Department of Environment
Land, Water & Planning

8 Nicholson Street
East Melbourne, Victoria 3002
PO Box 500
East Melbourne, Victoria 8002
www.delwp.vic.gov.au

RECEIVED AT
21 MAR 2016
CORONERS COURT OF VICTORIA

Ref: SBR008391

Cr John Olle
Coroners Court of Victoria
65 Kavanagh St
Southbank VIC 3006

Dear Cr Olle

16 MAR 2016

HARRIETVILLE CORONIAL INQUIRY

Thank you for undertaking your important inquiry into the tragic deaths of Katie Peters and Steven Kadar who died on 13 February 2013 whilst fighting the Harrietville Alpine North fire. The Department of Environment, Land, Water and Planning (DELWP) welcomes your findings and is committed to taking action to improve the safety of all of its staff.

DELWP has prepared a response (attached) to your recommendations in accordance with sections 72(3) and 72(4) of the Coroners Act 2008. DELWP accepts all recommendations and suggestions in your reports 20130648 and 20130649. A detailed response to each recommendation and suggestion is provided in the DELWP response.

Consistent with the *Practice Handbook – a legal practitioner's guide to the coronial system* in Victoria, evidence of implementation activities has also been included.

If you have any questions, please do not hesitate to contact me. Thank you again for undertaking this important inquiry.

Yours sincerely

Adam Fennessy
Secretary

Encl.

Any personal information about you or a third party in your correspondence will be protected under the provisions of the *Privacy and Data Protection Act 2014*. It will only be used or disclosed to appropriate Ministerial, Statutory Authority, or departmental staff in regard to the purpose for which it was provided, unless required or authorized by law. Enquiries about access to information about you held by the Department should be directed to the Privacy Coordinator, Department of Environment, Land, Water and Planning, PO Box 500, East Melbourne, Victoria 8002.

VICTORIA State Government

Response to Coroner Olle's inquest into the deaths of Katie Peters and Steven Kadar

March 2016

VICTORIA State Government | Environment, Land, Water and Planning

© The State of Victoria Department of Environment, Land, Water and Planning 2016

This work is licensed under a Creative Commons Attribution 4.0 International licence. You are free to re-use the work under that licence, on the condition that you credit the State of Victoria as author. The licence does not apply to any images, photographs or branding, including the Victorian Coat of Arms, the Victorian Government logo and the Department of Environment, Land, Water and Planning (DELWP) logo. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/

Printed by Doculink Australia – Port Melbourne
ISBN 978-1-76047-064-7 (Print)
ISBN 978-1-76047-065-4 (pdf/online)

Disclaimer
This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Accessibility

If you would like to receive this publication in an alternative format, please telephone DELWP Customer Service Centre 136 186, email customer.service@delwp.vic.gov.au via the National Relay Service on 133 677 www.relayservice.com.au. This document is also available on the internet at www.delwp.vic.gov.au

Contents

References and abbreviations:

- **AFAC**: Australasian Fire and Emergency Service Authorities Council
- **CFA**: Country Fire Authority
- **Chief Fire Officer** means the Chief Fire Officer, Department of Environment, Land, Water and Planning
- **Department** means Department of Environment, Land, Water and Planning (DELWP)
- **EMV:** Emergency Management Victoria
- **FBAN**: Fire Behaviour Analyst
- **FOPS:** Falling Object Protection System
- **IMT**: Incident Management Team
- **JSOP:** Joint Standard Operating Procedure
- **LACES:** Lookouts, Awareness, Communication, Escape Routes and Safety Zones
- **MFB:** Metropolitan Fire Brigade
- **PV**: Parks Victoria
- **Secretary** means the Secretary, Department of Environment, Land, Water and Planning
- **SES**: State Emergency Services
- **SMEACS:** Situation, Mission, Execution, Administration, Command and Communications, Safety

Overview

The Department of Environment, Land, Water and Planning welcomes the recommendations and suggestions from Coroner Olle's inquest into the tragic deaths of Katie Peters and Steven Kadar in February 2013. Katie and Steven were well respected and hardworking firefighters who made a valuable contribution to the important work of the Department. Their loss was felt, and continues to be felt, by the organisation and our emergency management sector partners. Their deaths were a stark reminder of the challenges and risks of firefighting.

The Department has commenced implementing or will implement all recommendations and suggestions handed down by His Honour. The Department considers that safety is the paramount consideration for everything that we do. We are committed to creating as safe a workplace as possible for our staff.

Coroner Olle's recommendations and suggestions details specific actions to improve the safety of personnel on the fire ground when fire fighting in hazardous tree environments. These actions will be considered as part of the broader work focused on staff safety and wellbeing, underpinned by principles of continual learning and improvement.

The Department continues to operate under the auspices of the State Strategic Control Priorities, established by Victoria's Emergency Management Commissioner, which provide clear direction on the priorities that are required to be actioned during the response to any emergency. The first of these priorities is that the protection and preservation of life is paramount. Delivering the State Strategic Control Priorities requires the full participation and collaboration of all agencies in Victoria's emergency management sector including Emergency Management Victoria (EMV), the Victorian State Emergency Service (SES), Country Fire Authority (CFA), Metropolitan Fire Brigade (MFB) and partner agencies Parks Victoria (PV), Melbourne Water and VicForests. The Department will work closely with all agencies in the implementation of the Coroner's recommendations and suggestions.

Wellbeing and safety are part of the Department's four core values. The Department delivers on this through a range of health and wellbeing, injury management systems, safety and medical standards, programs and initiatives. These include the Department's Employee Assistance Program, health monitoring, audits and inspections, job safety planning, Safety Committee and governance program, peer support, the staff medical assessment program, and critical incident planning and targeted training for example first aid, psychological, and job safety planning.

The Department's response to Coroner Olle's inquest includes projects underway to mitigate the risk to operational personnel posed by tree hazard risks, including new tree hazard map layers, revised and new standards and procedures, awareness raising through briefings, and improved and safer vehicles.

Following the events of 13 February 2013, there was a major review and revitalisation of the materials used to convey tree hazard risks and new products were developed as part of an awareness campaign prior to the 2013-14 fire season. The Department will continue to communicate and consult with staff and raise awareness of tree hazard risks through state-wide work centre briefings, lessons-learned documentation, awareness posters and videos, pre-season updates, revisions to the state-wide *Victorian Bushfire Handbook*, safety advisory updates and illustration through practical case studies. The Department is also implementing a fire-damaged tree removal program, through the treatment of priority roads and public places.

These projects are reflective of the complexity of the risk and the range of activities that the Department undertakes in forested environments. The Department recognises that a suite of measures are required to reduce the risk across the breadth of our work. Communications and awareness, policies and procedures, and staff capability, are all required as no single measure alone will fully mitigate the risk to staff safety. The Department is also actively working on creating a safety culture across the workforce that embeds a sense of collective responsibility with everyone being encouraged to be aware of safety risks and speaking up about possible safety compromises.

The Department recognises the critical need to build-in a continual learning approach to improving safety. This will involve working with the community to improve their understanding of safety risks posed by hazardous trees and how this may influence the Departmental strategy in responding to fires.

The Department reiterates it is committed to the safety of its personnel and the community we serve and protect. Implementing Coroner Olle's recommendations and suggestions will assist in the Department's continual improvement in the safety of staff working in high-risk environments.

Response

In his inquest, Coroner Olle made 10 recommendations and four suggestions. **The Department accepts all recommendations and suggestions.** A detailed response to each recommendation and suggestion is provided below.

Recommendation 1: DELWP highlight the necessity for two-way situation and weather reporting between the IMT and those on the fire ground in its training and preseason briefings.

The Department will implement this recommendation.

The Department already has a comprehensive suite of policies, procedures and work instructions that supports its response to bushfires, consistent with the broader standards and procedures in place across the emergency management sector.

The Department, in consultation with the emergency management sector, will, however, review current training and pre-season material to ensure the importance of two-way situation and weather reporting between the IMT and the fire ground is highlighted. This action will be completed by **September 2016**.

The Department will review *Work Instruction*: *Fire ground Information and Red Flag Warnings* (WI 5.5.4.3) to ensure effective two-way situation reporting. This action will be completed by **August 2016**. The Work Instruction and *Joint Standard Operating Procedure: Red Flag Warnings* (JSOP 3.11) will be promoted at pre-season briefings and reflected in relevant training. This will be completed by **November 2016**.

The Department will consult with its partner agencies in the emergency management sector to ensure that any changes are reflected in existing, or new Joint Standard Operating Procedures (JSOPs) and in the *Victorian Bushfire Handbook* (which is reviewed and re-issued each year).

In addition, the Department will investigate options for enhanced fire ground intelligence systems using new tools and technologies, such as a smart phone application (App), to supplement existing weather products and support timely briefings. This investigation will consider the current reliability of communication networks and will be completed by **March 2017**. Consideration of communication systems innovation will remain ongoing.

Recommendation 2: DELWP require, where possible, more information be provided at both morning and evening briefings on the strategy of fighting the fire at particular locations.

The Department will implement this recommendation.

Morning and evening briefings are conducted using the SMEACS (Situation, Mission, Execution, Administration, Command and Communications, Safety) approach. The Department, in consultation with the emergency management sector, will review existing SMEACS guidelines and templates to ensure timely and relevant information on the strategy of fighting the fire at particular locations is provided at morning and evening briefings. This review will be completed by **September 2016**.

In addition, the Department will investigate the development of enhanced fire ground intelligence systems using new tools and technologies, such as a smart phone App, to support timely briefing on the strategy of fighting the fire. This will be completed by **March 2017**.

Recommendation 3: DELWP include information on the salmon card reporting process and how the information in a salmon card is used in its preseason briefings as well as providing specific feedback to each person who makes or is affected by a salmon card report.

The Department is implementing this recommendation.

Information on the salmon card reporting process and how the information in a salmon card is used will continue to be incorporated into pre-season briefing materials. In addition, incident reporting and incident trend information will be incorporated by the Department into pre-season briefing materials. This action will be completed by **September 2016**.

Individual feedback to each person submitting salmon cards is required to be provided by their manager or fire supervisor. This requirement, as outlined in the Department's *Incident Reporting Guideline*, will be reinforced during pre-season briefings and highlighted in the Department's incident reporting processes and associated documentation. Provision of feedback and close-out of incidents in the Department's incident reporting system ("POSSUM") is monitored by the Department's Safety and Wellbeing team.

The Department is currently developing a salmon card App to be used on smart phones and other portable devices. The App will enable more timely notification of incidents and the capture of more information on the incident. This action will facilitate more timely safety messaging and identification of corrective actions. The App will be developed by **November 2016**. This App will not replace manual reporting processes in areas where mobile coverage is limited or unavailable.

Recommendation 4: DELWP (together with any other relevant agencies) utilise an Options Analysis template that specifically nominates and identifies safety to firefighters and human life as the number one priority.

The Department will implement this recommendation.

The Department will initiate a review of existing Options Analysis processes and documentation in consultation with its emergency management sector partners to ensure the template specifically nominates and identifies safety to firefighters and the community as the number-one priority. This action will be finalised by **October 2016** for implementation in the 2016-17 fire season.

Recommendation 5: DELWP participate in a national review of falling tree fatality, injury and near-miss incidents involving trees during fire response operations, and a literature review on the subject to bring in some international context as articulated in exhibit 52 (Australasian Fire Authorities Council (AFAC) report) at page 8.

The Department will implement this recommendation.

The Department will initiate both a literature review on hazardous tree management and a hazardous trees safety incident review via the AFAC Rural and Land Management Group (RLMG). These reviews will consider the international context , in particular, the British Colombia Wildfire Service, who are currently undertaking a review of end-to-end processes for hazardous tree management.

The Department raised this review at the February meeting of the RLMG and will initiate the project by **May 2016**. Timeframes for completion of the reviews will be determined by agreement with the AFAC RLMG.

Recommendation 6: DELWP continue to implement its program of designing fire vehicles to withstand greater tree impacts.

The Department is implementing this recommendation through three major projects:

1. The Department is upgrading the entire 312 Toyota "slip-on" vehicle fleet to ultralight tankers. A key feature of the new vehicles is a Falling Object Protection System (FOPS) to reduce the impact of falling trees and limbs and offering firefighters a greater level of protection. The FOPS is compliant with international standards (ISO:3449:2008 Level 2). The changeover of fleet commenced in 2015 and is expected to be completed by **2020**.

   A training manual and safe operating instruction for operation of the new ultralight tankers has been developed and training and assessment of operational staff to appropriate national standards commenced in **September 2015**. Training will be progressively delivered as the vehicles are rolled-out and form part of the Department's standard training package.

2. The Department is currently testing new heavy tankers with increased passenger safety requirements to replace the existing heavy tanker fleet. The prototypes will be tested and evaluated by the Department to ensure compliance with international standards (ISO:3449:2008 Level 2). The new heavy tankers are expected to be rolled-out on a staged basis with 20 fire tankers in 2016-17 and 20-30 tankers per year until replacement of the existing 80-vehicle fleet is complete.

   A training manual and safe operating instruction for operation of the heavy tankers will be developed and training of operational staff will commence in **August 2016**. Training and assessment will be progressively delivered as the vehicles are rolled-out and form part of the Department's standard training package.

3. The Department is currently developing a rappel crew/operational vehicle to safely transport rappel and/or operational crews around the fire ground. The prototype crew vehicle will be compliant with internal standards (ISO 3449:2008 Level 2). The Department intends to supply each Rappel team with two vehicles (eight vehicles in total). This action is expected to be complete by **February 2018**.

   A safe operating instruction will be developed for the rappel crew/operational vehicle and induction of operational staff will commence in **March 2016**. Induction will be progressively delivered as the vehicles are rolled-out.

Recommendation 7: DELWP re-emphasise the purpose of red flag warnings in its training and preseason briefings.

The Department will implement this recommendation.

The Department, in consultation with the emergency management sector, will re-emphasise the purpose of "Red Flag Warnings" in preseason briefing material. This action will be completed by **September 2016**.

A review of training materials will be undertaken to ensure that the Red Flag Warnings are properly and consistently understood. This action will be completed by **September 2016**.

Recommendation 8: DELWP liaise with any other relevant agency, to develop a training package designed for Operations Managers and Incident Controllers together with their support staff, which facilitates liaison with FBANS, interpreting the data accessed by FBANS and in establishing protocols for the dissemination of weather forecasts relevant to fire fighter safety to strike force leaders and sector commanders or via the open channel to all personnel.

The Department is implementing this recommendation.

The Department will review and update relevant multi-agency training courses (e.g. Operations Officer Level 2 and Incident Controller Level 2), in consultation with the emergency management sector, to include curriculum on liaison with FBANs and interpreting the products developed by FBANs. This action will be completed by **November 2016** and the Department will consider requirements associated with implementation of **recommendation 1**. Pre-season updates will also be used to advise the operational workforce as required.

The existing systems and processes involving daily briefings, Incident Action Plans, Fireground Information Updates and Red Flag Warnings are accepted protocols to disseminate weather forecasts or imminent events relevant to fire fighter safety, such as thunderstorm activity. The Department will work with agencies in the emergency management sector to reinforce application of these processes through pre-season and daily briefings and will ensure reference to these accepted protocols is included in relevant training materials. This action is ongoing.

Recommendation 9: DELWP liaise with any other relevant agency to ensure that the Options Analysis specifically addresses the terrain, topography, type of trees and their individual dangers in the context of the work proposed, and further should incorporate reference to the mapped areas of fire burnt alpine ash.

The Department will implement this recommendation.

The Department will initiate a review of existing Options Analysis processes and documentation in consultation with its emergency management sector partners. This review will look beyond Victoria and the fire-response context to examine practices of other emergency management agencies in both Australia and North America to identify leading practice. The review will ensure the revised Options Analysis processes and documentation specifically address the terrain, topography, type of trees, their individual dangers and refer to the current mapped areas of fire-affected alpine ash changes. This review will also consider the changes required to implement **recommendation 4**. This action will be finalised by **October 2016** for implementation in the 2016-17 fire season.

The review of the existing Options Analysis process and documentation will consider the new Departmental *Work Instruction: Initial Response in Very High Tree Hazard*, issued in January 2016, which addresses options and decision-making for response in fire killed ash (very high tree hazard) areas.

The Department has mapped tree hazard areas across the State, including fire affected alpine ash. This information is available in the eMap system and was first issued in Spring 2015. Use of the tree hazard maps was included as part of the pre-season briefings in October-November 2015. The Department will initiate a project to develop a second phase of tree hazard mapping to improve the accuracy of the data, coverage of vegetation types and to take into account recent fire activity. This action will be finalised by **November 2016.**

In reviewing the Options Analysis processes and documentation the Department will ensure that the revised processes and documentation refers to the mapped areas of fire affected alpine ash. This will be finalised by **October 2016** for implementation in the 2016-17 fire season.

Recommendation 10: DELWP liaise with any other relevant agency to develop a protocol which best ensures that fire crews are not exposed to fire-affected alpine ash forests unless absolutely necessary and only if all safety precautions, in particular removal of hazardous trees and regular monitoring of weather conditions are undertaken.

The Department will implement this recommendation.

A *Joint Standard Operating Procedure (JSOP) 8.03 – Tree Hazard – Bushfire* has been developed and agreed to by Victoria's emergency management sector. The first version was issued in December 2014 and version 2 was issued in August 2015. The purpose of JSOP 8.03 is to mitigate the risk to emergency service personnel of injury or death from falling trees and branches during bushfire response.

The Department has also developed its own *Work Instruction: Initial Response in very high tree hazard* and issued it in January 2016. This Work Instruction addresses options and decision-making for fire response in very high tree hazard areas. The application of this Work Instruction during a multiple fire response situation near Marysville during the 2015-16 bushfire season is being documented as a case study to support its implementation.

The Department, in consultation with the emergency management sector, will explore extending the Work Instruction across the emergency management sector to ensure that fire crews are not exposed to fire-affected alpine ash forests unless absolutely necessary and only if all safety precautions, in particular removal of hazardous trees and regular monitoring of weather conditions is undertaken. This action will be finalised by **November 2016**.

Suggestions in Coroner's Findings

In addition to the recommendations the Department has considered Coroner Olle's suggestions and made a decision to implement these suggestions as though they were recommendations.

Suggestion 1: DELWP access Mr Waddell's[1] knowledge and impart his teaching on hazardous trees and safety strategies to all fire fighters who may be called to fight fires in alpine regions (p.12 – 13)

The Department has been and will continue to implement this suggestion.

The training referred to in the Coroner's report (pgs. 12-13) was delivered by Mr Rob Caddell (a previous employee of the Department). This training was delivered under the auspices of a stand-alone course "Working in the Vicinity of Hazardous Trees" that was designed 2009 and first delivered during 2009 - 2010. This training was updated in 2010 and delivered as part of pre-season briefings.

The content has subsequently been incorporated into relevant courses in the Statewide fire role training program such as General Fire Fighter training. The course content is periodically updated to reflect changes in process. The most recent change occurred in late 2015 in response to *JSOP 8.03– Tree Hazard – Bushfire*.

The Department is committed to reviewing the statewide fire role training programs and has commenced initial planning for new training products that will supplement the existing course content. The intention is that these courses will support hazardous tree awareness and provide specific accreditation in hazardous tree assessment to authorise staff to assess and mark hazardous trees. This training will be rolled out systematically across the state.

This program will take approximately 18 months to design and deliver to key operational staff. It is anticipated to be completed by **September 2017**.

The Department will continue to work with the emergency management sector to improve awareness of the risks associated with hazardous trees and the development of skills and appropriate management strategies.

[1] The training referred to was delivered by Mr Rob Caddell (a previous employee of the Department), not 'Mr Waddell'.

Suggestion 2: DELWP consider how they may promote the healing process and rebuilding of relationships going forward (p.24)

The Department is implementing this suggestion.

The Department supports the Coroner's statements recognising the dedication and bravery of firefighters, and acknowledging the inherently dangerous nature of their work.

The healing process involves both staff and the community. The Department has undertaken a range of activities to help facilitate this process. This has included:

- Facilitated briefings with staff and affected individuals following the fire.
- Commemorative activities to recognise Katie and Steven's contributions to the Department and their local communities, including the creation of the Katie Peters Reserve on the Mitta Mitta River and a memorial plaque for Steven Kadar established at the Corryong Office and Depot. Opening ceremonies for both were attended by families, friends and staff.
- Establishing a strong collaborative relationship with the Harrietville Community Forum, which was jointly convened by the community and DELWP/Parks Victoria following the Harrietville fire.
- Involvement in the development of the Harrietville Community Emergency Management Plan.

The Department will continue to work closely with Harrietville Community Forum and the local CFA brigade through the implementation of the emergency management plan.

The Department will also work closely with our staff to obtain feedback on safety improvements and to help achieve continual improvements in this area.

The Department is also developing a community service charter (our promise to the Victorian Community) that will describe how the Department will partner with and involve local communities in decision-making about public land and bushfire management – drawing on the community's knowledge and experience all year round.

This work is ongoing.

Suggestion 3: DELWP canvass the suggestions made by Ms Gibos with other agencies, in consideration of their implementation (p.24).

Ms Gibos suggestions:

Consider the benefit of having a look-out permanently placed on the fire ground, in particular when potential changes are forecast.

The Department will implement this suggestion.

Lookouts, Awareness, Communication, Escape Routes and Safety Zones (LACES) is already a well-established guide to help mitigate the risks that firefighters face, including burn over and entrapment during bushfire and planned burning operations. This is documented in the *Victorian Bushfire Handbook* (latest edition No. 5- September 2015). Lookout in this context refers to expected behaviour of all crew members and is not a designated function assigned the role of lookout.

The Department's *Response Manual* (Work Instruction, LACES Safety System, 5.5.3.3, December 2014) further extends the principle of lookout to require 'Where a burn-over or entrapment risk is identified a fixed, aerial or mobile

Lookout is to be deployed. Lookouts will ensure that they maintain a clear appreciation of current fire behaviour and location and size of the bushfire or burn in relationship to the on ground firefighter location'.

The Department will review the Work Instruction to consider its broader application to high-risk scenarios, including forecasting adverse weather. The Department will promote awareness and understanding of this Work Instruction to staff via pre-season briefings. In addition, the Department will consult with its emergency management sector partners to consider any changes required in the next edition of the *Victorian Bushfire Handbook*. These actions will be completed by **September 2016**.

That any information emanating from the FBANs be communicated along the entire chain of command.

The Department will be implementing this suggestion through implementation of **recommendations 1 and 8**.

Suggestion 4: DELWP in liaison with other agencies ensure that appropriate support staff is provided to decision makers, in particular Divisional, Operations and Ground Commanders (p.24).

The Department is implementing this suggestion.

The Department will continue to provide support to senior fire ground roles with support staff (e.g. note takers, FBANs).

This action is ongoing.

www.delwp.vic.gov.au

Response to Coroner Olle's inquest into the deaths of Katie Peters and Steven Kadar

Evidence

Recommendation 6

- Ultralight tanker summary poster

Recommendation 9

- Hazardous tree eMap summary poster

Recommendation 10

- Joint Standard Operating Procedure 8.03 – Tree Hazard – Bushfire
- Work Instruction: *Initial Response in Very High Tree Hazard* (WI 4.4.1.3)
- Checklist- 4.4.1.4 Considerations for Initial Response in Very High Tree Hazard

Further information can be provided to His Honour if requested.

Ultralight Tanker

Mercedes Benz and Quik Corp Fire Engineering have worked with DEPI to produce the new firefighting and work vehicle. The G-Class is a full time all-wheel drive, powered by a 3 litre, V6 turbo diesel with a 5 speed automatic transmission.

Upgraded off road abilities

- 5 speed automatic gear box with a manual option
- Each of the 3 differentials have mechanical locks
- Choice of all terrain or mud tyres
- Optional 2nd spare tyre
- Optional air compressor – for fast tyre inflation
- The chassis is treated to meet military specification corrosion protection

Upgraded safety

The structure over the cabin is a certified ISO3449 Level 2 Falling Object Protective Structure. Level 2 is the highest level of certification available on vehicles.

Falling Object Protection will assist in making you safer. However there are plenty of trees that are bigger than anything Level 2 can handle. You still need to be careful and conscious of the dangers around you.

The Ultralight is fitted with fire curtains, two airbags and a reversing camera.

Because the Ultralight will operate at or near GVM getting the best performance from the Electronic Stability Control has meant it is speed restricted to 120kph.

The new firefighting body is ergonomically designed.

- Everything can be reached from the ground
- Spare wheel(s) are mounted on a lifting arm
- Push button pump start
- Everything can be operated with minimum effort

The Ultralight is designed to be seen. In low light, in dust or in smoke the high conspicuity films and the steady amber lights make you easier to see.

Upgraded firefighting capability

This is a slip-on, with a difference. The firefighting body has been designed specifically for this vehicle, using ideas and suggestions you provided over the last three years. Everything forward of the spare wheel(s) is permanently fixed. The rear section can be removed and replaced with a flat tray, a tipper tray, a spray unit or other purpose designed fire equipment.

4,490kg GVM. The high carrying capacity means more water, more equipment and clean, dry and secure storage for your gear.

The Ultralight will carry 650 litres of water, delivered through a high performance diesel pump fueled directly from the vehicle.

Remote controlled electronic hose reels. No more hand winding!

Upgraded storage

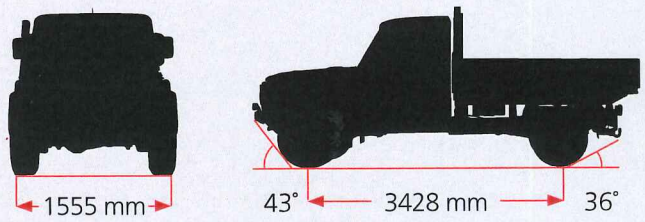
From rakehoes to a standpipe all the tools you told us you need can be stowed. There is a place for everything.

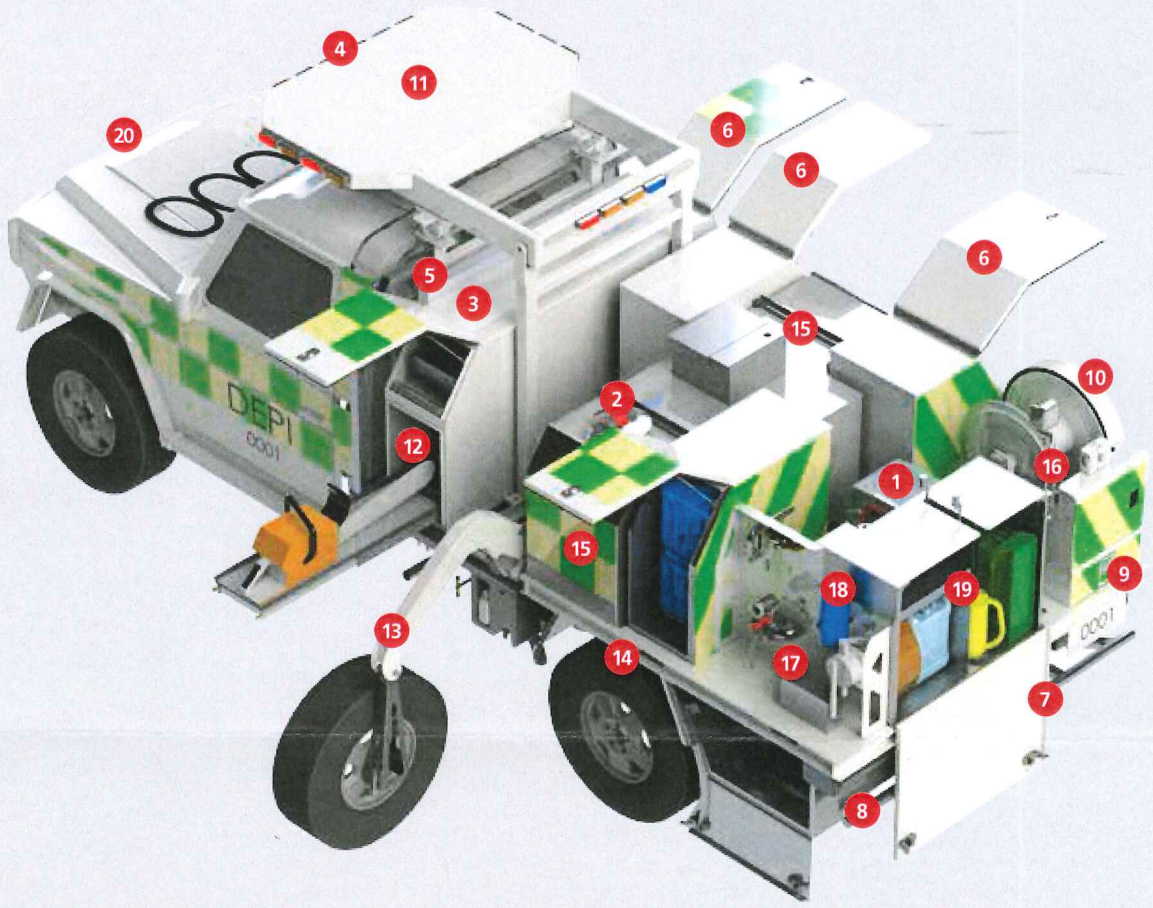
And, back by popular demand, a 4080kg front mounted winch!!

The new Ultralight Tanker. You're going to like it.

For further information contact
Hanut (03) 9412 4648 hanut.dodd@depi.vic.gov.au

Please note these images are designs in progress. The actual Ultralight Tankers will vary slightly from what is shown here.

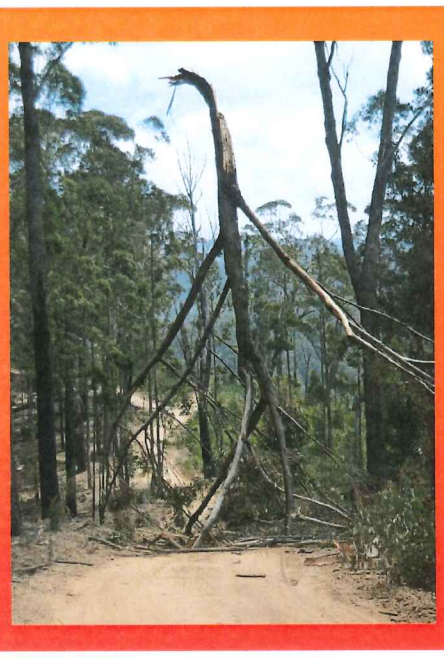




Drive	Full time all-wheel drive 4x4
Engine	V6 turbo diesel 2987cc 135 kW @3800 rpm 400Nm @1600-2600 rpm Euro 5 Emissions
Transmission	5-speed automatic with manual gear selection
Tyre Size	265/75R16
Clearance	245mm
Fuel capacity	96 Litres (approx)
GVM	4,490 kg
GCM	6,700 kg
Driving Systems	Rigid axles with high torsional flexing High/Low range transfer case. Three mechanical locking differentials (centre, rear, front) Antilock Brake System (ABS) Electronic Stability Control (ESC) Electronic Brake-force Distribution (EBD/EBV) Front disc brakes & rear drum brakes
Lifespan	Up to 15 Years

Vehicle Features

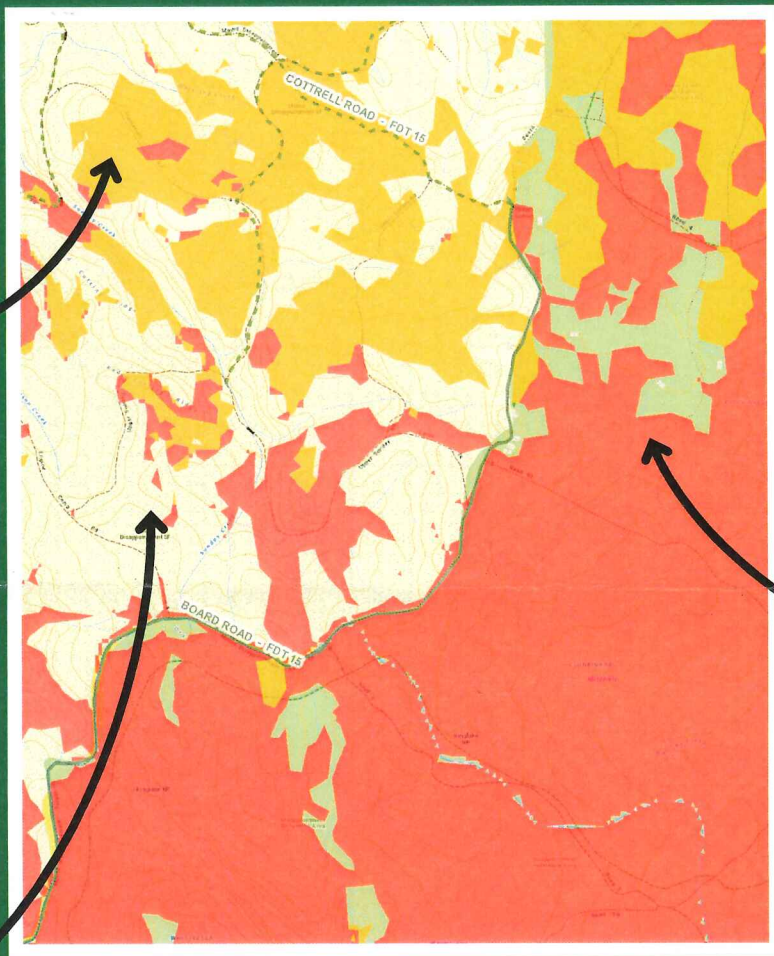
1. Hatz 1B40 9.2HP pump set
2. Tank fill point
3. Permanent locker
4. Warning lights
5. Sign boards
6. Stowage locker
7. Heavy duty tow bar
8. Strengthened rear bumper
9. Branch and tool drawer
10. Electric rewind reel with 50m hose
11. Falling Object Protection
12. Chainsaw drawer
13. Spare wheel carrier
14. Under tray lighting
15. 650 litre tank
16. Telescopic light mast
17. Pump control panel
18. Dosatron
19. Drip torch and foam locker
20. Winch



Hazardous Trees have proven to be a significant OH&S risk for DELWP over the last few years. Our objective remains that every fire fighter we send to a fire comes home to family. The recent spate of large landscape fires has created enormous potential for tree hazard into the next decade and beyond. One of the steps taken to assist first attack responders prepare for potential Hazardous Trees is the **eMap Tree Hazard Layer**.

eMap Tree Hazard Layer

High Tree Hazard
This stand of Messmate, burnt by the Black Saturday bushfires 2009, is an example of *High Tree Hazard*. Limb fall is likely but not as high as in Ash species.



Very High Tree Hazard
This stand of fire killed Mountain Ash from the Black Saturday fires of 2009 has an extremely high incidence of Hazardous Trees. (Photo also depicts Mt Margaret fire.)

Treated areas
Salvage logging is a treatment that results in a reduction of Tree Hazard. The above coupe was salvaged after Black Saturday. It is deemed to be *Background* risk. Such areas are mapped during the modelling process. Parts of the roading network are also being treated for Tree Hazard to create safer routes through the forest.

Tree Hazard Classes are:

Very High	Ash species killed by fire (Mountain or Alpine Ash plus Crown or Scorched Severity of fire).
High	Most other Eucalypt species burnt by a Crown or Scorched severity bushfire.
Background	Native forest unaffected by a Crown or Scorched severity fire. Note: Background risk is not zero risk, eucalypt forests are inherently risky to a certain extent at any time.
Diminished	Greatly reduced likelihood for Tree Hazard, usually as a result of species (i.e. Grassland, Heathland). Not zero as isolated trees may be present.

Intent of the tool
The tool was designed to assist in detection and awareness of Tree Hazard during first attack. It does not aim to be entirely accurate, or to detect individual Hazardous Trees. The key objective is to give first responders a 'heads up' to the likelihood of Hazardous Trees being in the vicinity of their response.

What is it based on?
Experienced forest staff across the State were involved in defining the species and events that create Hazardous Trees.

Phase 2
Additional funding has been sourced to update data from new fires and to improve the accuracy of the model.

© The State of Victoria Department of Environment, Land, Water and Planning 2016

Developed by the Office of the Chief Fire Officer in conjunction with Regional Services and Fire and Emergency Management Division.

www.delwp.vic.gov.au

VICTORIA State Government | Environment, Land, Water and Planning

EmapTHL-poster.indd 1 12/02/2016 2:27 pm

Joint Standard Operating Procedure

S O P

J8.03

JOINT SOP	
Title	Tree hazard - bushfire response
Purpose	To mitigate the risk to emergency service personnel of injury or death from falling trees and branches during bushfire response.
Scope	This Joint SOP applies to all emergency services personnel (including emergency service agencies and contractors) involved with bushfire response operations. Specifically in relation to the identification of tree hazard in the forested/treed environment and mitigating the risk of consequent injury, or damage to equipment while accessing or being on the fire ground. This Joint SOP does not apply to planned burning or operations arising from flood, storms or other events.
Content	The procedural contents of this SOP are: • Step 1: Identify the potential existence of tree hazard during bushfire response. • Step 2: Mitigate the risk arising from tree hazard during access to bushfire incidents • Step 3: Mitigate the risk arising from tree hazard on the fire ground. • Step 4: Mitigate the risk of unidentified hazard trees on the fire ground. • Step 5: Complete operations.
Responsibilities	All emergency service personnel involved in bushfire response, including Incident Controllers, Operations Officers, Sector Commanders, Crew Leaders, crew members, and all others entering a fire ground are responsible for following this procedure. Specifically: 1. Incident Controllers are to ensure tree hazard is considered along the route(s) used to enter/leave the fire ground. 2. Incident Controllers are to ensure that known areas of high tree hazard are identified during the development of the Incident Action Plan, particularly in relation to deployment orders and safety messaging. 3. Incident Controllers are to ensure that crews are briefed at shift commencement on known areas of high tree hazard. 4. Incident Controllers are to ensure that mop-up/blacking out or patrol does not commence until a hazard tree assessment has been completed for that portion of the fire control line or mitigation controls are in place.

	5. Incident Controllers are to ensure Clear and Present Danger trees that remain standing on the fire ground after the passage of fire are treated.
Definitions	For the purposes of this procedure: • **Advanced or Intermediate Faller**: A tree faller meeting the requirements of the relevant Public Safety Training Package Unit of Competency *Fall trees manually (advanced)* or *Fall trees manually* (intermediate)or successor(s). • **Assess (tree hazard):** To locate and evaluate the extent of tree hazard by appropriately qualified and/or experienced personnel. • **Bushfire:** Unplanned vegetation fire. A generic term which includes grass fires, forest fires and scrub fires both with and without a suppression objective. • **Clear and Present Danger tree (CPD):** A tree or branch that is likely to fall within the expected timeframe of the current operation and impact personnel in its potential impact zone. • **Dispatching Officer:** The agency or other authorised person initiating the act of ordering attack crews and/or support units to respond to a fire, or from one place to another. • **Going Fire:** Any bushfire which is expanding and suppression actions have not yet contained the fire. • **Hazard tree:** The collective term for Hazardous trees and Clear and Present Danger trees. • **Hazardous tree:** A tree or branch which in its current state may in part or wholly fall and impact personnel in its potential impact zone (but not considered likely to do so during the expected timeframe of the current operation). • **Identify (tree hazard):** The ability to recognize stands of, or individual trees that present an increased risk to personnel safety (as included in basic bushfire hazard recognition training). • **Initial attack:** The first suppression work on a fire. • **Mop up/blacking out:** The process of extinguishing or removing burning material along or near the fire control line, felling stags, trenching logs to prevent rolling and the like, in order to make the fire safe. • **Potential Clear and Present Danger tree:** A tree which in its current state does not appear hazardous, but may become a Clear and Present Danger tree if it catches alight or is impacted by wind or other disturbance. • **Tree hazard:** The overall combined safety risk to personnel from hazard trees within an area. *For example, an area of fire-killed trees.* Refer to Schedule 4 for supporting detail.

PROCEDURE

1. Step 1: Identify the potential existence of tree hazard during fire response.

   1.1 Local Mutual Aid Plans (LMAPS) are to contain, where relevant, map(s) indicating geographic areas with known and/or predicted high concentrations of tree hazard (eg. tree species, fire history including fire intensity overlays, stand history and health including disease, wind/snow damage and/or silvicultural treatments) overlaid with the fire access roads and tracks.

   1.2 LMAPS are also to contain details and/or maps of those fire access routes on which tree hazard has been assessed and treated.

2. Step 2: Mitigate the risk arising from tree hazard during access to bushfire incidents.

   2.1 Where the preferred access route to a fire ground is through known and/or predicted areas of high tree hazard which have not had tree hazard assessment and treatment, resources may only be deployed via this route if the risk factors are considered acceptable under the current conditions; eg. relevant weather factors such as wind speed (refer Schedule 3).

   2.2 Once deployed, personnel need to maintain awareness of hazard trees while commuting through or working in these areas and any identified unacceptable risks mitigated.

   2.3 Where personnel consider the risk of injury from tree hazard significant, the Incident Controller needs to be advised and acceptable lower risk alternative implemented.

   2.4 LMAPS are to include arrangements for the accessing the appropriately resources for the assessment and treatment of hazard trees (including appropriately equipped chainsaw and plant operators).

   2.5 Incident Action Plans are to clearly identify areas where access is restricted in response to the risk arising from tree hazard.

3. Step 3: Mitigate the risk arising from tree hazard on the fire ground.

   3.1 General Principles:

      3.1.1 Awareness and identification of trees which present a hazard must form part of the ongoing dynamic risk assessment performed by all personnel on the fire ground at all times.

      Refer to the Hazardous Tree Management Pictorial Guide, DEPI 2013 for more information on tree hazard identification.

      3.1.2 Safety from hazard trees during fire emergencies will take priority over other considerations (such as the conservation of biological values) consistent with the State Strategic Control Priorities. When in doubt or dispute over either the risk associated with a tree or its values, the decision will favour safety.

      3.1.3 Where alternative effective fire control options are available, relocate control lines and temporary access roads and tracks away from known tree hazard areas and/or establish exclusion zones.

3.1.4 Where a fire has impacted or otherwise damaged trees, access/control lines and other work areas in or near the impacted area, hazard trees will be assessed, marked and treated. Refer to Schedule 3 for details on the assessment area.

3.1.5 Crew Leaders/Sector/Division Commanders are to ensure appropriately qualified or experienced personnel assess, mark and treat hazard trees on the fire ground (including staging/briefing/assembly points), where practicable. Refer to Schedule 1 for a description of qualified and experienced personnel.

3.2 Pre-fire

3.2.1 Any planned retention of CPD, Hazardous, or Potential CPD trees where protection is not reliably assured, should be avoided where possible.

3.3 Initial attack/going fire

3.3.1 Awareness and identification of trees which present a hazard must form part of the ongoing dynamic risk assessment performed by all personnel on the fire ground at all times.

3.3.2 During attack on a going fire (ie. prior to mop-up/blacking out), personnel need to be particularly vigilant regarding identification of hazard trees and treat any identified unacceptable risks.

3.3.3 Any hazardous or potential CPD trees assessed are to be marked and CPD trees isolated in accordance with this procedure.

3.3.4 Where personnel consider the risk of injury from tree hazard significant, the Incident Controller needs to be advised and alternative lower risk alternatives considered. This consideration will balance the priorities placed on responder safety and any community members known to require assistance.

3.4 Following the passage of fire

3.4.1 As soon as practicable after the passage of fire, hazard trees within striking distance of access/control lines will be assessed, marked and treated (including possible isolation). Refer to Schedule 3 for details on the assessment area. In exceptional circumstances where this requirement is impracticable, the Incident Controller must approve and record alternative actions.

3.4.2 Before the commencement of any mop-up/blacking out/patrol of areas where fire has affected trees, hazard trees within striking distance of access/control lines will be assessed, marked and treated (including possible isolation). Refer to Schedule 3 for details on the assessment area. In exceptional circumstances where this requirement is impracticable, the Incident Controller must approve and record alternative actions.

3.5 Mark hazard trees on incident ground.

3.5.1 The agreed marking system for hazard trees will be used at all times, to ensure consistency and protect responder safety. Refer to Schedule 2 for details of the hazard tree marking system.

3.6 Treat hazard trees on the fire ground.

3.6.1 Treat hazard trees before and after the passage of fire on access routes, assembly areas, and control lines in accordance with the hierarchy of risk controls. Refer to Schedule 3 for details of hazard tree treatment.

3.6.2 Consider evacuation of treed areas when conditions such as wind speed, tree-fall, or other factors become unfavourable.

Refer to Schedule 4 for an overview of hazard tree identification, assessment, marking and treatment.

4. Step 4: Mitigate the risk of unidentified hazard trees on the fire ground.

4.1 Where Crew Leaders/Sector/Division Commanders believe that the residual risk from unmarked hazard trees on the fire ground requires vigilance, awareness is to be maintained by reference in fire ground briefings and close supervision.

5. Step 5: Complete operations.

5.1 Incident Controllers are to ensure removal of all marked CPD trees prior to transition to recovery, so far as is reasonably practicable.

5.2 Where marked CPD trees remain at the conclusion of the response phase, the Incident Controller will ensure the location of these trees forms part of the handover to recovery agencies and/or land manager.

REFERENCE	
Related Documents	Booklet: Guideline for fire control lines and management of hazardous trees (DSE/CFA 2011) Booklet: Hazardous Tree Management – Pictorial Guide (DEPI 2013) SOPJ 8.02: Dynamic Risk Assessment VICSES SOP019 Operations Involving Trees (SES 2012) Training manual: Bushfire Firefighter Reference Manual (CFA/DSE 2011) Video - Hazardous Tree Management During Fire Operations (DSE 2011)
Safety	CFA Safety Alert No 31 *Hazardous Trees* (8 January 2014) DSE Safety Alert Number 08/11 *Use of Plant and Equipment in the vicinity of Hazardous Trees* (13 December 2011) MFB Advisory Notice 7/2012 *Hazardous Tree Identification.*
Environment	Nil

S
O
P

J8.03

REVIEW	
Date Issue	24 August 2015
Date Effective	1 October 2015
Date to be Reviewed	August 2017
Date to Cease	

AUTHORITY		
The Emergency Management Commissioner has issued this SOP under section 50 of the Emergency Management Act 2013.		
Approved	**Signature**	**Date**
Craig Lapsley Emergency Management Commissioner		
Endorsed	**Signature**	**Date**
Euan Ferguson Chief Officer, CFA		
Alan Goodwin Chief Fire Officer, DELWP		
David Bruce Acting Chief Officer, MFB		
Trevor White Chief Officer Operations, VICSES		

SCHEDULE 1

QUALIFICATIONS AND EXPERIENCE FOR HAZARD TREE ASSESSMENT

SOP J8.03

1. Only appropriately, qualified or experienced personnel can carry out a hazard tree assessment. This does not preclude any other personnel from identifying a hazard tree and treating it appropriately (e.g. exclusion).

2. Appropriate qualification to carry out hazard tree assessment is:

   2.1 Formal timber industry endorsement as a tree faller in native forest with (or accompanied by a person with) (22023VIC) *Basic Wildfire Awareness* training OR (PUAOHS002B) *Maintain Safety at an Incident Scene* Unit of Competency; or

   2.2 Arborist with (or accompanied by a person with) (22023VIC) *Basic Wildfire Awareness* training OR (PUAOHS002B) *Maintain Safety at an Incident Scene* Unit of Competency.

3. Appropriate experience to carry out hazard tree assessment is:

   3.1 Operations Officer or Crew Leader with extensive experience in forest firefighting and/or forest harvesting; or

   3.2 Responder with extensive experience in suppression/ forest firefighting activities involving similar assessment of tree soundness.

SCHEDULE 2

HAZARD TREE MARKING SYSTEM

The system for marking hazard trees is described below and must be read in conjunction with SOP J8.03 Tree hazard - bushfire response.

S O P

J8.03

1. Pre-fire and Pre-ignition for Backburning and Burning Out

   1.1 **Yellow cross "X"** on hazardous trees (not yet CPD), or potential CPD trees which cannot be reliably protected, are accordingly marked for removal. These will normally be pushed over or felled as part of access/line construction.

   1.2 **Yellow dot "•"** on (as yet) non-hazard trees to be protected (ie hand raked or machine cleared around and/or fire suppressant applied) prior to the fire.

   1.3 Although uncommon pre-fire or pre-ignition, **Yellow "K"** trees (see below) if identified, should be managed as outlined below.

NB: Potential CPD trees marked for retention (and thus protection from fire), must have a high probability of surviving the fire intact based on the proposed protection measures and likely response resources available. If this is not reasonably assured, these trees are otherwise likely to become CPD trees post-fire and add unnecessary complexity to the fire response and should be pre-emptively removed.

2. Initial Attack/ First Response and Post-fire

   2.1 **Yellow "K":** Where it is considered by those qualified or experienced (SOP J8.03 Schedule 1) that in the circumstances it is safe to mark the tree, a yellow "K" identifies a tree which presents a "Clear and Present Danger". This is painted on two sides with non-flammable spray yellow paint in >30cm capital, and an exclusion zone is established (SOP J8.03 Schedule 3).

   2.2 Where it is not safe to approach a CPD tree, it is left unmarked and an exclusion zone is established (SOP J8.03 Schedule 3).

   2.3 If at all practicable, the mapped location of "K" (i.e CPD) trees is to be made available to fire ground personnel as soon as possible after marking.

   2.4 Although **Yellow "X"** trees are primarily identified and removed pre-fire it is not uncommon for new ones to be identified during and post fire. These should be removed as soon as practical after marking.

   2.5 **Yellow dot "•"** trees should be adequately resourced and patrolled to ensure they do not catch alight.

   2.6 If protection of a **Yellow dot "•"** tree has failed and the tree catches alight, extinguishment should be attempted as soon as possible provided it is safe to do so. If the tree cannot be reliably and effectively extinguished and threatens the work space/control line, it then becomes a CPD ("K") tree and treated as per paras 2.1and 2.2 above.

Refer to the Hazardous Tree Management Pictorial Guide, DEPI 2013 for more information on the Identification and Marking System.

SCHEDULE 3

HAZARD TREE TREATMENT

S O P

J8.03

ASSESSMENT AREA

The work area

Hazard trees or branches situated inside or immediately adjacent to the area where ground crew may be working. This area could the road itself if no mop up/blacking out is planned, or may include the blacking out depth where planned.

Outside the work area

The area beyond the work area where Clear and Present Danger trees present a risk by falling into or sliding downhill into the work area.

TREATMENT OPTIONS

1. ELIMINATE

   1.1 **Removal** of the hazard by downing trees is the preferred method of treating the hazard. Hazard trees should be machine felled where ever possible. Hand falling of hazard trees should be avoided unless it is both essential and safe and in accordance with dynamic risk assessment. Both intermediate and advanced fallers may hand fall hazard trees within the range limits of their competency..

   1.2 **Extinguishment** in-situ by water, fire suppressant and/or retardant, if safe to do so. If a tree is assessed to be a hazard tree it should be removed after extinguishment.

2. SUBSTITUTE

   2.1 **Move** or **abandon** the control line if CPD trees cannot be eliminated. Construct or select an alternative location for a control line.

3. ISOLATE

   3.1 **Isolate** CPD trees by locally re-aligning the control line (to provide at least a 2 tree length separation) or by establishing an exclusion zone.

   3.2 Generally, an **exclusion zone** shall be a distance of at least 2 tree lengths around a tree hazard. The actual distance in each instance is determined by site factors such as slope and may be larger (or in some rare instances smaller) than 2 tree lengths.

   3.3 The perimeter of an exclusion zone is marked using yellow and black hazard tape on sufficient individual trees to indicate its extent.

   3.4 Exclusion zones should only entered by plant or vehicles with falling object protection canopies or appropriately skilled crew tasked to remove the CPD tree.

3.5 When an exclusion zone is established over a control line relevant incident personnel should be advised of its location.

3.6 Where an exclusion zone extends across a track that exclusion needs to be effective and actively managed to ensure crew do not drive through the zone.

3.6.1 Traffic control needs to be established to warn others and prevent personnel entering the area while the hazard remains until it is removed or burns down.

3.6.2 If for some exceptional reason traffic control is not implementable, the existence of the exclusion zone must be marked with hazard tape on a piece of wood (or similar) across the middle of the track/control line.

S O P

J8.03

3.7 Consider **evacuation** of treed areas on the fire ground when tree-top wind-speed triggers are exceeded. This will vary depending on circumstances but will generally be triggered by an observation or forecast of Gale force winds/wind gusts (ie Beaufort Wind Scale = 8, 63-75km/hr), or greater.

3.7.1 The Incident Controller will determine the level and type of response based on the risk and operational environment. In general, deployment of personnel into areas where the level of tree hazard is unacceptably high, will only be considered if there is an imminent threat to life.

3.7.2 Operations staff need to be prepared for rapid crew withdrawal if trees are falling, forecast become unfavourable, or weather actually deteriorates.

3.7.3 Where an area is dominated by hazard trees and the opportunity for safe work is severely restricted, crew levels should be reduced to essential tasks only and where possible only purpose-built (for falling object protection) vehicles should be used.

Note: To maintain its effectiveness as an alert, yellow and black hazard tape is only to be used to mark the location/exclusion zone of CPD trees.

SCHEDULE 4

TREE HAZARD MITIGATION MATRIX: Identification, Assessment, Marking and Treatment

Assessment status	**Not Assessed In Fire Affected Area** (pre, during or post fire)	**Assessed And Deemed To Be Sound** (pre, during or post fire)	**Assessed** (pre fire)	**Assessed** (mostly pre-, occasionally during or post- fire)	**Assessed** (during or post fire)
Tree Type	Not assessed	Appears sound	Potential Clear and Present danger (CPD): protection reliably assured.	HAZARD TREE Potential Clear and Present Danger (CPD): protection NOT reliably assured. OR Hazardous Tree	Clear & Present Danger (CPD)
Hazard Status	Unknown	Low	Currently low but vulnerable to rapid increase if affected by the fire or associated operations	Deemed to have, or presents evidence of increased hazard	Extreme
Marking Symbol	No mark	Sound, no mark	Yellow Dot (•)	Yellow Cross (**X**)	Yellow "**K**" and/or hazard tape exclusion area.

Assessment status	**Not Assessed In Fire Affected Area** (pre, during or post fire)	**Assessed And Deemed To Be Sound** (pre, during or post fire)	**Assessed** (pre fire)	**Assessed** (mostly pre-, occasionally during or post- fire)	**Assessed** (during or post fire)
Definition	Tree yet to be assessed	An assessed sound tree that is not currently hazardous and is not likely to become a CPD tree when exposed to fire or other disturbance associated with the incident (eg. wind gusts, machine damage).	A tree which in its current state does not appear hazardous, but may become a CPD tree if it catches alight or is impacted by wind or other fire-related disturbance. It has a high probability of surviving the fire intact based on the proposed protection measures and likely response resources available.	A tree which in its current state does not appear hazardous, but may become a CPD tree if it catches alight or is impacted by wind or other operational disturbance. It does NOT have a high probability of surviving the fire intact based on the proposed protection measures and likely response resources available. OR A tree which in its current state may in part or wholly fall and impact personnel in its potential impact zone (but is not considered likely to do so during the expected time frame of the current operation).	A tree or branch that is likely to fall within the expected timeframe of the current operation and impact personnel in its potential impact zone.

Assessment status	**Not Assessed In Fire Affected Area** (pre, during or post fire)	**Assessed And Deemed To Be Sound** (pre, during or post fire)	**Assessed** (pre fire)	**Assessed** (mostly pre-, occasionally during or post- fire)	**Assessed** (during or post fire)
Description		Tree appears 'sound', ie - no obvious defects which would significantly weaken the trunk or allow the entry of fire. No large dead branches or widow makers present.	Tree has: Exposed butt scars, OR Hard to reach elevated hollows, OR Small diameter and surrounded by accumulated heavy fuel.	Trees with a stem or branch diameter greater than 10cm above shoulder height and are assessed to be at increased risk of total or partial collapse based on (but not limited to) one or more of the following indicators: • Dead and/or decaying; • Suspended loose or broken branches; • Significant lean with a recent cause or indicators of failure; • >50% decrease in sound and solid cross section at any point in bole or major branch; • Evidence of longitudinal cracking, or a weak fork; • Evidence of its roots lifting, or an under cut or disturbed root system; • Tree cannot be effectively protected from catching alight and becoming subsequently weakened; • Other indicators of serious weakness based on local knowledge and conditions.	Tree is on fire, not able to be safely and reliably extinguished and will be weakened to failure point by fire, OR Tree has incurred severe structural damage from recently extinguished fire and appears very unstable, OR Tree has been impacted on by some other factor and appears likely to fail within the timeframe of the current operation (eg. backed into by bulldozer, damaged by nearby tree fall).

Assessment status	**Not Assessed In Fire Affected Area** (pre, during or post fire)	**Assessed And Deemed To Be Sound** (pre, during or post fire)	**Assessed** (pre fire)	**Assessed** (mostly pre-, occasionally during or post- fire)	**Assessed** (during or post fire)
Instruction to HT assessment crew	Tree has not been assessed and its condition is unknown. For avoidance of doubt, during or post fire all trees in this category should be considered potential CPD ("K") trees.	Carefully check trees from both sides against criteria for hazardous and CPD trees. If in doubt regarding its soundness or ability to survive the fire, err on the side of fire fighter safety.	Mark with a Yellow Dot (•) provided the tree can reliably be protected from fire by measures and resources available (otherwise tree is to be considered as a potential CPD tree and marked accordingly). Tree may be worked under.	Mark with a yellow "X" for removal. If there is doubt regarding a tree being hazardous, err on the side of safety and mark for removal. Note: Small trees may burn out quickly. Trees may occasionally fall uphill particularly under the influence of strong winds.	Only mark if the tree is safe to approach, always establish an exclusion zone or reroute the control line.
Instruction to fire crew	Approach trees with caution. If approaching tree to assess presents hazard to personnel, use the tape mark off system to identify as a CPD tree (ie "K" tree) and isolate as per DEPI pictorial guide. Assessments must be conducted on foot, not 'drive by'.	Normal precautions, tree may be worked under.	**Pre-fire**: Clear around and protect from fire, normal precautions, ensure tree does not catch fire, tree may be worked under. Additional actions such as ground applied retardant or wetting down, pre-fire candling under controlled conditions, and intensive patrol may be requested. **Post-fire**: If protection fails and the tree catches alight, it should be fully extinguished as soon as possible, if safe to do so. If the tree cannot be reliably and effectively extinguished, and it threatens the work space/control line, it becomes a CPD tree and is treated accordingly.	Ensure tree removal as soon as practicable. Tree presents significant additional risks but is currently assessed as unlikely to fall during the current operation; may be worked under with caution following dynamic risk assessment during fire emergencies if necessary. Monitor condition to ensure tree has not caught alight or deteriorated to CPD. If tree has deteriorated reclassify to CPD and create exclusion.	Already too dangerous to work under, ensure taped-off exclusion zone for personnel and vehicles (unless specifically approved for this task) is established and maintained until tree falls or is removed.

Assessment status	**Not Assessed In Fire Affected Area** (pre, during or post fire)	**Assessed And Deemed To Be Sound** (pre, during or post fire)	**Assessed** (pre fire)	**Assessed** (mostly pre-, occasionally during or post- fire)	**Assessed** (during or post fire)
Instruction to plant operator or faller	Prohibit personnel entry into 'not assessed' areas for mop up/black out/patrol until hazard tree assessment and treatments have been implemented.	None (although tree removal may be required for other control line construction purposes).	Provide adequate width of mineral earth break around it to protect it from anticipated fire conditions. This must be achieved without damage to the tree (including its roots).	Remove provided the operator or faller deems it safe to do so.	Remove with extreme caution only when safety can be reliably assured. Wherever possible removal by machinery is preferred to hand falling.
General tree hazards	All trees present some degree of hazard, particular defects may be hard to see or identify so a degree of caution is always needed. Variable conditions such as increasing or gusty winds will change the overall level of risk and which trees are most dangerous.				

Initial Response in Very High Tree Hazard Work Instruction

Doc ID: 20-WI- 4.4.1.3
Date effective: 11/01/2016
Office of the Chief Fire Officer

History of changes

Version	Date Approved	Date Effective	Summary of Changes	Owner	Approver
1.0	22/12/2015	11/01/2016	New Document	Fire Management Operations Unit	Chief Fire Officer

Contents

1.0 Purpose

This instruction outlines how initial incident response will be carried out in very high tree hazard (VHTH). This work instruction supports the application of *JSOP 08.03 – Tree Hazard – Bushfire Response*.

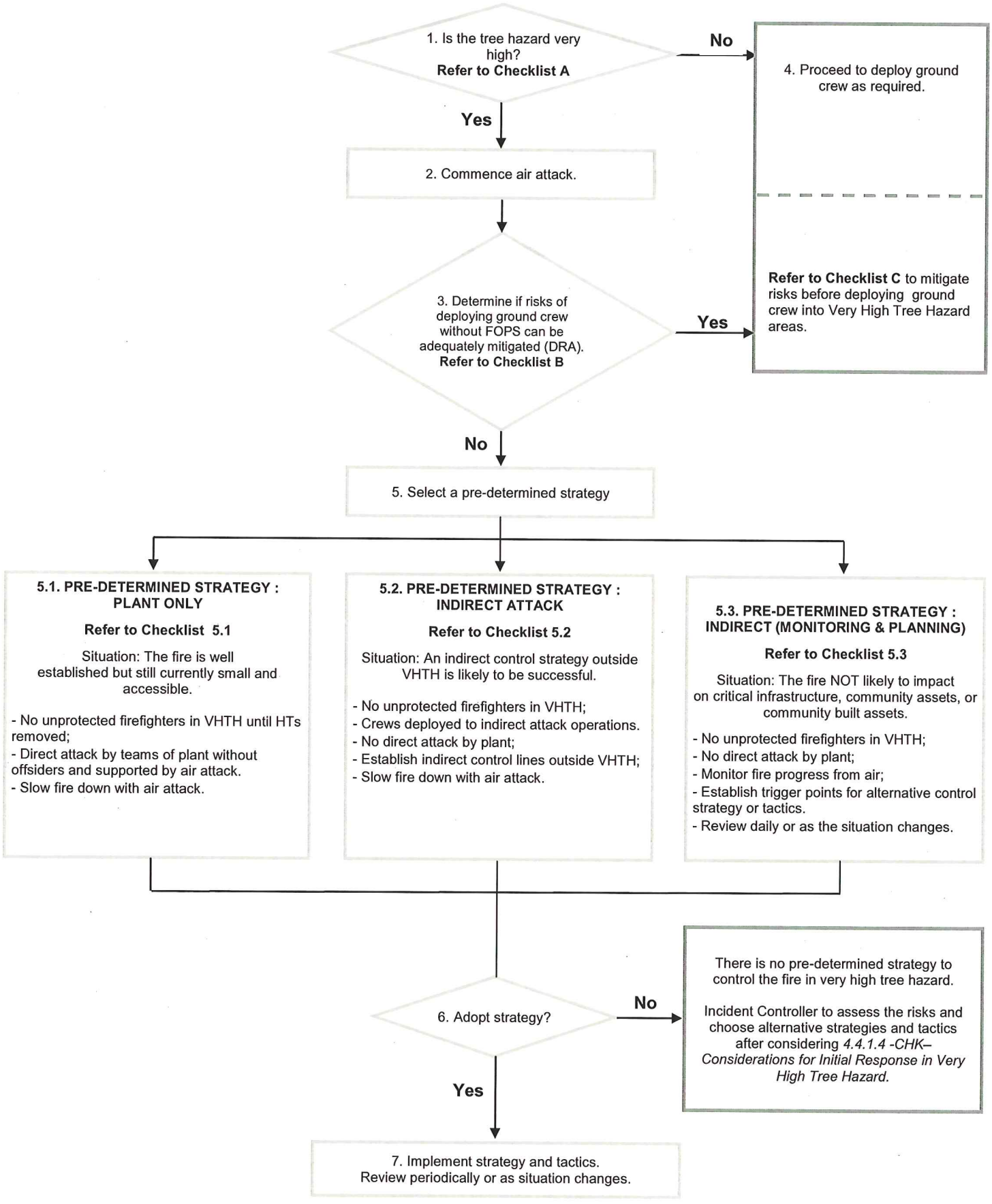
2.0 Scope

This instruction summarises the strategies and tactics available to the Incident Controller in initial response to bushfires in very high tree hazard, such as fire killed ash forest. These areas are extremely hazardous environments for firefighters. While the instruction is focused on very high tree hazard, similar approaches can be applied in other forest types dominated by tree hazard, such as dead or dead topped trees.

3.0 Instructions

Please not all checklists referenced below are contained in 4.1.4 -CHK– Considerations for Initial Response in Very High Tree Hazard.

3.1 *Process Map*



3.2 *Process Steps*

Step #	Description
1	Determine the tree hazard risk. Use: o tree hazard risk mapping; o situational observations; o local knowledge and. o *Considerations for Initial Response in Very High Tree Hazard – Checklist 1* to help evaluate the risk level. If the tree hazard is very high then proceed to **Step 2**. If the tree hazard is not very high proceed to **Step 4**.
2	Commence air attack immediately to slow the spread of the fire and gain further intelligence on tree hazard. The success of air attack will also assist to a select pre-determined strategy.
3	Determine if risks of deploying ground crew without FOPS can be adequately mitigated. The risks of deploying crew without FOPS in Very High Tree Hazard may be mitigated in particular circumstances such as: o When there is an immediate risk to community members or personnel o The fire is small and recently ignited o The risk from wind speed is low. A risk assessment undertaken using the principles in the Dynamic Risk Assessment procedure (JSOP 8.02) should the decision. *Considerations for Initial Response in Very High Tree Hazard – Checklist B* should be used to help determine if the risk of deploying ground crew into very high tree risk areas can be adequately mitigated. If the risk can be adequately mitigated go to **Step 4**. If the risk cannot adequately mitigated to **Step 5**.
4	Proceed to deploy ground crew as required and complete operations. Review decision if the situation changes. **Whenever deploying crew in areas of very high tree hazard apply the appropriate controls in the *Considerations for Initial Response in Very High Tree Hazard – Checklist C* to mitigate the risk.** The dynamic risk assessment process should be continually applied by firefighters.
5	Select a pre-determined strategy. In order to mitigate the risks of responding to bushfires in very high tree hazard areas (eg. fire killed ash) there are three pre-determined strategies and tactics are identified to provide decision support depending on the situation.
5.1	PRE-DETERMINED STRATEGY: PLANT ONLY Refer to Checklist 5.1. Situation: The fire is well established but still currently small and accessible. Strategy and tactics: - No unprotected firefighters in VHTH until HTs removed; - Direct attack by teams of plant without offsiders supervised and directed from the air; - Slow fire down with air attack if required.
5.2	PRE-DETERMINED STRATEGY: INDIRECT ATTACK Refer to Checklist 5.2. Situation: An indirect control strategy outside VHTH is likely to be successful. Strategy and tactics: - No unprotected firefighters in VHTH;

	- No direct attack by plant; - Establish indirect control lines outside VHTH; - Slow fire down with air attack if required.
5.3	PRE-DETERMINED STRATEGY: INDIRECT (MONITORING & PLANNING) Refer to Checklist 5.3. Situation: The fire is not likely to impact on critical infrastructure, community assets, or community built assets. For example, the fire starts very high tree hazard in late Autumn or a known significant rain event will extinguish the fire. Strategy and tactics: - No unprotected firefighters in VHTH; - No direct attack by plant; - Monitor fire progress from air; - Establish trigger points for alternative control strategy or tactics. Review strategy daily or as the situation changes.
6	Adopt strategy? A decision is required as to whether a pre-determined strategy is appropriate and safe based on the situation (eg. availability of plant and or aviation resources). If the situation and strategy is suitable then adopt the strategy and proceed to **Step 7**. If the situation and strategy is not suitable in the circumstances then do not adopt the strategy, proceed to **Step 8**.
7	Implement strategy and tactics. Review periodically or as situation changes.
8	There is no pre-determined strategy to control the fire while reducing the risk of very high tree hazard to firefighters. Alternative strategies and tactics should be selected after considering the entire checklist – *Considerations for Initial Response in Very High Tree Hazard*.

4.0 Roles, responsibility and authority

Role	Responsibility
Incident Controller	• Application of this work instruction and associated checklist
District Duty Officer	• Application of this work instruction and associated checklist
Operations Officer	• Application of this work instruction and associated checklist

5.0 References

Document	Document title
Joint Standard Operating Procedure	J08.02 – Dynamic Risk Assessment J08.03 – Tree Hazard – Bushfire Response
Standard Operating Procedure	4.1.1 Initial Incident Response
Work Instruction	4.5.1.1 – WI – Analysis and Planning for Bushfire Control
Checklist	4.4.1.4 – CHK - Considerations for Initial Response in Very High Tree Hazard

6.0 Other requirements

6.1 *Training and Safety Requirements*

All roles identified in section 4.0 will be trained in the application of this work instruction.

Checklist

Doc ID: 20-Checklist- 4.4.1.4 Considerations for Initial Response in Very High Tree Hazard
Date effective: 11/01/2016
OCFO, Land, Fire and Environment

History of changes

Version	Date Approved	Date Effective	Summary of Changes	Owner	Approver
1.0	23/12/2015	11/01/2016	New Document	Fire Management Operations Unit	Chief Fire Officer

Checklist A. Is the Hazard Tree Risk Level Very High?

This checklist applies to Step 1 of the Work Instruction – *Initial Response in Very High Tree Hazard*

- **Answer all questions "Yes" or "No" where possible.**
- **"Yes" answers indicate very high tree hazard.**
- **Considerations are ordered in increasing importance.**
- **Weighting should be given to most reliable information to determine if the tree hazard is very high.**

		Y/N
1	Does the modelled tree risk data available on eMap predict a very high risk level?	
2	Does local knowledge indicate that the fire ground is dominated by hazardous trees overhead?	
3	Does aerial observation of the fire ground indicate that the majority of trees appear hazardous, dead, or dead topped?	
4	Do ground observations report the area is dominated by hazardous trees with most sites having hazardous trees overhead?	
5	Do fire crew report tree hazard of a size or distribution that the ground crews cannot readily avoid working in the exclusion zones around any CPD trees which are burning or weakened by the fire?	

.Checklist B. Determine if risks of deploying ground crew without FOPS can be adequately mitigated (application of DRA process)?

This checklist applies to Step 3 of the Work Instruction – *Initial Response in Very High Tree Hazard*

- **Answer all questions "Yes" or "No" where possible.**
- **"Yes" answers indicate that an assessment can be made that the benefit gained from carrying out the tasks outweigh the possible consequences if the risks are realised (refer to Dynamic Risk Assessment JSOP 8.02). Ground crews can be deployed after considering Checklist C.**

		Y/N
1	Are community members or personnel located within the incident area and at immediate risk?	
1.1	Have there been calls for help from crew or the public?	
1.2	Is someone at risk of being trapped without adequate refuge or egress?	
1.3	Are there visitor facilities within the fire which cannot be checked by aircraft?	
2	Is the fire small, recent and accessible so that it can be contained before tree fall starts and the wind speed is not a risk?	
2.1	Has the fire been going for less than hour when crew are expected to arrive on site?	
2.2	Is the full fire perimeter visible from the access road?	
2.3	Do crew confirm that no trees are falling yet?	
3	Is the risk to human life (including fire fighters) from an indirect strategy clearly greater than that from direct initial attack?	
3.1	Does modelling indicate the fire impact on communities if an indirect strategy is used?.	
3.2	Can the fire be prevented from becoming a major campaign by early use of ground crew?	

Checklist C. Considerations to mitigate the risks to ground crews.

This checklist applies to Step 4 of the Work Instruction – *Initial Response in Very High Tree Hazard*

- **Answer all questions "Yes" or "No" where possible.**
- **All answers should be "Yes" to support deployment of Ground Crew.**

		Y/N
1	Do ground crews have Falling Object Protective System canopies for direct attack within very high tree hazard?	
2	Can the clear and present danger trees be isolated, or treated by heavy plant before ground crews enter?	
3	Are the ground crew fully briefed, highly skilled and experienced in working around hazardous trees?	
4	Are ground crew essential to complete the direct attack? (Direct attack by plant without ground crew support is unlikely to be effective in most situations unless the fire is small with short plant turnaround times.)	
5	Are adequate ground crew available and not required for other tasks in line with strategic control priorities such as public evacuation through the fire ground?	
6	Can the ground crew work be completed during daylight hours? (Firefighters or plant should not work in very high tree hazard at night.)	
7	Is an effective and safe medivac plan is feasible? (safe medical aid and extraction in the event of a VHTH tree strike is necessary)	
8	Are adequate hazardous tree inspection and treatment resources available? (Smaller diameter VHTH will rapidly become CPD trees during a fire and will be hard to identify without close inspection and monitoring of each tree butt, this is unlikely to be feasible in most stands)	
9	Are wind speeds, directions and forecast suitable for ground crew safety from tree hazard?	
10	Is the fire remaining on the ground and out of elevated tree hazards, and not spreading rapidly into areas of greater tree hazard?	
11	Are suitable fire behaviour and wind speeds for ground crew forecast in the coming days?	
12	Can the fire be accessed by a safe route (no tree hazard or treated roads with reduced tree hazard)?	
13	Are safe areas established for ground crew retreat if tree hazard conditions change?	
14	Is sufficient intel available to complete this appraisal?	

Checklist 5.1. Pre-determined strategy: Plant only

This checklist applies to Step 5 of the Work Instruction – *Initial Response in Very High Tree Hazard*

- **Answer all questions "Yes" or "No" where possible.**
- **All answers should be "Yes" to support deployment of heavy plant in VHTH without Ground Crew**

			Y/N
1	Situation	Is the fire well established but still currently small and accessible – if yes, consider control by plant only.	
2	Heavy plant capability	Are plant in appropriate configuration and numbers available? (Plant should operate in teams of 2-3 machines to offside each other due no ground support. Harvesters and excavators will be needed to deal with the volume of material and to reduce the loading up of standing dead trees.)	
3	Operator experience	Are operators competent and safe to work without direct on-ground support and supervision? (Consider operator experience in forest fire fighting, logging, mineral earth control line construction and bushfire suppression tactics. Additional briefing required before despatch to operate in very high tree hazard.)	
4	Staging areas / refuelling / maintenance	Has the clearing of VHTH around of staging areas (and their access) been identified and planned? (Required for plant refuelling / maintenance in proximity to fire)	
5	Communications	Do plant have GPS and VHF radios for comms with IC, fireground and AC?	
6	Safety zones	Has the clearing of VHTH around of safety zones (and their access) been identified and planned? (Safety zones need to be established / cleared and carefully considered evacuation triggers and escape routes planned due to decreased mobility of plant.)	
7	Medivac	Has a feasible, effective and safe medivac plan been established which will not expose medical staff to the risks of tree fall?	
8	Aircraft	Are aircraft and air observers available and tasked to support the plant? (Critical consideration in absence of ground crew for safety of plant operators. Examples: fire intel, directions to operators, strengthening safety zones or slowing fire fronts with air attack.) Is a plan in place to withdraw plant (to safety zones etc) should aircraft become unavailable?	
9	Logistics	Are plant operators self-sufficient for meals / hydration for duration of shift?	

Checklist 5.2. Pre-determined strategy: Indirect Attack

This checklist applies to Step 5 of the Work Instruction – *Initial Response in Very High Tree Hazard*

- **Answer all questions "Yes" or "No" where possible.**
- **All answers should be "Yes" to support an indirect strategy attack outside the Very High Tree Hazard area.**

			Y/N
1	Situation	Is an indirect control strategy outside VHTH is likely to be successful?	
2	Safety	Does the strategy represent an overall gain in fire fighter safety compared with a direct attack within the very high tree hazard?	
3	Heavy plant capability	Are plant in appropriate configuration and numbers available to complete the control lines before the fire is predicted to reach them?	
4	Tactics	Are suitable control lines outside the very high tree hazard available?	
5	Forecast weather	Does the weather forecast support timing for the strategy and any associated back burning?	
6	Aircraft	Are aircraft and air observers available and tasked to monitor fire spread and behaviour, and where necessary slow the rate of spread?	
7	Logistics	Are all the additional resources required available given the overall fire situation?	

Checklist 5.3. Pre-determined strategy: Indirect (Monitoring and Planning)

This checklist applies to Step 5 of the Work Instruction – *Initial Response in Very High Tree Hazard*

- **Answer all questions "Yes" or "No" where possible.**
- **All answers should be "Yes" to support a monitoring strategy without direct or indirect attack.**

			Y/N
1	Situation	Is the fire unlikely to impact on critical infrastructure, community assets, or community built assets. (For example, a remote fire starts very high tree hazard in late Autumn or a known significant rain event will extinguish the fire.) - If yes, consider only monitoring the fire progress.	
2	Forecast	Does the forecast weather and fire behaviour continue to support this strategy bring used?	
3	Tactics	Have trigger points been established for any change in tactics, and have the likely impacts of the fire been evaluated?	
4	Season	Has the fire started during a time of the year when it is unlikely to threaten communities/infrastructure/environment?	
5	Communications	Have stakeholders, community and command/control structure been advised of the chosen strategy and reasons for its choice?	
6	Aircraft	Are aircraft and air observers available and tasked to monitor fire progress? Is a plan in place to implement an alternative strategy should aircraft become unavailable?	

Where none of the three pre-determined strategies are suitable, and the Incident Controller chooses to deploy ground crew in very high tree hazard, an alternative strategy should be logged and Checklist C should be considered.

Decision Outcome
Complete checklists above, and define decisions below.
Is the fire in very high tree hazard? (Checklist A) ☐ Yes ☐ No
Are the risks of deploying ground crew without FOPS adequately mitigated? (Checklists B & C) ☐ Yes ☐ No
Strategy to be adopted: ☐ 5.1. – Plant Only ☐ 5.2. - Indirect attack ☐ 5.3. – Indirect (Monitoring and Planning) ☐ Other (Step 8): Document in log