The NSWFB prefers the indicator lights to be tested each time the AMC activates (refer to section 13.1).

- 5.4.7 The ACS console shall incorporate a digital 24 hour master time unit which displays time to all clock displays.
- 5.4.8 The master time unit shall be able to accumulate time for engine running hours and pump and/or PTO engaged hours and display both on the cabin clock display via differing combination of switches on the ACS console.

Note: Accumulated time shall be stored into memory to ensure the count does not restart when all power is lost. Clear instructions for obtaining engine and pump/PTO hours shall be on a permanent label fixed near the ACS console (preferably under the centre console hatch).

- 5.4.9 The master time unit shall include a long life battery to keep correct time (including accumulated) when external power is removed.
- 5.4.10 The master time unit shall allow easy adjustment of the time using a combination of switches on the ACS console.

5.5 Body Control Console (BCC) (e.g. at pump panel)

- 5.5.1 The vehicle shall have a BCC (unless specified otherwise) which is interfaced with the ACS to provide switching, control and fault indication of operating systems to the vehicle operators when outside the cabin.

- 5.5.2 The BCC shall be designed as per drawing no. ENG00133/OS94-01/BCC.PDF in Appendix B.
- 5.5.3 The BCC shall receive power when one of either the 'aux. power' and 'Pump and/or PTO engage' switches are activated from the ACS console.
- Note: Only one of the ACS console switches needs to be ON at any one time to activate the BCC.**
- 5.5.4 The BCC shall only deactivate when the 'aux power' switch on the ACS console is intentionally used to turn OFF the BCC.
- 5.5.5 The BCC shall be installed flush mounted in a NSWFB approved position.
- Note: Generally, the BCC is installed at the rear panel, right of centre, and inside a locker where possible.**
- 5.5.6 Spare indicator lights and switches on the BCC shall be utilised as specified, otherwise shall not be provided.
- 5.5.7 The text on the BCC shall be backlit and shall dim with the operation of an automatic dimming control which detects ambient light levels.
- 5.5.8 All indicator lights shall be tested for correct functioning by the operation of the 'Test/mute' button on the body control console.
- 5.5.9 The BCC shall incorporate a slaved clock display which only displays time when the body control console is switched ON (refer to clause 5.4.7 for details of the master clock).

6 Electrical Wiring Installation

6.1 Cables and Wiring

- 6.1.1 The minimum gauge of wire in each circuit shall comply with the following:

- (a) multi-strand 1.5mm^2 (cross sectional area) for all general circuits;
- (b) multi-strand 0.75mm^2 (cross sectional area) for very low current control and monitoring circuits only;
- (c) PVC insulated and temperature rated not less than 100°C ;

Note: Single stranded conductors are unacceptable.

- (d) voltage drop at any point in a single circuit shall not be greater than 0.5V;
- (e) resistance for each wire within any circuit shall be not greater than 2.0Ω

- 6.1.2 The size of the conductors installed shall be adequate for all expected load currents of the circuit in all operating circumstances.

Note: De-rating factors relevant to the installation of each circuit must also be considered.

- 6.1.3 No wire joints shall be permitted.

- 6.1.4 Excess length shall be provided where wiring crosses moving parts (e.g. doors, mirrors and other mechanical assemblies) and also to facilitate vehicle or equipment repairs that require termination replacements.

- 6.1.5 A drip and stress relieving loop shall be provided to prevent moisture and vibration being conducted into/from assemblies and interconnection boxes.

6.2 Connections

- 6.2.1 All connections shall be made with NSWFB approved plugs and sockets only (refer to Appendix C of this specification).

- 6.2.2 All installed electrical equipment shall be fitted with approved connectors to allow easy replacement for maintenance.

- 6.2.3 All unused electrical connection plugs or sockets shall be protected with a plug conforming to IP56 as a minimum standard.

- 6.2.4 Where wiring is terminated in a screw type terminal, ferrules or lugs shall be used to prevent screws from bearing directly on the wire strands.

- 6.2.5 Solder shall not be used to firm the wire ends.

- 6.2.6 At multiple termination points, wiring shall be terminated so as to enable disconnection of individual wires without disturbing other wiring (e.g. terminal strips, link bars).

- 6.2.7 All control and electrical panels shall be capable of being removed and disconnected by means of approved plugs and sockets.

- 6.2.8 Where the vehicle body has been designed to be removable, major assemblies shall be configured so as to permit removal from the vehicle without the need to cut cables or remove connectors from cable assemblies.

Note: NSWFB approved multi-pin connectors should be used between the chassis and removable body.

- 6.2.9 Connectors shall be so keyed that two (2) plugs or sockets of the same type cannot be interchanged or polarity reversed.

- 6.2.10 One (1) side of the connector shall be mounted to the frame or chassis of the vehicle with both sides of the plug/socket wiring identified by the respective circuit identification (number/colour).

- 6.2.11 Connector and wire terminations external to the vehicle cabin (including the body interior and pump area) shall be rated to IP56 (or greater) with wire entry sealing glands.

6.3 Labelling and Identification

- 6.3.1 All wiring, connectors, indicators, switches, plugs, circuit breakers, relays and operator controls shall be clearly and permanently marked by either colour coding or alpha-numeric coding to ensure positive identification.

Note: Paper labels and hand marked identifiers are unacceptable. The minimum lettering height shall be 4mm (except wiring).

- 6.3.2 If alpha-numeric coding is used for wire identification, then both ends of all wires shall be marked.
- 6.3.3 All alpha-numeric coding used to identify wiring and components must correspond to those used for the same wiring/components in all documentation.
- 6.3.4 Identification must be unique to the wiring/component and must not be duplicated anywhere on the vehicle.
- 6.3.5 All components within enclosures shall be identified both on the component itself and adjacent to the component.
- 6.3.6 Each enclosure shall be labelled in a conspicuous position on the outside.

6.4 Mechanical Protection

- 6.4.1 All wiring shall be mechanically protected.
- 6.4.2 Wires and wiring harnesses shall not be in direct contact with sharp edges and care shall be taken to minimise the effects of motion and vibration.
- 6.4.3 Wiring passing through metal panels shall be mechanically protected by a suitable grommet and sealed by a non-rigid, moisture proof sealant which shall be impervious to petroleum based products and UV exposure.
- 6.4.4 Wiring shall have an effective heat shield when positioned within 150mm of heat generating components (e.g. engine, exhaust, gearbox).

6.5 Conduits

- 6.5.1 Where wiring is to be enclosed in a protective conduit, two (2) types may be used:
- (a) heavy duty UPVC conduit to AS 2053; (refer clause 3.2 (g))
 - (b) flexible type (heavy industrial - HFT or equivalent).

Note: The conduit must be resistant to petroleum based products, UV exposure, shock, vibration and flexure.

- 6.5.2 Conduits and wire harnesses shall be adequately secured to prevent sagging or dislocation with a maximum distance of 400mm between securing points.

- 6.5.3 Conduits and wire harnesses shall be secured to the body or chassis by corrosion resistant fasteners (bands, straps or clamps).

Note: Stainless steel, nylon, PVC or other approved material shall be used for fasteners. Glues and weather sealants shall not be used as an independent permanent means of securing cables.

- 6.5.4 Where conduits or cable harnesses are attached to elevating, rotating, telescopic or moving assemblies, adequate cable strain relief and bend radii shall be provided.

- 6.5.5 Wiring or conduit passing into protected enclosures (IP56) shall be secured by means of glands rated at IP56 or greater.

Note: Conduit fittings, cable entry glands and the like, must be of a type matched to the conduit/wiring being used.

7 Electrical Protection

- 7.1 The OEM and auxiliary electrical systems shall have clearly defined fuse/circuit breaker panels.

- 7.2 Circuit Breakers (CB), fuses and final sub-circuits shall be grouped and installed in modules (refer to section 5.3) or enclosures and shall include a drawing and legend (if required) to identify each protective device.

- 7.3 All final circuits shall be protected by a manual reset type Circuit Breaker (CB) or fuse (minimum acceptable fuse is a blade type fuse).

Note: Automatic reset protective devices are not permitted.

- 7.4 The CB shall be capable of interrupting the expected short circuit current and a permanent overload current, without damaging the CB.

Note: For current loading below 500A, the minimum interrupt capacity shall be 500A. In excess of 500A, the current loading itself shall be the limiting factor i.e. current 1000A - minimum interrupt capacity = 1000A

- 7.5 In-line fuses or single fuses are not permitted.

- 7.6 All electrical short circuit protective devices shall be of appropriate size to protect the wiring of the relevant circuit.

- 7.7 A minimum of one (1) spare CB/fuse shall be provided at each grouping of protective devices. As the number of CBs/fuses at each location increases by five, an extra CB/fuse shall be provided. See example below:

No. of Protective Devices	Spares Required
0 - 5	1
6 - 10	2
11 - 15	3

- 7.8 All circuit protective devices shall include a readily visible indication that it has operated (i.e. CB open, fuse blown) where failure may be indicated mechanically or electrically by way of an LED or extended life lamp (under rated).

Note: If coloured LEDs are to be used then the NSWFB prefers green for normal status and red to indicate a tripped/blown device.

- 7.9 The 'main system fault' indicator light on the ACS console (refer to section 5.4) shall indicate when any circuit protective device has tripped on the APD.

Note: The NSWFB prefers the 'main system fault' indicator light to also indicate when any circuit protective device in all ACS modules has also tripped.

8 Installation of Electrical Equipment

8.1 Mounting

- 8.1.1 Major assemblies shall be mounted with anti-vibration fittings and shall be fixed in a position allowing unrestricted movement.

Note: Sensitive components such as resistors and diodes shall also be mounted so as to preclude damage or failure caused by vibration and shock.

- 8.1.2 Electrical equipment shall be mounted as recommended by the equipment manufacturer including using OEM mounting points and hardware when provided.

- 8.1.3 Rivet nuts or nut-serts shall be used when mounting equipment to aluminium construction of thickness 5mm or less.

- 8.1.4 Self tapping fasteners (screws) are not permitted under any circumstance.

8.2 Enclosures

- 8.2.1 Major assemblies which are mounted externally or in unprotected positions shall be contained in electrical equipment enclosures rated to IP56 (or greater).

- 8.2.2 Enclosures shall be mechanically reinforced against general external loads and must be fabricated from corrosion resistant materials.

- 8.2.3 Large enclosures and those containing sensitive equipment shall be provided with a low wattage dehumidifier heater which shall operate permanently and independently of the equipment contained.

Note: Where equipment enclosures are located within the cabin the heater is not required. An example heater may be a 36V 10W globe powered by 24V, or 2 x 24V 10W globes connected in series and powered by 24V.

- 8.2.4 All enclosures shall ensure that any form of heat transfer from any source (including the environment) does not affect the performance of the electrical equipment within.

Note: Forms of heat transfer include conduction (i.e. heat transferred through a metallic mounting base), convection (i.e. heated gasses emanating from working motors) or radiation (i.e. prolonged exposure to the sun or fire).

- 8.2.5 All metal covers protecting electrical terminations shall be made in such a manner to prevent contact (under any circumstances) with live connections or terminals.

8.3 Access & Removal

- 8.3.1 All major assemblies and components shall be located in readily accessible positions for ease of inspection and maintenance.
- 8.3.2 All wiring and equipment shall be capable of being disconnected using approved connectors (refer to Appendix C for approved connectors).
- 8.3.3 Access shall be provided to all major assemblies and components including mounting points and fasteners to allow easy removal when failure occurs.

8.4 Relays

- 8.4.1 Relays, solenoids and actuators shall have a visual means of indicating that they have operated.

8.5 Switches

- 8.5.1 A list of NSWFB approved switches is provided in Appendix C of this document.

Note: This list excludes all vehicle OEM switches.

- 8.5.2 Switches outside the vehicle cabin shall be heavy duty and rated IP56 or greater.
- 8.5.3 Vehicle OEM switches shall be used in the vehicle cabin wherever possible unless otherwise approved.

Note: Additional OEM switches can often be acquired as optional extras from the vehicle manufacturer.

- 8.5.4 Where doors and shutters actuate switches (e.g. for locker lighting), weatherproof, mechanically rugged, industrial reed type switches with magnets shall be fitted (see Appendix C items no.72 and 73).

8.6 Audible Alarms

- 8.6.1 Audible alarms must be capable of providing an effective alarm to the intended persons within the expected operating context (i.e. above engine and other operating noises for either internal or external use and in all areas around the vehicle where warning is required).

Note: Specific requirements may be identified in this COP or the technical specification.

8.7 Batteries

- 8.7.1 NSWFB approved wet batteries (i.e. lead acid) shall be installed on the vehicle in an approved position which:

- (a) is as near to the starter motor as practicable;
- (b) is vented so as to prevent the accumulation of gas;
- (c) does not permit the intake of hot air from the engine;
- (d) allows air flow across the batteries when the vehicle is stationary;
- (e) does not allow the battery temperature to rise above 60°C, irrespective of ambient air temperature;

Note: Ventilation may need to be forced in an enclosed pocket to provide a minimum air flow of 0.05m³/minute when the vehicle is stationary. The final position of wet batteries shall be approved by the NSWFB.

- 8.7.2 If the vehicle batteries are more than 0.5m from the APD, the auxiliary power cable shall be fitted with an appropriate fuse near the battery connection.

- 8.7.3 Batteries shall be secured by a non corrosive battery holder.

- 8.7.4 The entire top section of the batteries, including mounting points and terminals, shall be accessible without requiring the removal of body panels and without the need to raise the cabin.

Note: The NSWFB prefers batteries to be placed on a stainless steel slide out tray for easy maintenance and removal.

- 8.7.5 Batteries mounted externally shall have a robust top cover plate provided to protect the batteries and the cover plate shall be easily removable by hand.

Note: If required, a 'NO STEP' permanent label should be fitted.

- 8.7.6 Polarity of the battery system shall be clearly identified.

- 8.7.7 No other equipment shall be stored or mounted in any enclosure containing wet batteries.

8.7.8 Where more than one set of batteries are fitted to a vehicle, the battery sets must be connected in such a way that ensures:

- (a) all battery sets comply with all clauses of this section (8.7.1 to 8.7.7 inclusive);
- (b) all battery sets are adequately charged by the vehicle alternator(s) (refer to section 9.1); and
- (c) that low voltage (charge) of any auxiliary battery set does not discharge the main vehicle batteries.

Note: The ACS should monitor voltage output of each battery set and provide corresponding low voltage indication on the ACS console.

8.8 Lighting

8.9 Only NSWFB approved lighting products shall be used (refer to Appendix C).

Note: Fluorescent lights are currently available on NSW state Government contract.

8.9.1 All lights shall be installed with ease of replacement when the light fails or becomes damaged, or to replace a blown light bulb.

8.9.2 All lights, especially fluorescent lights, shall be tested to ensure correct operation prior to delivery of the vehicle to the NSWFB.

8.9.3 Where necessary and practical, lights shall be fitted with a cowl, shroud or guard to offer mechanical protection to the light.

Note: The shroud/guard must not affect ease of replacement of the light.

8.9.4 All fluorescent lights shall be fitted with a minimum of two (2) robust retaining clips, fitted in a manner which minimises the vibration of the light.

8.9.5 Long tube length fluorescent lights (i.e. 28W lights) shall be fitted with three (3) clips where the middle clip is offset to one side of the centre to prevent vibration resonance within the light.

8.9.6 Fluorescent lights which contain an internal reflector shall be installed with the reflector directing maximum illumination towards the intended location.

9 Vehicle Chassis & Cabin Equipment

9.1 Alternator(s)

9.1.1 The vehicle shall be fitted with an alternator capable of providing a minimum of 120A or 125% of the maximum electrical load, whichever is the greater (refer to section 14.5 'Electrical Calculations' on page 37).

- 9.1.2 The alternator shall also be able to manage electrical loads applied when the vehicle is at idle during night operations (refer to section 14.5 on page 37).

Note: Night operations will include all emergency lights, cabin lights, area lighting, locker lights, communications and other auxiliary loads operating concurrently.

- 9.1.3 If a second alternator is required to handle the electrical load, it shall not noticeably reduce the vehicle's road performance.

- 9.1.4 A charging indicator lamp or voltmeter for the second alternator shall be installed in a NSWFB approved position.

- 9.1.5 The alternator(s) shall be approved by the NSWFB before installation.

Note: Approval is dependant on electrical calculations as stated in section 14.5 being supplied to the NSWFB.

9.2 Electrical Auxiliary Compressor (EAC)

- 9.2.1 When pressure in the wet (or primary) air tank drops below 110% of the minimum working pressure as recommended by the vehicle OEM (e.g. below 660kPa when min.working pressure is 600kPa), the EAC shall operate until the maximum OEM recommended pressure is achieved.

- 9.2.2 Maximum pressure must be re-established within five (5) minutes of the EAC starting.

- 9.2.3 If the EAC is activated in excess of five (5) times in an eight (8) hour period, an indicator light on the ACS console shall be illuminated to advise the operator that maintenance is required.

Note: A switch shall be provided for a service technician ONLY to manually reset the system, once the fault has been rectified.

- 9.2.4 The EAC shall only operate when the battery charger is connected and the count shall reset each time the charging cable is connected.

- 9.2.5 A NSWFB approved electric compressor motor shall be used for the EAC (see Appendix C item no. 45 and 46).

9.3 Cabin Fluorescent Light

- 9.3.1 A NSWFB approved fluorescent light shall be installed longitudinally along the centre of the cabin ceiling (in a NSWFB approved position) and shall be switched by the 'cabin light' switch provided on the ACS console.

- 9.3.2 If required, the ends of the cabin fluorescent light shall be covered by easily removable guards which protects the wiring and connector, and minimises the risk of head injuries by cabin occupants from the edge of the light.

9.4 Night Operations Cabin Lighting (if specified)

- 9.4.1 Night operations cabin lighting (see Appendix C item no. 55) shall be installed as per drawing no. ENG00141-ELC-3357 in Appendix B, and shall switch ON automatically when the parking lights are ON.

Note: The lights provide low level green lighting so operators can don clothing and breathing apparatus while the vehicle is moving.

- 9.4.2 A separate switch, preferably a spare OEM dash panel switch, shall be provided to override the night operations cabin lighting (i.e. manually switch ON/OFF).

- 9.4.3 The night operations cabin lighting shall be installed in NSWFB approved positions which provide flat even illumination around the whole cabin.

Note: In general, a crew cabin vehicle will require two (2) night operation lights, while a single cabin may not have any night operation lights.

- 9.4.4 The night operations cabin lighting shall be fitted with a suitable shroud (see Appendix C item no. 56) to protect the light fitting and prevent reflections on the windscreen.

9.5 Cabin Clock

- 9.5.1 A slaved clock display (see Appendix C item no. 75) shall be installed in the cabin placed high front centre in a position visible to all cabin occupants, and the display shall be activated when the ACS is activated (refer to clause 5.4.7).

9.6 Cabin Raise Protection Circuit

- 9.6.1 Vehicles which are fitted with a tilting cabin for engine maintenance shall have a cabin raise protection circuit installed if equipment stowed on the top deck encroaches over the cabin.

Note: The NSWFB currently use a through beam photo electric detector (see Appendix C item no. 50) to detect equipment over the cabin.

- 9.6.2 The circuit shall disable the operation of the power operated cabin tilt until the equipment is removed.

- 9.6.3 A permanent label shall be fitted adjacent to the tilt mechanism to remind operators to remove stowed equipment before tilting the cabin.

9.7 Fold Down Access Step Warning Circuit

- 9.7.1 Automatic fold down access steps shall incorporate a warning light and buzzer adjacent to each respective cabin door to provide warning if the step fails to self lower.

- 9.7.2 If automatic fold down access steps fail to raise when the cabin door is closed a fault indication lamp provided on the ACS console and a warning buzzer shall both activate.

9.8 Map Light (if specified)

- 9.8.1 A switched map light (see Appendix C item no. 66) shall be installed in the front cabin with the beam of light concentrating on the passenger's lap and the map light shall not interfere with the driver's night vision.
- 9.8.2 A small clip shall be fitted to retain the map light head in a stowed position when not being used.

9.9 Remote Control Spotlight (if specified)

- 9.9.1 A remote control spotlight (see Appendix C item no. 68) shall be fitted to the cabin roof and the corresponding spotlight controller fitted in the front cabin with both positions being approved by the NSWFB.

9.10 Hand Held Spotlight (if specified)

- 9.10.1 A hand held spotlight (see Appendix C item no. 69) shall be installed centrally in the cabin with the final position being approved by the NSWFB.

Note: The hand held spotlight shall be able to be used by all occupants within the cabin.

- 9.10.2 The hand held spotlight shall include a retaining strap to secure it in the stowed position.

9.11 Intrinsically Safe Torch (if specified)

- 9.11.1 An intrinsically safe torch and charging base (see Appendix C item nos. 48 and 49) shall be provided, mounted in the front cabin and interconnected to the ACS with the final position being approved by the NSWFB.
- 9.11.2 The intrinsically safe torch shall include a retaining strap to secure it in position.

9.12 Communication Equipment

- 9.12.1 The installation of communication equipment shall follow the NSWFB COP OS-E-95/03, Automotive Mobile Radio Installation.

Note: The communication equipment must not receive interference from any installed electrical equipment.

- 9.12.2 Communication equipment components shall be installed in a purpose designed 'communications' enclosure and incorporated into the ACS.
- 9.12.3 The communications enclosure shall include provision to fit a number of components including all transceivers, and shall be fitted in an easily accessible location for maintenance purposes.
- 9.12.4 A power distribution and fuse panel shall be fitted in the communications enclosure so that all individual circuits are protected by a suitably rated blade type fuse.

- 9.12.5 Unless specified otherwise, power for communications equipment shall be from a separate 12V communications battery (see Appendix C item nos. 9 to 11) fitted adjacent to the communications enclosure.
- 9.12.6 The 12V battery shall be permanently maintained in a fully charged state by the main vehicle battery through a purpose designed battery charging system.
- 9.12.7 Power to communication equipment shall be controlled by the 'standby/activate' switch on the ACS console (refer to clause 13.1.4).
- 9.12.8 An emergency override switch shall be provided in an easily accessible position to power the GRN radio directly from the battery if the ACS fails.
- Note: If necessary, the switch should be mechanically protected to avoid accidental switching.**
- 9.12.9 If fitted, the external speaker (see Appendix C item no. 2) shall be supplied from the GRN radio auxiliary pin for audio output to provide independent volume control of the rear speaker.

10 Vehicle Body Equipment

10.1 Locker/Body Power (if specified)

- 10.1.1 A three (3) pin connector (see Appendix C item no. 20) shall provide 12/24V power in specified lockers, with pin 1 being negative (earth), pin 2 being 12V positive, and pin 3 being 24V positive.

Note: The connector shall be fitted with blind mating plugs if not being used.

- 10.1.2 Locker/body power plugs shall be enabled when the vehicle engine is running or the external battery charger is connected.

10.2 Locker Lighting

- 10.2.1 Fluorescent lights (unless specified otherwise) shall be installed in each locker compartment with the exception of lockers only containing firefighting hoses.
- 10.2.2 Locker lights shall be installed to provide a minimum of 20 lux of lighting to each area of stowed inventory.
- 10.2.3 The locker lights shall be enabled when the ignition key is not off or the external battery charger is connected.
- 10.2.4 Locker lights shall activate by a switch operated by the roller shutter or locker door assembly unless otherwise specified.
- 10.2.5 The wiring harness for each locker light shall terminate in a two (2) pin connector within the locker.

10.3 Working Area Illumination

- 10.3.1 Working areas including portable pump area, top deck and roof access ladder shall be illuminated by a light/s which are activated when the body surround lights are switched ON (refer to section 11.3).

Note: Reference should be made to the technical specification for alternative switching requirements.

- 10.3.2 Steps which open outside the line of the body (e.g. step door or slide step) shall be fitted with synchronised flashing amber lights at the outer corners of the steps, and shall switch ON when the respective step is opened.

Note: Attention must be given to mechanical protection of step door lights from being damaged by equipment.

10.4 'Check Vehicle Body' Alarm

- 10.4.1 The 'check vehicle body' indicator light on the ACS console shall be used to warn the driver when any locker door, roller shutter, slide out step or raised/lowered equipment is not closed or housed.
- 10.4.2 An audible alarm shall activate when the vehicle park brake is released with the 'check vehicle body' indicator light illuminated.

10.5 Electric Motors (e.g. winches, rewind motors)

- 10.5.1 All equipment which include any electric motor shall be installed as per the equipment and vehicle manufacturer's recommendations.

Note: Details of the method of installation, wiring and protection must be provided to the NSWFB prior to installation for approval.

- 10.5.2 Electric motors shall be wired as part of the ACS thus the circuit must terminate within an ACS module with an approved manual reset circuit breaker or fuse.
- 10.5.3 The electric motor shall be protected with a thermal type manual reset circuit breaker with an appropriate 'response curve' or by a 'slow blow' fuse of suitable capacity to protect the motor in fault conditions.
- 10.5.4 Protection in the electric motor circuit must not interrupt the circuit when the motor is operating within all expected operating conditions.
- 10.5.5 Any electric motor control device (e.g. switches, relays) shall have a minimum current capacity eight (8) times the full load current of the motor.
- 10.5.6 If required, a motor controller (see Appendix C item no. 47) shall be provided to control the speed of the motor.

Note: This may be required for hose reel rewind units.

- 10.5.7 Electric motors should be mechanically guarded to prevent moisture, dirt, mud and other debris from adversely affecting the performance of the motor.

- 10.5.8 Permanent labels shall be affixed adjacent to equipment containing electric motors stating any design limitations to the operator including maximum capacity (rated) and allowed directions of use.

11 Area Lighting

11.1 General

- 11.1.1 External lighting shall be heavy duty and rated to IP56 (or greater) and shall be connected to power by an approved connector (see Appendix C item no. 14).
- 11.1.2 When any external area light (refer to sections 11.2 and 11.3) is ON and the handbrake is released, an audible alarm shall activate within the cabin and the 'aux. power' indicator light on the ACS console shall flash.

11.2 Spot Lights (if specified)

- 11.2.1 Spot lights (spotlights) shall be installed on the top deck of the vehicle in NSWFB approved positions.

Note: The current NSWFB standard is four (4) spotlights, one at each corner of the top deck.

- 11.2.2 The spot lights shall be enabled when the body control console is activated (refer to clause 5.5.3).
- 11.2.3 Spot lights on each side of the body shall be independently switched as a bank of lights (NS bank, OS bank) at the body control console (refer to drawing no. ENG00133/OS94-01/BCC.PDF in Appendix B).

11.3 Body Surround Lighting (if specified)

- 11.3.1 Fluorescent lights shall be fitted to the top surround of the body and shall either be recessed into the body or fitted into a continuous guard (pelmet) to protect, reduce glare and direct lighting onto the ground around the body.

Note: Alternative design concepts for installation of surround lights are provided in drawing no. ENG00133/OS94-01/LIGHT.PDF. Details of the installation method shall be supplied to the NSWFB for approval prior to installation.

- 11.3.2 Body surround lights shall be installed in continuous banks of fluorescent lights which provide the maximum amount of ground illumination.

Note: It is preferred that shadows formed between lights do not fall upon the NSW Fire Brigades decals along each side of the vehicle.

- 11.3.3 A minimum lighting level of 20 lux shall be achieved at any point on the ground between 200 - 1000mm from the sides and rear of the body (refer to drawing ENG00133/OS94-01/LIGHT.PDF).

Note: The NSWFB prefers the maximum length of fluorescent lights to be installed within the guard, using a combination of different models (lengths) so that the light thrown is maximised and evenly dispersed.

- 11.3.4 The body surround lights shall be enabled when the BCC is activated (refer to clause 5.5.3).
- 11.3.5 All body surround lights shall be switched in unison from the BCC when fitted (refer to drawing in Appendix B).
- 11.3.6 The body surround lights shall automatically switch ON when the BCC is activated and the parking lights are also ON.

Note: This shall occur regardless of the last condition (ON or OFF) of the switch on the BCC. The body surround lights may then be switched off by the switch on the BCC.

12 Emergency Warning System (EWS)

12.1 Revolving Beacons

- 12.1.1 All appliances shall be fitted with NSWFB approved revolving beacons on the roof of the vehicle cabin in a forward and side most position (refer to drawing no. ENG00133/OS94-01/WARN.PDF in Appendix B), unless specified otherwise.
- 12.1.2 The OS beacon shall have a blue lens cover and the NS beacon a red lens cover.
- 12.1.3 The revolving beacons shall be securely fixed to the vehicle as per the manufacturer's guidelines and not increasing the noise level in the cabin.
- 12.1.4 Revolving beacons shall be installed in a manner which provides maximum visibility in all directions.

12.2 Flashing Lights (e.g. Strobes/LEDs)

Note: The NSWFB have adopted flashing strobe or LED flashing lights on response vehicles due to superior visibility. Non-response vehicles (i.e. minor fleet) may use flashing incandescent lights as an alternative.

- 12.2.1 Flashing lights (including the any driver units) shall not cause interference to communication equipment or other electronic equipment installed on the vehicle.
- 12.2.2 Only NSWFB approved flashing lights shall be used with final selection of the type of flashing lights being determined by aesthetic qualities and available space.
- 12.2.3 A pair of flashing lights shall be positioned on the front grille symmetrically about the centre of the vehicle (refer to 'Vehicle Emergency Warning Lights' drawing in Appendix B), unless specified otherwise.

- 12.2.4 Grille flashing lights shall be blue on the OS and red on the NS.
- 12.2.5 A pair of flashing lights shall be positioned on the outer, top corners of the rear body, facing rearwards (refer to 'Vehicle Emergency Warning Lights' drawing in Appendix B), unless specified otherwise.
- 12.2.6 A pair of flashing lights shall be positioned on the outer, top corners of the rear body, facing perpendicularly sideways (refer to 'Vehicle Emergency Warning Lights' drawing in Appendix B), unless specified otherwise.
- Note: A single flashing light giving both side and rear coverage may be accepted when equivalent light coverage and intensity is provided.**
- 12.2.7 All rear flashing lights shall be synchronised so that the side and rear lights on one corner of the vehicle are ON while the side and rear lights on the opposite corner of the vehicle are OFF, then flashing vice-versa.
- 12.2.8 The rear flashing lights must not desensitize the operator's night vision when working at the rear of the appliance.
- Note: This can be achieved by either recessing the flashing lights into the corner of the body or by providing glare shields below the flashing light fittings.**
- 12.2.9 Both side and rear flashing lights shall be blue on the NS and red on the OS.
- 12.2.10 A pair of flashing lights shall be positioned on the lower front corners of the vehicle, facing sideways (refer to 'Vehicle Emergency Warning Lights' drawing on Appendix B), unless specified otherwise.
- Note: These flashing lights act as 'intersection' lights, where vehicles travelling perpendicular to the path of the appliance are given warning of the vehicle's intent to cross an intersection.**
- 12.2.11 Intersection flashing lights shall be blue on both the OS and NS.
- 12.3 Flashing Headlights**
- 12.3.1 The OEM headlights shall flash with alternating low beam cycles at approximately 60 full flashes (ON and OFF cycles) per minute.
- 12.3.2 The flashing headlight operation shall be overridden by the activation of the parking lights.
- 12.4 Green Command Light (if specified)**
- 12.4.1 Only one green command light shall be installed on the cabin roof in a forward centre position on approved vehicles.
- Note: The command light may be included into a lightbar or as a separate rotating beacon as specified.**

- 12.4.2 The command light must be individually switched and must not be able to be activated when any other emergency warning light is ON.

Note: The command light should deactivate when any emergency light or siren is switched on.

12.5 Siren

- 12.5.1 An approved siren unit (refer to Appendix C of this specification) shall be provided and incorporated into the ACS.

- 12.5.2 The siren driver and speaker shall be installed at the front of the vehicle in a position approved by the NSWFB.

Note: The noise level in the vehicle cabin shall not be greater than 85dB when the siren is operating and vehicle is travelling with a road speed of 60kph.

- 12.5.3 The wail and yelp switching function of the siren shall be duplicated by means of a foot switch on the floor in front of the passenger seat and by the OEM horn control.

- 12.5.4 The siren shall include a Public Address (PA) facility with a hand microphone provided and the microphone housing clip installed in a NSWFB approved position.

12.6 EWS Switching

- 12.6.1 All EWS switching shall be integrated into the ACS console (refer to drawing no. ENG00133/OS94-01/ACSC.PDF in Appendix B).

- 12.6.2 When 'on scene' is selected on the ACS console, the primary lights consisting of revolving beacons and rear flashing lights shall be on.

- 12.6.3 When 'response' is selected on the ACS console, the primary and secondary lights consisting of revolving beacons, rear flashing lights, grille flashing lights, intersection flashing lights and flashing headlights shall be on.

- 12.6.4 A switch shall be provided on the ACS console to switch the siren ON and OFF and another switch shall be provided to toggle the siren between wail and yelp modes and to select a high/low two tone mode of operation.

- 12.6.5 If required, a switch may be utilized on the ACS console to activate the command light (refer to clause 12.4.2), otherwise a switch shall be installed on the dash in a NSWFB approved position.

13 Special Circuits

13.1 Auxiliary Master Circuit (AMC)

13.1.1 All auxiliary electrical circuits, except those detailed in clause 13.1.3, shall be controlled through an isolating AMC which is activated when:

- (a) the ignition switch is in the 'ON' or 'AUXILIARY' key position; and
- (b) the 'standby/activate' switch on the ACS console is in 'activate' mode.

13.1.2 The AMC shall deactivate when either:

- (a) the ignition switch is in the 'OFF' (or lock) key position; or
- (b) the 'standby/activate' switch on the ACS console is in 'standby' mode; or
- (c) the main battery voltage drops too low (refer to section 13.2).

13.1.3 The vehicle external charging system as described in section 13.3 should not be switched by the AMC.

13.1.4 Power to communications equipment shall only de-activate when the 'standby/activate' switch on the ACS console is in 'standby' mode.

Note: Communications equipment is required to operate when the vehicle ignition switch is 'OFF'

13.2 Voltage Sensing Circuit (VSC)

13.2.1 A battery Voltage Sensing Circuit (VSC) shall be fitted and shall operate in the following manner:

- (a) when the battery voltage drops to 11.75V or 23.5V (as appropriate) and remained at this level for not less than 10 sec., an audible alarm shall activate;
- (b) when the battery voltage drops to 11.35V or 22.7V (as appropriate) and remains at this level for 20 sec., the AMC shall deactivate and isolate power to the appropriate auxiliary circuits (refer to section 13.1);
- (c) when the battery voltage drops to 10.5V or 21V (as appropriate), the ACS shall automatically switch OFF.

13.2.2 If the emergency warning lights are in operation when the VSC deactivates the AMC due to low voltage, then the OS revolving beacon (blue) and NS rear flashing light (blue) shall remain operating after all auxiliary circuits have been deactivated.

Note: It may be necessary to operate both rear flashing lights depending on the installation requirements.

13.2.3 Resetting the VSC requires the battery voltage to rise above 12.0V or 24.0V (as appropriate) and can be achieved by starting the engine.

- 13.2.4 Low Voltage indicator lamps shall be provided on the ACS console for each set of batteries installed on the vehicle e.g. vehicle, auxiliary and communications batteries.

Note: These indicator lamps shall warn that battery Voltage is below optimum operating voltage (indicating a battery or charging failure).

13.3 External Charging System

- 13.3.1 The vehicle shall incorporate an external battery charging system capable of being operated by the automatic battery chargers used by the NSWFB.

- 13.3.2 A seven (7) pin charging socket connector shall be fitted on both the OS and NS of the vehicle adjacent to the vehicle cabin, and wired according to drawing no. PRJ084-ELC-3151 in Appendix B.

Note: The NSWFB shall approve the location of both charging sockets.

- 13.3.3 The sockets shall be permanently identified **BATTERY CHARGER INLET** with a minimum lettering height of 10mm.

- 13.3.4 When the battery charger cable is attached to either charging socket the vehicle engine or transmission shall be isolated to ensure the vehicle cannot be driven.

Note: This is a mandatory requirement and the NSWFB shall approve the proposed circuit before construction of the vehicle.

- 13.3.5 A “charger connected” warning light shall be provided on the ACS console to indicate when the charger cable is connected to the vehicle.

Note: This warning light does not indicate that the batteries are being charged.

- 13.3.6 Any vehicle fault signal from the ACS showing:

- main system fault,
- air system fault,
- vehicle battery voltage low,
- comms battery voltage low

shall activate the flashing light and audible alarm in the external battery charging system.

13.4 Jump Start Connection (if specified)

- 13.4.1 A 'jump start' connection comprising of a 350 Amp Anderson type connector (see Appendix C item no. 18) shall be fitted and connected to the OEM batteries by wiring of minimum cross sectional area of 40mm².

- 13.4.2 The connector shall be located not more than 0.5m from vehicle batteries to minimise the length of unprotected wiring.

13.4.3 The connector must be fitted in a manner/location that is not exposed to road grime or likely to incur physical damage, and is easily accessible for operators wearing gloves.

13.4.4 A surge suppressing device approved by the vehicle OEM shall be connected to the jump start wiring to protect the engine CPU from electrical damage during jump starting.

13.5 Auxiliary Drive Systems (if fitted)

Note: Auxiliary drive systems are fitted on most NSWFB vehicles to power either a firefighting pump, hydraulic system or electric alternator.

13.5.1 The following process should be used to engage the auxiliary drive system:

- (a) the engine shall be running and ACS active;
- (b) the vehicle must be stationary in neutral with the park brake applied;
- (c) the engine rpm must be at idle;
- (d) the auxiliary drive engage switch (e.g. 'pump engage') must be turned ON.

Note: Generally, a PTO requires the vehicle to remain in neutral, while a transfer case requires the engagement of a suitable drive gear.

13.5.2 Normal disengagement procedure of the auxiliary drive system shall be the exact reverse of the engagement sequence.

13.5.3 While the auxiliary drive system is engaged, it must NOT be possible to:

- (a) select a gear (or neutral) other than that selected for auxiliary drive;
- (b) engage road drive, unless specified otherwise.

13.5.4 When the auxiliary electrical system loses power, the engine shall ramp down and disengage the auxiliary drive system in a manner which protects the engine.

13.5.5 When the auxiliary drive has disengaged out of sequence and the auxiliary electrical system is reset, the auxiliary drive system must not re-engage automatically.

Note: The auxiliary drive engage switch must be turned OFF and then ON to re-engage the auxiliary drive.

13.5.6 If the vehicle park brake is released while the auxiliary drive system is engaged, the auxiliary drive must not disengage and an audible warning shall sound in the cabin.

13.5.7 A label giving brief instructions on the engagement/disengagement of the auxiliary drive system shall be provided in the cabin on the centre console.

13.6 Fire Pump Governor (if specified)

Note: A governor is fitted to control engine output to the fire pump.

13.6.1 An approved engine governor system shall be installed to regulate engine output and shall include an operator interface panel providing the following functions:

- (a) an ON/OFF switch to activate/deactivate the governor;
- (b) a rotating dial to select output pressure;
- (c) an automatic (pressure) and manual (RPM) mode select switch;
- (d) push buttons to increase/decrease pump RPM;
- (e) adjustable maximum pressure and RPM settings available only via a diagnostic or calibration mode (allows setting for different pump models).

Note: The NSWFB prefers the *Rosenbauer DRE 2.3* governor.

13.6.2 The governing system shall maintain constant pressure or RPM as selected and shall take no longer than 6 seconds to activate/deactivate.

13.6.3 When the governing system is switched OFF, or power to the governing system is lost, irrespective of operating mode or setting, the governor shall quickly ramp the engine down to idle RPM.

13.6.4 A manually operated electrical/electronic switching device shall be installed to directly control engine speed in the event of governing system failure.

Note: Direct manual control of engine speed must be approved by the engine OEM. The pump should not disengage if the auxiliary electrical system is still functioning.

13.6.5 The governing system shall reduce the engine to idle revolutions when a pre-set maximum engine RPM limit is reached.

Note: Pump cavitation can cause the engine to over rev. The maximum RPM limit shall be set to the engine manufacturer's recommendations.

13.7 Auxiliary vehicle powered equipment (if specified)

13.7.1 Unless specified otherwise, inverters, converters and other electrical equipment connected to locker/body power (e.g. chargers, refrigerators, ventilation fans, hose reel motor, foam transfer pump) shall only be enabled when the 'standby/activate' switch is in the 'activate' position and the engine is running or the External Charging System is connected.

13.8 Message Display (if specified)

13.8.1 The approved Message Display (preferably 24V DC version) shall be enabled whenever the Body Control Console is activated.

14 Drawings and Documentation

14.1 General

- 14.1.1 Strict adherence to NSWFB drawing and documentation practices shall be maintained and compliance with these practices assured.
- 14.1.2 New installations, modifications and/or enhancements to existing systems may be simplified by schematic diagrams, drawings and supporting documentation as supplied by the NSWFB. This may include nominated cable and connector types, pin connections, sub-assemblies and components (component identification/sequence numbers and other markings or labels, may be included).
- 14.1.3 Where specifications, drawings and/or supplementary documentation are provided by the NSWFB, these may be in the form of:
- (a) conceptual, general layout or overall design requirements;
 - (b) fabrication and/or installation requirements;
 - (c) specific layout, including fabrication details, schematics, drawings and supporting documentation;
 - (d) of NSWFB standard systems.
- 14.1.4 The complexity of the work will dictate the level to which drawings and supporting documentation is provided to the contractor. Where pin connections, inter-wiring layout and cable identification/sequence numbers, are included (as would be expected within an already standardised system), the contractor must comply.
- 14.1.5 Names, numbers and codes used for wiring and components shall be identical across all drawings, schematics and documentation.

14.2 Text Based Documentation

- 14.2.1 Documentation including tables and explanatory text, shall be submitted in two (2) formats:
- (a) hard copy using standard paper sizes A4 (portrait) or A3 (landscape);
- Note: A3 landscape shall only be used when drawings/text cannot be accurately portrayed on A4 portrait paper.**
- (b) electronic copy in Adobe FrameMaker 7.2 or higher.

14.3 Manuals

- 14.3.1 Where text, graphics and diagrams are integrated into a manual (as may be required for major work), assembly and compilation shall be in accordance with the NSWFB Style Manual for Managed Documents.

Note: A copy of the above manual will be provided upon request.

- 14.3.2 The manual shall be submitted in two (2) formats:
- (a) hard copy using standard paper sizes A4 nominally portrait (A3 landscape as required);
 - (b) electronic copy in Adobe FrameMaker 7.2 or higher.

14.4 Drawings

- 14.4.1 Where the work includes conceptual design, general layout and fabrication, documentation may be provided by the NSWFB.

Note: Detailed design, proof of performance, provision of drawings and documentation shall be the responsibility of the Contractor.

- 14.4.2 Draft electrical schematics shall be submitted for approval in principle prior to commencement of all major work, other than that acknowledged as part of a standard system (refer to clause 14.1.3(d)). In all other cases, drawings shall be submitted not less than ten (10) working days before the nominated date of inspection.

- 14.4.3 At the completion of the work, final draft as-built drawings incorporating all changes, shall be submitted together with a request for final inspection of the completed work.

Note: Final inspection requests may not be accepted unless drawings are submitted at the time of the request.

- 14.4.4 Final drawings and other supporting documentation shall be provided to the NSWFB following acceptance of the completed work.

Note: Formal acceptance of the finished drawings and other documentation by NSWFB Engineering Services Unit is considered essential to the completion of the work.

- 14.4.5 Drawings and supporting documentation shall include:

- (a) electrical schematic diagram(s);
- (b) master cable schedule with cable identification, sequence number codes and sizes clearly indicated;
- (c) general cable and parts layout (i.e. diagram location on vehicle);
- (d) parts list detailing manufacturer/supplier by name and part number;
- (e) reference to the drawing (by drawing number & grid reference) whenever a circuit is referred to in other documentation (e.g. drawings, manuals, parts or lists)

- 14.4.6 Drawings, diagrams and graphics (including graphics and diagrams integrated with text based documentation) shall be submitted in two (2) formats:

- (a) hard copy using standard paper sizes (AO to A4 inclusive); and

- (b) electronic copy in AutoCAD 2005 (DXF format). Acceptance by the NSWFB of layering conventions and use of colour may be required;

Note: Other drawing formats may be deemed acceptable for minor work, including the provision of accurate, carefully hand-drawn diagrams, though prior written approval shall be obtained. Minimum size is A3.

14.5 Electrical Calculations

- 14.5.1 Calculations of estimated short circuit and overload current for each protective device shall be supplied not less than ten (10) working days before each inspection.
- 14.5.2 A table itemising all electrical loads on the vehicle shall be supplied not less than ten (10) working days before each inspection and shall include a description, voltage rating, and power consumption for each electrical load. The table shall also include:
 - (a) a sum of loads for the maximum expected load when the vehicle is responding i.e. all EWS lights and siren operating (refer to clause 12.6.3);
 - (b) a sum of the loads for the maximum expected load when the vehicle is operating at an incident i.e. primary EWS lights on (refer to clause 12.6.2), headlights on and all body lights operating (both internal and external);
 - (c) a sum of all electrical loads on the vehicle.

Note: These details shall be supplied together with an output curve of the recommended alternator.

- 14.5.3 If two alternators are fitted to the vehicle, individual output curves shall be supplied for each alternator and separate load tables also being supplied, as required in clause 14.5.2.

14.6 Functional Descriptions

- 14.6.1 Electrical and electronic circuits shall include a functional description, including voltage, currents and wave forms necessary to diagnose faults and generally understand the operation and functionality of the circuit and sub-assemblies.

Note: NSWFB prefers truth tables including all relevant inputs and outputs to describe circuit functionality. Other formats (e.g. flow-charts) may be accepted.

- 14.6.2 Where micro-processor or other software/firmware/hardware programmable units are used, the source code shall be supplied both as hard copy and on magnetic media with a functional explanation.

APPENDIX A

1 Glossary of Terms

1.1 The following terms are used throughout this document which shall be interpreted as having the meaning provided:

ACS (Auxiliary Control System)	is a series of integrated components which provide micro-processor controlled electrical management (control, switching, monitoring, protection) of installed auxiliary electrical equipment.
ACS console	the switching and indicating console used by vehicle operators when seated within the vehicle cabin.
Activate	a mode of operation where the circuit, system or device is operable. Also, the status of the ACS when functioning as normal.
Alternating (headlights)	headlight flashing mode where one headlight is ON whilst the opposite headlight is OFF, then both switching vice versa.
Alternator	an electromechanical device that converts mechanical power into electrical power, typically via Faraday induction effects with current carrying coils and magnets, and produces alternating current (AC).
APD (Auxiliary Power Distribution)	an enclosure providing primary distribution and protection of power from the main battery system to major components (including ACS modules).
Appliance	a vehicle specifically designed for fire service application of response to emergency incidents.
Auxiliary Control System (ACS)	a system of integrated units providing control, switching, power distribution and circuit protection for auxiliary electrical equipment. The ACS is segregated from the cab/chassis electrical system to facilitate maintenance and fault finding.
Body Control Console	the switching and indicating console used by vehicle operators when external of the vehicle.
Completed vehicle	a vehicle which has been manufactured to completion and is to the satisfaction of the NSWFB, immediately prior to formal acceptance.
Convertor	a power electrical device which transforms electrical power from one frequency and voltage to another.
Emergency Warning System (EWS)	vehicle warning system comprising of emergency lights, siren unit and speaker/s, and associated switching controls.
Equivalent	having the same form, fit and function.
Fitted	provided and installed in a manner which does not allow general movement from its fixed position (permanent or semi-permanent).
Generator	an electromechanical device that converts mechanical power into electrical power, typically via Faraday induction effects with current carrying coils and magnets, and produces direct current (DC).
Inverter	a switching circuit that converts direct current (DC) to alternating current (AC).

LED (Light Emitting Diode)	a forward biased p-n junction that emits light by a phenomenon termed electro-luminescence.
Near Side (NS)	left side of the vehicle when looking forward (i.e. kerbside).
Off Side (OS)	right side of the vehicle when looking forward (i.e. roadside).
Original Equipment Manufacturer (OEM)	the recognised manufacturer of individual equipment (at component level).
Powered	where the equipment is receiving an electric power supply which enables that piece of equipment to operate as designed.
Rear Panel (RP)	the rear facing section or sections at the rear of an appliance.
Secured	to support or fasten an item and prevent it from being displaced by the general range of motions associated with response driving.
Shall	the word 'shall' is to be understood as expressing an insistence or expectation of compliance.
Should	the word 'should' is to be understood as indicating advisory or recommended.
Standby	the status of the ACS when limited functions are available due to being in 'sleep' mode of operation.
Step door	is a bottom hinged locker door that becomes an access step when in the open position, providing better access into the body lockers.
Strobes	are lights which emit a high intensity and high frequency flashing light to attract attention from a long distance.

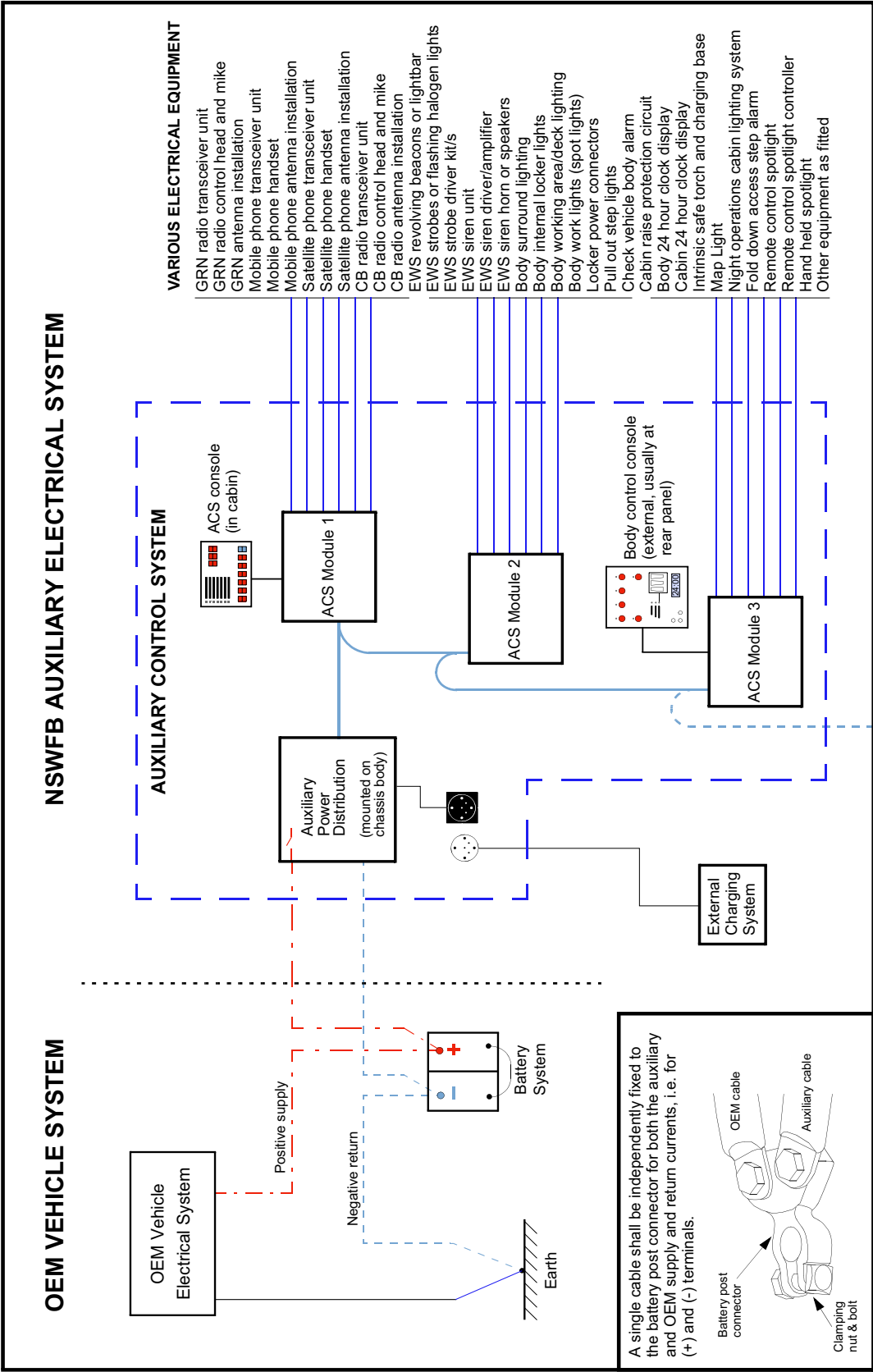
APPENDIX B

1 NSWFB Reference Drawings

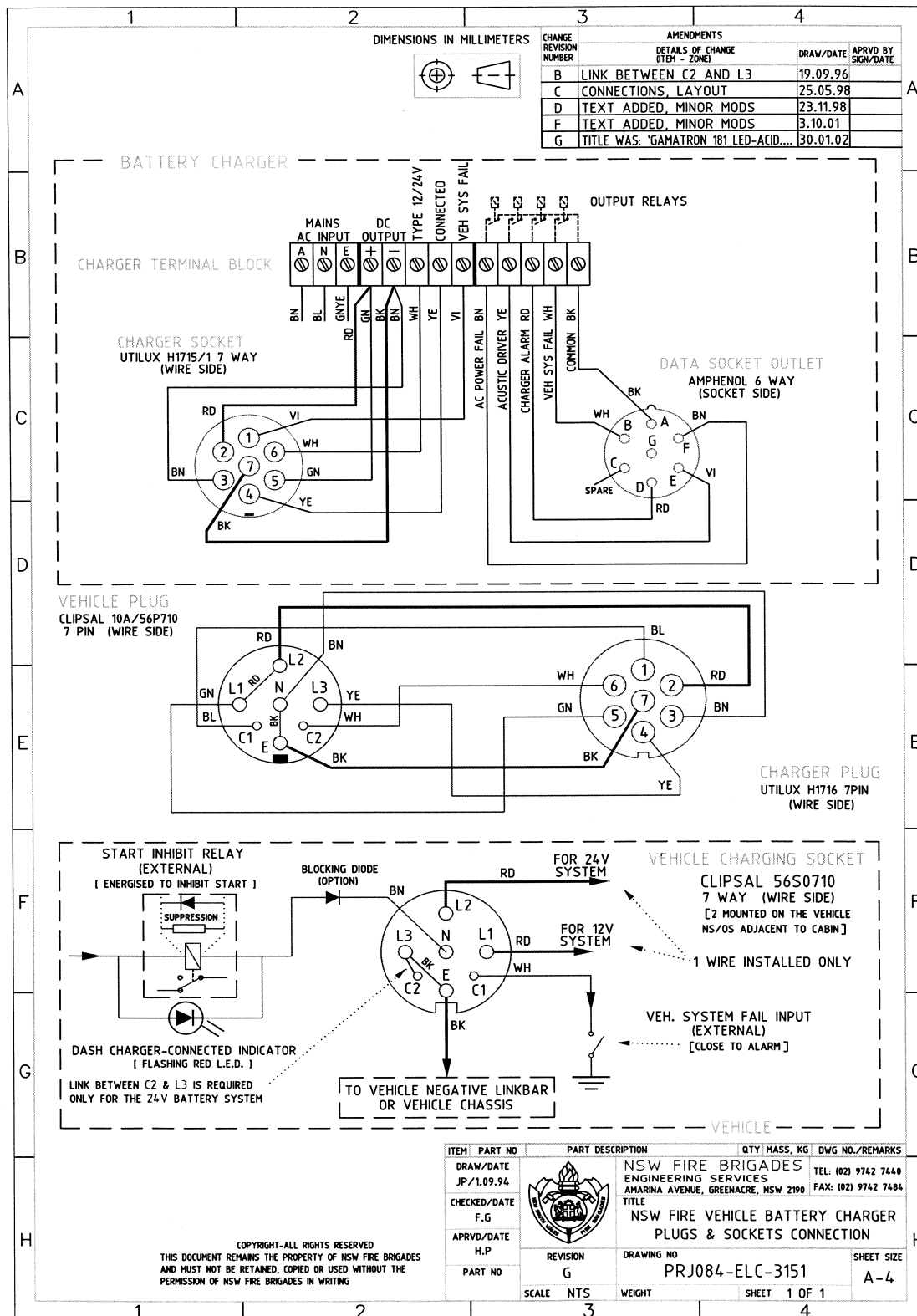
1.1 The following drawings are provided by the NSWFB for reference and shall be read in conjunction with this COP:

Drawing No	Drawing Title
PRJ084-ELC-3151	Lead-Acid Battery Charger Plugs & Socket Connections
ENG00133/OS94-01/SEGW.PDF	Segregated Wiring and ACS
ENG00133/OS94-01/ACSC.PDF	ACS Console
ENG00133/OS94-01/BCC.PDF	Body Control Console (i.e. Rear/Pump Panel)
ENG00133/OS94-01/LIGHT.PDF	Vehicle Body Surround Lights
ENG00133/OS94-01/WARN.PDF	Vehicle Emergency Warning Lights
ENG00141-ELC-3357	NSWFB Cabin Peripheral Lights

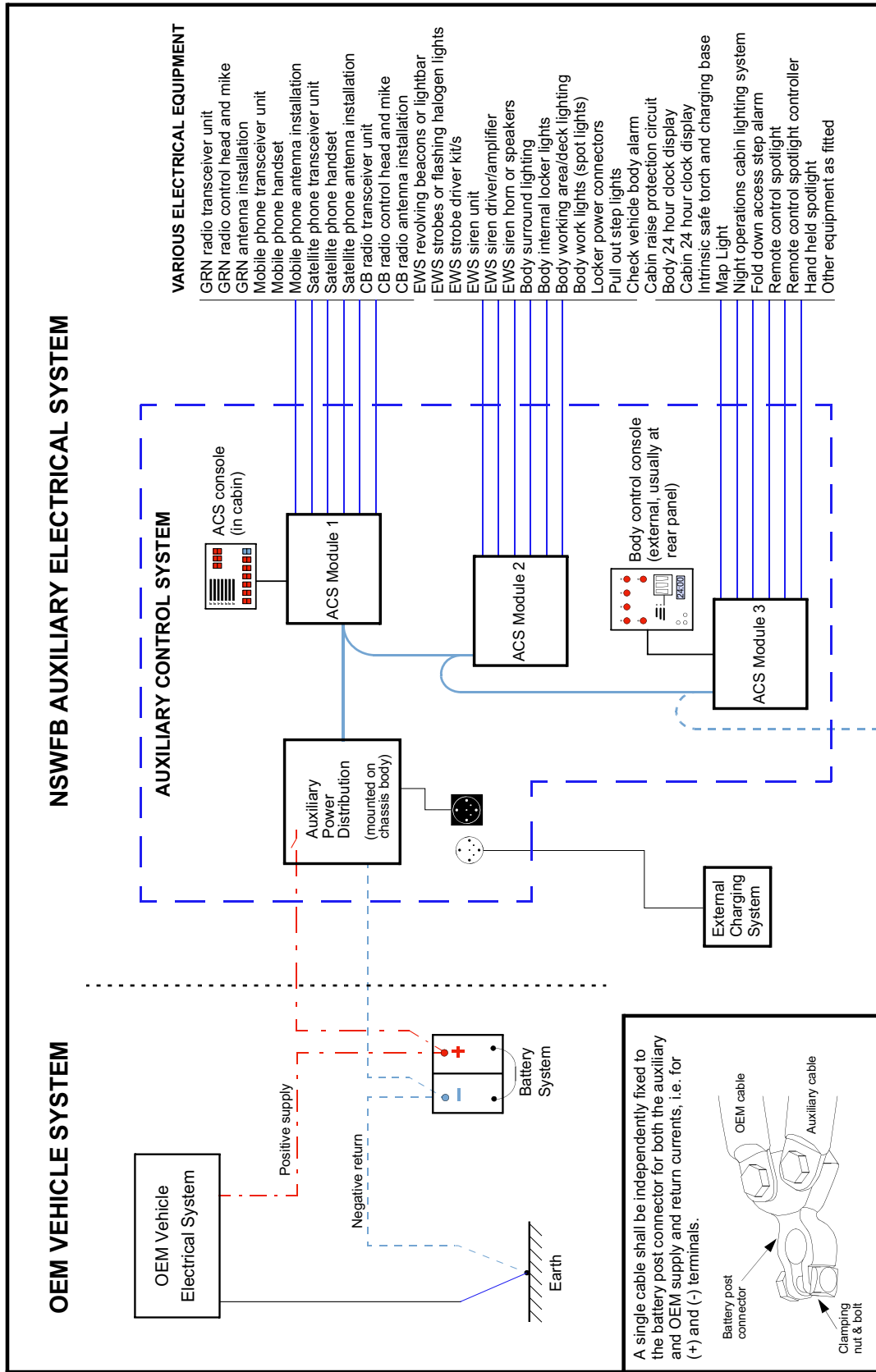
SEGREGATED WIRING AND ACS



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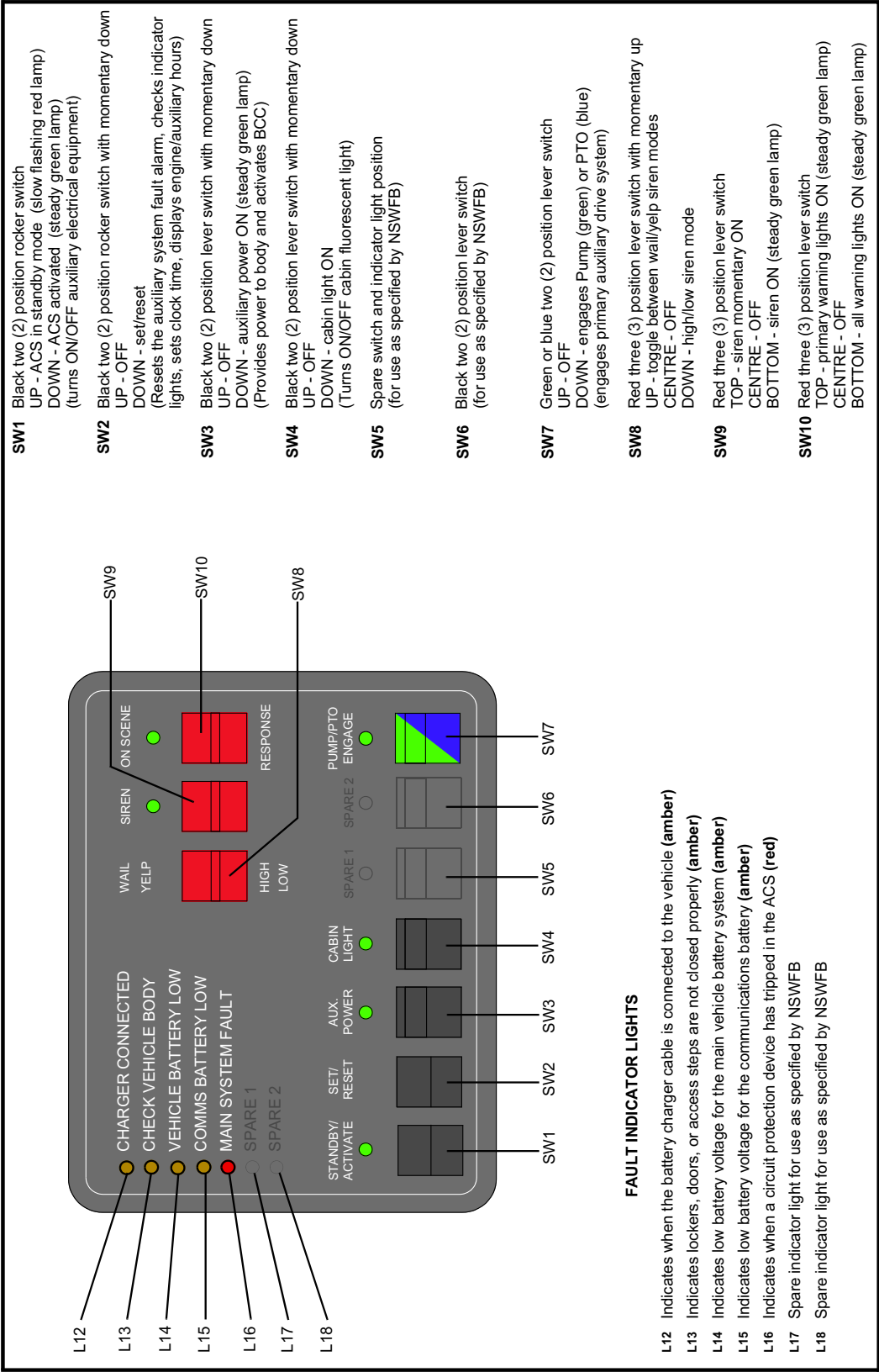


SEGREGATED WIRING AND ACS



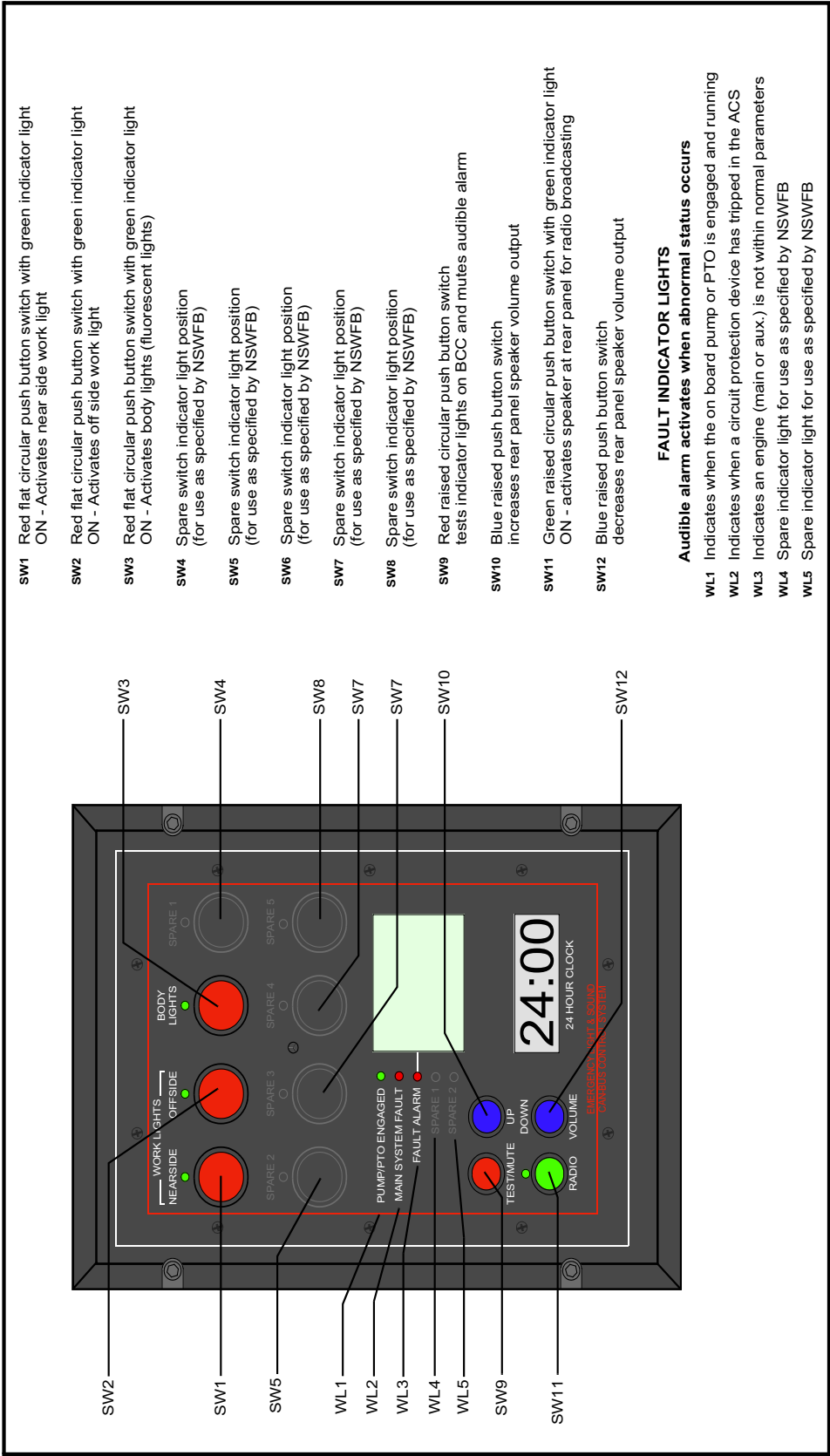
OS94-01\SEG.W.PDF

ACS CONSOLE (GENERIC DESIGN)



OS94-01ACSC.PDF

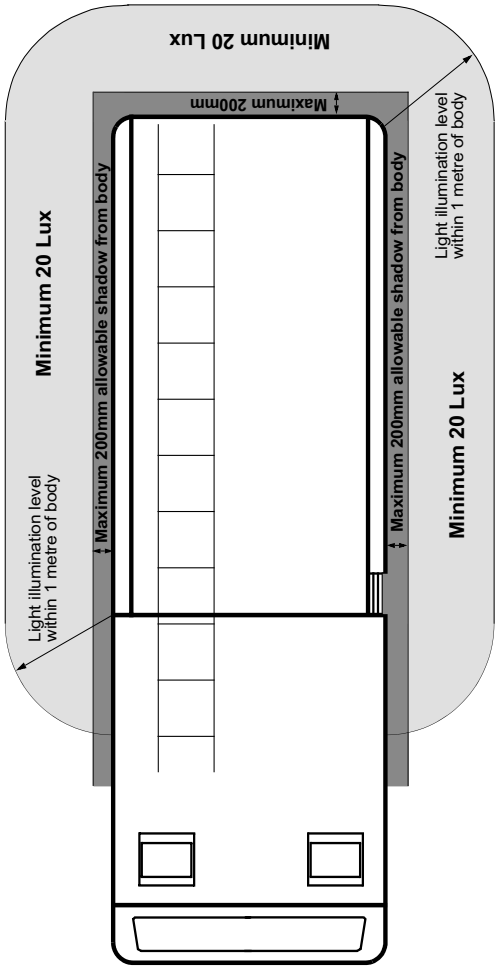
BODY CONTROL CONSOLE (GENERIC DESIGN)



OS94-01/BCC.PDF

BODY SURROUND LIGHTS

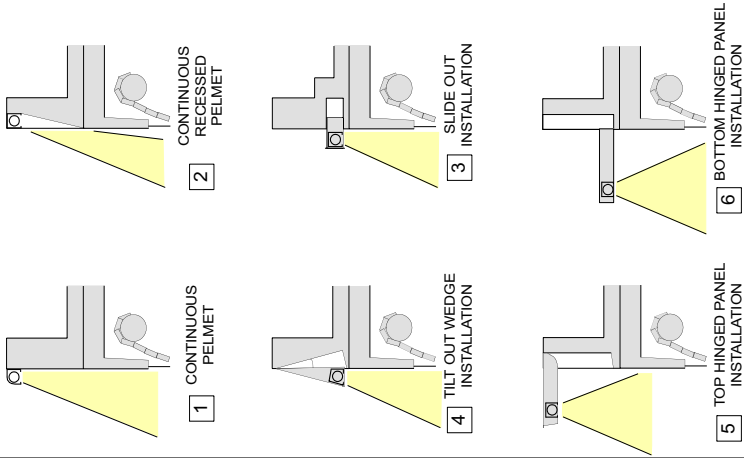
Body surround lights are fluorescent lights which direct light onto the ground around the body during night operations. The maximum possible length of fluorescent light tubing should be installed to achieve the most effective illumination.



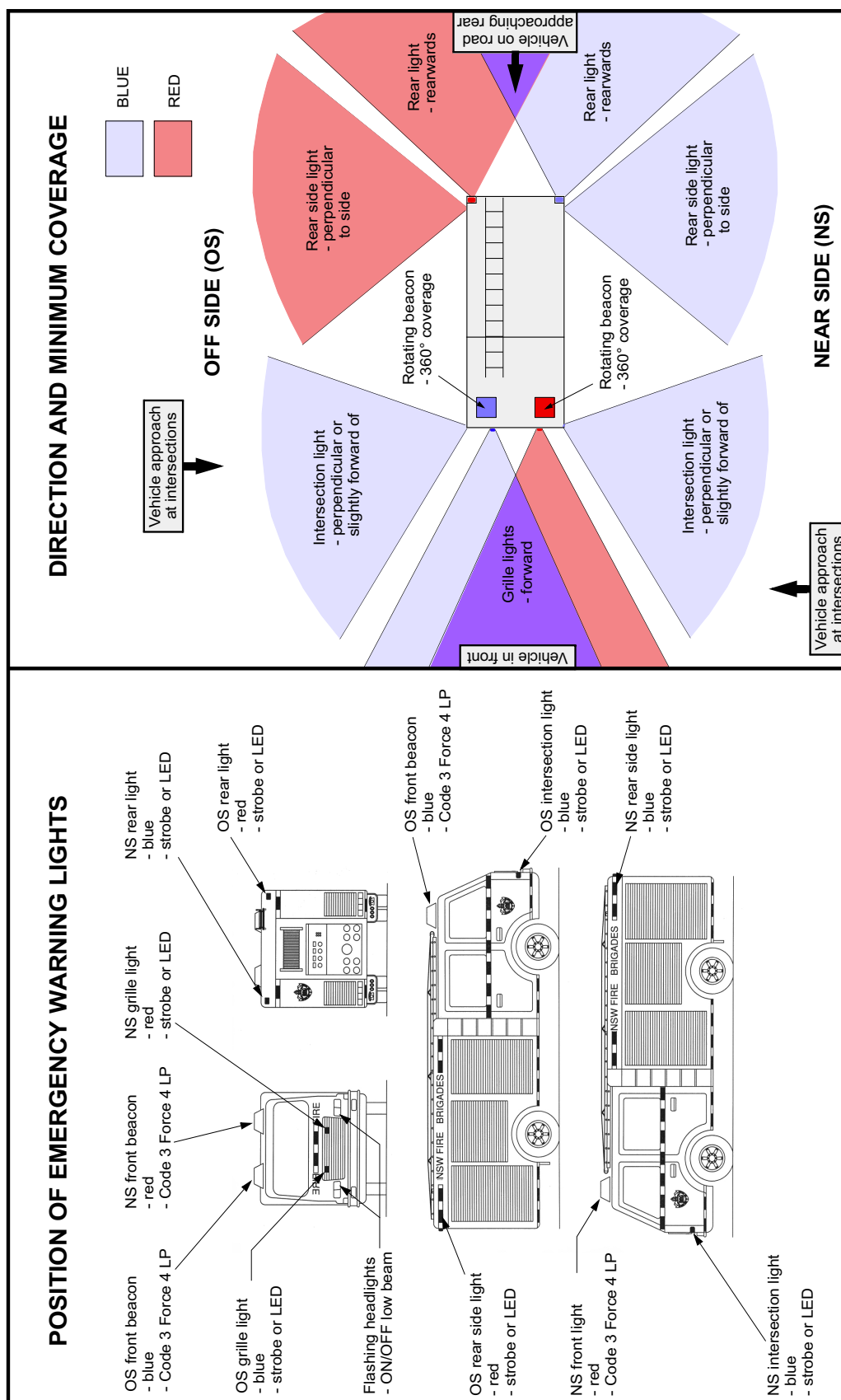
Note: All lockers and shutters must be closed
Measurements must be taken at ground level
Lighting shall only be from body surround lights and rear panel lights
Shadows cast from body fixtures should be minimised

INSTALLATION CONCEPTS

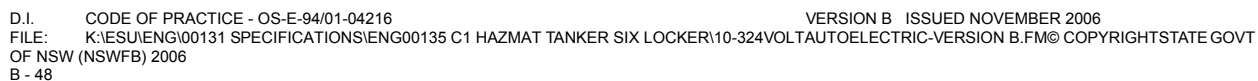
The following are concepts only. Pelmet (no. 1 and 2) shall be continuous around the body. Manufacturers are encouraged to design simple, reliable & effective light installations which blend into the body. Reference should be made to the 12-24V Code of Practice for specific requirements.



VEHICLE EMERGENCY WARNING LIGHTS



OS94-01\WARN.PDF



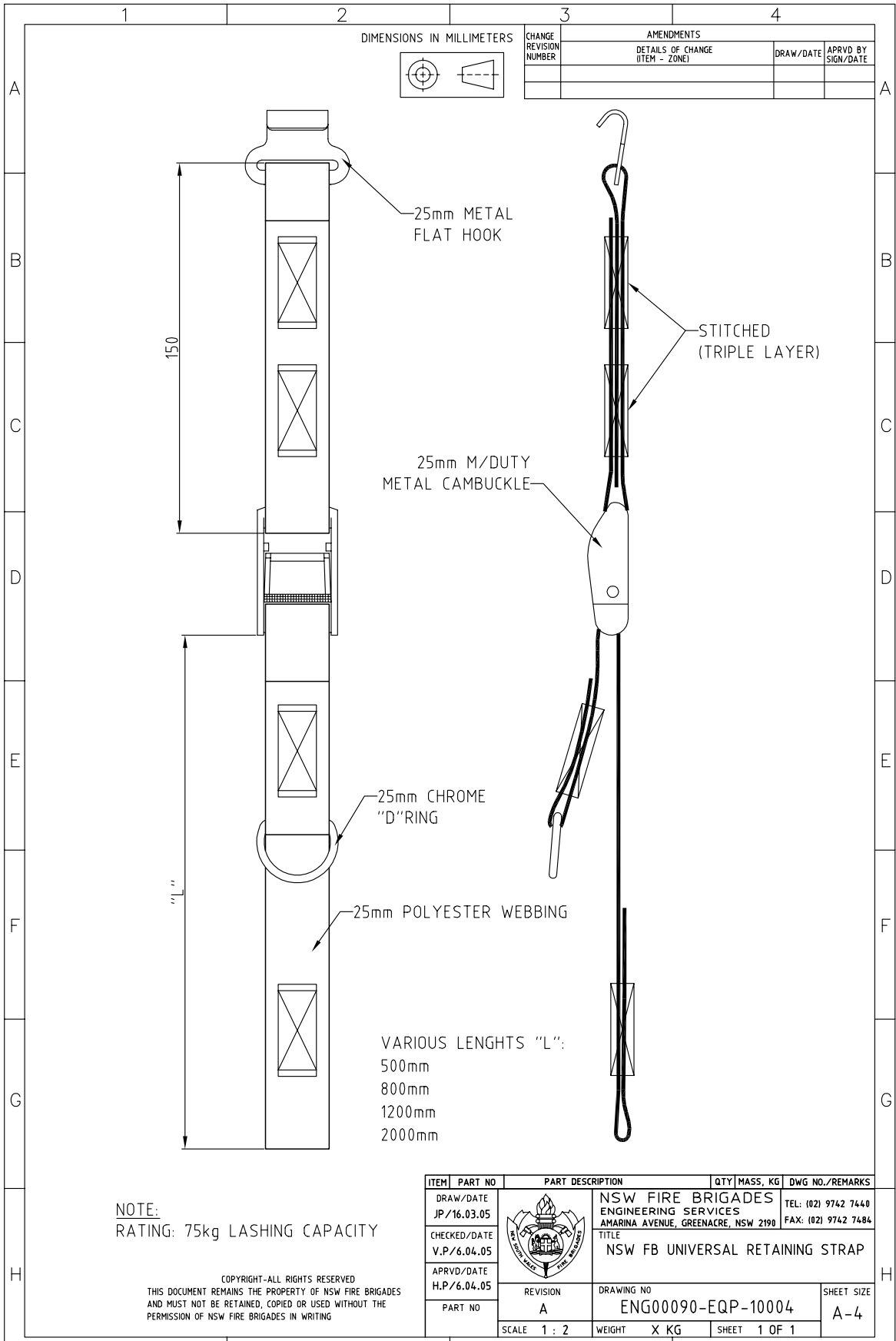
No.	Description	Manufacturer (OEM)	OEM Part no.
50	Photoelectric detector	Erwin Sick	WS/WE 250-5132
51	Refrigerator, 40L, 12/24/240V	Engel	MT45FS
52	Whiteboard, electronic	Electroboard	Various
Electrical, Lighting			
53	Area illumination light	Hella	1516
54	Courtesy light, LED, white	Hella	95950067
55	Courtesy light, LED, green (for NOCL)	Hella	95950077
56	Courtesy light, shroud (for NOCL)	Brett Franzi Industrial Design	FS470
57	Fluorescent light, 1280mm long	Dapro	FBFL26
58	Fluorescent light, 1280mm long	Impart	ELSL T04 - 28
59	Fluorescent light, 652mm long	Dapro	FBFL13
60	Fluorescent light, 652mm long	Impart	ELSL T04 - 13
61	Fluorescent light, 412mm long	Dapro	FBFL8
62	Fluorescent light, 412mm long	Impart	ELSL T04 - 8
63	Fog lights, front	Hella	1107
64	Fog lights, rear	Hella	2300
65	Hand held spot light	Narva	71012
66	Map light	Hella	2636
67	Rear combination lamp	Hella	2412
68	Spot light, external, remote controlled	Federal Signals	VB 24S (Visibeam II)
69	Spot light, internal, hand held	Narva	71012
70	Step light	Hella	2635
71	Work lights (top deck spotlights)	Hella	1513
Electrical, Switches			
72	Reed switch	Varley Specialised Vehicles	3550372
73	Reed switch proximity magnet	AMF	Various
Electrical, Auxiliary Control System			
74	ACS console	Impart Special Products	Various
75	Digital clock (slave display)	Impart Special Products	ELS 31L2
76	Body Control Console (BCC)	Impart Special Products	Various

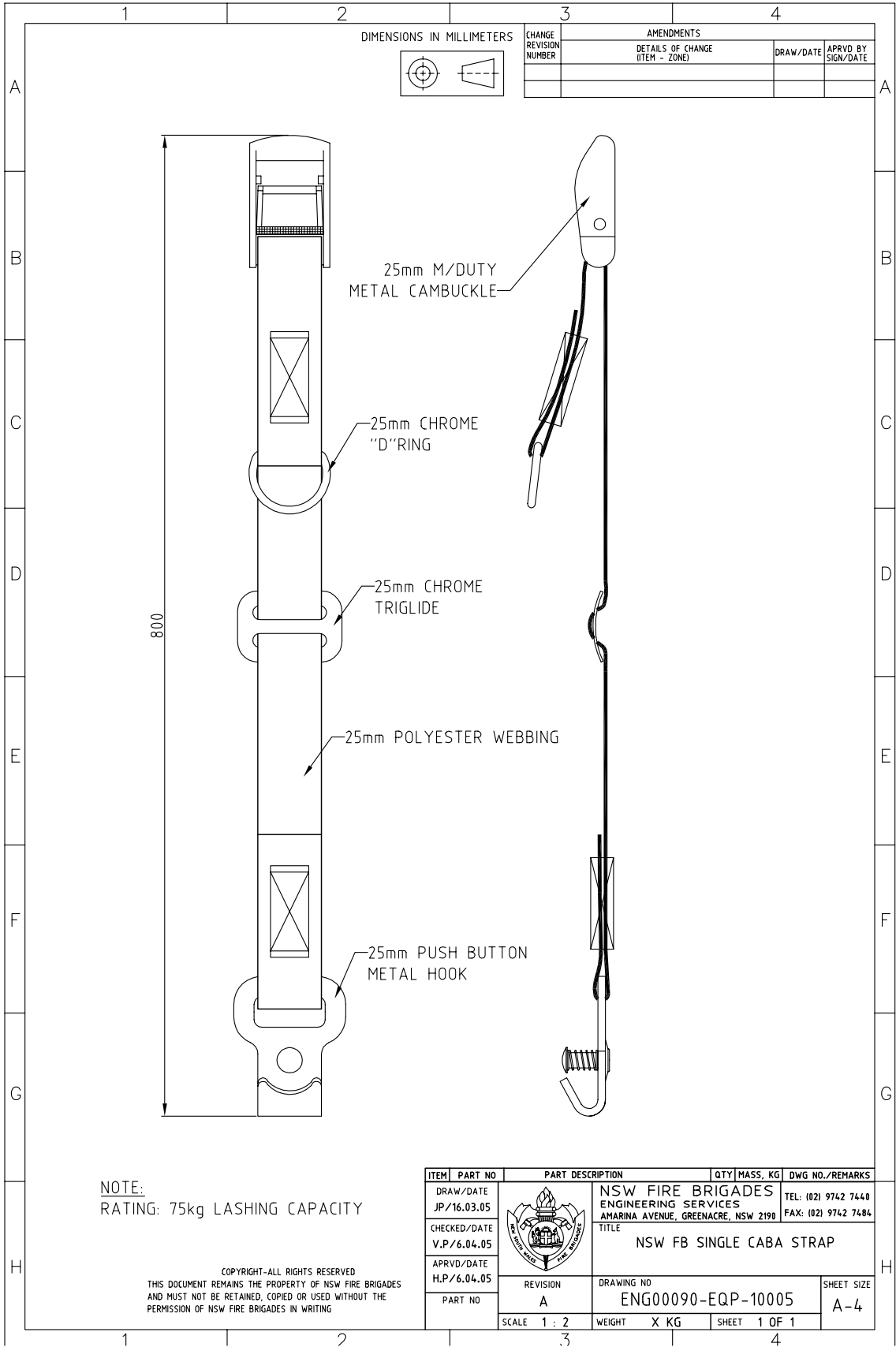
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ANNEX C NSWFB Reference Drawings

The following drawings are provided by the NSWFB for reference.

Drawing No.	Drawing Title
ENG00090-EQP-10004	NSWFB Universal Retaining Strap
ENG00090-EQP-10005	NSWFB Single CABA Strap
ENG00090-EQP-1055	Velco Straps



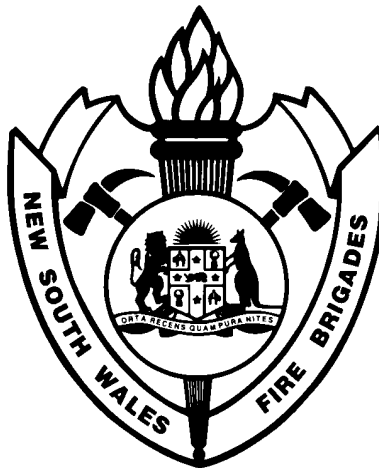


D.I. SPECIFICATION - ENG-00226 VERSION 01 ISSUED AUGUST 2007
FILE: K:\ESU\ENG\00131 SPECIFICATIONS\ENG00135 C1 HAZMAT TANKER SIX LOCKER\DRAWINGS TO COP.FM© COPYRIGHTNSW STATE GOVT 2007

ANNEX D CODE OF PRACTICE - AUTOMOTIVE MOBILE RADIO INSTALLATION (OS-E-95/03)

The installation of Mobile Radios shall follow the latest version of this Code of Practice.

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CODE OF PRACTICE

**AUTOMOTIVE MOBILE RADIO
INSTALLATION)**

OS-E-95/03
VERSION B

ABBREVIATIONS

	DESCRIPTION
NSWFB	New South Wales Fire Brigades
SWR	Standing Wave Radio checks
UHF	Ultra High Frequency
EME	Electromagnetic Emission
NATA	National Association of Testing Authorities
RF	Radio Frequencies
GRN	Government Radio Network
T/L	Through Line
PMR	Private Mobile Radio

List of Abbreviations used in this document

CONTENTS

Page No.**Part 1 Installation**

1.1	Function	6
1.2	Introduction	6
1.3	Overall Requirements	6
1.4	Installation Practice	7
1.5	Antenna Installation	8
1.6	Power Cables and Fuses	8

Part 1 Installation Testing

1.1	Receiver Interface	10
1.2	EME Testing	10
1.3	Functional and Standing Wave Ratio (SWR) Checks	10
1.4	Standing Wave Ratio Measurement	11

Appendix A Recommended Antenna, Cable and Connector Types 14**Appendix B UHF Mobile Radio 15****Appendix C Portable Radio 16****Appendix D Cellular Phone 17****Appendix E UHF CB Radio 18****Appendix F Satellite Phone 19****Appendix G Mobile Data 20****Appendix H Global positioning System 21****Appendix I Drawing 22**

PART 1 INSTALLATION

1.1 Function

- 1.1.1 This Code of Practice (COP) is in two parts. Part One defines the installation techniques and Part Two defines the equipment and testing used for Automotive Mobile Radios for the NSW Fire Brigades (NSWFB).

1.2 Introduction

- 1.2.1 The communication equipment and installation shall comply with the guidelines in this Code of Practice to minimise the effects of RF interference.

 NOTE

ANTENNAS shall be separated from large metallic objects, such as ladders, by at least 500mm.

- 1.2.2 NSWFB vehicles can be stationed or operated anywhere within NSW and occasionally interstate, therefore the highest level of vehicle and equipment reliability is essential.
- 1.2.3 To ensure that all vehicles are configured similarly throughout their service life, maintenance, alterations and additions to the radio systems are simplified through design, installation and maintenance guidelines.

1.3 Overall Requirements

- 1.3.1 The following drawings (with details) are required for approval by the NSWFB before construction begins:
- (a) radio transceiver locations and mounting arrangements;
 - (b) antenna types;
 - (c) antenna location;
 - (d) associated cabling drawings;
 - (e) ground plane construction.
- 1.3.2 In order to allow for heat dissipation there shall be a separation of at least 25mm between any two adjacent transceivers and around the transceivers or portable radio housings.
- 1.3.3 Cables with poor quality shielding and poor bonding between inner dielectric and outer braid are not acceptable.
- 1.3.4 Connectors shall be tested for short circuit between outer braid and centre conductor while any crimping shall be tested to manual force.

1.4 Installation Practice

- 1.4.1 The installation shall be carried out by a qualified radio trades person, in accordance with the requirements of the local radio communication authorities and the current NSW OH&S regulations.
- 1.4.2 Prior to commencing installation, the installer shall evaluate the installation method best suited to the vehicle and confirm this with the NSWFB.
- 1.4.3 Where possible, existing holes should be used to pass cables through bulkheads.
- 1.4.4 Any holes that are drilled should be de-burred, have grommets fitted and be sealed to safeguard against chafing, cutting and the ingress of dust and moisture.
- 1.4.5 The mobile transceivers are to be installed into the ACS Unit (Refer to Low Voltage Code of Practice OS-E-94/01-04216), unless otherwise specified.
- 1.4.6 Selection of the appropriate radio antenna depends on the mounting materials used.
- 1.4.7 Once the first vehicle installation is completed to the satisfaction of the NSWFB then all subsequent installations shall be identical.
- 1.4.8 Access through the roof lining/cavity is required to permit replacement of the UHF type antenna base and cable, once in service.

NOTE

The cable entry should never be run in a non-accessible cavity.

- 1.4.9 While performing the installation the contractor shall not interfere, physically or through RF disturbance, with the electronic devices fitted to the vehicle (electronic devices include ABS brakes, Electronic Engine Management Systems, airbag sensors and Electronic Suspension—any of these systems could be affected by the presence of an RF field of sufficient intensity).

NOTE

In the interests of safety, the vehicle must be tested after the installation is completed.

- 1.4.10 The control head cabling shall be run within an easily accessible appropriate protective enclosure (such as a conduit or similar).
- 1.4.11 If required, the control head cable can only be exposed less than 30cm from the radio and control head.
- 1.4.12 The control head shall be securely mounted by means of at least 2 (two) screws of a gauge supplied with the radio. The control head shall be visible to users and shall be safe to use whilst in transit and not exposed to direct sunlight.

NOTE

Mounting in a centre console (where provided) is recommended.

1.4.13 Non-Metallic Roof

- 1.4.14 Where a non-metallic roof is used, a ground independent antenna conforming to an elevated feed design is required (see Appendix A Recommended Antenna, Cable and Connector Types on page 14).

 NOTE

Access through the roof lining/cavity is required to permit replacement of the antenna stud base and cable, once in service.

1.5 Antenna Installation

- 1.5.1 Consideration shall be given to the location of other equipment on the appliance when installing the radio and its associated equipment.

- 1.5.2 A typical NSWFB antenna location on the cab roof is shown in drawing: ENG00133-ELC-3351 (Appendix I: Drawing on page 22).

 NOTE

Alternative positions may give degraded performance.

- 1.5.3 The procedures for antenna installation are:

- (a) wash and clean the paintwork in the area of operations to avoid any scratches caused by dust;
- (b) ensure that the location of the antenna is clear of any obstructions;
- (c) apply masking tape to the area where the hole will be, to minimise the chance of swarf damaging the painted surface when drilling;
- (d) carefully centre punch this point to ensure that the drill will not slide;
- (e) fit a stop so that the pilot drill and hole saw cannot pass through the roof headlining;
- (f) prevent the cut-out piece falling onto the headlining by using the hole saw at a slight angle and by breaking the last tag;

 NOTE

The cut-out piece may be sharp and hot and can cut or burn the headlining if not controlled.

- (g) install the antenna according to the manufacturer's instructions;
- (h) terminate the coaxial cable with the recommended connector.

1.6 Power Cables and Fuses

- 1.6.1 Power cable shall be standard red/black or red/red (black trace) of no less than 4mm OD. Both conductors shall terminate to or near the battery or adjacent suitable termination box (see Appendix A Recommended Antenna, Cable and Connector Types on page 14 for cable types).

- 1.6.2 Power cabling shall be run within an appropriate protective enclosure (such as a conduit or similar) and shall not be exposed except within 30cm of the radio.
- 1.6.3 Power cabling shall never restrain the use of other items.
- 1.6.4 Cables shall be cut to length and not coiled.
- 1.6.5 Radios shall be protected by a fuse near the battery (see table in see Appendix A Recommended Antenna, Cable and Connector Types on page 14 for ratings).

PART 1 INSTALLATION TESTING

1.1 Receiver Interface

- 1.1.1 No receiver interference shall occur during normal operation of the vehicle and/or other radios installed.
- 1.1.2 Using channel 801 as in the SWR test, but on Receive with the volume set to 75 percent of adjustment, co-radio interference tests shall be carried out:
- (a) transmit on the UHF CB (channel 40) (if fitted) and confirm no interference is detectable on the UHF;
 - (b) make a telephone call using the satellite phone (if fitted) and confirm no interference is detectable on the UHF;
 - (c) make a telephone call using the mobile phone (if fitted) and confirm that no interference is detectable on the UHF.
- 1.1.3 For the first vehicle of any new type of appliance, it will be necessary to use a signal generator and RF monitor to measure receiver desense. This shall be carried out on channel 801 (receive frequency 419.125MHz, ctss tone 151.4Hz) using the T-piece method.

1.2 EME Testing

- 1.2.1 For the first vehicle of any type of appliance, it shall be necessary to perform Electromagnetic Radiation Emission (EME) measurements and for a report to be produced for all the antennas and radio systems installed.
- 1.2.2 This work shall need to be performed by an organization that is NATA accredited in EME RF measurements in consultation with the NSWFB Communications Unit.

1.3 Functional and Standing Wave Radio (SWR) Checks

- 1.3.1 For the installation of any radio equipment, the following checks and actions shall be carried out:
- (a) ensure that fuses of the correct rating are installed (refer to Appendix A);
 - (b) ensure that the negative lead is connected to the chassis earth point;
 - (c) check that all cables requiring connection to the transceiver are connected;
 - (d) connect the positive terminal to the battery;
 - (e) switch on the radio;
 - (f) measure the SWR, as set out in Clause 1.4.4;
- 1.3.2 For the installation of GRN/PMR radios, the following checks and actions shall be carried out:

- (a) ensure that fuses of the correct rating are installed (refer to Appendix A:);
- (b) ensure that the negative lead is connected to the chassis earth point;
- (c) check that all cables requiring connection to the transceiver are connected;
- (d) connect the positive terminal to the battery;
- (e) switch on the radio (press green knob on the left and wait); the liquid crystal display (LCD) should show all segments and display **Self Test**;
- (f) measure the SWR, as set out in Clause 1.4.4;
- (g) if the radio was previously on a GRN channel, the radio may display **Out of Range**; change to PMR channel **801 (NSWFB 01)** to confirm correct operation (refer to Clause 1.4.4);
- (h) set to channel **506 (Incident 6)**, make a call to a GRN portable radio on that channel and ensure satisfactory audio performance was achieved.

1.4 Standing Wave Ratio Measurement

- 1.4.1 The antennas specified are factory tuned to the GRN frequency band (406–408MHz Tx / 416-418MHz Rx).

NOTE

Cutting antennas to length is not required.

- 1.4.2 It is only possible to test the radio on GRN frequencies within the GRN coverage area (e.g. Sydney).

NOTE

An “Out of Range” warning will flash when outside GRN area.

- 1.4.3 Antenna SWR needs to be measured on both GRN and NSW Fire Brigades PMR frequencies. Channels talkgroups to be used for testing are:

RN talkgroup 1001 - when within GRN coverage area;

PMR channel 801 - where transmitting frequency is 409.675MHz.

- 1.4.4 To measure the SWR:

- (a) if in GRN coverage area: select **1001 Comms** by using the **Zone key** and rotary knob (right hand side of radio);
[if not in GRN coverage area, follow instructions of subclause 1.4.4 (h)];
- (b) connect a Through-Line (T/L) wattmeter in line with the antenna cable;
- (c) using the T/L wattmeter, fitted with a module no greater than 50 W FSD, confirm that the radio forward power is approximately 25 W;
- (d) replace the module with a 5-10 W FDS unit and measure the reflected power (the Standing Wave Ratio should not exceed 1.5/1);

- (e) if the measured ratio exceeds 1.5/1, then re-check all connections between the antenna, antenna feeder and transceiver and ensure that the antenna radiator is not touching any part of the vehicle or other object;
- (f) if the reflected power reading is satisfactory, disconnect the T/L wattmeter and reconnect the transceiver directly to the antenna;
- (g) carry out an **On Air** test if possible;
- (h) select **801 (NSWFB 01)** using the **Zone** key and rotary knob, on the right hand side of the radio; this is a UHF PMR two frequency channel (Tx 409.675 MHz, Rx 419.125 MHz);
- (i) repeat procedures (b) to (g) using the 801 channel.

1.4.5 Record all readings of vehicle serial number, radio serial number, channel selected, forward and reflected power, and supply these readings to the NSWFB upon completion of work.

1.4.6 Audio Quality

1.4.7 Carry out an **On Air** test.

1.4.8 The speaker system shall be tested to ensure that correct operation takes place in regard to level, distortion and switch operation.

1.4.9 Fire Station Test

1.4.10 On arrival at the fire station, a call shall be placed with either the appropriate Brigade Command Centre or the Brigades' Communication Services Department.

NOTE

This procedure will be agreed to, before commencing the installation.

1.4.11 RF Compatibility Checks

1.4.12 When performing the RF compatibility checks ensure that the transmitter is activated only for the time required to make an observation and that an assistant is available to help carry out the checks.

- (a) with the vehicle stationary and the engine running at fast idle, activate the transmitter and check that the brake lights do not illuminate and that the engine continues to run normally and that the airbag sensors (if fitted) are not affected;
- (b) with the vehicle idling, no electrical noise shall be audible;
- (c) with the vehicle at 3000 rpm, no electrical noise shall be audible;
- (d) operate the brake pedal, activate the transmitter and ensure that operation is normal;
- (e) operate the direction indicators, activate the transmitter and ensure the operation is normal;

- (f) drive the vehicle at 15–20km/h, activate the transmitter and simultaneously operate the brake pedal; check that braking action is normal and the engine does not surge or cut out.

 NOTE

Further information may be obtained from the NSWFB Communication Planning Group, (02) 9742 7476.

APPENDIX A RECOMMENDED ANTENNA, CABLE AND CONNECTOR TYPES

Antenna Ref	Radio Application	Antenna Type	Cable Type	Connect or Type	Fuse Rating	Purchasing Details
A	NSWFB GRN/PMR	CSW13	RG58C/U	MPL - 604	10A	RF Industries
B	Mobile Data Terminal		RG58C/U		5A	
C	GSM Cellular Phone	EG 883	9014/RJ44 low loss cell-oame	FME - 101	5A	RF Industries
	CDMA Cellular Phone	SW/485	9014/RJ44 low loss cell-oame	FME - 101	5A	RF Industries
D	UHF CB	CSW15	RG58C/U	UHF-44	5A	RF Industries
E	Satellite Phone	Marlec	LMR 300	Special TNC	10A	Marlec
F	GPS					

APPENDIX B UHF MOBILE RADIO

Table 1: Motorola GRN / UHF Mobile Radio

Model	Description
M01RHM9PW5-NH038	MCS2000II Mobile Radio, 25W, Smart Zone (GRN model)
B654	Remote Mounting Kit, 5 metre
AKB70	Omit Standard Antenna
Projmat	Agency Profile Programming
State Government Contract Number:	UHF Radio ITS 2573
Supplier:	Motorola Australia Pty Ltd Level 7, 18 - 20 Orion Rd, Lane Cove, NSW 2066 Ph: (02) 98828910

 NOTE

These radios cannot be purchased outside the NSW Government Agencies contracted to the Government Radio Network. All enquiries regarding supply and connection of additional GRN radios should be referred to the Communications Service Manager Tel: (02) 9742 7366.

APPENDIX C PORTABLE RADIO

Table 2: Motorola Portable Radio (Hand Held Transceiver - HHT)

Model	Description
H09RDH9PW-N	XTS 3000 III Portable Radio, FM, 403 - 407 MHz, 4 Watt Smartzone GRN Portable radio
NMN 6193	Remote Speaker/Microphone
H223-NTN8295	Battery FM Intrinsically Safe
CPM 300	Case to suit XTS 3000/II Portable Radio
State Government Contract Number:	UHF Radio ITS 2573
Supplier:	Motorola Australia Pty Ltd Level 7, 18 - 20 Orion Rd, Lane Cove, NSW 2066 Ph: (02) 9822 8900
Case Supplier:	Tote System Pty Ltd PO Box 4414 Loganholme DC Queensland 4129 Ph: 07 3287 7699

 NOTE

These radios cannot be purchased outside the NSW Government Agencies contracted to the Government Radio Network. All enquiries regarding supply and connection of additional GRN radios should be referred to the Communications Service Manager Tel: (02) 9742 7366.

APPENDIX D CELLULAR PHONE

Table 3: Cellular Phone

Model	Description
New model being reviewed.	Contact Communications Facility Manager on (02) 9742 7466 for latest detail.
GSM	
CDMA	
Supplier:	

 NOTE

Currently a review of allocations for appliances is being undertaken by Deputy Regional Commanders.

 NOTE

Allocation approved on an individual needs basis.

 NOTE

Purchase and allocation co-ordinated by the Communications Service Manager Tel: (02) 9742 7366.

APPENDIX E UHF CB RADIO

Table 4: UHF VCB Radio

Model	Description
GME TX 4400	GME TX 4400 UHF CB Local Unit (large) For use in appliances when approved.
GME TX 3400	GME TX 3400 UHF CB Remote Unit (small) For use in small fleet vehicles when approved.
Supplier:	GME Electrophone - Reseller: Command Communications

 NOTE

Requests for new services should be directed to the Communications Service Manager Tel: (02) 9742 7366.

APPENDIX F SATELLITE PHONE

Table 5: Satellite Phone

Model/Type	Network	Supplier	Comments
NEC S1	Optus	Marlec Pty Ltd	Fixed In-Vehicle handset. No Longer available. Used in fire fighting appliances and light fleet vehicles. (+ Spares) (See Note 1)
NEC S2	Optus	Marlec Pty Ltd	Fixed In-Vehicle handset. Used in fire fighting appliances and light fleet vehicles. (+ Spares) (See Note 1)
Telit Sat 550	Globalstar	Marlec Pty Ltd	Removable handset. No longer purchased. Dual band GSM/Sat. Used in light fleet vehicles and HAZMAT Support Vehicles only. (See Note 2)
Qualcomm GPS1600	Globalstar	Marlec Pty Ltd	Removable handset. Dual band CDMA/Sat. Used in light fleet vehicles and HAZMAT Support Vehicles only. (See Note 2)
Installation Kits	Note 1: In vehicle installation kits come as part of the complete Satellite Phone package.		
	Note 2: These satellite phones come with separate in-car kits, allowing the handset to be operated outside the vehicle.		

NOTE

Allocation approval is based on the NSWFB satellite phone allocation policy and on an individual needs basis.

NOTE

Requests for new services should be directed to the Communications Operations Manager Tel: (02) 9742 7466.

APPENDIX G MOBILE DATA

Table 6: Mobile Data

Model	Description
Supplier:	

 NOTE

Pilot being performed.

 NOTE

Details will be provided at the end of the pilot installation.

 NOTE

For progress details, contact the Senior Engineer, Communications Unit
Tel: (02) 9742 7466.

APPENDIX H GLOBAL POSITIONING SYSTEM

Table 7: GPS

Model	Description
Supplier:	

 NOTE

Pilot being performed.

 NOTE

Details will be provided at the end of the pilot installation.

 NOTE

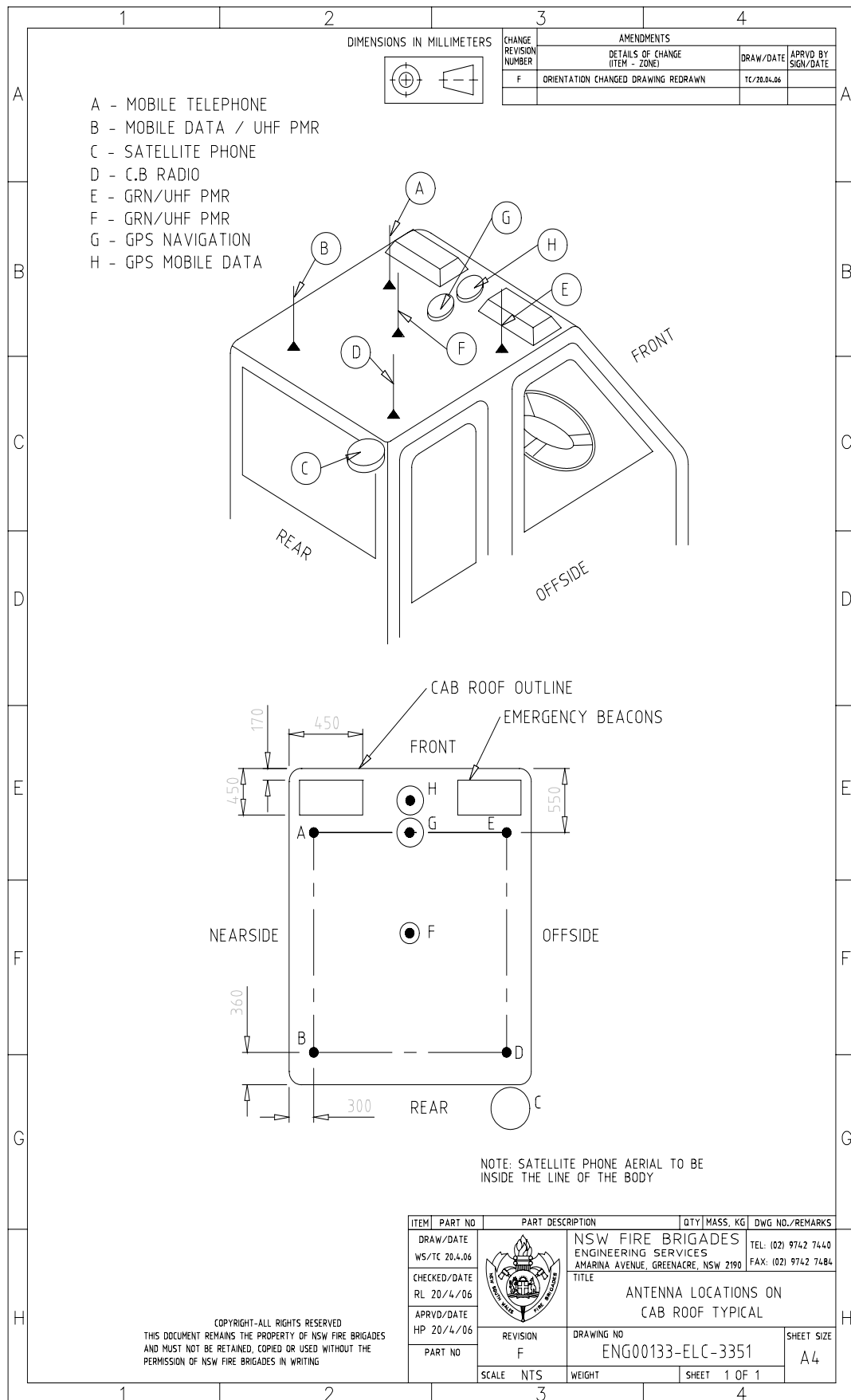
For progress details, contact the Senior Engineer, Communications Unit
Tel: (02) 9742 7466.

APPENDIX I DRAWING

1 NSWFB Reference Drawings

1.1 The following drawings are provided by the NSWFB for reference and shall be read in conjunction with this COP:

Drawing No	Drawing Title
ENG00133-ELC-3351	Antennae Locations



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ANNEX E DELIVERY HANDOVER SHEET - CLASS 1 (4X4) HAZMAT TANKER SIX LOCKER

1 Delivery Handover Sheet

A delivery handover sheet similar in design and content to that shown overleaf shall be provided for every completed vehicle.

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CLASS 1 (4x4) HAZMAT SIX LOCKER TANKER

DELIVERY HANDOVER SHEET

FBY STATION JOB No. KM

FUEL (3/4 min.) CONDITION

(These are items presented with the vehicle)

Documentation	Y/N	Equipment Serial Numbers	
Contractor's Warranty		Chassis (VIN)	S/No.
Cab/Chassis Warranty		Engine	S/No.
Registration Papers		Transmission	S/No.
Inspection Certificate		Auxiliary Engine	S/No.
Operator's Handbook		Pump	S/No.
Weighbridge Ticket		GRN Radio	S/No.
Other Test Reports		Radio Personal Identification No.	

Vehicle Keys

Type	Serial Number	Qty
Ignition		
Doors		
Lockers		

Certified the documents, communication equipment and vehicle keys detailed above were presented to the NSWFB when the vehicle was delivered.

Contractor Representative

Date _____

NSWFB Representative

Date _____

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ANNEX F VEHICLE INFORMATION DATA SHEETS

1 Vehicle Information Data Sheets

Vehicle information data sheets as provided in the following pages shall be completed for every Class 1 (4x4) hazmat six locker tanker vehicle built.

 NOTE

The vehicle information data sheets should contain all particulars for each given vehicle so the NSWFB can enter the information into its fleet database.

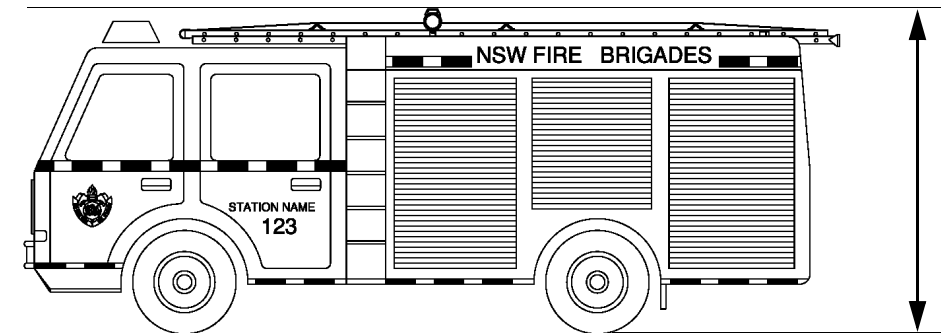
Description	Particulars (Details)
General	
Vehicle FBY number	
Vehicle make	
Vehicle model	
Year model	
Vehicle Identification Number (VIN)	
Chassis number (if different to VIN)	
Compliance plate number	
Engine number	
Accessories	
AM/FM Radio PIN	
Key number	
Communications	
AM/FM radio make, model and serial no.	
GRN (UHF) radio serial number	
Mobile phone serial number (if fitted)	
Satellite phone serial number (if fitted)	
CB radio serial number (if fitted)	
Electrical	
Electrical schematic drawing number	
ACS component drawing numbers	
APD drawing number	
Mechanical	
Engine capacity (litres)	
Number of engine cylinders	
Engine power rating (kW)	
Engine bore (mm)	
Engine oil type and grade	
Engine oil capacity (litres)	
Engine oil filter catalogue number	
Fire pump make, model and serial no.	
Fire pump rated output (litres per second)	
Transmission (manual or automatic)	
Transmission catalogue number	
Transmission oil type and grade	
Differential oil type and grade	
Road Dimensions (*refer to drawings at end of annex)	
(a)* - Vehicle height (mm)	
(b)* - Vehicle length (mm)	
(c)* - Vehicle width (mm)	
(d)* - Wheelbase (mm)	
(e)* - Clearance height under body (mm)	
(f)* - Clearance height under diffs (mm)	
(g)* - Entry angle (°)	

Class 1 (4x4) Hazmat Tanker Six Locker

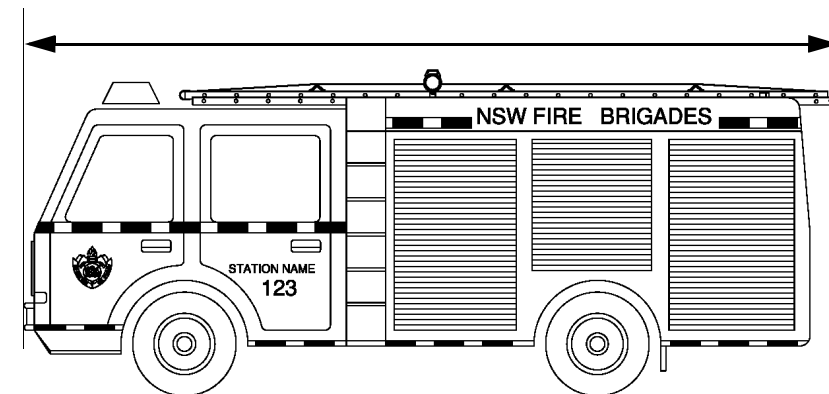
VEHICLE INFORMATION DATA SHEETS

Description	Particulars (Details)
(h)* - Exit angle (°)	
(i)* - Ramp angle (°)	
(j)* - Wall to wall diameter (mm)	
(k)* - Kerb to kerb diameter (mm)	
Front axle capacity (kg)	
Rear axle capacity (kg)	
Gross Vehicle Mass (GVM) (kg)	
Front axle mass (laden) (kg)	
Rear axle mass (laden) (kg)	
Total laden mass (GOM) (kg)	
Total unladen mass (Tare) (kg)	
Front tyre pressure (kPa)	
Front tyre brand and size	
Rear tyre pressure (kPa)	
Rear tyre brand and size	
Suspension/Brakes	
Shock absorber catalogue number	
Sway bar catalogue number	
Number of axles	
Type of axles	
Brake catalogue number	
ABS catalogue number	
Body	
Name of body manufacturer	
Primary body construction material	
Date of complete manufacture	
Corrosion protection treatment	
First aid tank capacity (litres)	
First aid tank construction material	
Paint type and colours	
Roller shutter make and model	
Type of cabin (single, island or crew)	
Number of front seats	
Front seat belt catalogue numbers	
Number or rear seats	
Rear seat belt catalogue numbers	

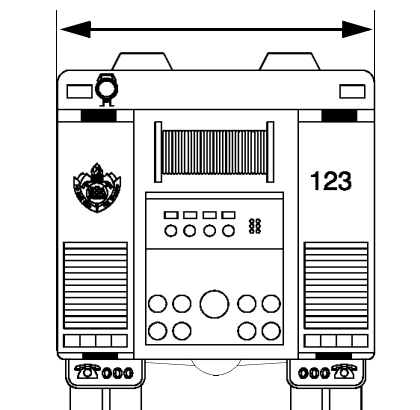
(a)**Overall Height (mm)** - the maximum vertical distance of a fully stowed vehicle measured between the horizontal ground contact plane and a parallel plane at the top most rigid or fitted (for stowed equipment) contact point;



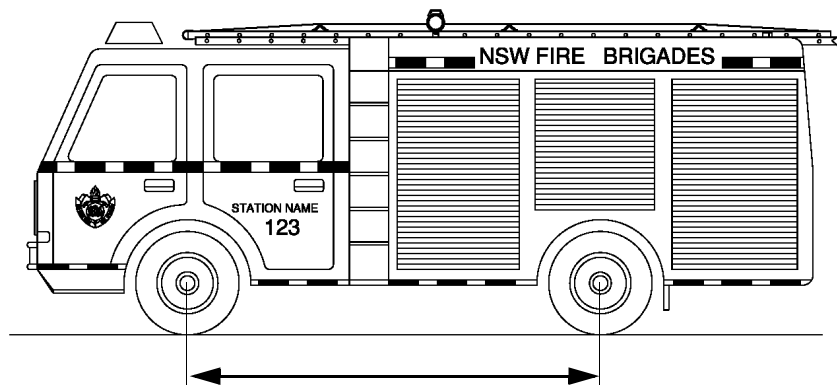
(b)**Overall Length (mm)** - the maximum longitudinal distance of a fully stowed vehicle measured between two vertical parallel planes at the front and rear most rigid or fitted (for stowed equipment) contact points;



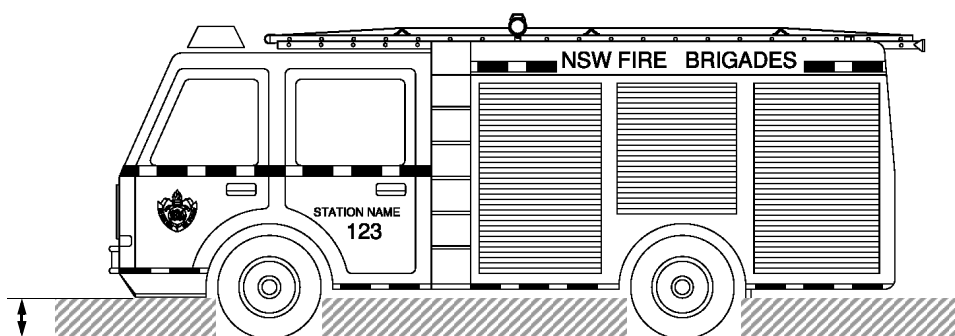
(c)**Overall Width (mm)** - the maximum lateral distance of a fully stowed vehicle measured between two vertical parallel planes at the left and right most rigid or fitted (for stowed equipment) contact points;



(d)**Wheelbase (mm)** - The distance between the longitudinal centres of the front and rear most axles, or the medians between groups of axles;

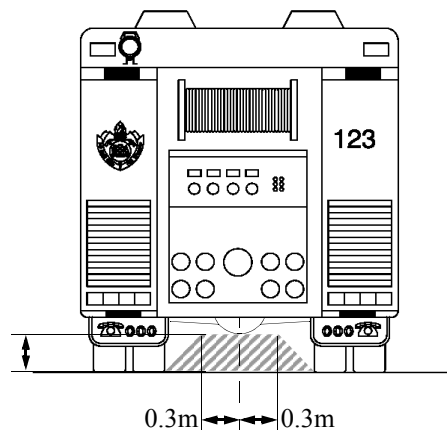


(e)**Clearance Height Under Body (mm)** - The distance between the horizontal ground contact plane and the lowest fixed point of the vehicle, other than the axles, and measured with the vehicle at its Gross Operating Mass;

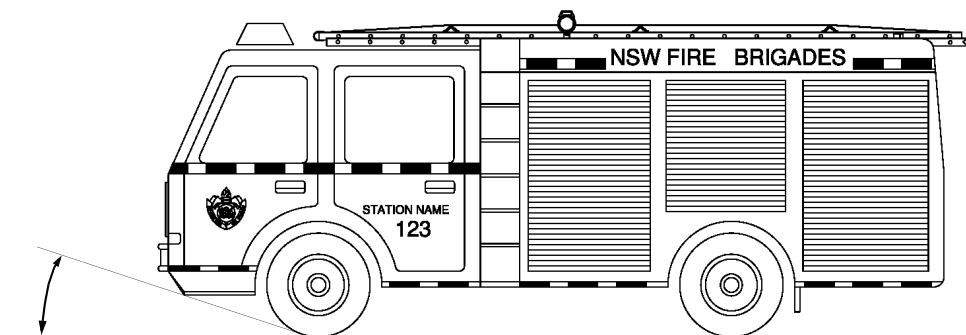


(f)**Clearance Height Under Differential (mm)** - The distance between the horizontal ground contact plane and the lowest fixed point between the wheels

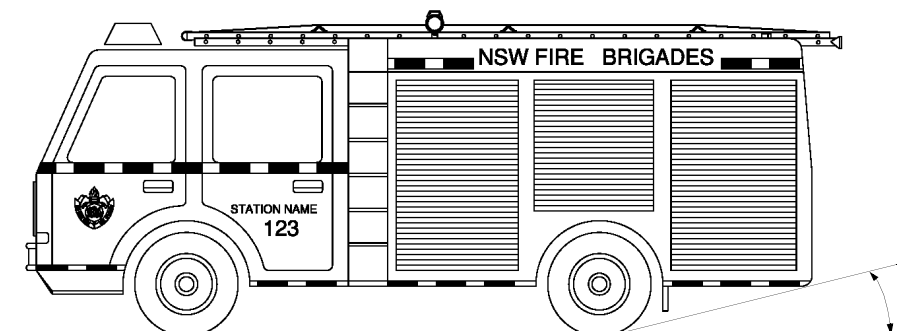
within 0.3m either side of the vehicle centre line, and measured with the vehicle at its Gross Operating Mass;



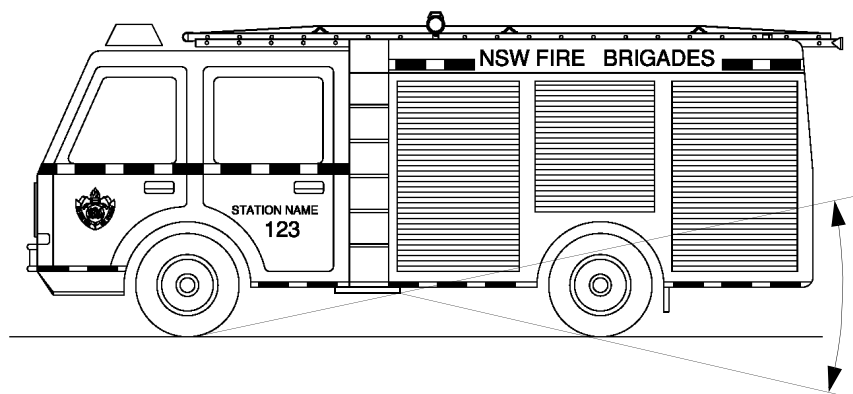
(g) **Entry Angle (°)** - The angle between the horizontal ground contact plane and the plane tangent to the tyres of the front wheels, such that no rigid part ahead of the first axle is between these two planes;



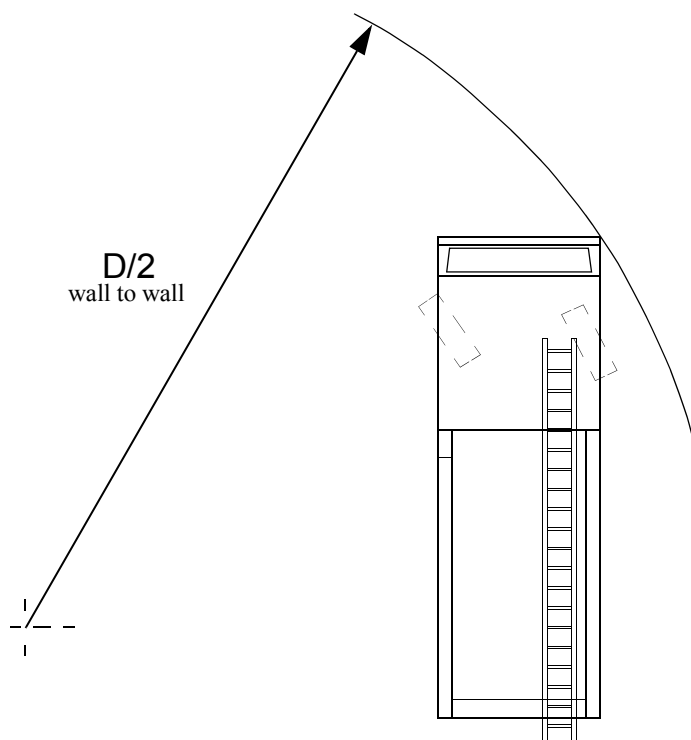
(h) **Exit Angle (°)** - The angle between the horizontal ground contact plane and the plane tangent to the tyres of the rear most wheels, such that no rigid part behind the last axle is between these two planes;



(i)**Ramp Angle (°)** - The smallest angle between two planes tangential to the innermost front and rear tyres which intersect at the lowest rigid point or surface of the underside of the vehicle between these tyres;

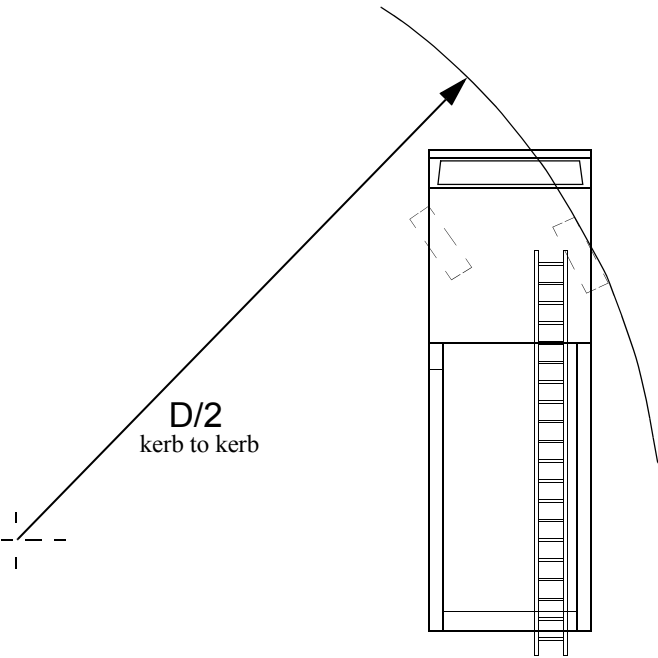


(j)**Wall to Wall Turning Circle Diameter (mm)** - The diameter of the smallest imaginary cylinder within which the vehicle can turn at maximum steering lock. The wall to wall of the vehicle shall be taken as the larger cylinder necessary for either the left or right turning vehicle;



(k)**Kerb to Kerb Turning Circle Diameter (mm)** - The diameter of the smallest imaginary cylinder within which the front wheels can turn at maximum steering

lock. The kerb to kerb of the vehicle shall be taken as the larger cylinder necessary for either the left or right turning vehicle;



ANNEX G CLASS 1 (4X4) HAZMAT TANKER SIX LOCKER VEHICLE INVENTORY

The following equipment list is the expected maximum inventory that will be stowed on the Class 1 (4x4) Hazmat Tanker six locker.

CLASS 1 (4x4) HAZMAT TANKER SIX LOCKER

VEHICLE INVENTORY

CAT ID	DESCRIPTION (TYPE, CODE)	KG EACH	QTY	WEIGHT
Breathing Apparatus				
MANDATORY	BREATHING APPARATUS, SELF CONTAINED, AIR SET	15.6	4	63.60
MANDATORY	CLEANING SET, BREATHING APPARATUS	5.8	1	5.80
MANDATORY	CYLINDER, COMPRESSED GAS, BREATHING APPARATUS	8.9	12	106.8
MANDATORY	CYLINDER, COMPRESSED GAS, RESUSCITATION, OXYGEN	3.92	1	3.92
MANDATORY	EXTENSION MASK, SET	6.76	1	6.76
MANDATORY	TALLY BOARD, STAGE 1	1.96	1	1.96
EITHER OR	MEDICAL EQUIPMENT SET, SOFT PACK	10	1	10
EITHER OR	RESUSCITATOR -INHALER - ASPIRATOR, PORTABLE	11.1	1	11.10
	Sub Total			199.94
Bush Fire Equipment				
MANDATORY	BUSHFIRE PUMP KIT	27.76	1	27.76
MANDATORY	EXTINGUISHER, FIRE, COLLAPSABLE KNAPSACK	3.78	2	7.56
MANDATORY	OIL CAN	0.32	1	0.32
MANDATORY	PUMP, TYRE, ENGINE COMPRESSION WITH GAUGE	1.5	1	1.5
MANDATORY	RAKE, FOREST FIRE	2.54	3	7.62
MANDATORY	TORCH, FIRE LIGHTING	2.06	1	2.06
	Sub Total			46.82
Communications Equipment				
MANDATORY	COMPUTER, LAPTOP	6.18	1	6.18
OPTIONAL	RADIO TELEPHONE, MOBILE, CELLULAR	2	1	2
MANDATORY	RECEIVER-TRANSMITTER, RADIO, HAND HELD	1.34	4	5.36
	Sub Total			13.54
Cordage Equipment				
MANDATORY	CORD ASSEMBLY, LAYED, GP LINE, 30m X 12.5mm	3.96	2	7.92
	Sub Total			7.92
Corporate Stationary				
MANDATORY	BOOK SET, VARIOUS, (CHEMICAL)	21.1	1	21.1
MANDATORY	CARD, MAGNETIC DATA RECORDING, FUEL PURCHASES	0.06	1	0.06
	Sub Total			21.16

CLASS 1 (4x4) HAZMAT TANKER SIX LOCKER

VEHICLE INVENTORY

CAT ID	DESCRIPTION (TYPE, CODE)	KG EACH	QTY	WEIGHT
Firefighting Equipment				
MANDATORY	ADAPTOR SET, PIPE TO HOSE, STORZ, LARGE	10	1	10.00
MANDATORY	AXE, SINGLE BIT, 2kg	2.9	1	2.90
MANDATORY	BAR, PRY, FIRE HYDRANT, STRAIGHT BLADE, 600mm	2.54	2	5.08
MANDATORY	CROWBAR, 1800 x 25mm	10.68	1	10.68
MANDATORY	CUTTER, BOLT, 750mm	3.9	1	3.90
MANDATORY	DETERGENT, EMULSION DEGREASER, DILUTED	21	2	42
MANDATORY	EXTINGUISHER, FIRE, CARBON DIOXIDE	12.34	1	12.34
MANDATORY	EXTINGUISHER, FIRE, DRY CHEMICAL POWDER	10	1	10.00
MANDATORY	FLASHLIGHT, INTRINSICALLY SAFE, RECHARGABLE, LARGE	1.62	1	1.62
MANDATORY	FOAM, LIQUID FIRE EXTINGUISHING, CLASS A, 20 LITRES	21.7	2	43.4
MANDATORY	FORCED ENTRY TOOL, COMBINATION, 750mm	6	1	6.00
MANDATORY	HANDLE, CRANK, HOSE REEL	1.8	2	3.60
MANDATORY	HOSE ASSEMBLY, FIREFIGHTING, 19mm RUBBER, 30m	13.44	4	53.76
MANDATORY	HOSE ASSEMBLY, FIREFIGHTING, 25mm, LAYFLAT, 10m	1.3	1	1.30
MANDATORY	HOSE ASSEMBLY, FIREFIGHTING, 25mm, LAYFLAT, PERCOLATING, 30m	3.5	3	10.5
MANDATORY	HOSE ASSEMBLY, FIREFIGHTING, 38mm, LAYFLAT	5.44	6	32.64
MANDATORY	HOSE ASSEMBLY, FIREFIGHTING, 70mm, LAYFLAT	12.52	6	75.12
MANDATORY	HOSE ASSEMBLY, FIREFIGHTING, 70mm SHORT FEED	5.26	1	5.26
MANDATORY	HOSE ASSEMBLY SET, FIREFIGHTING, 100mm SUCTION	47.3	2	94.6
MANDATORY	HYDRANT, FIRE, STANDPIPE, SINGLE HEAD	13.1	2	26.2
MANDATORY	INDICATOR SET, ELECTRICAL POTENTIAL, FIRE VEHICLES	1.92	1	1.92
MANDATORY	INSULATING BLANKET, THERMAL, WOOL, 1.8m	2	2	4
MANDATORY	LADDER, FIRE, EXTENSION-A-FOLDING	14	1	14
MANDATORY	LIGHT, WARNING, CLEAR STROBE LIGHT KIT	1.94	1	1.94
MANDATORY	NOZZLE, FIRE HOSE, NOZZLE ONLY, 38mm	3	1	3
MANDATORY	NOZZLE, FIRE HOSE, ROTARY HEAD, DIAL A JET, 25mm	1.3	3	3.90
MANDATORY	NOZZLE, FIRE HOSE, SHUT OFF/NOZZLE COMBINATION, 38mm	2.58	2	5.16
MANDATORY	NOZZLE, FIRE HOSE, PLAYPIPE/NOZZLE COMBINATION, 65mm	4.54	1	4.54
MANDATORY	PLAYPIPE, NOZZLE, FIRE HOSE, SHUT OFF/STACKED TIP COMBINATION, 65mm	2.96	1	2.96
MANDATORY	SHEET, NON-METALLIC, PROTECTIVE, DEBRIS, 1800 x 1200mm	2.16	1	2.16
MANDATORY	SHEET, NON-METALLIC, PROTECTIVE, SALVAGE, 3600 x 3600mm	7.67	2	15.34
MANDATORY	SIAMESE CONNECTION, FIRE HOSE, NON VALVED, 38 x 38 x 38mm	1	1	1.00
MANDATORY	SIAMESE CONNECTION, FIRE HOSE, VALVED, 65 x 65 x 65mm	9.46	1	9.46
MANDATORY	VEST, HIGH VISIBLTY, INCIDENT CONTROLLER	0.3	1	0.30
MANDATORY	VEST, HIGH VISIBLTY, SECTOR COMMANDER/SAFETY OFFICER	0.3	1	0.30
MANDATORY	WRENCH, OPEN END, STORZ PRESSURE FITTINGS (25 to 75mm)	1.01	2	2.02
MANDATORY	WRENCH, OPEN END, STORZ SUCTION FITTINGS (100 to 150mm)	1.25	2	2.50

CLASS 1 (4x4) HAZMAT TANKER SIX LOCKER VEHICLE INVENTORY

CAT ID	DESCRIPTION (TYPE, CODE)	KG EACH	QTY	WEIGHT
OPTIONAL	WRENCH, SOCKET, HYDRANT COVER LIFTERS	0.4	2	0.8
	Sub Total			526.2
General Consumables				
MANDATORY	BAR, AWNING, CENTRE RIDGE	2	1	2
MANDATORY	BODY BAGS, BIOLOGICAL AND RADIOLOGICAL	1	2	2
MANDATORY	BROOM, PUSH, BASSINE, 450mm	0.92	2	1.84
MANDATORY	BUCKET, MOP, METAL	3.48	1	3.48
MANDATORY	CAN, GASOLINE, MILITARY, 10 LITRES	10.42	2	20.84
MANDATORY	CHOCK, WHEEL-TRACK	3.36	2	6.72
MANDATORY	FOOD CONTAINER, INSULATED (ESKY) 15L (BOTTLED WATER)	11.88	1	11.88
MANDATORY	HAND CLEANER, 500G	1	1	1
MANDATORY	JACK SET, HYDRAULIC	20	1	20
MANDATORY	LEAD ASSEMBLY, ELECTRICAL 20m x 15 AMP x 240V	2.58	3	7.74
MANDATORY	MARKER, TRAFFIC, RED CONE, 450mm	1.33	6	7.98
MANDATORY	MOP, WET	1	2	2
MANDATORY	PAIL, UTILITY, 9L	1.64	1	1.64
MANDATORY	PLASTIC SHEET, BLACK, 100mm	18	1	18
MANDATORY	SHOVEL, HAND, LONG HANDLE, SQUARE MOUTH	2.24	1	2.24
MANDATORY	SIGN SET, TRAFFIC, HAZARD AHEAD	8.04	1	8.04
MANDATORY	SIGN SET, TRAFFIC, HAZARD TRIANGLES	2.34	1	2.34
MANDATORY	TAPE, BARRICADE, YELLOW, HAZMAT, 500m	10	1	10.00
MANDATORY	TAPE, BARRICADE, HOT ZONE, 500m	10	1	10.00
MANDATORY	TAPE, BIN SEALING	1	1	1.00
MANDATORY	TRUCK, HAND, TWO-WHEELED	4.42	1	4.42
	Sub Total			142.58
Hazmat Equipment				
MANDATORY	ABSORBENT MATERIAL, SPILL CLEANUP, HYDROCARBONS, LOOSE PARTICLE	9	3	27
MANDATORY	BAG, CONTAMINATED CLOTHING	0.22	30	6.6
MANDATORY	BIN, HAZMAT RECOVERY, 30L	1.22	15	18.3
MANDATORY	BIN, HAZMAT RECOVERY, 60L	7.04	6	42.24
MANDATORY	BINOCULAR, 10 x 50	1.52	1	1.52
MANDATORY	BOOM, FLOATING, HYDROCARBON, ABSORBENT	2	4	8
MANDATORY	BOOTS, MID-LENGTH, VARIOUS	2.46	12	29.52
MANDATORY	CLAMP, RIM CLENCHING	6.74	2	13.48
MANDATORY	COVERALLS, DISPOSABLE, VARIOUS	0.26	8	2.08
MANDATORY	DECONTAMINATION KIT, PERSONNEL CLEAN UP	12.84	1	12.84

CLASS 1 (4x4) HAZMAT TANKER SIX LOCKER

VEHICLE INVENTORY

CAT ID	DESCRIPTION (TYPE, CODE)	KG EACH	QTY	WEIGHT
MANDATORY	DETECTOR, GAS, CMS	5	1	5
MANDATORY	DETECTOR, GAS, ORION	5	1	5
MANDATORY	GLOVE KIT, ASSORTED	13.1	2	26.20
MANDATORY	LITMUS PAPER	0.02	2	0.04
MANDATORY	PAD, ABSORBANT, HAZARDOUS MATERIAL, CHEMICAL, PILLOW, 130 x 360 x 635mm	1.2	18	21.60
MANDATORY	PUMP UNIT, RECIPROCATING, ARO KIT	45.8	1	45.8
MANDATORY	RING, DRUM LIFTING	9.92	1	9.92
MANDATORY	SEALING AID KIT	1.2	1	1.2
MANDATORY	SEAT, STOOL, BREAK APART	1.04	4	4.16
MANDATORY	SHOWER ASSEMBLY, DECONTAMINATION, FB1	26.98	1	26.98
MANDATORY	SLING, DRUM LIFTING, 200L	11.16	1	11.16
MANDATORY	SLIPPER AND SOCK SET	0.65	8	5.20
MANDATORY	SODIUM BICARBONATE, 25kg	25	2	50
MANDATORY	STOPPER, WASTE DRAIN	5	1	5
MANDATORY	SUIT, CHEMICAL PROTECTIVE, GAS	11.36	8	90.88
MANDATORY	SUIT, CHEMICAL PROTECTIVE, SPLASH	2.38	12	28.56
MANDATORY	TOWEL, BATH	0.28	8	2.24
MANDATORY	SAMPLER KIT, CHEMICAL AND BIOLOGICAL AGENT	1	1	1
	Sub Total			501.52
Medical Supplies				
MANDATORY	BLANKET, BED, SINGLE	4.28	2	8.56
MANDATORY	SUNSCREEN PREPARATION	1	1	1
EITHER OR	MEDICAL EQUIPMENT SET, TRAUMA, FIELD	5.9	1	5.90
EITHER OR	EMT, SOFT PACK (see BREATHING APPARATUS)			
	Sub Total			15.46
Personal Protective Equipment				
MANDATORY	COAT, ALL WEATHER	1	4	4.00
MANDATORY	GLOVE AND PLIER SET, ELECTRICAL	0.94	1	0.94
MANDATORY	PROTECTIVE EQUIPMENT SET, VEHICULAR	3	1	3.00
MANDATORY	VEST, HIGH VISIBILITY, ALL, LIME, FIRE	1	4	4
	Sub Total			11.94
Rescue Equipment				
MANDATORY	CHAIN SAW KIT	14.9	1	14.90
MANDATORY	LIGHTING KIT	58.2	1	58.20

CLASS 1 (4x4) HAZMAT TANKER SIX LOCKER VEHICLE INVENTORY

CAT ID	DESCRIPTION (TYPE, CODE)	KG EACH	QTY	WEIGHT
MANDATORY	PLUG KIT	1.8	1	1.8
	Sub Total			74.9
Office and Station Equipment				
	CLEANER, VACUUM, ELECTRIC (NILFISK)	11	1	11
	Sub Total			11
	Total Inventory Weight			1572.66

ANNEX H CLASS 1 (4 X 4) HAZMAT TANKER SIX LOCKER STOWAGE LAYOUT

The following layout is typical for the inventory that will be stowed on the vehicle.

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RECOMMENDED PRACTICE



VEHICLE STOWAGE CONFIGURATION

COMPOSITE (4x4) HAZMAT TANKER INVENTORY



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NOTICES**CAUTION**

The plant and equipment listed under the following inventory is under strict configuration management (CM) disciplines. each item has been weight and stowed according to this CM Procedure to ensure the gross operating mass (GOM) does not exceed the rated gross vehicle mass (GVM) of this vehicle type.

**CAUTION**

This inventory must not be changed or added to at any time.

**CAUTION**

The vehicle can carry a maximum of six (6) persons at all times. Any departure from this instruction will only be sanctioned by consultation with:

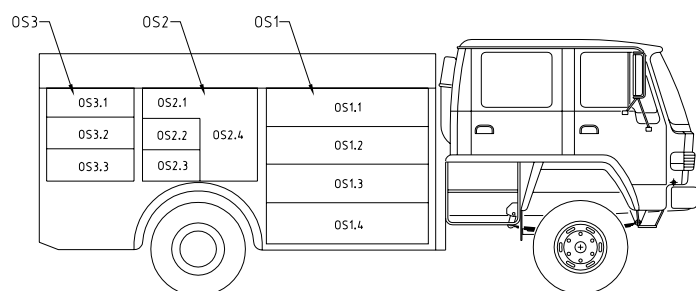
Director of State Operations

Manager Engineering Services Unit

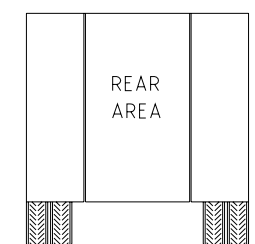
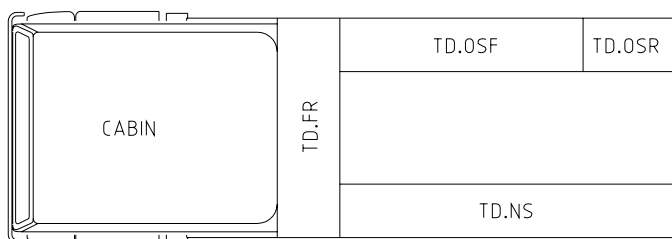
Manager Fleet Management Unit

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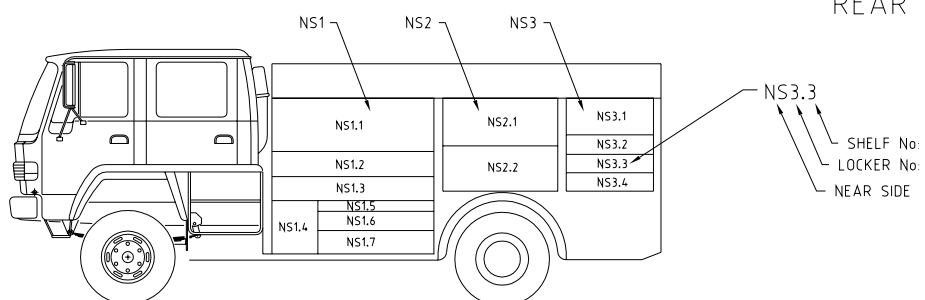
NAMING AND NUMBERING CONVENTION



OFF-SIDE



REAR PANEL



NEAR-SIDE

Identifier	Location
NS	NEAR SIDE
OS	OFF SIDE
TD.FR	TOP DECK, FRONT
TD.NS	TOP DECK, NEAR SIDE
TD.OSF	TOP DECK, OFF SIDE FRONT
TD.OSR	TOP DECK, OFF SIDE REAR
REAR AREA	REAR OF TRUCK

Fig 1 Front Near Side One Locker

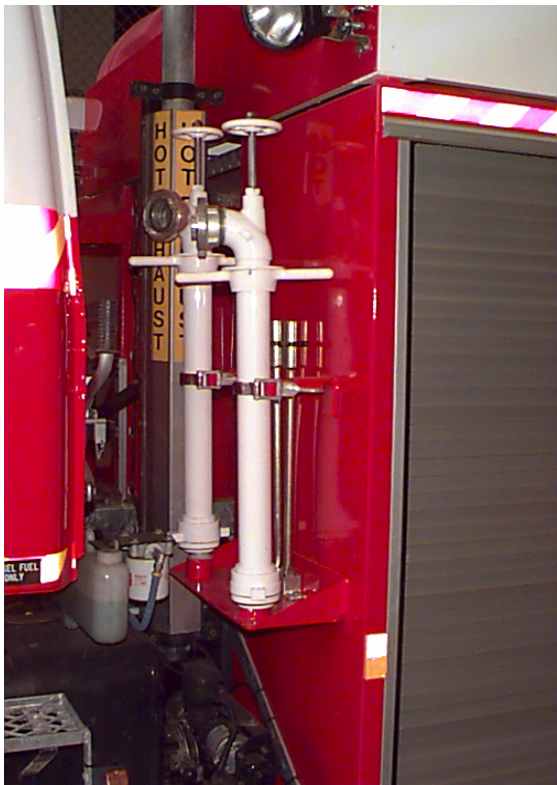
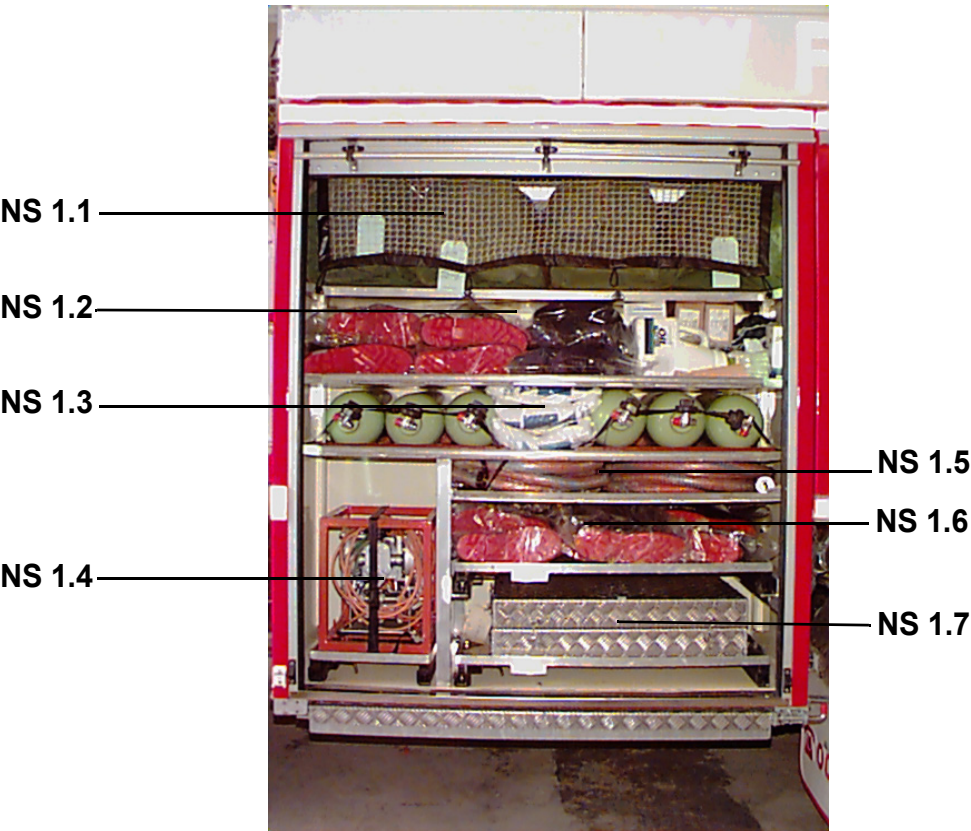


Fig 2 Near Side One Locker



FRONT NEAR SIDE ONE LOCKER

Shelf 	Description	Size	Qty	Remarks
	Standpipe, Aluminium, single head		2	
	Bar, fire hydrant		2	

NEAR SIDE ONE LOCKER

Shelf 	Description	Size	Qty	Remarks
NS 1.1	Suit, chemical, protective		4	F.E. suits
NS 1.2	Boots, knee, rubber		6	gum boots
	Glove kits, assorted (20 chemical, 12 Neoprene, 100 sterile)		2	
	Sealing aid kit-Denso		1	
	Rescue plug kit, timber (x3)		1	
	Slipper and sock set		8	
NS 1.3	Cylinder, breathing apparatus, compressed air		6	spares
	Coveralls, disposable, various		8	
NS 1.4	Pump, reciprocating, aro		1	
	Lead, static discharge		6	earth leads
NS 1.5	Hose, reciprocating pump		2	
NS 1.6	Boots, knee, rubber		6	gum boots
NS 1.7	Shower, decontamination		1	

Fig 3 Near Side Two Locker

NS 2.1

NS 2.2



NEAR SIDE TWO LOCKER

Shelf 	Description	Size	Qty	Remarks
NS 2 BRK	Breathing Apparatus, Self-contained, air set		4	on swing out bracket
NS 2.1	Decontamination Kit, Personnel Clean Up		1	
	Extension face mask kit,		1	
	Suit, Splash		6	
NS 2.2	Tally Board, breathing apparatus, stage 1		1	
	Vest, high visibility, all, lime, fire		4	
	Jacket, wet weather		4	Rain coat

Fig 4 Near Side Three Locker

NS 3.1

NS 3.2

NS 3.3

NS 3.4

NS 3
Under
locker



NEAR SIDE THREE LOCKER

Shelf 	Description	Size	Qty	Remarks
NS 3.1	Suit, chemical protective		4	F. E. suit
NS 3.2	Adaptor set, pipe to hose, <i>Storz</i>		1	in red box
	Keys, Fire Hydrant, cover		2	Optional, in bin 3ZD
	Wrench, fire hose, <i>Storz</i>	25 to 75mm	2	in bin 3ZD
	Wrench, fire hose, <i>Storz</i>	100mm	2	
	Glove and plier set		1	in bin 3Z
	Cutter, bolt, Two cut, high tensile	750mm	1	
	Chocks, wheel, rubber		2	
	Gauge, tyre pressure, dial type		1	in bin 3Z
	Triangle set, traffic hazard		1	
	Can, oil		1	
	Jack set,		1	OEM
	Air line, tyre filling		1	in bin 3ZD
	Handle, hose reel, rewind		2	in bin 3ZD
NS 3.3	Hose, layflat non-percolating	38mm	2	flaked
	Nozzle, fire hose,	38mm	1	AWG
NS 3.4	Hose, layflat non-percolating	38mm	2	flaked
	Nozzle, fire hose,	38mm	1	AWG
NS 3 Under Locker	Foam, liquid, concentrate 'A' class	20L	1	
	Detergent	25L	1	
	Hose, rubber	19mm x 30m	2	1st aid
	Nozzle, Dial-a-jet	25mm	1	

Fig 5 Front Off Side One Locker



Fig 6 Off Side One Locker



FRONT OFF SIDE ONE LOCKER

Shelf 	Description	Size	Qty	Remarks
OS Front	Extinguisher, Carbon Dioxide		1	
	Extinguisher, Dry Chemical Powder		1	

OFF SIDE ONE LOCKER

Shelf 	Description	Size	Qty	Remarks
OS 1.1	Floodlight, portable, quartz halogen, 500W		1	
	Floodlight, portable, caged, incandescent, 150W		2	
	Stand, light, tripod		1	
	Light, warning, clear strobe lighting Kit		1	
	Cooler, plastic, Esky	15L	1	
OS 1.2	Chainsaw		1	
	Accessory kit, chain saw (in box)		1	
	Goggles, safety, clear		6	
	Personal equipment sets, vehicular		2	ear muffs
	Can, combination, fuel/oil	10L	1	
	Hand cleaner	500g	1	
OS 1.3	Cylinder, breathing apparatus, compressed air		6	spares
OS 1.4	Generator set, petrol engine	2.2kVa	1	
	Pump, bush fire		1	
	Vacuum Cleaner complete		1	
	Lead assembly, electrical	20m x 15 Amp x 240V	1	vacuum cleaner

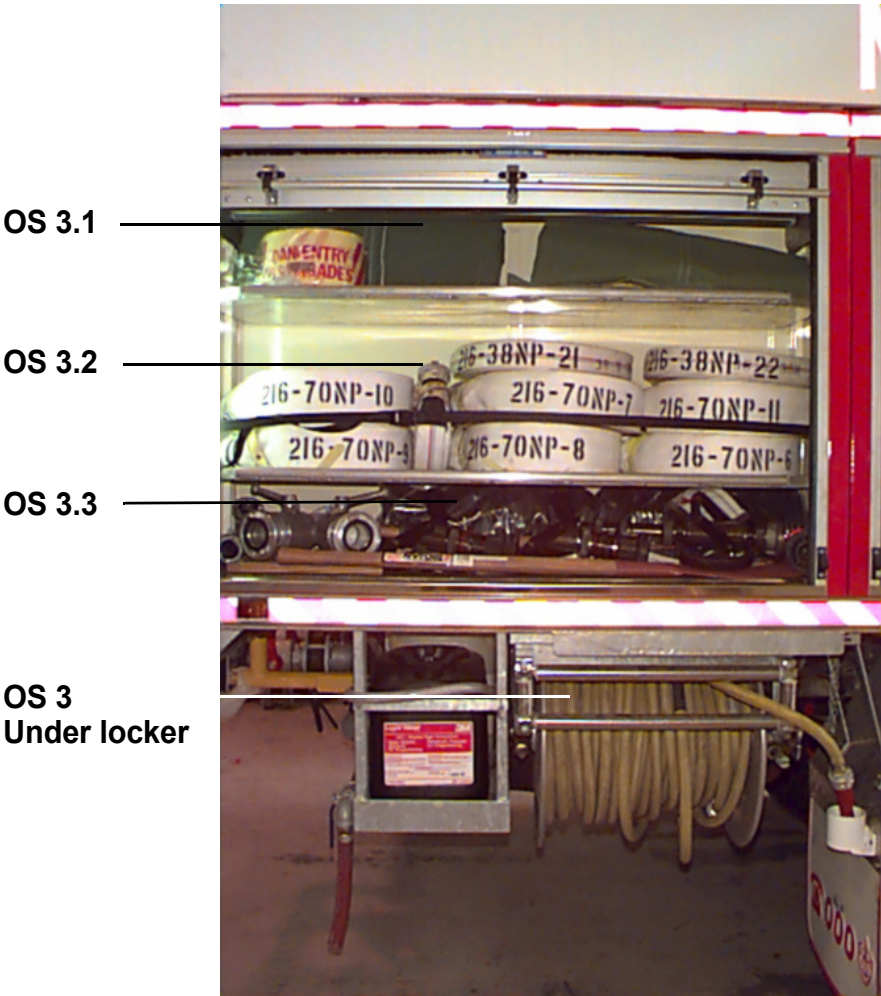
Fig 7 Off Side Two Locker



OFF SIDE TWO LOCKER

Shelf 	Description	Size	Qty	Remarks
OS 2.1	CMS Detector		1	
	Orion Gas Detector		1	
OS 2.2	Rope, polyester, general purpose line (in bag)		2	
	Cleaning aid set, breathing apparatus		1	
	Blanket, woollen, single bed		2	In Blanket Bag
OS 2.3	EMT pack		1	Either or Oxy Viva and Trauma kit
	Cylinder, gas, resuscitator, oxygen		1	
	Resuscitation Kit - Oxy Viva		1	Either or EMT pack
	Trauma kit		1	
OS 2.4	Lead assemblies, electrical NOTE: Unused SCBA bracket	20m x 15Amp x 240V	3	On rear wall

Fig 8 Off Side Three Locker



OFF SIDE THREE LOCKER

Shelf 	Description	Size	Qty	Remarks
OS 3.1	Sheet, canvas, debris		1	
	Sheet, canvas, salvage		2	
	Tape, barrier, yellow, printed - Hazmat		1	
	Tape, hot zone		1	
	Tape, bin sealing		1	
OS 3.2	Hose, layflat non-percolating	38mm	2	rolled
	Hose, layflat non-percolated	70mm	6	rolled
OS 3.3	Nozzle, fire hose	38mm	1	AWG
	Nozzle, fire hose, shut-off/ combination	38mm	2	AKRON
	Nozzle, fire hose, playpipe/ combination	65mm	1	AKRON
	Playpipe, fire hose, stacked tip/ combination	65mm	1	AKRON
	Siamese connection, 1 into 2, Y shape, <i>Storz</i>	38mm	1	
	Siamese connection, 1 into 2, Y shape, <i>Storz</i>	65mm	1	
	Sheeting, plastic, black	100m	1	
	Axe	2 Kg	1	
	Forced entry tool, combination		1	Hooligan Tool
OS 3 Under Locker	Foam, liquid, concentrate 'A' class	20L	1	
	Detergent	25L	1	
	Hose, rubber	19mm x 30m	2	
	Nozzle, Dial-a-jet	25mm	1	first aid

Fig 9 Top Deck Front



TOP DECK FRONT

Location 	Description	Size	Qty	Remarks
TD F	Bin, Hazmat, recovery,	60L	5	
	Bin, Hazmat, recovery,	30L	5	(2 empty)
	Boom, floating, hydrocarbon absorbent		4	1 per 60L bin
	Pillow, chemical		12	In 60L bin
	Spagsorb		3	3 x 30L bins
	Sign set, traffic, Hazard ahead		1	

Fig 10 Top Deck Near Side



TOP DECK NEAR SIDE

Location 	Description	Size	Qty	Remarks
TD NS	Hose, suction	100mm	2	
	Hose, layflat, percolating, bushfire	25mm	3	rolled
	Hose, suction, with strainer and float		1	for bushfire pump
	Rakehoe		3	McLeod Tool
	Crowbar		1	1800mm x 25mm
	Shovel, long handle square mouth		1	
	Clamp, drum lifting		2	
	Ring, drum lifting		1	
	Sling set, drum lifting		1	
	Cone, traffic control, red		6	
	Basket, wet hose		1	
	Trolley, hand		1	
	Broom, bassine		2	
	Mop		2	
	Block, drain		1	in 60L bin
	Bin, Hazmat, recovery	60L	1	
	Bar, awning, centre ridge		1	
	Little Giant ladder		1	Not shown

Fig 11 Top Deck Off Side Front



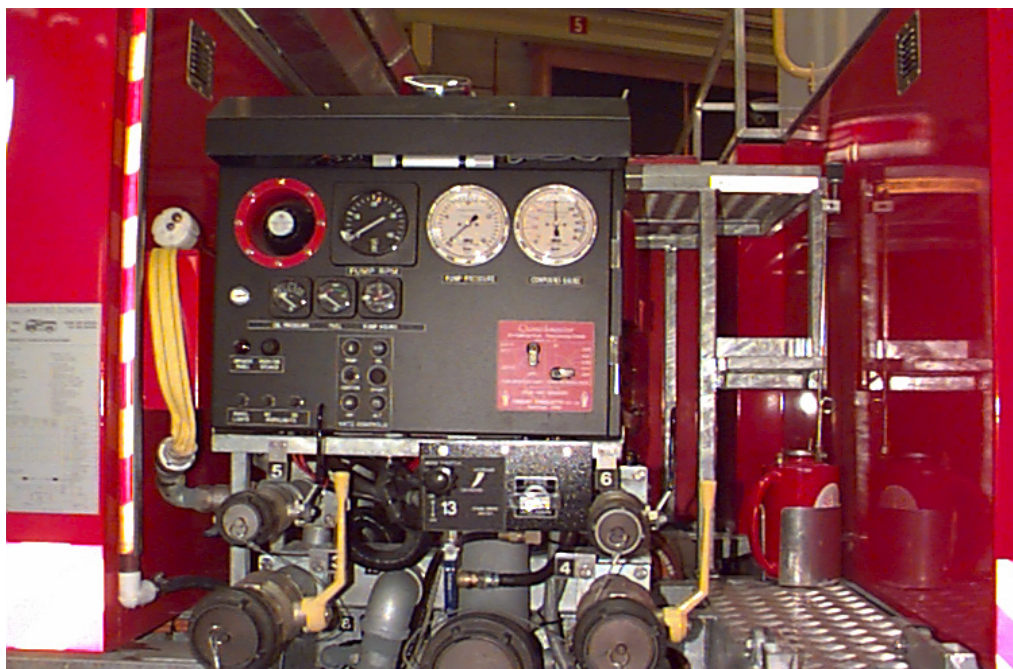
Fig 12 Top Deck Off Side Rear



TOP DECK OFF SIDE

Location 	Description	Size	Qty	Remarks
TD. OSF	Bin, Hazmat, recovery	30L	9	
	Towel, bath		8	In 30L bin
	Suit, splash		6	2 per bin
	Bag, PVC, contaminated clothing		30	In 30L bin
	Sampler kit, chemical and biological (white powder)		1	in 2 x 30L bins
	Body bag, biological and radiological		2	in 30L bin
	Pillow, chemical		6	in 30L bin
TD. OSR	Basket, cane Strainer		1	
	Strainer, suction hose		1	
	Hose, layflat non-percolating,	70mm x 10m	1	tank filler
	Can, fuel (including pourer)	10L	1	Unleaded
	Can, fuel (including pourer)	10L	1	Drip torch fuel
	Knapsack, collapsable		2	in black bag
	Bucket, galvanised	9L	1	
	Bucket, mop, metal		1	
	Bin, Hazmat, recovery	30L	1	
	Ash, soda		1	in 30L bin
	Stool, plastic		4	

Fig 13 Rear Area



REAR AREA

Location 	Description	Size	Qty	Remarks
Rear Area	Torch, backburning		1	drip torch
	Hose, layflat, percolating	25mm x 10m	1	tanker protection
	Nozzle, dial-a-jet	25mm	1	

CABIN ITEMS (NOT SHOWN)

Description	Size	Qty	Remarks
Book set, various		1	
Computer, lap top		1	
Fuel card set		1	
Blankets, personal fire protection		4	
Transceiver, hand held GRN		4	
Vest, high visibility, incident controller		1	
Vest, high visibility, sector commander/safety officer		1	
pH test kits		2	litmus paper
Flashlight, intrinsically safe, rechargeable		1	<i>Wolflite</i>
Binoculars		1	
Sunscreen preparation		1	

ANNEX I EXTERNAL SIGNS AND LABELS

1 Signs, Labels and Markings

1.1 Warning Signs

The NSWFB considers the following to be ‘warning’ signs and labels which describe a hazard that can cause personal injury and/or damage to equipment:

DESCRIPTION (or text on sign, label or marking)	BACKGROUND COLOUR	LETTERING COLOUR	MIN. LETTER HEIGHT
Towing point labels	YELLOW	BLACK	5mm
“HOT EXHAUST”	YELLOW	BLACK	25mm
“WATCH YOUR STEP”	YELLOW	BLACK	25mm
 EXAMPLE OF WARNING SIGN			

1.2 Regulatory Signs

The NSWFB considers the following to be ‘regulatory’ signs and labels, where a mandatory instruction that requires compliance is given.

Note: Examples of typical signs are listed.

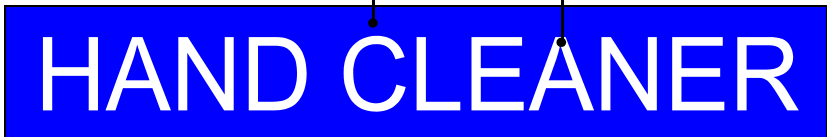
DESCRIPTION (or text on sign, label or marking)	BACKGROUND COLOUR	LETTERING COLOUR	Min. LETTER HEIGHT
“DIESEL FUEL ONLY”	WHITE	GREEN	10mm
“FASTEN SEAT BELTS”	WHITE	RED	10mm
“NO SMOKING”	WHITE	RED	25mm
“NO STEP” (on battery cover)			
THERMAL LANCE BATTERY			
TO OPERATE TYRE INFLATION, START ENGINE AND MAINTAIN RPM AT XXXX			
REMOVE LADDER FROM ROOF BEFORE TILTING CAB			
EXTERNAL LIGHTS NOT HOUSED			

DESCRIPTION (or text on sign, label or marking)	BACKGROUND COLOUR	LETTERING COLOUR	Min. LETTER HEIGHT
TRANSMISSION DISABLED WHEN EXTERNAL LIGHTS NOT HOUSED			
 EXAMPLE OF REGULATORY SIGN			

1.3 General Information Signs

The NSWFB considers the following to be ‘general information’ signs and labels which describe supplementary information to the operators:

DESCRIPTION (or text on sign, label or marking)	BACKGROUND COLOUR	LETTERING COLOUR	Min. LETTER HEIGHT
Maintenance inspection point labels	BLUE	WHITE	10mm
“COMPRESSED AIR OUTLET FOR TYRE INFLATION ONLY”	BLUE	WHITE	10mm
Vehicle information label	BLUE	WHITE	5mm
Clock display adjustment label	BLUE	WHITE	4mm
Individual Locker Identification labels	BLUE	WHITE	10mm
Each Locker/Shelf Carrying Capacity Label			
“SUNSCREEN/REPELLANT”	BLUE	WHITE	10mm
“HAND CLEANER”	BLUE	WHITE	10mm
“LOCKER DRAIN OUTLET”	BLUE	WHITE	10mm
“BATTERY CHARGER INLET”	BLUE	WHITE	10mm
“240V INLET” & “415V INLET”	BLUE	WHITE	10mm
“415V OUTLET”	BLUE	WHITE	10mm
“240V OUTLET”	BLUE	WHITE	10mm
CLOCK SET INSTRUCTIONAL LABEL			
HOURLY METER DISPLAY LABEL			
PTO ENGAGEMENT LABEL			
PTO DISENGAGEMENT LABEL			
DO NOT DRILL LIVE WIRE INSIDE LABEL			

DESCRIPTION (or text on sign, label or marking)	BACKGROUND COLOUR	LETTERING COLOUR	Min. LETTER HEIGHT
 EXAMPLE OF GENERAL INFORMATION SIGN			

1.4 Other Signs, Labels and Markings

The NSWFB considers the following signs, labels and markings as possible exceptions to the requirements of the Australian Standard:

DESCRIPTION (or text on sign, label or marking)	BACKGROUND COLOUR	LETTERING COLOUR	Min. LETTER HEIGHT
Dash mounted switches or controls	EMULATE WITH OEM		
Tyre inflation pressure labels	WHITE (if on label) or RED (if on body)	BLACK	10mm
Locker number labels	WHITE (if on label) or RED (if on body) or metal (if on shutter)	BLACK	15mm

Intentionally left blank