Wildfire Risk Assessment and Plan for Simon's Kloof

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VULCAN™ WILDFIRE MANAGEMENT

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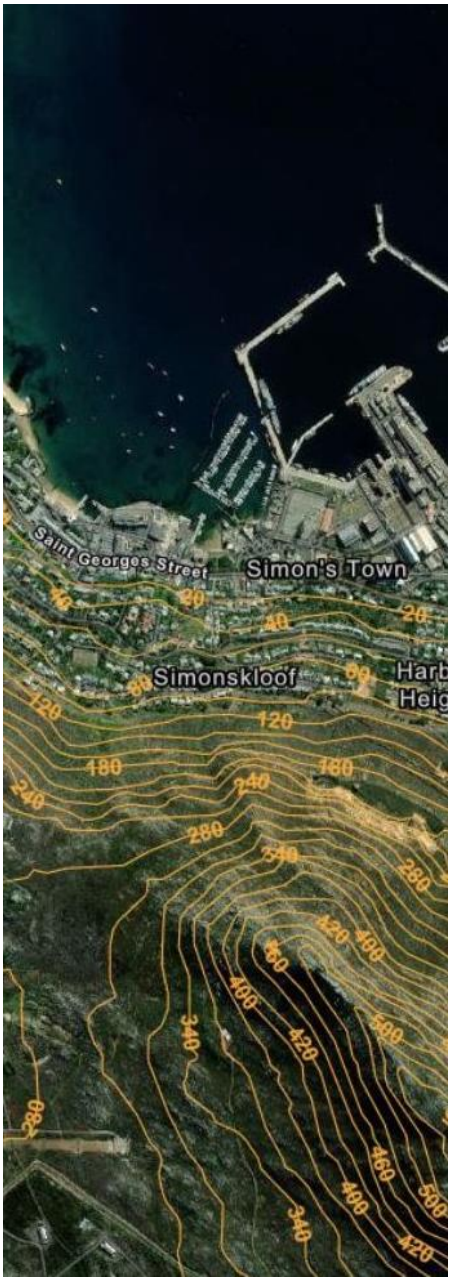
Acceptance of the important role wildfire plays in your ecosystem will help you to develop a positive mindset towards preparedness.

This report will be a continuation of Simon's Kloof steps and procedure towards becoming WildfireReady. The aim is to expand knowledge, develop systems and processes, improve preparedness, and lower the chance of negative outcomes from wildfires.



WILDFIRE READY

WildfireReady means you are in a continual state of readiness for wildfires. The goal must be to prioritise the safety of residents, workers and first responders throughout a wildfire incident. This is only achieved through careful planning before an incident and by minimising the risks which can lead to the damage and destruction of property and infrastructure.

Simon's Kloof is situated within an environment which will experience regular wildfires. The vegetation, topography and weather provide the perfect mix for wildfires to be considered a significant hazard; one that must be expected and prepared for.

Vulcan Wildfire Management have developed a Risk Analysis System to assess wildfire risk and report on recommended risk reduction actions. Wildfires can occur throughout the year, albeit with periods of higher frequency and intensity, and can pose a significant threat to residents, property, infrastructure, and assets. This report looks at prioritising actions through:

- Awareness and Understanding of The Risks from Wildfires.
- Vegetation (Fuel) Management Recommendations.
- Reducing the Risk of Structure Ignitions.
- Preparation and Response Strategies.

CONTENTS

Report

The report is structured to build knowledge as you progress through sections.

Solutions

Wherever there is a challenge or risk there are always options and solutions.

#WILDFIRE READY

EXECUTIVE SUMMARY

Wildfire Risk

Assess

Understand

Act

This wildfire risk analysis report for Simon's Kloof focuses on identifying key risk areas and goes into detail to explain how wildfires might impact the suburb. The contents serve to create a better understanding of the wildfire environment so that you may look at the suburb from the perspective of understanding wildfire risk with clear solutions in mind.

There are three ways in which wildfires spread and cause damage to properties, structures, and infrastructure.

- Threat No.1 – Embers
- Threat No.2 – Structure to Structure Ignitions
- Threat No.3 – Direct Flame / Radiant Heat Contact

Knowledge

Understand the wildfire threat. Be encouraged by solutions to reduce risk.

Wildfire Scenarios That Can Threaten Simon's Kloof

- Primary Threat: Wildfires driven by a southerly wind.
- Secondary Threat: Wildfires driven by a south easterly or north westerly wind.
- Tertiary Threat: Nature is unpredictable, with many other possible variations that occur. In fact, it may even be a wildfire that originates within your own suburb that can cause damage.

Fuel for Thought

Fuels

Weather

Topography

Firebreaks and Fuel Reduction Buffer Zones

- Proactive work with the large landowner neighbours, particularly TMNP, City of Cape Town and the SA Navy can help ensure firebreaks are well maintained and response procedures are mutually understood.
- Simon's Kloof also requires focus to ensure that green belts, communal areas, open ERFs as well as gardens are well maintained, and vegetation is analysed from the perspective of wildfires being a source of fuel.

Home

Protecting your space. Saving a place of memories and priceless experiences.

Collaboration

Strength and ability come from synergy and the collective working together.

Step by Step

Even the most complex tasks begin by taking the first step.

Risk Analysis for Homes and Infrastructure

The suburb has been broadly analysed for risk and recommendations have been provided. The overall risk level of the suburb falls into Medium Risk category. The standout threat to homes comes from threat of embers during wildfires and the vegetation (fuel) corridors that exist. There is also risk of radiant heat and structure-to-structure ignitions. The consistently weak, or vulnerable points observed on homes were:

gutters | open spaces and vents into roof | wooden decks | outside furniture | wood piles against homes | gaps or spaces in windows, doors, garages | proximity of trees or vegetation to homes or gutters.

Preparation and Response Strategies

- Relationships with your neighbouring properties as well as the CPFPA are vital.
- A communication plan and as well as thought about personal protective equipment (PPE) for residents who might stay to defend their property is required.
- Residents could benefit from fire readiness and response training.
- There is a lot of thought, processes and actions that need to be put into place if properties are going to be actively defended by residents.
- Evacuation, sheltering in place or actively defending property and homes from wildfires are the various options to be considered and weighed up based on the risk level for each incident.

Faced with a risk report, the task of wildfire preparedness can seem overwhelming. It must be said that Simon's Kloof is already in a good position and the risk is moderate. Taking a step-by-step approach in the suburb and with the residents will result in an improved state of readiness for wildfires.

Vulcan Wildfire Management, through this analysis and report process, now have a detailed understanding of Simon's Kloof and can help guide and consult to help you further with this process, when you need additional help.

GLOSSARY

Ember Attack. During a wildfire, burning matter such as bark, sticks, leaf matter etc. can be lifted into the air by the convective updraft winds of the fire and then carried for some distance, even hundreds of meters, depending on the wind strength and the size/weight of the material. Spotting or spot fires (ignitions of new fires) caused by embers have been recorded kilometres away from flaming fronts. Embers pose a threat of fire spread to vegetation but also to homes and buildings, where they can land on dry timber, in gutters, in roof vents etc., where they have the potential to start a fire that can quickly spread throughout your home.

Firebreak. (sometimes referred to as a "break"). An area where all vegetation and organic matter is removed down to mineral soil, thereby removing the fuel element of the fire triangle. (Fire triangle: Oxygen, Heat, Fuel – remove one of these and fire is extinguished).

Fire Danger Index (FDI). The Fire Danger Index predicts how a fire would behave if one started, including how difficult it would be to control. The rating is your trigger to be prepared and act. The ratings are Safe (Blue), Moderate (Green), Dangerous (Yellow), Orange (Very Dangerous) and Red (Extremely Dangerous).

Fuel Break. This is a strip of land where fuel has been modified or reduced to limit the fire's ability to spread rapidly, normally cut down to ankle height level and regularly maintained. Often mistakenly called 'Firebreaks'.

Fuel Load. The mass of combustible materials available for a fire (such as vegetation).

Home Ignition Zone. This is the area of up to 30m that immediately surrounds your home, and it is the ignitions that occur within this zone that most threaten a home or structure

Incident. An occurrence or event, natural or human-caused that requires an emergency response to protect life or property.

Integrated Fire Management. A comprehensive and holistic approach to managing wildfire. This includes prescribed burning, stack burning, fuel reduction, fire breaks, risk assessments and risk reduction, operational planning, proactive interventions, intelligence gathering, awareness via education and wildfire suppression.

Preparedness. The range of deliberate, critical tasks and activities necessary to build, sustain, and improve the operational capability to prevent, protect against, respond to, and recover from emergency incidents.

Spotting (Spot Fires). New fires being started ahead of the main fire by embers carried by the wind and convective air column landing in unburned areas.

Wildland Urban Interface (WUI). Refers to the zone of transition or area between unoccupied land and human development. This zone is not measured by a specific or predetermined geographic distance but rather by the area of land in which human development co-exists with unoccupied or rural land, this includes the any paths of vegetation that can extend from the unoccupied land into the urban sprawl.

INTRODUCTION: PRINCIPLES OF WILDFIRE AND RISK IDENTIFICATION FOR SIMONS KLOOF

Before we discuss the specifics of Simon's Kloof it's important to understand wildfire risk.

Principles of Wildfire Spread and Structure Vulnerability to Wildfires
Wildfires will spread due to one, but most likely a combination, of these primary factors.

1. Direct Flame / Heat Contact
2. Embers (Firebrands)
3. Structure to Structure Ignitions

Wildfire preparedness, response, and recovery should consider these factors to limit the threat to life and damage to property, structures, and infrastructure.

Direct Flame / Heat Contact

A wildfire can burn at incredibly high temperatures, 800˚C to 1200˚C at it hottest levels and generate enough radiant and convective heat that any flammable material ahead of the flaming front becomes preheated and ignition occurs unless there is some intervention or fuels run out. Finer fuels are easily combustible materials such as grasses, fynbos, dry sticks, curtains in a home, pine needles in gutter etc. and can easily ignite from radiant heat alone and carry fire to the heavier fuels or materials such as bushes, trees, balconies, roofs, carpets, gutters etc. Slope directly affects the preheating rate of the fuels, as the steeper the slope the more the convective heat column is combined with radiant heat spread and the closer this is brought to the upslope fuels. Strong winds can have a similar effect. If conditions are favourable, ALL flammable materials (fuels), including homes in their path can burn.

Ignitions from direct flame / heat contact can occur when a flaming front passes through an area, especially an area with enough continuity of vegetation or other flammable material to carry a fire. In a building, all it takes is one small ignition in the wrong place for the entire structure to be lost.

See the image to the right. The flaming front doesn't necessarily have to make contact with the fuel in its pathway for it to ignite. Radiant heat (or convective heat if on a slope), can heat the fuels (garden and parts of the structure) to ignition point.

Embers

A significant threat of damage or loss comes from embers. These are burning pieces of organic material such as bark and twigs that are lifted into the air by the convectional updraft of the fire and travel in the wind from the area of fire settling in areas of combustible vegetation (fuel) or on structures (such as in gutters, eaves, decks).

During a wildfire, embers can occur before, during and after a flaming front. Before a flaming front reaches you, as well as during, the intensity of embers will typically be at the highest, however do not discount ember threat for the extended period after the main wildfire has passed your area. If there is burning fuel anywhere in the general area combined with wind to carry embers, there is a threat.

Embers pose a threat because they ignite vegetation, fences, door mats, garden furniture, etc., close to structures which then carry the fire into the structure. Of equal concern is the embers that also set fire directly to structures in various ways where they find dry timber, organic material in gutters, roof vents, eaves etc.

Embers force their way into vulnerable areas, collecting in 'weak points' around a structure and they have a potential to start a fire that can quickly spread throughout. Several scientific studies have been conducted in the USA and Australia, the results of which point to the highest percentage of damage and loss of structures coming from embers. This percentage is far higher than any other ignition sources, such as direct heat exposure.

Image credit: Justin Sullivan c/o Sullivan Photography.

The **illustration on the left** depicts burning material, (embers), being carried from a fire over some distance towards a structure. Each one of these embers flying through the air has the potential to enter vulnerable areas of a structure (or home) also known as the Home Ignition Zone (HIZ) and cause an ignition.

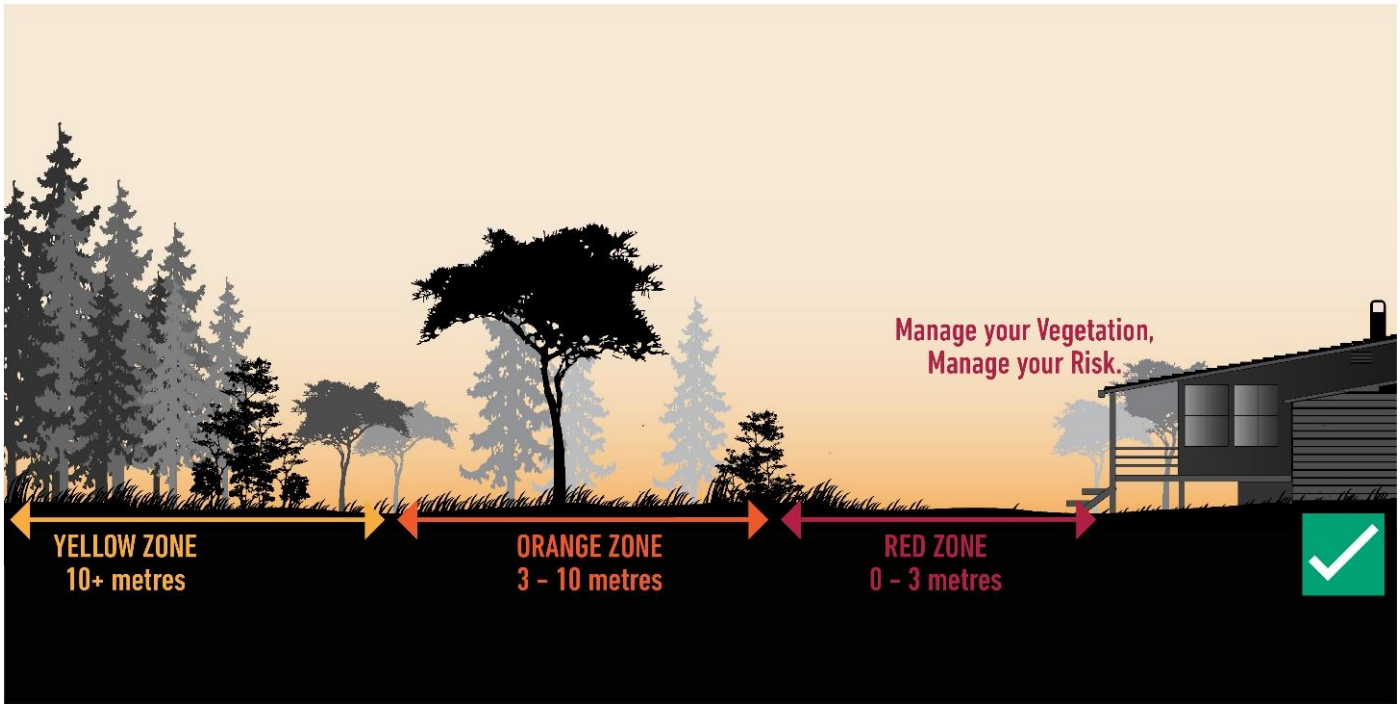
Minimising gaps and areas where dry fuels can accumulate, will significantly increase the structures resistance to ember attack. Paying attention to these vulnerable points around a structure can alert you to an ignition while it is still small, and you can deal with it before it takes hold.

Left: The photograph clearly shows the reality of how many embers are thrown into the air and carried by the wind when vegetation is burning. Embers can originate from fynbos, trees, bushes, burning homes in the form of bark, twigs, wood chips, pinecones, etc. These can burn for long periods of time and are easily carried by the wind, making them ideal carriers of fire.

"In Wildfires, Big Flames Attract Attention But Watch Out for The Embers"

Dr. Jack Cohen, pre-eminent fire scientist

The **Home Ignition Zone** is the area that immediately surrounds a home (or structure) and extends up to 30m out and away from that structure. Ignitions that occur within this zone pose a significant threat and have a high probability of leading to other homes and structures being lost. Once a home ignites a chain reaction can occur as depicted in the illustration to the right. Radiant heat (+ embers) can result in ignitions, even without any direct flame contact.



Critical Zones to Consider in Wildfire Risk Management.

- ***Red Zone*** covers 0 – 3m from the exterior walls of the structure
- ***Orange Zone*** covers 3 – 10m from the exterior walls of the structure
- ***Yellow Zone*** covers the area from 10m out to the perimeter or boundary or at least to 30m.

There will be more discussed about these zones when we get to recommendations within the report.

Structure to Structure Ignitions

The other threat to many structures within a community could come from another adjacent structure (home, shed, office) which catches alight. Once a structure has ignited the radiant heat given off is enough to cause the preheating of fuels (other homes, fences, gardens) close by. A burning structure will also produce significant embers adding to the threat downwind. When one or more structures catch fire, they can cause a chain reaction destroying an entire block or suburb.

This has been experienced on many wildfires around South Africa (and the world). In recent times, examples include entire suburbs (bricks and mortar homes) impacted in the 2017 Knysna Fires, as well as the thatch homes of St Francis Bay. The reality is that structure to structure ignitions is a common occurrence on wildland urban interface incidents throughout the Western Cape and South Africa every fire season.

Image Left (A&B Structures)

Analysis from the Knysna Fires of 2017 gives us an example of a likely structure-to-structure ignition.

Home A was determined to catch fire first due to embers landing in vulnerable areas.

Due to the proximity of Home B and prevailing wind direction, **Home B** likely caught fire and burned down due to a structure-to-structure ignition.

Image Left (B Structure)

With reference to the image above, **Home B** shows the results of exposure to extreme heat from **Home A**.

Despite being made of bricks and mortar, the home was too close to the intense heat of burning structure A. With a distance of less than 30m separating them, it is most likely **Home B** was lost due to a structure-to-structure ignition.

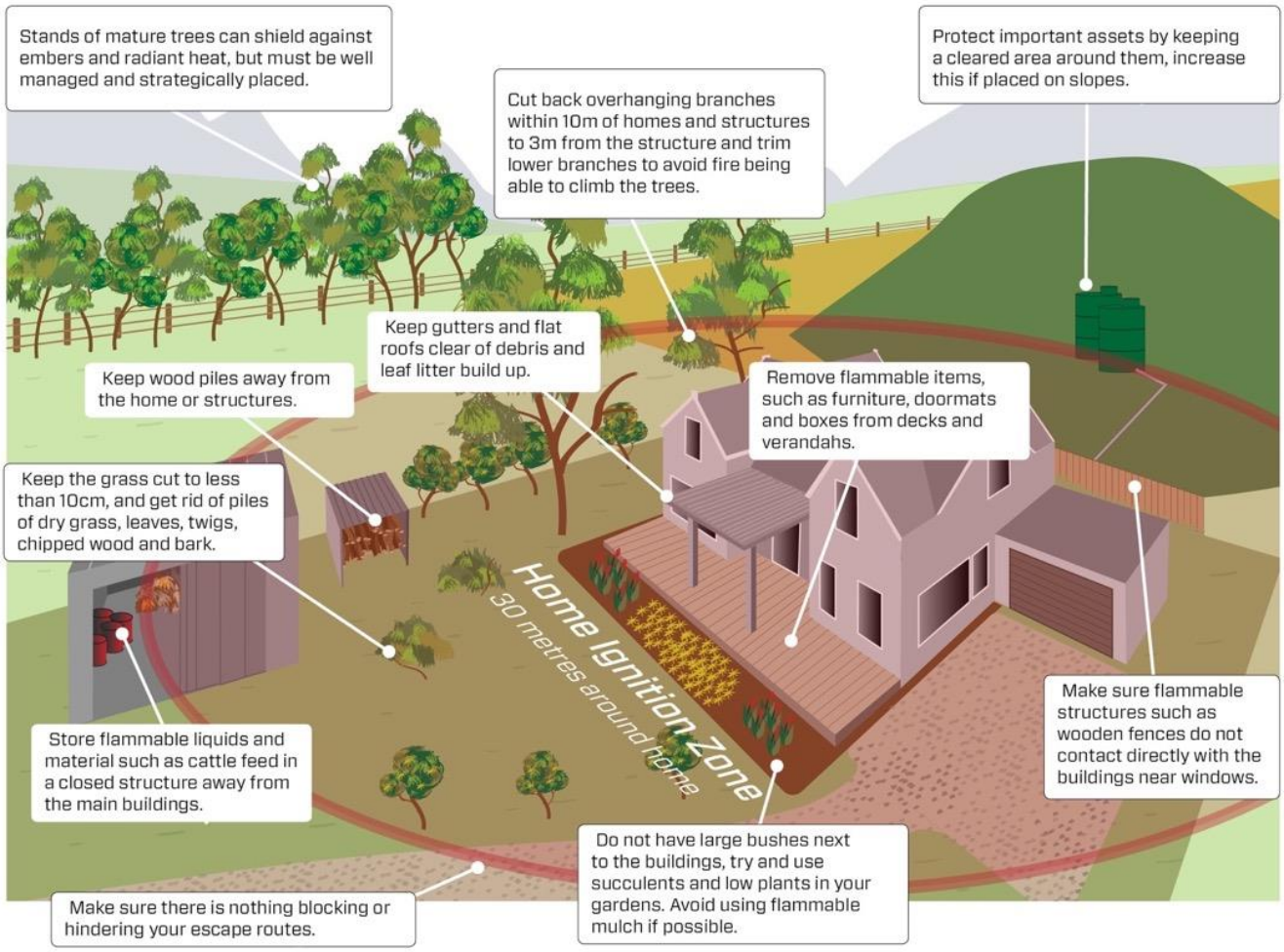
If a home ignites there is often intense focus (tunnel vision) on the burning structure. It is therefore important to understand the potential for even greater loss and to have plans and processes in place of what will be done if this were to occur during an incident. Homeowners, business owners, community members are not firefighters and the greatest action for them comes in form of defence i.e., preparedness.

Taking action to prepare structures from igniting in the first place must be a top priority. Being Wildfire Ready as an owner is further enhanced by the wider community also becoming Wildfire Ready.

Community wide preparedness puts everyone in a better position to withstand wildfires.

Co-existing with wildfire means taking active measures to reduce wildfire risks.

The image below gives an indication of the fine eye for detail that you need to have when you are assessing the wildfire risks around a home or structure. Pay particular attention to the area within the Home Ignition Zone (HIZ), starting there first to reduce the risks. This doesn't mean you can ignore the area beyond 30m, but you can prioritise your HIZ first and then work further outwards, continuing to break fuel paths and reduce ignition potential from embers and heat.

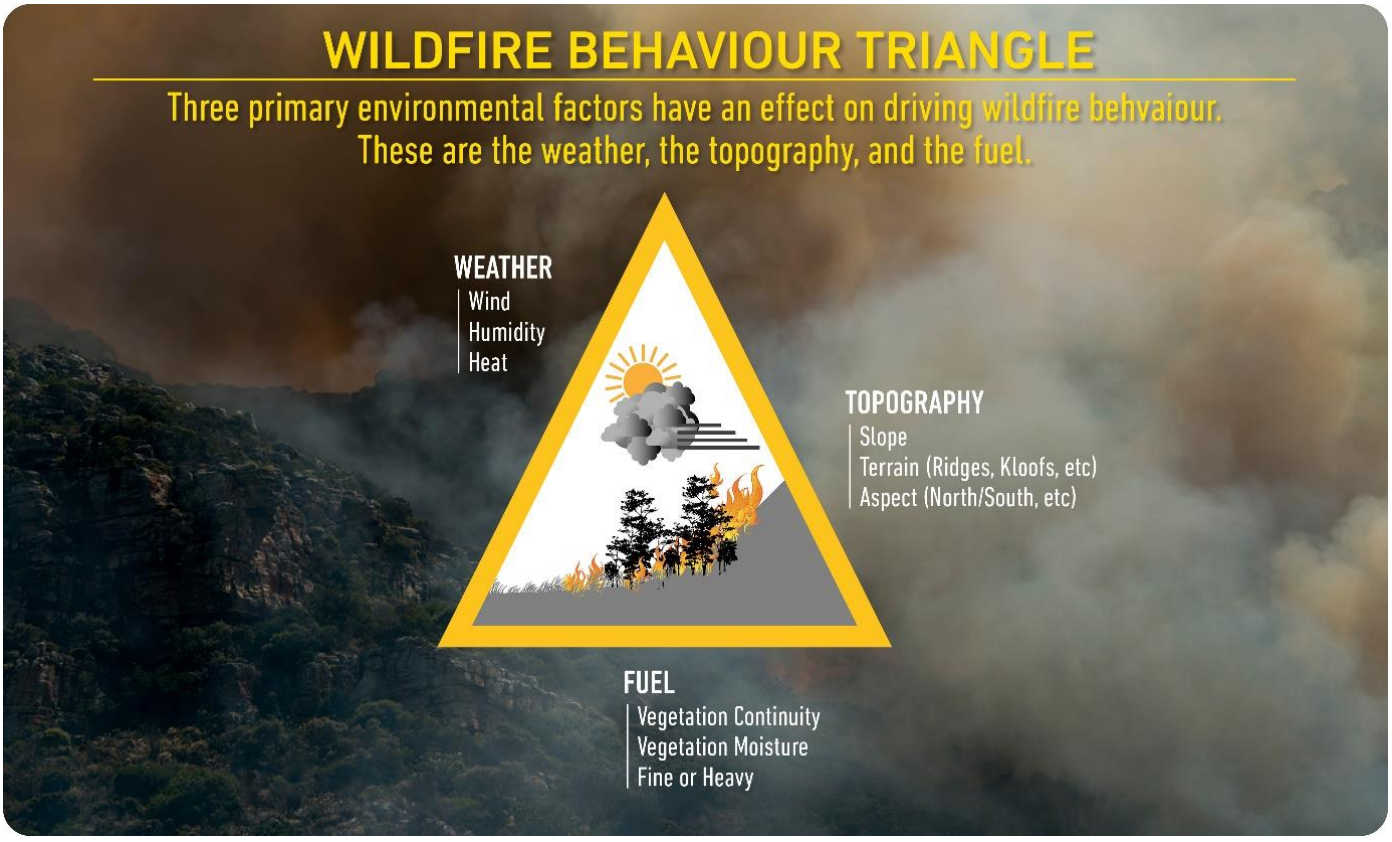


SECTION 1: WILDFIRE ANALYSIS AND RISK RECOMMENDATIONS

Before we discuss the specifics of Simon's Kloof it's important to understand wildfire risk.
To discuss the wildfire environment of Simon's Kloof there are three main factors that need to be considered.

These factors have a combined influence on wildfire behaviour, and they include:

1.1 Fuels
1.2 Topography
1.3 Weather



For this analysis, we will cover the key points within each factor and highlight their relevance to wildfire behaviour or risk. Together, all these factors combine to form a wildfire risk profile for the area and influence life safety and threat to property, infrastructure, assets, and business. We therefore spend time going into detail to explain these different factors.

1. **Wildfire Behaviour Analysis.** Fuels (vegetation), topography, and weather.

*Please Note: This first section provides context for the Simon's Kloof area fuel analysis which has images and specific examples and recommendations. If you wish to read analysis first and then return to these principles it is an acceptable way to navigate this section***.**

1.1 Fuels (Vegetation)

The following terms will be referenced with regards to fuels (vegetation). After the terms are introduced, they are discussed alongside photographs of the Simon's Kloof area.

Types of Fuels

Heavy Fuels: A broad category referring to slower burning fuels. Examples include thick logs or tree trunks. They take more energy (heat) to ignite compared to light fuels, but they take more effort to extinguish once they are burning. Heavy fuels may burn slower in comparison to light fuels, but they burn with significantly more intensity (heat). They also retain a lot of heat for long periods of time compared to lighter fuels.

Light (or Fine) Fuels: A broad category referring to fast burning fuels. Examples include grasses, twigs, and dry pine needles that will ignite very easily. Light fuels are also referred to as tinder. Light fuels take less effort to extinguish once they are burning compared to heavier fuels. The burned area of light fuels will retain less residual heat compared to heavier fuels because most of the fine fuels are consumed in a fire, leaving only ash behind.

Ground Fuels: Situated under the earth (ground). Examples include deep layers of dead leaves, roots, and rotten buried logs, or peat materials (especially found in pine plantations). Burn with low intensity and may become problematic as they carry fire underneath fire breaks and control lines and may smoulder for months.

Surface Fuels: Situated from ground up to about two metres in height. Examples include grass, forest litter, and brush. The fuels where fires usually start. When they exist underneath trees, they are responsible for allowing fires to spread to aerial fuels.

Ladder Fuels: A continuous layering (ladder) of fuels that allows fires to burn from surface to aerial fuels such as branches of trees and tall bushes. Ladder fuels include surface fuels comprised of grasses, bushes, slash, large shrubs, tree bark, fallen dead branches.

Aerial Fuels: These are situated in the overhead canopy of branches and leaves of trees that are two meters or more above ground. Wildfires in aerial fuels are known as crown fires. Crown fires can move extremely quickly and should be considered to be very dangerous. Once the fire is in the crown it can move faster than a ground and surface fire. This is especially true in strong wind conditions where there is a superior supply of air (and therefore oxygen) at the top of the trees. These are known as independent crown fires.

Embers / Firebrands: Spot fires (new fires started by embers) occur when embers, which are burning bits of vegetation (fuel), are carried by winds or by the convectional heat column out of the area of fire and into unburned fuels. The number of embers that can be lifted out of an area of fire can range from a handful up to tens of thousands or millions, dependant on what fuel is burning and what the wind and atmospheric conditions are like. Spot fires are a major hazard when fires reach the Wildland Urban Interface (WUI) as the embers can cause spot fire ignitions deep into the urban area including homes (which are also considered fuel).

Properties or Characteristics of Fuels

Compact Fuels: Fuels that are compact have very little spacing between fuel particles. Closely packed fuel particles expose less surface area to flames and oxygen which are necessary to support combustion. Fires consuming compact fuels spread more slowly than fires in loosely packed fuels.

Loaded Fuels: An area loaded with fuels will cause more combustion to take place. Loading can be measured as the dry weight of the fuel in a given area.

Arrangement of Fuels: The distribution of fuels affects how the fire will spread. Horizontal continuity refers to the horizontal distribution of the fuel (e.g., continuous, patchy, or loose arrangements). A continuous supply of fuel will enable a fire to spread more easily as each collection or item of fuel provides a link from one to the other. Vertical continuity refers to the distribution of fuels from ground, through surface to aerial fuels.

Size and Shape: The size and shape of fuels will impact the surface-area-to-volume ratio. Fuels with high surface-area-to-volume ratios dry and burn more easily than those with low ratios. The size and shape of firebrands, or embers, are also important considerations in predicting the severity of spotting.

Chemical Content: Flammable chemicals within the fuel will cause it to burn more fiercely (e.g., plant resins that are flammable). Fynbos, Renosterveld, and Eucalyptus are examples of fuels with a high chemical content.

Moisture Content: The amount of moisture present in the fuel plays a major role in determining the ignitibility and the rate of spread. As vegetation (fuel) dries out, it becomes more readily ignitable and will burn with greater intensity. Green vegetation, or vegetation having high moisture content is more difficult to ignite and will burn more slowly due to the moisture within the vegetation requiring more heat to evaporate the moisture.

Environmental Factors: These will influence the fuel moisture and these need to be considered as well. The environmental factors are:

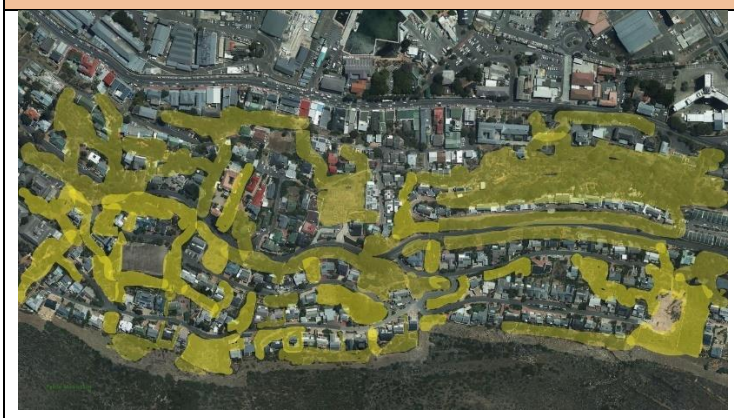
Indirect Influences:

- Time of Day,
- Cloud Cover,
- Fuel Canopy,
- Aspect,
- Slope,
- Elevation,
- Shade Cover

Direct Influences:

- Wind,
- Temperature,
- Relative Humidity,
- Precipitation

Fuel Analysis for Simons Kloof

Vegetation Pathways	
 This is a basic, and not an all-inclusive, analysis but it has been done to demonstrate the possible paths fire could take where there is a continuity of organic fuels.	**Recommendation:** Break the continuity through fuel reduction. Clear underneath trees, remove dead fuels and keep the vegetation in a green, fresh, young state. Fuel moisture levels will drop in summer so irrigation when possible will help. Additionally, it's important to remove dead fuel that has built up on the ground (surface fuels) and in the lower branches of trees and shrubs (ladder fuels). The strategy should focus on breaking the continuous spread of fuel both horizontally (across the ground) and vertically (up into the trees).
	**Recommendation:** Creating paths and maintaining existing paths in areas where there is a lot of flammable material (fuel) is advised. These paths provide access for firefighters should there be a wildfire. The goal is to limit or slow down the spread of fire until they can arrive. If an ember falls into an area surrounded by these paths, ideally only that small area will burn.
	Similarly, consider homes as potential fuel. When homes are close to each other, if one catches fire, it can easily spread to nearby homes. In Simon's Kloof, lines of homes are at risk, especially if a fire starts (from a wildfire or other cause) and there is an easterly or westerly wind blowing. Homes could ignite like dominoes as shown by the highlighted lines. Broad based recommendations for home-to-home ignitions include:

Recommendations:

- **Emergency Access:** Ensure that firefighters have easy access to properties by keeping driveways clear and maintaining adequate space for fire trucks and equipment. Report a home ignition ASAP. They build and grow in intensity and limiting their impact on nearby homes requires emergency resource professionals and their equipment.
- **Create Firebreaks Between Homes:** Ensure there are clear spaces or barriers between homes to prevent fire from spreading from one structure to another.

- **Maintain Defendable Space**: Clear vegetation and other flammable materials from around homes to reduce the risk of fire spreading.

Use Fire-Resistant Materials: Construct homes with fire-resistant materials to decrease the likelihood of ignition.

Install Sprinkler Systems: Consider installing external sprinkler systems to keep the area around homes moist during high fire danger periods.

Regular Maintenance: Regularly clean roofs, gutters, and gardens to remove flammable debris that could ignite.

Community Planning: Work with neighbours and local authorities to develop community-wide fire management plans and ensure everyone is prepared in case of a fire.

Fire Safety Education: Educate residents about fire safety practices and the importance of maintaining their properties to reduce fire risk.

This corridor presents a risk to Simon's Kloof on the western side of the suburb. Consider creating more pathways and segmenting the area.

Pay close attention to removing the buildup of dead fuels. Keeping the suburb connected to nature is important, but this can be done with wildfire-ready principles in mind.

The combination of high continuity plus heavier fuels could be improved by fuel reduction, creating pathways and removing dead fuels. This is on the mountain edge, so it carries a high risk of ignition.

	This is an example of how a pathway onto the firebreak creates a fuel break. However, this pathway is currently overgrown and could be improved by lowering the fuel load and continuity to make it an even better barrier. More of these paths could be added to the greenbelt areas, giving residents more places to walk and enjoy the environment while also helping to lower the fire risk. **Recommendation:** Create new paths in a manageable way, perhaps a few each year, to make the task less daunting.
	In the forefront (green tick), this represents a great defendable space and fuel barrier. Lower down, yellow circle area, this same philosophy has not been adopted. With the fuel load in the area, it is suggested to reduce the fuels to create a similar defendable space.
	As Simon's Kloof is situated on a steep slope, pay careful attention to all homes with a vegetation pathway below them, as seen in this example. This threat exists when a wildfire's ember lands in the area, but also from other ignition sources such as a spark from grinding, an electrical fire, or a car catching fire and setting the bush alight (Many possibilities exist). Fanned by a strong wind and the combined effect of the slope, a fire can build in intensity very quickly and compromise the home. Note how heat, embers, and fire would directly hit the overhanging roof and balcony area of the home, concentrating heat and having a high probability of igniting.

	Heavy fuels and high continuity exist in the fuel pathway to and around the suburbs underground reservoir.
	The steep slope and abundant fuels present a risk to these homes. Reducing dead fuels and carefully breaking the fuel continuity can be achieved while still maintaining the aesthetic and appeal of a green suburb. By selectively clearing dead vegetation and creating strategic breaks in fuel continuity, the risk of fire can be significantly reduced without compromising the natural beauty and greenery of the area. This approach ensures both safety and environmental enjoyment for residents.

Vacant Properties

Dangers of Vacant Overgrown Properties

***Increased Fire Risk**:* Overgrown properties with dry vegetation and debris can serve as a significant fuel source for fires. If a fire starts in such an area, it can spread rapidly to neighbouring homes and suburbs, especially during hot, dry, and windy conditions.

Fuel for Fire Spread: Dense, unmaintained vegetation can create a continuous fuel bed that allows fire to travel quickly and easily. This can lead to larger and more intense fires that are harder to control.

Obstructed Access for Firefighters: Overgrown properties can obstruct access routes for firefighting efforts, making it more difficult for firefighters to reach and effectively combat fires in these areas.

Increased Ember Production: Fires in overgrown areas can produce a large number of embers, which can be carried by the wind and ignite neighbouring properties, even those some distance away.

Health and Safety Hazards: Overgrown properties can also harbour pests and become dumping grounds for waste, posing additional health and safety risks to nearby residents.

Exacerbation by Invasive Alien Vegetation

Higher Flammability: Invasive alien plants often have higher flammability than native species. They can contain oils, resins, and other compounds that ignite more easily and burn more intensely as they are often heavier fuels especially when compared to fynbos.

Increased Fuel Load: Invasive species can grow rapidly and densely, outcompeting native vegetation and increasing the overall fuel load. This leads to a greater volume of combustible material that can feed a fire.

Disruption of Natural Fire Regimes: Invasive plants can alter the natural fire regimes of an area, increasing the frequency and intensity of fires. This disrupts the ecological balance and makes the environment more fire-prone.

Difficult Eradication: Once established, invasive alien vegetation can be difficult and costly to remove. Their resilience and rapid growth make them a persistent threat to fire safety.

Overall Impact on Neighbours and Suburbs:

Greater Spread of Fire: The combination of dense overgrowth and invasive vegetation creates an ideal environment for fires to spread quickly from vacant properties to neighbouring homes and suburbs.

Increased Fire Intensity: Fires burning through invasive vegetation can be more intense and harder to control, posing greater risks to people, properties, and infrastructure.

Higher Suppression Costs: Firefighting efforts become more challenging and expensive due to the increased fuel load and difficulty in accessing overgrown areas.

General Mitigation Measures:

Regular Maintenance: Ensure that vacant properties are regularly maintained, with vegetation trimmed and debris removed.

Control of Invasive Species: Implement programs to identify and remove invasive alien vegetation, replacing it with fire-resistant native plants.

Community Cooperation: Encourage community efforts to maintain properties and manage vegetation collectively to reduce overall fire risk.

The continuous vegetation provides a pathway through the homes to the road.

Reduce this continuity, especially before the summer months and consider segmenting the property with fuel breaks within its footprint to limit fire spread should an area catch alight.

	This is the eastern edge of Simon's Kloof where the vacant land from the neighbour suburb is overgrown. This overgrown region is placing Simon's Kloof at risk and needs to be addressed. In the forefront is a great example where fuel has been reduced compared to the property highlighted by the yellow circle.
	Yellow Circles: Remove dead fuels – these pose a risk to ignition and spreading embers to neighbouring homes. **Recommendation:** Simon's Kloof should consider implementing a policy where all dead fuels are removed in a spring cleaning month. Collectively work as a community or co-fund a team to come and remove all dead and cleared fuels. X: There is evidence that the invasive alien vegetation was cleared but not poisoned, resulting in regrowth. If you invest in clearing invasive plants, also invest in a maintenance plan (such as using poison to prevent regrowth) to ensure your clearing investment is not quickly compromised.
	If this area is not cleared again before summer, a wildfire could ignite in this vegetation or fire could easily spread into this area and compromise the homes on the right of this image. Especially with an easterly wind direction. Wooden fences, gates, and other wooden structures increase wildfire risk, especially if not well-maintained. To mitigate this risk, consider replacing wooden elements with non-combustible materials, and/or ensure gardens and vegetation are properly managed and kept clear of flammable structures. Regular maintenance and strategic landscaping can significantly reduce the likelihood of ignition and fire spread.

	This graphic shows dry, light fuels that can carry fire into larger bushes, putting the home at risk, especially with a westerly wind. Reduce fuels and create defendable space around the home to minimise risk.
	Dead, dry fuels need to be removed. It's great the property has been cleared but the remaining fuels still pose a risk. General tidy-up is required.
	These fuels are nice and green now, but come summer, growth will create a dry vegetation corridor that could spread fire. Reduce this fuel load and break the continuity.

Vegetation and Fuel Observations

This basic report, while detailed, did not assess all vegetation areas and homes comprehensively, but we have compiled a list of vegetation observations and home vulnerabilities. We hope these guidelines will help you apply wildfire safety principles across the entire suburb.

	Pines drop needles that often blow and collect in gutters and on homes. Embers landing there can ignite the needles, especially if they have dried over time. Additionally, there is ladder fuel from the ground into the trees, which can exacerbate the problem. Large fuel buildup between homes also poses a significant risk. To mitigate these dangers, reduce fuel continuity and remove invasive trees.
	While there are no ladder fuels below the tree, the pine needles blown into gutters and roof spaces put the nearby homes in the area at risk. Trees like this can still catch fire if an ember lands in the wrong spot, and then throw embers over large distances in strong winds. Given its location on the firebreak, this tree is a high-risk fuel. Consider removing. The protea bushes, due to their location and high chance of ignition, also pose a significant risk for fires and embers. Consider reducing the continuity of these bushes.
	Trim dead ladder fuels on the tree. Additionally, this is a pine, which is a high-risk fuel and should be considered for removal. **Recommendation:** To preserve the environment, whenever removing a large alien tree, replace it with a less fire-prone indigenous species.

	**Remove all alien invasives where possible.** The top 10 invasive alien plants affecting the Western Cape, (many of which are present in Simon's Kloof include): Rooikrans, Black wattle, Port Jackson, Silky hakea, Long-leafed wattle, Stinkbean, Australian myrtle, Spider gum, Cluster pine, Blackwood. The high fire risk posed by these species needs to be considered in invasive plant clearing efforts: Pinus radiata, Eucalyptus camaldulensis, Acacia mearnsii, Acacia melanoxylon, Pinus pinaster, Acacia cyclops, Cestrum laevigatum. Australian Acacia and Eucalyptus species increasing the amount of fuel available to burn, the fires become more intense and more difficult to control.
	Palm trees, especially the dead leaves collecting at the base (red arrow), are incredibly high-risk trees in the Wildland-Urban Interface (WUI). They catch fire easily and spread embers prolifically, endangering not only the homeowner's house but also the neighbours' homes. Palms in wildfire risk areas such as Simon's Kloof should be extremely well maintained (no dead leaves), but our recommendation is to always remove them as they pose such a high risk to homes, especially those on the firebreak edge.
	Example of dead fuel loading in bushes that can be removed to reduce ignition probability and fire intensity: Removing dead branches, leaves, and other debris from bushes significantly lowers the chances of a fire starting and spreading, thereby protecting nearby structures.

	Same comment as above.
	Fires occurring below homes on a slope can intensify rapidly and directly threaten homes upslope. To mitigate this risk, it's crucial to reduce fuel continuity and establish defensible space around homes. Residents with top and bottom boundaries should treat both sides with equal care. The wildfire threat doesn't just come from the mountain above, winds can swirl and cause spot fires below, with fire then running upslope. Fires can also originate from below caused by home ignitions, or other sources etc. On slopes, flammable debris and vegetation create pathways for fires to climb and compromise homes. This not only endangers the resident's own property but also threatens the homes beside them, especially under windy conditions that can drive flames. Proper maintenance of both top and bottom boundaries is essential to mitigate these risks and protect the community from wildfire spread.

	Remove dead fuels an create spaces void of fuels around bushes.
	The arrows indicate a valley that will funnel fire moving upwards, increasing intensity and posing a greater threat to homes located above. Slope, fuel load, and if the wind direction is upslope, will all combine to compromise the homes uphill. Thin out the fuels and continuity of fuels dramatically in a valley.
	Circle: Fine fuels—ignite easily and can spread fire into bushes. Remove finer fuels and clear around bushes to reduce fire risk.

	Remove dead trees. They are extremely prone to catching fire from embers. When burning, they pose a risk by throwing embers carried by the wind into roofs, homes, and surrounding brush, increasing the fire hazard significantly.
	Remove dead fuels, and thin out fuels to reduce horizontal and vertical continuity.
	Wooden fences connected to homes pose a significant risk for structure ignitions. This risk is exacerbated by the thick and dry vegetation surrounding the fence, making it prone to ignition. Mitigation suggestion: Consider replacing wooden fences connected to homes with non-combustible materials such as metal or masonry. Alternatively, well-maintained wood is lower risk compared to poorly maintained wood. Regularly inspect and treat wooden fences connected to homes with fire-retardant coatings or treatments to enhance their fire resistance. Ensure that vegetation near the fence is regularly maintained and kept at a safe distance to reduce the risk of fire spreading to the home.

	Pay close attention to what is under bushes and shrubs. Clearing dead fuels and cutting lower hanging branches can significantly reduce the ignition risk in areas like this.
	Same comment as above.
	Don’t leave cut fuel among gardens and open areas. Remove all dead fuels promptly as they dry out and pose a significant ignition risk.

	Wood chip piles are extremely dangerous in wildfire-prone areas. They burn hot, produce embers, and are extremely difficult to extinguish. In erratic winds, embers can blow all over, spreading the fire unpredictably. Never leave wood chip piles exposed in wildfire-prone areas. Equally, dead a rotting stumps as shown here pose a similar high risk.
	Dead, dry cuttings, high risk. Remove.
	Fine fuels pathway into heavier fuels of trees. Reduce continuity.

	Dead, cut fuels stacked right next to home. High risk. Remove.
	Palm, high risk. Lots of dead fuel build up needs to be removed from area.
	Same comment as above. Also, note dead lower limbs of trees need to be cut and removed.

	Reduce continuity, especially noting the presence of large gum trees known for shedding high amounts of flammable fuels. Hidden beneath these bushes, there is likely a substantial buildup that needs clearing to lower the fire risk in this area.
	Nearby the gum trees, there is significant new growth that needs to be removed. With such high fuel loading, these trees will be extremely volatile if they catch fire.

Home Vulnerabilities	
	Wooden fences and gates pose a risk to structures, especially where vegetation touches or has built up around them. During summer maintenance is crucial to clear away accumulated dead matter which can collect and potentially ignite if an ember lands there.
	Pine trees, needle build up in gutters, roof spaces etc and compromises surrounding homes.
	High continuity of fuels around homes a high risk.

	Vertical continuity of vegetation close to home.
	Thick bushes along the firebreak are positioned close to windows, as indicated by the arrows. If these bushes were to catch fire, the intense radiant heat could easily break windows and ignite curtains. In some cases, windows may not break, but the heat can still penetrate the glass. Double-pane windows provide additional protection but are not foolproof. It's important to be mindful of dry curtains during wildfires. Pay close attention to the proximity of vegetation below and at the level of windows to minimise the risk of fire spreading to homes. Regularly maintaining defensible space around windows and keeping curtains and other flammable materials away from potential ignition sources is essential for fire safety.
	If bushes ignite close to homes, they pose a significant risk to those homes. If a home ignites, there is a chain reaction risk for neighbouring homes in close proximity, as illustrated here. This risk is heightened during strong winds, which can rapidly spread fire from one home to another.

	Vegetation at the same height as homes poses a high risk if ignited. Strong winds can push heat into the home, increasing the likelihood of fire spreading and causing damage. It's critical to manage vegetation around homes to reduce this risk, especially during periods of high fire danger.
	High fuel loading between homes increases chance of home to home ignition.
	Trees growing close to roofs can drop debris, such as leaves and branches, which collects and dries in roof spaces. Roofs are commonly the most vulnerable part of a home to wildfire ignition because of factors like this. Recommendation: Cut back vegetation to reduce fuel accumulation near roofs and gutters. Regularly clean roofs and gutters to remove flammable debris and reduce the risk of wildfire ignition.

	Good example of defendable space. However, it can be improved, especially with large trees nearby. Ensure these trees do not catch fire by trimming branches and ensuring there is no buildup of bushes and fine fuels beneath them. Maintaining this area clear of flammable materials helps create a more effective defendable space around the home.

Firebreaks as Vegetation (Fuel) Management

Wildfire safety and property protection is optimised when all landowners work together to prepare for wildfires, introduce vegetation management strategies and have clear plans in place to attempt to limit the spread of fire on their properties.

In terms of the National Veld and Forest Fire Act No.101 of 1998 landowners are responsible for taking actions to prepare and respond to wildfires. Table Mountain National Park, City of Cape Town, and the South African Navy are all considered landowners in the Simon's Kloof area and have a responsibility to maintain firebreaks and have resources in place to manage wildfires. If Simon's Kloof is concerned about firebreak maintenance, we suggest contacting the Cape Peninsula Fire Protection Association. They collaborate with all landowners in your area and can facilitate communication to address any concerns or questions you may have.

During our evaluation, we observed that a recent fire has impacted the area. An assessment of the firebreak's suitability will need to be conducted in future years as regrowth occurs. However, we noted some inconsistencies and vulnerable areas in the firebreak. These issues should be taken into consideration in the reestablishment and future maintenance of the firebreak running above Simon's Kloof and neighbouring suburbs. Improvements and recommendations, with accompanying images, follow further within this section.

The Cape Peninsula Fire Protection Association (CPFPA)
Ruan Matthee - General & East Ward Manager
Ruan can be contacted on gmanager@cpfpa.org / eastmanager@cpfpa.org.za
Website: https://cpfpa.org.za/

Compliance with the National Veld and Forest Fire Act, 1998
If there is an injury or loss of life, damage to property or assets, or spread of fire from a property to a neighbouring property there is most likely going to be an investigation of some kind. One of the key areas examined will be compliance with the National Veld and Forest Fire Act, 1998. The act looks at steps to deal with fire on property but also has a large focus on controlling measures and procedures to prevent the spread of fire. Chapter 4 of the National Veld and Forest Fire Act, 1998 places a duty on landowners to prepare and maintain Firebreaks.

Included below are key exerts from the National Veld and Forest Fire Act, 1998.

"12. (1) Every owner on whose land a veldfire may start or burn or from whose land it may spread must prepare and maintain a Firebreak on his or her side of the boundary between his or her land and any adjoining land.

Requirements for Firebreaks

13. An owner who is obliged to prepare and maintain a Firebreak must ensure that, with due regard to the weather, climate, terrain and vegetation of the area—

(a) it is wide enough and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land;

(b) it does not cause soil erosion; and

(c) it is reasonably free of inflammable material capable of carrying a veldfire across it.

[Section 13 came into effect on 2 July 1999]"

External (Neighbouring Property) Firebreaks

In terms of Simon's Kloof suburb neighbouring properties which may include private, municipal, or state landowners you will need to discuss your concerns with them and motivate them to be proactive in creating and maintaining firebreaks as well as applying other risk reduction measures to prepare and respond to wildfire risks. As mentioned the CPFPA should be your first contact in trying to reach out to these landowners.

Firebreak Maintenance

Firebreaks will still need a maintenance plan, they are always in some stage or growth. To retain the integrity of firebreaks it is essential to maintain them regularly. There are different factors which will affect the growth of vegetation returning to a firebreak that has been cleared. All breaks should undergo an annual assessment to determine their suitability for each upcoming fire season. Regular maintenance of a firebreak is going to ensure it is effective and it is much easier and less costly than reinstating a break after years of growth.

Fire Break Analysis Simons Kloof	
	There is a good firebreak along the top of the suburb but consider a firebreak down the western side as there is a clear fuel pathway coming down from the mountain. This landowner needs to ensure there is a break against the homes.

<table>
<tr>
<td> 
</td>
<td>1. The firebreak line could straightened as per the dotted line. Bends in firebreak lines often present as weak points when defending these areas during wildfires.
2. Fuel loading is high and places within the firebreak. This needs to be reduced before summer 2024.
3. Dead fuels within the firebreak. The suggestion would be for the landowner to conduct fuel reduction burning during the winter months and also while the surrounding mountain vegetation is in a young state after the recent fire.
4. Homeowners would be wise to reduce heavy fuels, especially beneath these trees if they are not removed.</td>
</tr>
<tr>
<td>  </td>
<td>As per point 3 above, dead fuels in firebreak are problematic and could be dealt with by burning.

Thick logs might be hard to burn and may help with erosion so these could remain if they are placed correctly.</td>
</tr>
<tr>
<td>  </td>
<td>Orange line: This straight line will assist firefighters in defending this area effectively. The firebreak seems a sufficient size between mountains and homes. (Based on current fuel loads)

Yellow circles: Dead fuels within the break should either be burned or positioned at the upper edge to aid in erosion control. If they cannot be relocated, ensure they are placed securely to avoid compromising the break and prevent them from rolling downhill in case the ground becomes unstable during a fire.</td>
</tr>
</table>

Firebreak bends create difficulty for firefighters to defend this area. See the image and comment below.

It must be noted that this is a well-constructed and maintained firebreak. These suggestions are simply enhancements:

The X areas indicate where the firebreak could be optimised by straightening the line and removing vegetation below the red section marked on the white line to eliminate jagged corners.

The Yellow circles highlight areas where fuel along or inside the firebreak is compromising its effectiveness. Landowners should either reduce garden vegetation continuity, or these areas need to be cut as part of the firebreak.

	These heavy fuel areas along the firebreak compromise the area, and put firefighters at risk, and homes at risk.
	This shows a narrow part of the firebreak on one of the jagged corners. A combination of fuel in the break and the corner makes this a vulnerable location which can be improved.
	Remove dead tree on firebreak. High risk to homes as will catch alight easily and throw embers into the wind.

	Protea bush in the garden along the firebreak is an ignition and ember risk.
	Pine trees along the break are an added risk for fuel and embers blowing in the wind.
	This area provides a great access point for firefighters to the firebreak. Ensure the area remains well maintained otherwise, this could become a fuel pathway into the suburb as indicated by the arrows.

	Wooden fences and unmaintained gardens are at particular risk along the break.
	This fuel corridor right against the homes poses a great risk to these homes. Even with a firebreak, it will be vulnerable to embers.
	Consider removing the pine tree. As stated before, poses a risk.

	Overgrown property and Pine Trees pose a risk. Clearing is advised.
	Neighbouring Suburb is posing a risk to Simon's Kloof on the eastern edge.
	Vegetation risk along the firebreak puts homes in a compromised position.

1.2 Topography

In the wildfire environment topography plays an integral part in determining how a fire will develop and spread across a landscape. Topography can be described as the configuration of the Earth's surface, including its relief (the variations in the elevation of the ground surface) and position of natural and man-made features (such as buildings), arranged across the landscape.

Topography can be broken up into two primary categories: these being topographic features and topographic characteristics.

Topographic Features

Narrow Valleys: These will often appear perpendicular to a ridge line of a hill or mountain. The impact that a narrow valley will have on a wildfire and fire burning into it is directly linked to the way air will move vertically through the valley. Narrow valleys are also susceptible to the spread of fire from one side of the valley to another through spotting or radiant heat raising the temperature of the fuels and bringing them to a pyrolysis and combustion point.

Wide Valleys: The likelihood of spotting (new fires from embers) or radiant heat resulting in fire spread to opposite slopes in a wide valley is lower compared to narrow valleys. The exception to this is in high winds and also dependent on the fuel type. (Wind direction might push the fire from one side to the other). The principles of air flow and therefore fire spread that apply in a narrow valley will still apply, although the impact of many of these effects will be drastically reduced and may even be insignificant. Wide valleys may also be more prone to prevailing winds and the effect the wind has when it swirls over ridge lines into the valley.

Box Valleys: These are determined by their shape and not their size, as a box valley can exist as a relatively small area of landscape or a much larger one. The smaller a box valley is, the more intense the effect of the topography will be on the weather and wind. Box valleys are essentially a steep-sided valley that is enclosed on all or three of the sides. The effect of the 'box' on fire behaviour is that fire moving into a box valley will likely be drawn further along and up as the winds are drawn up and over the ridge lines. A fire burning within a box valley that is enclosed on all sides may burn around the valley in a circular movement, and the hazard of there being only one route out, the exit route, should always be considered.

Chimneys: Sometimes also called a 'Kloof' in South Africa, these are very narrow topographic features that have three walls that form a steep and narrow chimney, chute, or ravine. The effect of fire in this feature is the same as that of a narrow valley but will potentially be more extreme, with a very fast rate of spread when moving up the chimney. The same acceleration of wind happens in a chimney, and therefore the same acceleration of fire spread will occur. Upslope convectional preheating and cross-valley radiant heating that will occur. These are extremely dangerous features to be in or close to when fire is moving through the landscape and are best avoided. If there is fire burning into the base of a chimney anticipate a huge increase in the rate of spread up the chimney.

Dominant Ridge: Forms a prominent skyline feature and may have one or more spur ridges that connect to it.
Spur Ridge: A small ridge which extends finger-like from a main ridge.
Flat Ridge: Has terrain that slopes down gently from one or both sides of the ridgeline
Knife Ridge: Has steep slopes that extend down both sides of the ridgeline.

Ridge Influence on Fire Behaviour: When fires reach a ridgeline, the rate of spread often slows as it encounters an opposing upslope airflow from the other side of the ridge. This effect can slow the fire spread

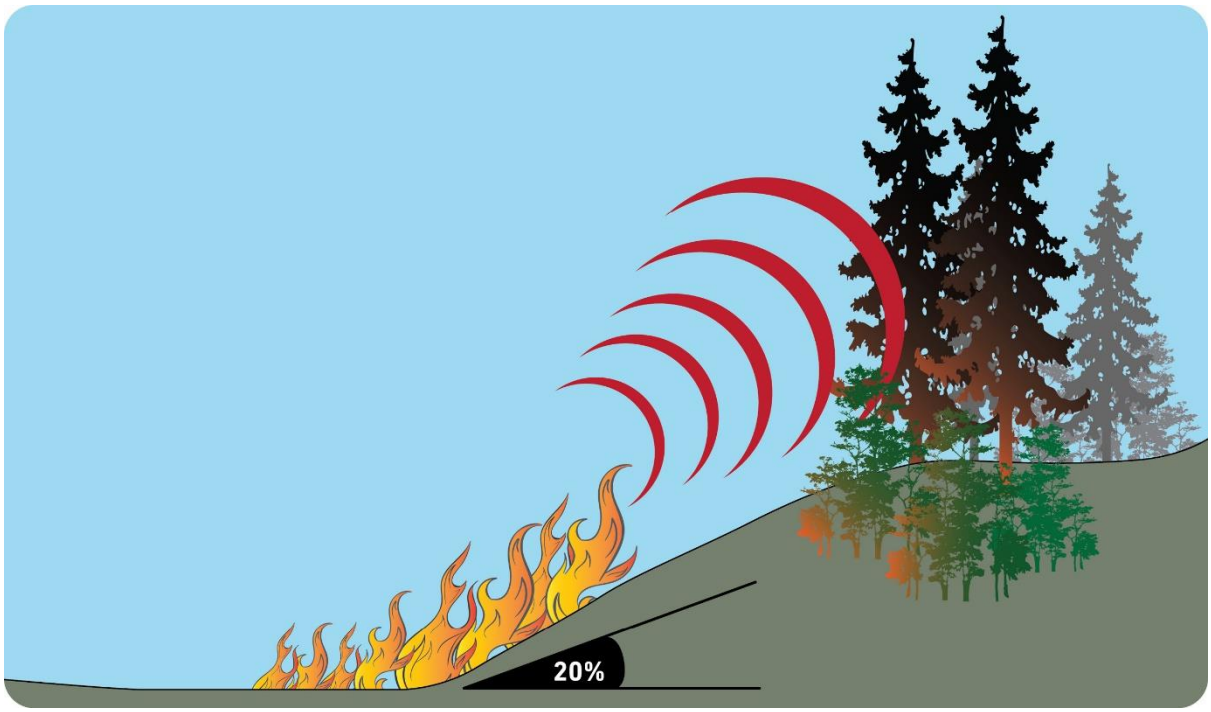
and limit spotting concerns on the opposite slope. However, the effect of erratic winds caused by various winds converging at the ridgetop can change fire behaviour. This is especially likely if the winds on one side of the ridge are stronger than the other.

Saddle: Depression or pass in a ridgeline. A saddle has the same effect on air movement through it that of a chimney or narrow valley. The wind will increase in speed and strength as it moves through the constricted area of topography and once through the saddle, which can be a short distance, the wind will spread out and slow down again on the downwind side. The effect of this feature on fire behaviour will be that of accelerated fire spread and intensity and even a change of direction at times.

Topographic Characteristics

The Slope: The percentage change in the elevation over a certain distance. This percentage describes how steep a slope will be. The steepness can also affect the kind and density of the fuel that exists on the slope and steepness will lead to increased rates of fire spread. Fire spreads uphill the quickest and statistically, fires that begin at the base of slopes have become the largest fires. The slope directly affects the preheating rate of the fuels, as the steeper the slope the more the convective heat column is combined with radiant heat spread and the closer this is brought to the upslope fuels. The rate of spread up a slope is exponential, and the following is a guide:

- 0 – 20% results in a determined flame height and a rate of spread.
- 20 – 40% results in an increase of 2 x flame height and 4 x rate of spread.
- 40 – 60% results in 2.5 x flame height and 8 x rate of spread.
- 60 – 80% results in 3 x flame height and 14 x rate of spread.



The **trench effect** is a combination of circumstances that can rush a fire up an inclined surface. It depends on two well-understood but separate ideas: the Coandă effect from fluid dynamics and the flashover concept from fire dynamics.

The **Coandă effect** is the tendency of a fast stream of gases to bend towards, and adhere to, nearby surfaces. The stream's static pressure tends to decrease, which creates a pressure difference between the surface and areas far from it. This bends the stream towards the surface and tends to keep it attached to that surface.

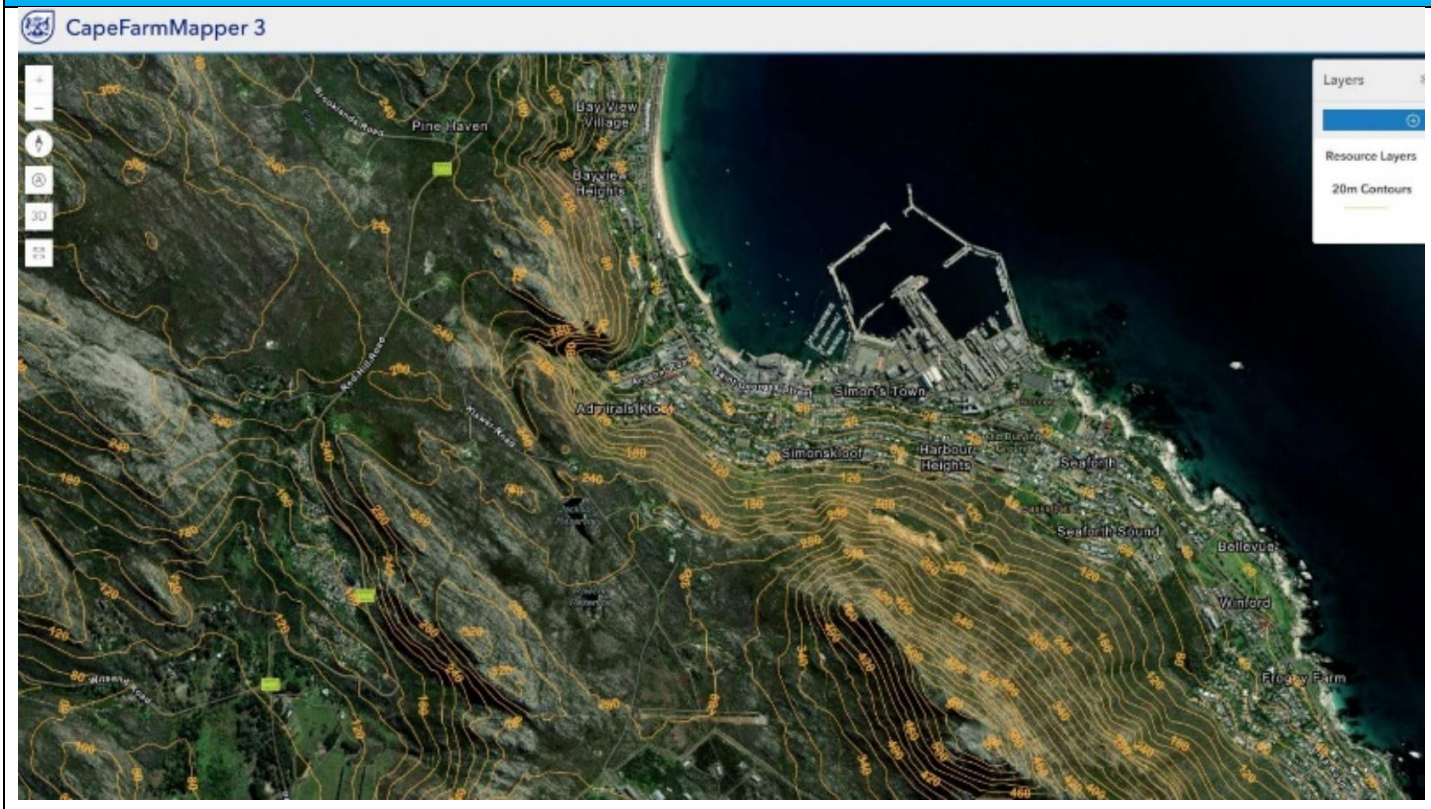
Flashover is a sudden widespread fire, which occurs when most surfaces in a space are heated until they emit flammable gases hot enough to auto-ignite. Before flashover, flammable gases may be emitted but are too cool to ignite.

Aspect of a Slope: This is the cardinal (compass) direction towards which a slope is facing. The aspect will determine the amount of heat that the slope receives from the sun and that will determine the kind and density of fuel that will exist on it.
In the southern hemisphere, the north and northwest slopes are the most critical in terms of the ease of ignition and initial spread of a wildfire. This is because they are exposed to more direct sunlight and will typically have lighter and more sparse fuels, higher temperatures, lower humidity, and a lower overall fuel moisture.

The south and southeast facing slopes will be critical in the carrying and intensifying of a wildfire, (depending on the weather conditions and fuel kind). As they are more shaded, they will generally have heavier fuels. It's true that it will take more energy to ignite these areas compared to finer fuels, however the fuels situated in these areas are heavier and will burn with higher intensity and take a long time to reduce in intensity.

Topography Analysis for Simons Kloof

Topography



Being situated on a steep mountain slope edge, even near the bottom, can put a suburb at risk to wildfire.

The steep slopes can accelerate the spread of wildfires. Flames move uphill more rapidly due to preheating of fuels and increased airflow. This rapid spread can make it challenging for firefighters to contain the fire.

On steep slopes, fires can generate intense heat, creating strong updrafts that can carry embers long distances. These embers can ignite spot fires ahead of the main fire front, making it difficult to predict and control the fire's spread.

Steep slopes may limit access for firefighting equipment and personnel. Evacuation routes can also be compromised if roads are narrow, winding, or prone to debris flow after fires or heavy rain.

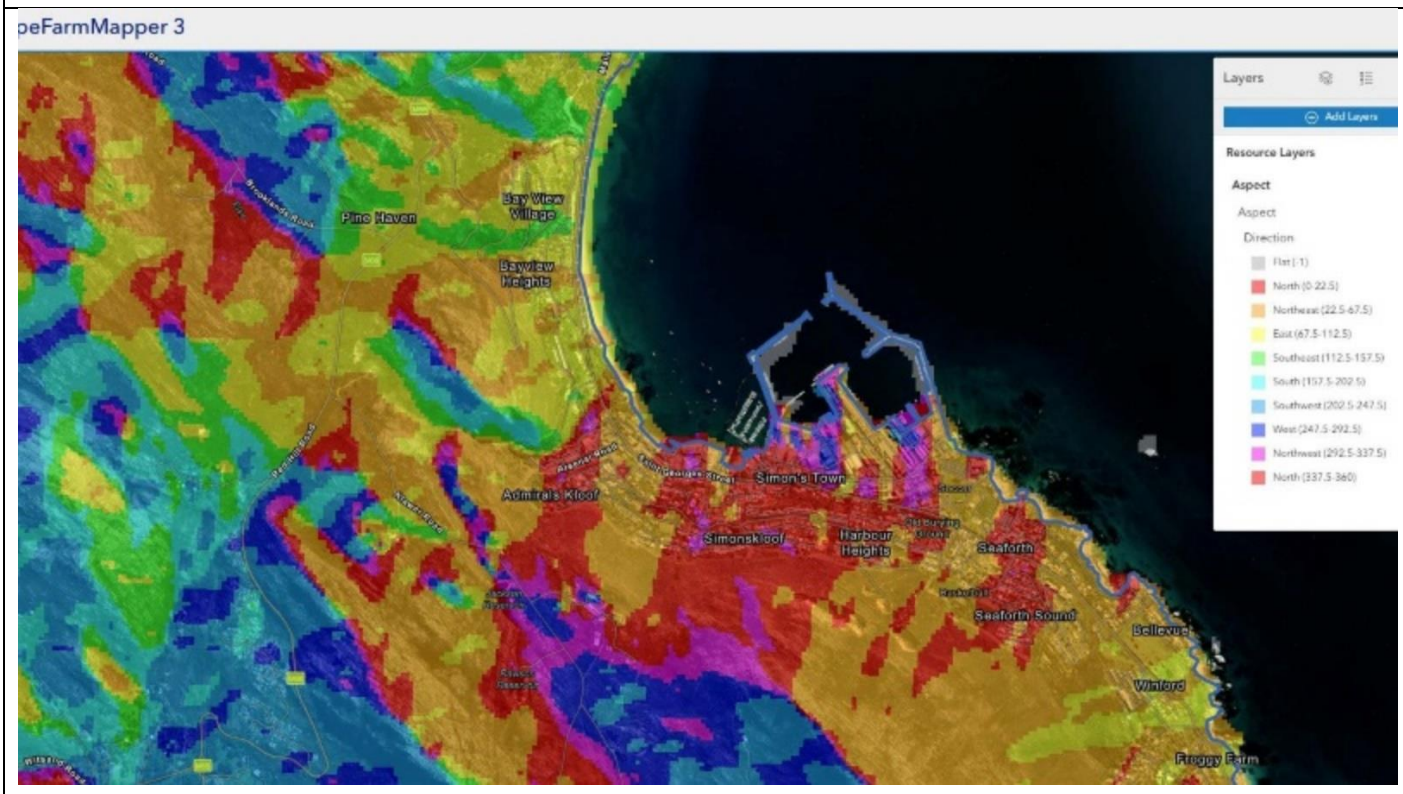
Vegetation on steep slopes can have continuous fuel beds, allowing fire to spread rapidly from one area to another. Dense vegetation can also contribute to fire intensity and spotting.

Wind patterns can be amplified on steep slopes, further influencing fire behaviour and spread. Wind-driven fires are harder to control and can quickly change direction, posing additional risks to nearby suburbs.

On steep slopes, embers can easily ignite vegetation or structures downhill, posing a direct threat to the suburb.

Wildfires can destabilize the soil and increase the risk of erosion, mudslides, and debris flows, especially on steep slopes. This can further impact infrastructure and compromise recovery efforts.

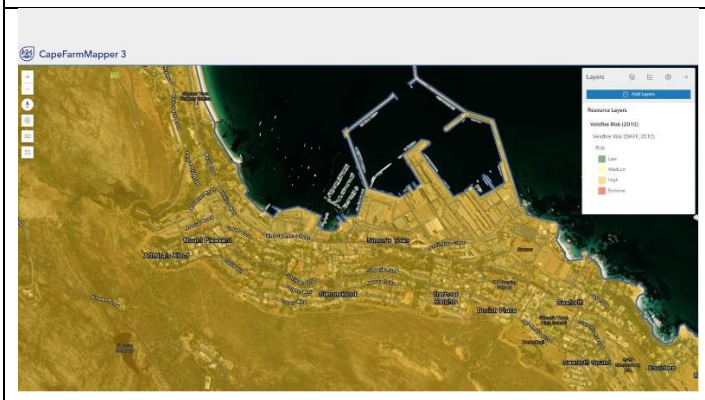
Overall, the combination of steep terrain, rapid fire spread, ember attacks, and limited access can significantly increase the vulnerability of suburbs situated on steep mountain slopes to wildfire.



Simon’s Kloof is in a band of North and Northeast Aspect shown in red and orange.

Solar Exposure: North and Northeast aspects receive more direct sunlight in the Southern Hemisphere, leading to quicker drying of vegetation. This increases fuel availability and flammability during dry periods.

Fire Behaviour: These aspects can experience more intense fire behaviour due to enhanced solar exposure and wind dynamics. Fires can spread rapidly upslope, driven by preheating of fuels and increased airflow.

Fuel Moisture: Vegetation on North and Northeast aspects dries out faster due to direct sunlight exposure. Dry vegetation burns more readily, contributing to increased fire intensity and the potential for ember showers.	
	Veldfire Risk DAFF 2010 puts Simon's Kloof in an Orange "High" risk area.
	Box Valley - Admirals Kloof Area A box valley with steep slopes presents several dangers, including rapid fire spread, limited access, terrain instability, and ember transport. Steep Slope – High risks as explained.

1.3 Weather

The weather is the main influencer on wildfire and is often the key component of why problematic fire behaviour will occur. The other factors of fuel and topography will of course have a role to play and impact the fire behaviour and rate of spread (ROS), but it is the weather (and wind) that is the primary driver of fire behaviour.

Weather on the day affects fire behaviour, but the weather leading up to the day also factors into how the fire will burn. In the context of wildfire management, the weather that has an impact on the fire behaviour and is conducive to the ignition and spread of wildfire is termed 'fire weather'. There are several elements of weather that must be considered, and they are:

- Temperature
- Wind
- The Stability of the Atmosphere
- Relative Humidity
- Precipitation
- Cloud development
- In addition, drought, which is the result of certain weather conditions must also be considered (when it is taking place).

It is important to recognise that weather conditions will have an impact on the environment surrounding the fire and on the fire behaviour. High temperatures, low humidity and strong or shifting winds are a recipe for more extreme fire behaviour. These environmental changes can occur over relatively short periods of time. For example, cool temperatures, high humidity a stable atmosphere and light winds may be present in the morning but by mid-afternoon an approaching front may push higher temperatures, lower humidity an unstable atmosphere and strong shifting winds ahead of it.

Temperature: The air temperature has a direct influence on fire behaviour because of the heat requirements for ignition to take place and for a continuing combustion process. Air temperature is directly linked to the amount of radiant heat from the sun that warms up the surface of the earth and all that is on it. The vegetation in the landscape is heated by the radiant heat of the sun having an effect on fuel moisture and temperature.

Relative Humidity (RH) is the term used to express the amount of moisture in the atmosphere. The lower the RH, the easier it is for a fire to ignite and burn and for the intensity to increase. When the RH is low, the moisture in the vegetation (fuel) evaporates as it rises to the surface of the vegetation, drying it (the fuel) out. When the RH is high, it is harder for the moisture to evaporate as moisture won't rise to the surface of the vegetation as easily.

Wind: This movement of air is termed 'wind'. Wind occurs over a range of scales, from large-scale systems influenced by the transfer of heat from the equator to the poles, to small eddies or whirls that can occur around obstacles.
Wind is the horizontal movement of air relative to the surface of the Earth and is often cited as the most influential factor affecting wildfires. Wind increases the supply of oxygen to a fire, resulting in the fire burning more intensely. The wind will also dry out the surface fuel moisture meaning that it is more combustible, and the development of air pressure differences will lift flames and embers into areas of unburned fuel. Wind will also push flames closer to the ground which combines the radiant and convectional heat leading to an increased preheating of the fuel and the air surrounding vegetation (fuel), which in turn accelerates the release of moisture from the vegetation allowing it to reach its ignition temperature at an accelerated rate.

Prevailing winds: A pattern of seasonal winds which may or may not be present during the fire. Often the general wind is the same as the prevailing wind.

General winds: Winds that are reported by weather forecasts that often affect large geographic areas for the forecasted period.

Local winds: Produced because of the natural features (topography) of the area. This includes valleys, hills, and mountains that cause the air to move in specific directions. These features, together with solar heating, cause valley and slope winds to build up as the temperatures rise or fall.

Surface winds: Are measured 6 – 10m above the ground (winds that are near the surface of the earth).

Mid-flame winds: Winds that occur halfway up the flames in a fire and have the greatest effect on the direction in which a fire will burn.

Cold fronts: Cold fronts (with or without precipitation) cause winds to speed up and gust as the front passes by. They may also cause changes in wind direction. Direction changes are often at 90° to 180° angles. Cold fronts will also often bring rain but before the rain falls, strong gusts of wind can cause extreme fire behaviour. If no rain comes, or only limited showers, wildfires might continue burning.

Anabatic and Katabatic winds: Anabatic Winds are upslope winds driven by warmer surface temperatures on a mountain slope than the surrounding air column. Katabatic winds are downslope winds created when the mountain surface is colder than the surrounding air and creates a down slope wind.

Lee Rotor Winds are a particularly hazardous wind to wildfire management. The Lee Rotor effect on wind occurs when an airflow moves across a landscape and over a ridge and separates from the lee slope. In other words, instead of flowing along with, or adhering to, the shape of the topography the wind shears off and rolls becoming turbulent. This turbulence causes a rotor or spinning effect and will draw wind laterally across a slope. If there is fire on this slope, the fire will be intensified by the rotor effect and be drawn horizontally across the slope. This movement can be in a completely different direction to the main fire spread.

An Inversion Layer is a sign of a stable atmosphere but is still a weather hazard. This is because the state of the atmosphere is always one of continual fluctuation and change. A stable atmosphere will become an unstable atmosphere as conditions change, and when this occurs fire intensity can increase and become problematic very quickly. Inversions are layers in the atmosphere where the temperature increases with altitude instead of decreasing. Made up of warmer and less dense air, it essentially acts like a lid on any vertical movement or updraft.

The Fire Danger Index (FDI) system was created to alert fire suppression organisations and landowners to the daily fire weather and the impact this will have on a wildfire should it occur. The system uses a colour code that aligns to a level of risk, with Blue being the lowest and Red the highest. This colour coding is linked to a numerical rating system that indicates the level of risk. This level of risk is worked out from a formula that takes the temperature, the wind speed, the relative humidity, and the amount of rainfall and how recently this occurred into account. The colour coding system is an easy way for this numerical value to be communicated to the landowners and public so that they know what fire behaviour to expect and what actions they should/should not be taking.

The FDI is not just an indicator of what you can expect from the fire behaviour, but it also offers guidance on the level of preparedness that fire suppression organisations, landowners and even the public should be aware of. This can guide a landowner on making sure that their response to a fire occurring will be appropriate for the fire weather conditions, or whether a member of the public can understand the risk they may face when deciding to burn some garden refuse or have a braai on a high fire danger day.
The FDI is part of a greater model that has the following goals:

- To aid the prevention of wildfires through advice on precautionary measures.
- To provide guidelines on how planned fires are to be managed, and whether or not they are to go ahead.
- To provide guidelines on resource readiness plans.
- To provide guidelines on fire suppression tactics that will be required given the expected fire conditions.
- To serve as an alert or warning system to the public, of the fire danger on any given day in attempts to heighten readiness and promote good practice in preventing wildfires from occurring.

The Fire Danger Index (FDI) colour coded rating system is as follows.

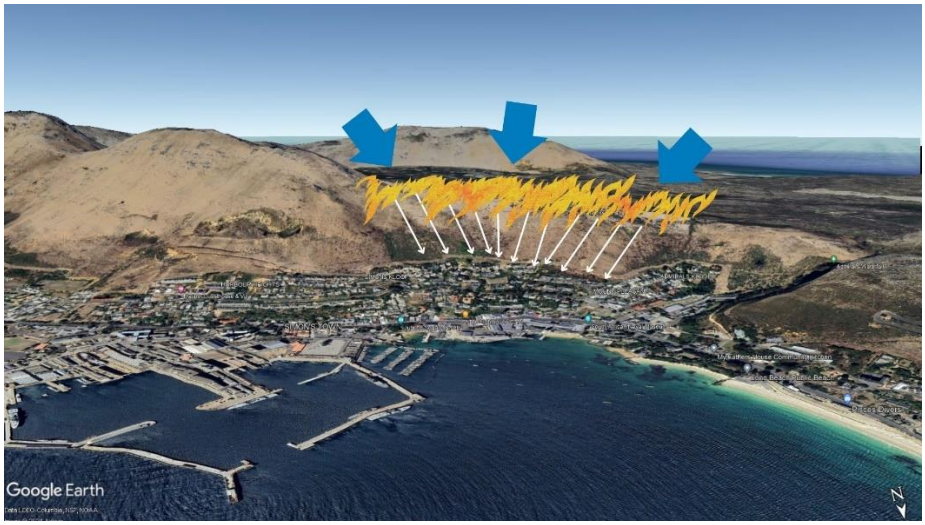
CODE	RATING	FIRE BEHAVIOUR	FLAME LENGTH	RATE OF SPREAD
BLUE	Safe	Ignitions unlikely, fire low intensity.	± 0.5m or less.	Up to 2m per minute.
GREEN	Moderate	Ignitions can occur, fire moderate intensity, control possible.	± 0.5m to 1m	Up to 5m per minute.
YELLOW	Dangerous	Ignitions occur easily, fire intensity severe at times, control possible but difficult.	± 1m to 2m	Up to 25m per minute.
ORANGE	Very Dangerous	Ignitions occur easily, fire intensity severe, spotting and crowning possible, control dangerous and maybe not possible.	± 2m to 5m	Up to 35m per minute.
RED	Extremely Dangerous	Ignitions occur easily, fire intesity severe, spotting and crowning occurring, control very dangerous and likely not possible.	± 5m or more.	Up to 60m per minute.

CODE	STAGE OF PREPAREDNESS	LEVEL OF DIFFICULTY OF FIRE SUPPRESSION ACTIONS
BLUE	Burn with a permit only, open air fires allowed in designated areas.	Fire suppression (Direct Attack) easy and may not be required.
GREEN	Burn with a permit only, open air fires allowed in designated areas.	Fire suppression (Direct Attack) feasible with appropriate resources and tactics.
YELLOW	Burn with a permit only, open air fires allowed in designated areas, extreme caution required.	Fire suppression (Direct Attack) constrained, aircraft called at early stages.
ORANGE	No burning, no open air fires allowed, no activity that can lead to ignition allowed.	Fire suppression (Direct Attack) not feasible, aircraft called immediately at early stages, evacuations may be needed.
RED	No burning, no open air fires allowed, no activity that can lead to ignition allowed.	Fire suppression (Direct Attack) not feasible, resources on standby, immediate response required, aircraft called immediately at early stages, evacuations very likely.

Weather Analysis for Simons Kloof

Weather and Possible Resulting Fire Scenarios

Note: We have made use of visuals and graphics to illustrate and describe concepts in this section. Due to the nature of these elements, it is not possible to give exact scenarios or illustrate with 100% accuracy as these elements are extremely dynamic and influenced by so many variables. The concepts however allow for consideration of principles which apply to fuel, weather, topography and how they influence wildfire behaviour.



The greatest threat is from wildfire driven by a strong southerly wind as shown by the arrows. A fire in this direction can be pushed rapidly downslope toward Simon's Kloof.

This fire front impacting the suburb, would be hard to defend and will most likely ignite spot fires within the suburb and fuel corridors. Homes and lives would be at great risk. Evacuations would mandatory (highly likely) leaving nobody home to defend homes from embers. This situation validates why preparation is vital.

	Fire from the southeast direction is common. The fire flanks the suburb and often gives firefighters a chance. But watch out for variable and swirling winds that send embers into the suburb. Smoke and fire intensity may also require evacuations, especially for vulnerable people within the community.
	Similarly, fires from the northwest will flank the suburb. The northerly wind can be noxiously gusty, and this can create a lot of airborne embers. Smoke and fire intensity may also require evacuations, especially for vulnerable people within the community.
	In addition to the three high-risk scenarios discussed above, a fire originating within your suburb could quickly escalate and spread to neighbouring areas. This scenario underscores the importance of proactive fire mitigation strategies and community preparedness. The interplay of factors such as wind direction and speed, terrain features like gullies that can channel fire spread, and the presence of dense vegetation can significantly influence fire behaviour and its potential impact on the community.

Wildfire behaviour is driven by Fuels, Weather and Topography. The combination of these variables in your area can create extreme fire behaviour but also result in a combination of local factors influencing fire spread and fire behaviour. Preparedness means you prepare for the worst-case scenario that raises your defensive level to it best possible state.

Additional Wildfire Considerations

Hydrants and Water

In general, the hydrants appeared to be well-maintained, and the painted indicators on the road were freshly done. However, there was one fire hydrant that was identified as needing repairs.

As residents, it is crucial to promptly report any issues with fire hydrants to the municipal authorities and ensure follow-up until the necessary repairs are completed. Fire hydrants play a critical role in firefighting efforts, providing access to water for emergency responders during fires. Ensuring that all hydrants are in proper working condition enhances community safety and readiness in the event of a fire emergency.

By actively reporting and monitoring the repair process, residents contribute to maintaining effective fire protection infrastructure, thereby safeguarding their neighbourhood and surrounding areas from potential fire hazards.

The hydrant to the left was nicely visible and looked in good order. While it's not possible for us to test fire hydrants, if you speak nicely as a community to your local fire service you can ask that they check all your hydrants in your suburb.

Hydrants located in driveways can be inadvertently blocked by residents and visitors, including fire tourists, posing significant risks during emergencies. Here's how this can happen and why it's crucial to keep these areas clear:

Blocking by Residents: Residents may unknowingly or temporarily park vehicles in front of or near hydrants, especially if they are not clearly marked or if parking spaces are limited. This can obstruct access for firefighting crews who need quick and unimpeded access to hydrants during a fire.

Blocking by Fire Tourists: Visitors, including fire tourists who may be unfamiliar with local regulations or emergency procedures, might also park in front of hydrants while observing fire activities or taking photographs. This can create barriers to firefighting efforts and delay response times crucial for containing fires.

Traffic Cones for Clearing Hydrant Areas: Placing traffic cones or other visible markers near hydrants can help remind residents and visitors not to park in these critical access zones. This proactive measure encourages compliance with fire safety regulations and ensures that hydrants remain accessible at all times.

Reports of people driving into areas and parking over hydrants during fires highlight the urgent need for awareness and enforcement of parking regulations near hydrants. Such incidents underscore the potential consequences of blocked hydrants, including delays in firefighting operations and increased fire risk to surrounding properties.

Streams serve as vital additional water resources during firefighting, particularly when hydrant pressure is low or inaccessible. They provide a reliable and replenishing water source that can be accessed using fire engine pumps. Firefighters can deploy portable pumps and hoses to establish continuous water supply lines from streams, enhancing firefighting effectiveness and resilience during emergencies.
Recommendation: Chat to local fire services to make sure they are aware of this resource.

In drought conditions, homeowners can support firefighting efforts by creating a local hydrant and water source map for incoming fire resources.

This map should detail the locations of hydrants, streams, ponds, swimming pools and other accessible water sources.

Additionally, homeowners can supplement water supplies by installing water tanks equipped with fittings approved by local fire services. Fire services require a special fitting to draw from JoJo tanks for example. Chat to them and see what they need.

Regular maintenance ensures tanks are filled and accessible, while communication with fire services ensures they are aware of available resources.

This proactive approach enhances community resilience and supports effective firefighting during emergencies.

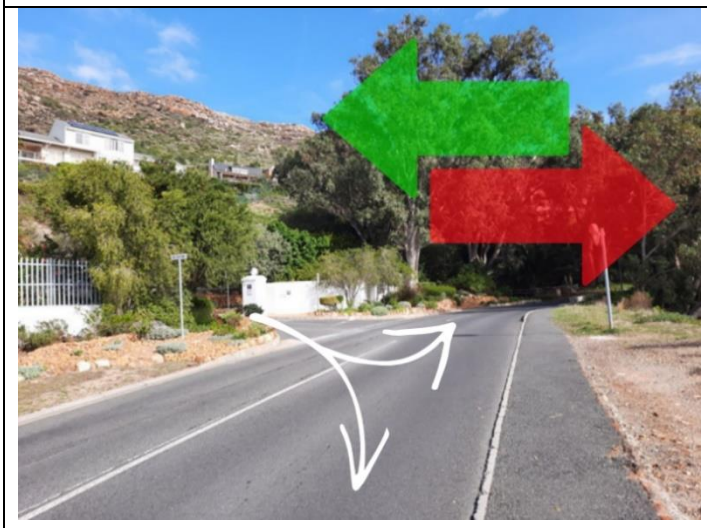
With the potential of future droughts, this may become more and more essential.

Roads, Access and Egress	
	During a wildfire, obstacles such as a boat blocking a green belt area, or cars parked in obstructive positions can severely hinder firefighting efforts. These impediments not only restrict access for firefighting vehicles but also delay response times critical for containing and extinguishing the fire. The suggestion to remove the boat, if it is not on private property. On the day of analysis, the presence of a parked car blocking access underscores the immediate need for proactive measures to prevent such obstructions in the future. Clear access routes are vital for firefighters to swiftly reach affected areas, deploy resources, and effectively combat wildfires, thereby safeguarding lives and property within the community.
	It's crucial to emphasise that while parking may not typically be an issue during normal times, residents should be vigilant about how they park to avoid obstructing roads. Emergencies can occur unexpectedly, and emergency vehicles must have unimpeded access to suburbs at all times. Maintaining adequate clearance on roads ensures that fire trucks, ambulances, and other emergency responders can reach their destinations swiftly and effectively, potentially saving lives and reducing property damage during critical situations. Therefore, awareness and responsible parking practices are essential community efforts to support emergency response capabilities year-round.

	This is an excellent example of vegetation management that ensures the roadway remains clear and unobstructed for traffic. Well-maintained vegetation along roadsides is crucial to prevent hindrances during emergencies and ensures efficient access for vehicles, including fire trucks and evacuation efforts. Regarding palm trees, as previously noted, they can pose a significant threat in wildfire-prone areas due to their flammability and potential for spreading fire. However, this particular palm tree is being well-maintained, which reduces its wildfire risk. Proper maintenance may include trimming dead fronds and reducing the accumulation of dry vegetation around the tree, thereby lowering the likelihood of it catching fire and contributing to wildfire spread. Overall, effective vegetation management practices, coupled with responsible maintenance of potentially hazardous trees like palm trees, are essential steps in enhancing community safety and resilience against wildfires and other emergencies.
	It's critical that trees obstructing roads are promptly addressed to ensure unimpeded access for emergency services such as fire trucks and ambulances. Clearing obstructive trees not only facilitates faster response times during emergencies but also reduces the risk of delays that could potentially impact life-saving efforts and property protection. When trees encroach on roadways, they can create obstacles that hinder vehicle passage and navigation, especially under urgent circumstances. This obstruction may also impede the deployment of firefighting equipment and the efficient evacuation of residents during wildfire events or other emergencies.

	The tree needs trimming on the left On the right, a great example of clearing work.
	The tree needs trimming.
	These trees need trimming.

These trees need trimming on both sides of the road.



One-way access and egress for a suburb creates challenges during emergencies when emergency vehicles need to enter while residents are simultaneously trying to evacuate. This situation can lead to congestion and delays that hinder response times and endanger lives. To manage this effectively, communities can implement temporary traffic management measures until professional services arrive.

<u>Residents can take proactive steps such as</u>:

Fuel management: Having vegetation such as palms and eucalyptus trees near access and egress roads increases wildfire risks for all. Unmaintained areas underneath these trees allow flammable debris to accumulate, heightening the risk of fire intensity and spot fires. This can block escape routes, reduce visibility, and pose hazards to people, cars and homes. These eucalyptus trees should be removed & replaced with less flammable species. If this isn't possible proper maintenance underneath is critical.

Community Traffic Management: Designating individuals to assist with directing traffic can help prioritise emergency vehicle access. This could involve trained volunteers or designated community leaders who coordinate traffic flow to ensure clear pathways for emergency responders.

Engaging Local Authorities: Discussing traffic management concerns with local councillors can lead to coordinated plans with traffic services. This collaboration can establish protocols for managing

traffic during emergencies and ensure that resources are allocated efficiently.

Local Knowledge Sharing: Residents can contribute valuable local knowledge about accessing firebreaks, identifying the best evacuation routes, and navigating challenging terrain. This information is crucial for developing effective emergency response plans tailored to the community's specific needs.

Neighbourhood Teams: Training a neighbourhood team capable of assisting in emergencies enhances community resilience. These teams can facilitate communication, coordinate actions, and provide essential support until professional help arrives.

Enhancing Visibility: Improving the visibility of entrances to the suburb can aid emergency responders and residents alike. Simple measures like placing reflective tape on street signs or using flashing cones can make entrances more conspicuous, helping emergency services locate and access the area quickly.

By taking these proactive measures and fostering community involvement in emergency preparedness, residents can significantly improve safety and response effectiveness during critical situations. Collaboration with local authorities and proactive planning ensures that resources are utilised optimally, enhancing overall community resilience and emergency response capabilities.

ABOVE: The green roads highlight the potential traffic congestion that can occur. It is highly recommended to have a traffic evacuation plan put in place because of this.

SECTION 2: RISK ANALYSIS

In this section we are going to give you an overview of how we assess risk to homes, analysing various factors and a relationship between Likelihood, Intensity and Susceptibility (LIS) Levels. After this background to our methodology, we look at the vulnerability analysis for homes on Simon's Kloof.

Risk Categories

To quantify and compare risk levels and potential impact on life and other infrastructure Vulcan Wildfire Management used a tool to rank factors which influence risk into Risk Categories which consider the (LIS) Level, which stands for Likelihood. Intensity. Susceptibility.

There are five different categories of risk which are rated as follows.

Extremely High Risk LIS 5
High Risk LIS 4
Medium Risk LIS 3
Low Risk LIS 2
Insignificant Risk LIS 1

Based on the analysis, as provided in the report, Vulcan Wildfire Management complete the risk categories with all this information in mind. It must be noted that some risk levels can be reduced, while others will always remain the same.

Vulcan Wildfire Management developed this tool to assess risk. This tool can be used to ascertain why certain structures or areas are placed at a specific risk level. This is to be used as a guide to enhance your own understanding of what influences risk with regard to wildfires, as well as what can be done to possibly reduce risk. This assessment has been done on a suburb level so it is broad in its approach.

The factors assessed are those which influence the risk level to life, homes, assets, and infrastructure. They are as follows:

A: Fuels
B: Fuel Proximity to Structures
C: Embers
D: Wildfire Behaviour
E: Structure to Structure
F: Structure Ignition Zone
G: Threat to Life
H: Threat Animals (Domestic/Livestock)
I: Defensive Actions
J: Fire Services

Risk Categories

To quantify and compare risk levels of the different structures and key infrastructure on properties and in communities Vulcan Wildfire Management developed the tool below to assess risk. We have included this methodology to help explain the risk level in Simon's Kloof, but also as a guide and general awareness to enhance your own understanding of what influences risk with regard to wildfires.

General Table of Definitions (Followed by the table for Simon's Kloof)

Risk Category Descriptions					
Factors (A-H) Influencing the Risk Level of Homes, Assets, Infrastructure	**Risk Category (LIS1-5) Likelihood, Intensity and Susceptibility (LIS) Level**				
	Extremely High Risk LIS 5	**High Risk LIS 4**	**Medium Risk LIS 3**	**Low Risk LIS 2**	**Insignificant Risk LIS 1**
A *Fuel Condition:* age, moisture content, oil content, continuity. *Types of Fuels:* light (grasses), medium (bushes and shrubs) heavy (trees). *Risk Factors:* Prone to produce embers (blue gum bark, pinecones, palms).	Significantly large wilderness or natural fuel belts in the general area. In the immediate area there is a large build-up of dead and dry fuels with high continuity as well as a mixture of light, medium and heavy fuels. Problematic fuels are also abundant.	Large wilderness or natural fuel belts in the general area. In the immediate area there is a notable build-up of dead and dry fuels with medium to high continuity as well as a mixture of light, medium and heavy fuels. Problematic fuels are widespread but not all over.	In the immediate area approximately half the area has build-up of dead and dry fuels. Horizontal fuel continuity is high but only a small percentage of area has vertical continuity. mixture of light, medium and limited heavy fuels. Problematic fuels are also sporadic.	Fuels are in a young, state. Light, medium, and heavy fuels exist but not in abundance and they are separated from one another i.e., minimal continuity. Minimal problematic fuels.	Fuels are in a young, high moisture state, with very low continuity and with minimal light and medium fuels. Zero problematic fuels in area.
B *Proximity to Fuels or Heat Exposure Potential:* Considering the vertical and horizontal arrangement of fuels around homes, assets, infrastructure, the threat posed by radiant heat is considered. *Barriers = Man made or natural breaks in fuel. HIZ = Home Ignition Zone*	Structures, assets, infrastructure completely surrounded, no clear barriers, high fuel continuity from wilderness areas as well as immediate area.	Structures, assets, infrastructure mostly surrounded, very few barriers, high fuel continuity from wilderness areas as well as immediate area.	Structures, assets, infrastructure mostly clear of immediate fuel threats. Strategic barriers are in place and well positioned. Beyond the 30m HIZ there exists potential for wildfires to generate heat which will pose limited threat levels.	Structures, assets, infrastructure predominantly clear of fuel threats with only a small percentage of light to medium fuels posing a low level of risk. Strategic barriers are in place and well positioned. The 30m HIZ has been well thought out with low ignition potential.	Structures, assets, infrastructure are well away from any fuel threats. The general and immediate area poses no heat threats from wildfires.
C *Ember Attack Potential:* Burning firebrands with potential to start new fires. The type of vegetation, fire intensity and weather conditions will influence the amount,	Given proximity and type of fuels ember storms covering the area extremely likely.	High intensity of embers to be expected over area with high threat level.	Medium intensity of embers to be expected over area with moderate threat level.	Under extreme conditions, long range embers may travel into area and pose limited medium risk.	Under extreme conditions, long range embers may travel into area and pose limited medium risk.

intensity and area affected by embers					
D *Expected Fire Behaviour:* The three most significant factors affecting fire behaviour are Fuels, Weather & Topography.	Extreme fire behaviour and prolonged intensity highly likely.	Extreme fire behaviour and prolonged intensity possible.	Moderate to High Intensity fire, with limited extreme fire behaviour periods expected.	Moderate to Low Intensity fire and fire behaviour expected.	Low Intensity fire and fire behaviour expected.
E Structure to Structure Ignition Potential: The closer structures are located to one another the greater the threat of a burning home resulting in a chain reaction, causing another or multiple homes to catch fire from increased heat and ember exposure.	Extremely high likelihood.	If one structure ignited, high chance of multiple structures catching fire in a chain reaction due to heat exposure of close proximity homes.	A moderate threat exists, however if homeowners have WildfireReady principles in place the threat can go from moderate to low.	It is possible that isolated blocks of close proximity structures could affect one another if one were to catch alight but only if an ember ignition is not noticed and a home begins to burn.	Plausible under extraordinary conditions however threat level very low.
F Accumulated Percentage of Vulnerabilities: Looking at all likely risk factor variables in the HIZ (30m radius around the home), what is the percentage loss rate of the homes, assets, infrastructure due to accumulation of vulnerabilities present (100% = Max. chance of Loss - 0% Lowest Chance of Loss)	90- 100%	50-90%	30-50%	20-30%	5-20%
G *Defensive Actions* After Wildfire Breaks Out: *Chance of success by Homeowner* to defend their property.	Zero Chance, Early evacuation critical to preserve life.	Very low chance. Early evacuation of area advisory.	Home defensive measures only advisable if extensive preparation efforts and safety measures in place. Evacuate if extreme fire conditions.	Home defensive measures from ember attack advisable. Moderate smoke exposure expected.	Home defensive measures from ember attack advisable. Limited smoke exposure expected.
H *Defensive Actions* After Wildfire Breaks Out: *Chance of success by Fire Services* to defend the property.	Not practical to send crews for structure protection measures. No chance to defend homes during an incident. Emergency services would be in extreme danger immediately before, during and in early stages after wildfire affecting the area.	Plausible that loss might be reduced but tactical success rate very low. Advisable to only move into area after wildfire to prevent or limit total loss. Emergency services would be in extreme danger during an incident.	Some rapid improvements to the area will assist. Structures, assets, infrastructure defensive efforts will be effective. A medium risk area in which to operate in.	Structures, assets, infrastructure defensive efforts will be effective. A low-risk area in which to operate in.	Structures, assets, infrastructure defensive efforts will not be required and advisable to be tasked to homeowners who are capable. Concentrate resources elsewhere.

Simon's Kloof Risk Table – The Average Risk Sits at Medium Risk LIS 3

Risk Category Descriptions					
Factors (A-H) Influencing the Risk Level of Homes, Assets, Infrastructure	**Risk Category (LIS1-5) Likelihood, Intensity and Susceptibility (LIS) Level**				
	Extremely High Risk LIS 5	**High Risk LIS 4**	**Medium Risk LIS 3**	**Low Risk LIS 2**	**Insignificant Risk LIS 1**
A *Fuel Condition:* age, moisture content, oil content, continuity. *Types of Fuels:* light (grasses), medium (bushes and shrubs) heavy (trees). *Risk Factors:* Prone to produce embers (blue gum bark, pinecones, palms).			In the immediate area approximately half the area has build-up of dead and dry fuels. Horizontal fuel continuity is high but only a small percentage of area has vertical continuity. Mixture of light, medium and limited heavy fuels. Problematic fuels are also sporadic. **Medium Risk LIS 3**		
B *Proximity to Fuels or Heat Exposure Potential:* Considering the vertical and horizontal arrangement of fuels around homes, assets, infrastructure, the threat posed by radiant heat is considered. *Barriers = Man made or natural breaks in fuel. HIZ = Home Ignition Zone*		Structures, assets, infrastructure mostly surrounded, very few barriers, high fuel continuity from wilderness areas as well as immediate area. **Medium Risk LIS 4**			
C *Ember Attack Potential:* Burning firebrands with potential to start new fires. The type of vegetation, fire intensity and weather conditions will influence the amount, intensity and area affected by embers			Medium intensity of embers to be expected over area with moderate threat level. **Medium Risk LIS 3**	.	

D *Expected Fire Behaviour:* The three most significant factors affecting fire behaviour are Fuels, Weather & Topography.			Moderate to High Intensity fire, with limited extreme fire behaviour periods expected. **Medium Risk** **LIS 3**		
E Structure to Structure Ignition Potential: The closer structures are located to one another the greater the threat of a burning home resulting in a chain reaction, causing another or multiple homes to catch fire from increased heat and ember exposure.		If one structure ignited, high chance of multiple structures catching fire in a chain reaction due to heat exposure of close proximity homes. **Medium Risk** **LIS 4**			
F Accumulated Percentage of Vulnerabilities: Looking at all likely risk factor variables in the HIZ (30m radius around the home), what is the percentage loss rate of the homes, assets, infrastructure due to accumulation of vulnerabilities present (100% = Max. chance of Loss - 0% Lowest Chance of Loss)	90- 100%	50-90%	30-50% **Medium Risk** **LIS 3**	20-30%	5-20%
G *Defensive Actions* After Wildfire Breaks Out: *Chance of success by Homeowner* to defend their property.				Home defensive measures from ember attack advisable. Moderate smoke exposure expected. **Medium Risk** **LIS 2**	Home defensive measures from ember attack advisable. Limited smoke exposure expected.
H *Defensive Actions* After Wildfire Breaks Out: *Chance of success by Fire Services* to defend the property.			Some rapid improvements to the area will assist. Structures, assets, infrastructure defensive efforts will be effective. A medium risk area in which to operate in. **Medium Risk** **LIS 3**		

SECTION 3: BASIC FIRE MANAGEMENT PLAN INCLUDING EVACUATION PROCEDURES

General Guidelines

We have supplied a WildfireReady information document along with this report, that contains information which we encourage you to read and apply to your circumstances. This includes:

Stay Informed

- Reporting a wildfire
- Your emergency numbers
- Questions to ask/Actions to take
- Fire Danger Ratings explained
- Main weather factors impacting fire
- Other factors which may influence fire behaviour

Check

- General wildfire preparedness
- Prepare your Home from Wildfire Risks
- Prepare your Property (Garden) from Wildfire Risks

Protect

- Community Protection Plan and Wildfire Risk
- Quick Evacuation Checklist
- Pets and Wildfire
- Horses and Wildfire
- Livestock and Wildfire
- Defending your Property from Wildfire

Survive

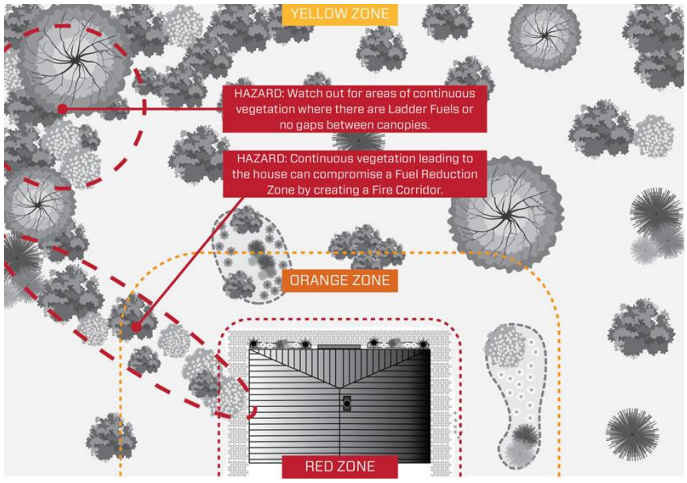
- Evacuate from Wildfire
- Surviving being Trapped by Wildfire

Recommendations to Reduce Risk

General Notes about the Fuel Reduction Zone

A Fuel Reduction Zone (FRZ) shall be created within the Home Ignition Zone and shall extend for 30m from the outside walls of the house. The following applies to the creation of the Fuel Reduction Zone:

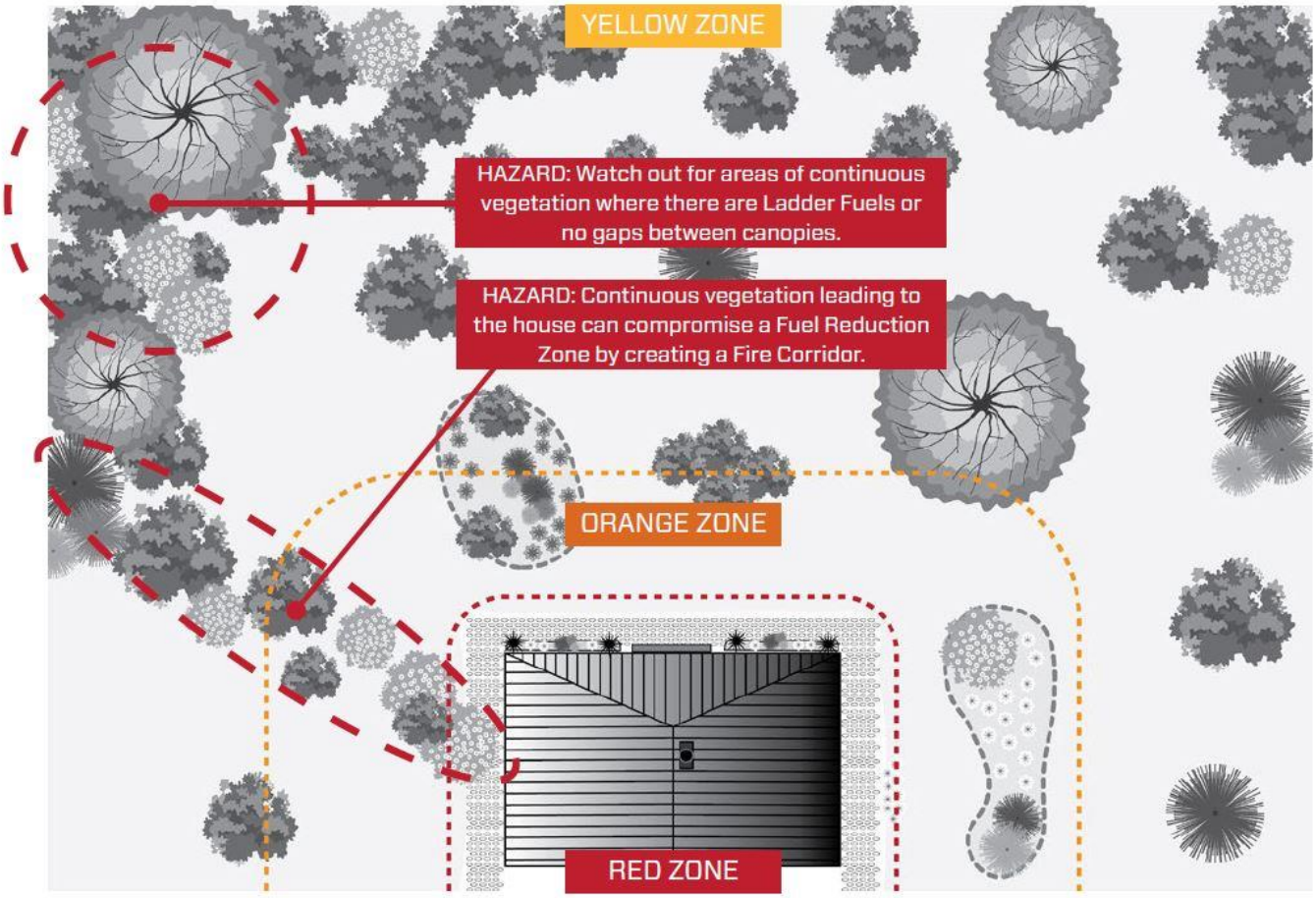
- Remove all dead and decaying vegetation within the FRZ and thin and prune all live vegetation.
- Dead and downed fuels within 10m of all buildings.
- Vegetation under trees within the FRZ shall be maintained at a height that will preclude ground fire from spreading into the tree crown.
- Tree crowns within the FRZ shall be spaced to prevent structure ignition from radiant or convective heat.
- Use decorative rock, gravel, and steppingstone pathways to break up the continuity of the vegetation. This can modify fire behaviour and slow the spread across the property.
- Use mulches to conserve moisture and reduce weed growth. Avoid using pine bark, thick layers of pine needles or other mulches that readily carry fire.
- The fuel modification plan shall include a maintenance element identifying and defining the responsibility for continued and periodic maintenance.



The Zone System

The zone system is a simple way to divide up the defendable spaces within the Home Ignition Zone or Fuel Reduction Zone. Note: The same principles apply to all structures, whether they are homes, offices, garages, buildings etc. This zone system is designed for rural or wildland interface homes and structures.

Red Zone covers 0 – 3m from the exterior walls of the structure
Orange Zone covers 3 – 10m from the exterior walls of the structure
Yellow Zone covers the area from 10m out to the perimeter or boundary or at least to 30m.



Red Zone (0-3m)
This is the area closest to the structure and fires starting here can have a significant negative impact on the integrity of the structure during a wildfire incident. The following applies:

- Create a 3m wide zone of hardened landscaping, lawn or low growing fire-resistant vegetation around the structure.
- Clear fine fuels and keep grass areas trimmed to around 5cm height.
- Do not plant shrubs underneath windows, close to decks, close to combustible wall cladding or vents.
- Recommended groundcovers to use in this zone are:
  For sunny areas
  Cliffortia Ferruginea, Othlobium Decumbens, Dymoondia Margaretae, Gazania spp., Helichrysum argophyllum, Hermannia saccifera, Cotula lineariloba, Agathosma Ovata 'Kluitjies Kraal' and Vygies.
  For shade areas
  Plectranthus verticillatus, P. Neochilus (also sun) and P. Ciliatus 'Drege'.
- Recommended Shrubs are:
  Agathosma Serpyllacea, Phylica Ericoides, Felicia spp., Natal Plum (Carissa macrocarpa & cvs.), Cotyledon orbiculate, Scabiosa spp., and Geelblombos (Athanasia dentata).

Orange Zone (3-10m)

Outside of the Red Zone, create a Fuel Reduced Area of hardened landscaping, that extends out to at least 10m from the structure. The following applies:

- Create 'islands' of flower beds surrounded by lawn, paving or gravel. Use fire-resistant shrubs and trees within these beds, ensure there is a 3m gap between the canopies of trees and shrubs or groups of trees and shrubs, so that fire cannot travel easily from canopy to canopy.
- Plant shrubs at wide intervals and do not plant directly underneath trees unless a clearance of 5m exists from the canopy of the shrub to the lower branches of the trees.
- Do not plant shrubs or trees close to windows.
- Clear fine fuels.
- Keep grass areas trimmed to 5cm in height.
- Recommended plants and shrubs for this zone are:

Resprouters: Lecadendron Salignum, Chondropetaulm Tectorum, Erica spp., Maytenus Oleoides, Brachylaena Discolour, indigenous Salvia spp. (Salvia Africana Caerulea, Salvia African-lutea), Pelargonium Cucullatum, King Protea, Felicia Echinate, Wild Olive (Olea europeana subsp. Africana), Wild Peach (kiggelaria Africana), Glossy Currant (Searsia syn. Rhus lucida).

Corky Bark: Leucospermum cococarpodendron, Protea Nitida, Mimetes Cucullatus, Aloe Plicatus.

Bulbs: Agapanthus, Watsonia, Haemanthis Coccineus, Cyrtanthus Ventricosus, Kniphofia Praecox.

Yellow Zone (10m+)

Within the Yellow Zone, create a Fuel Reduced Area of buffered landscaping, that extends out to the perimeter or boundary from the structure.

- Consider the placement of trees and shrubs and avoid creating paths (fire corridors) for fire to follow through the vegetation.
- Ensure there is at least a 3m gap between the canopies of trees and shrubs or groups of trees and shrubs, so that fire cannot travel easily from canopy to canopy.
- Plant trees and shrubs at wide intervals and do not plant shrubs directly underneath trees unless a clearance of at least 5m exists from the canopy of the shrub to the lower branches of the trees.
- The best trees to plant generally are those that occur naturally on or near the property.
- Recommended shrubs that do not burn easily are:

Krantz Aloe (Aloe Arborescens), Dune Crowberry (Searsia Crenata syn. Rhus Crenata), Sersia Glauca, Glossy Currant (Searsia Lucida), Tarchonanthus Camphorates, Pterocelastrus Tricuspidatus, Osteospermum Moniliferum.

- Recommended trees that do not burn easily are:

Cape Holly (Ilex Mitis), Cape beech (Rapanea Melanophloeos), Wild Almond (Brabejum Stellatifolium), Rooiels or Butterspoon Tree (Cunonia Capensis), indigenous Cherry (Maurocenia Frangularia), Rock Elder (Canthium Mundianum), Milkwood (Sideroxylon Inerme) and Tree Fuschia (Halleria Lucida).

- Recommended bulbs that do not burn easily are:

Tulbaghia Violacea, Agapanthus and Watsonia.

- Recommended low growing ground covers are:

Vygies (Lampranthus, Malephora, Drosanthemum, Delosperma and Carpobrotus), Gazania, Arctotis, Cliffortia Ferruginea, Aloe Brevifolia and other suitable ground-covering aloes.

General Notes on Planning for Wildfires

- Homes being of a modern bricks and mortar construction with mostly metal roofing, tend not have a multitude of vulnerabilities, however it is important to note the following:
  - A wire mesh with holes 2mm diameter or less should be added to the inside of vents where embers can gain access.
  - Check that roof spaces do not have gaps under the metal sheeting where embers could gain entry.
  - Wooden doors should be regularly checked for wear and tear, cracking, flaking, and chipping of varnish and paint.
  - Ensure all windows/doors/garages/shutters close tightly.
- All chimneys or flues must have spark arresters.
- Insurance. All residents should check the replacement value of their home, vehicles and contents and outbuildings were they to incur damage from wildfires. Check that this matches the sum insured and they should review their policy on an annual basis. (Check specifically for wildfire cover).
- Consider your emergency exit routes, and safe gathering areas should evacuations be necessary.
- It is recommended that a laminated map of the suburb showing the located of homes, infrastructure hydrants and entrances/exits be created, and a copy kept easily available. This can be handed to fire services when they arrive.
- A Disaster Portfolio should be created if a CID is formed with the aim to oversee all disaster related activities or incidents. It would be the role of those on this portfolio to coordinate with, and be the liaison for, emergency services when they arrive on the scene and to ensure all people are informed and acknowledge receipt of any evacuation instructions.
- Vegetation should be cleared from around all the junction boxes. Allow 3m clear at the front of the box and 1.5m clear on the other sides of the box. *Note: This recommendation is in alignment with researched international best practise as we are unable to find guidelines from Eskom or City of Cape Town.*
- Compost heaps can spontaneously combust, it is therefore important that the vegetation surrounding the heap be kept a minimum of 1m from the edge of the compost heap and that the ground is kept to soil (no grass or plants) in this area. Vegetation must not be allowed to grow above the heap.
- During wildfires have ladders available so fire services can access roofs if required.
- Residents should have a ‘Go Bag’ ready should they need to evacuate, this should contain all their important documents, any valuable items and a first aid kit.
- We **highly recommend installing an internal smoke alarm** model that uses a photo electric sensor and comes with a hush button and a long-life battery. The hush button is important because cooking can sometimes trigger the alarm. It is also recommended to have a fire extinguisher in the home (should you not have one) in case of a fire in the kitchen or home.
- Store gas containers in a manner that has the outlet valve facing away from the home. Should the valve fail and catch fire the hope is that the bottle will vent away from your home. Additionally, store bottles in an area where leaking gas cannot ‘pool’. Gas is denser than air and it will ‘pool’ in low areas if there is a leak. During a wildfire, move gas bottles away from any area where they will be exposed to a direct or radiant heat source.

- Contact Coating.co.za for advice on coating and treating the wooden deck for fire resistance. https://www.coating.co.za/fireproof-coating-za/
- Access the FireWise South Africa website for information on fire resistant vegetation. https://landworksnpc.com/resource-centre/
- There is more useful advice and downloads on becoming #WildfireReady at http://wildfireready.org.za/

When a Wildfire Occurs

- Close the windows and doors when a wildfire occurs in the area, this will protect combustible material inside from embers as well as create a barrier to radiant heat.
- Wet down (saturate) your garden paying particular attention to the mulch, chips, hedges, wooden fences, and the decking.
- Block your roof drain openings and any down pipes and fill the gutters with water. You can purchase downpipe blockers or use tennis balls, sandbags, or any homemade device that with block the end of the downpipe or the top portion in the gutter where the downpipe connects. Spray enough water onto the roof to ensure that a shallow pool is created and any embers that fall are extinguished.
- During wildfires have a ladder available so you or fire services can access your roof if required.
- Remember there may be a drop in water pressure due to firefighting activities in the area or excess use by all residents of the irrigation system. (Alternative water sources such as pools, reservoirs with an independent petrol pump may be necessary).
- Fill buckets with water to throw onto any small fires that start.
- Use a fire beater or rubber car mat to extinguish small spot fires or embers.
- Remember to lock cat and dog flaps (if possible) this will stop the wind blowing them open and blowing embers into the home.
- Keep doors and windows of cars closed.
- Keep a watch on all areas of your property during the wildfire and make sure you check the vulnerable areas highlighted in this report for any burning embers landing.
- Watch for ignitions in the neighbouring properties and alert your neighbour immediately should you spot one.
- Ensure firefighters and emergency responders have easy access around your property and onto your roof. Open your main gate and access gates.

Relationships Neighbouring Suburbs

The work you do in preparedness, response and recovery from wildfires is going to be substantially enhanced if you have good working relationships with your neighbouring suburbs. We have spoken at length about areas that need improving in terms of fuel reduction and firebreaks. In addition to this, any combined effort in preparedness and response can see the sharing of resources and the enhancing of everyone's abilities.

During a wildfire, communication is vital and, if you do not have this in place already, set up community WhatsApp Groups or forms of communication that are dedicated for managing incidents. This is not a social group but contains key members for designated areas involved in safeguarding and assisting with operations to protect the area, evacuate vulnerable residents etc.

Have at least a bi-annual meeting with your immediate neighbours to discuss wildfires, storms, security etc. and ensure you discuss wildfire preparedness, response and recovery plans that may impact your property.

Setting up Response Structures

Preparedness sets up a successful response. This section will focus on guidelines as to how you as Simon's Kloof respond to wildfire incidents.

Reporting wildfires immediately is a top priority. This applies to fires on your property as well as fires in your general area. If you are not certain it has been reported by someone else, always report it in.

What information to provide Emergency Services?

- Call without delay.
- While dialling think about the critical details you need to convey.
- Begin with your name and phone number.
- What is the situation, i.e. wildfire.
- Exact location of wildfire. (Describe as accurately as possible)
- Inform them of the best access for emergency responders to reach the wildfire safely.
- Try to explain the potential of the fire, i.e. lives threatened, property in danger, fire is moving fast.
- Any other critical information?
- Follow the dispatcher's instructions that are given.

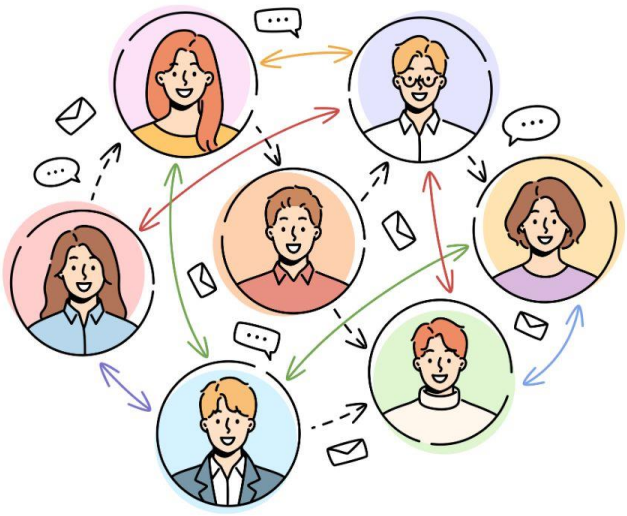
Communication Guidelines

Cell Phone:

There is coverage in the area however, wildfires in mountainous areas where cell phone towers are often positioned can go down. This can result in a loss of signal so have a backup plan.

Local WhatsApp Group:

WhatsApp groups for community members to communicate with each other. When there is an incident taking place, this is a great channel to communicate with the community. We recommend establishing a group where only admins can send messages and a separate group where the community can ask questions. Trying to achieve both on one group can become problematic to communication during an incident as the flow of communication becomes too difficult to follow. Having one group just for official alerts is vital.



Radio Communication:

This communication method works well during active incidents. We strongly suggest you purchase radios for the suburb for key members but before doing so, ask what radios your neighbours are using (if at all). For example, community radios which are used for security, can be used for essential communication during incidents including wildfires.

Giving Arriving Fire Services Instructions During Incidents

The following is a Briefing Checklist which operational emergency crews often use to ensure that when they give instructions during an incident it covers all the relevant topics. This may be useful to the Simon's Kloof team, and we have therefore included it.

Briefing Checklist

Situation
□ Fire name, location, map orientation, other incidents in area
□ Terrain influences
□ Fuel type and conditions
□ Fire weather (previous, current, and expected)
□ Winds, RH, temperature, etc.
□ Fire behaviour (previous, current, and expected)
Time of day, alignment of slope and wind, etc.

Mission/Execution
□ Command
Incident Commander/immediate supervisor
□ Leader's intent
Overall objectives/strategy
□ Specific tactical assignments
□ Contingency plans
□ Medevac plan
Personnel, equipment, transport options, contingency plans

Communications
□ Communication plan
Tactical, command, air-to-ground frequencies
Cell phone numbers

Service/Support
□ Other resources
Working adjacent and those available to order
Aviation operations
□ Logistics
Transportation
Supplies and equipment

Risk Management
□ Identify known hazards and risks
□ Identify control measures to mitigate hazards/reduce risk
□ Identify trigger points for re-evaluating operations

Wildfire Response Strategy and Tactics

The residents of Simon's Kloof are not firefighters. There is a lot that can be done to prepare for a wildfire as it approaches and even to protect homes during the wildfire, but it is important to respect your limitations. ***As an additional service Vulcan Wildfire Management can conduct training with staff and residents to enhance safety and guide actions of what can be done.***

There are some basic guidelines for defensive actions on a property. It is always the safest option to evacuate, and this must be considered first and foremost.

What to do if you choose to stay and defend?

The decision to stay and defend your property must be well thought through and you must have prepared your property and home adequately in order to do so. Staying under the right conditions could save your home, staying under the wrong conditions could result in injury or loss of life.

If you choose to stay you must have done proactive planning and work around your home to safely commit to this option.

Preparation must include:

- Creating defendable space, giving yourself a buffer to defend your property.
- Having water capabilities and/or other tools and resources to help you take action.
- Be adequately prepared with the right personal protective equipment (see list below).
- Be physically fit and feeling strong and healthy on the day to cope with the stressful situation and physical strain you will be under.
- Have a contingency plan and still be prepared to leave under extreme fire conditions, despite preparation.
- Have someone to assist you; it is not advisable to be alone.
- Inform someone out of the fire danger zone of your decision to stay and defend your property. Instruct them to call and check on you or keep in touch with them so there is always someone who knows that you are doing ok.

Personal Protective Equipment (PPE)

Although you will not be actively engaged in formal firefighting operations it is still important to have appropriate personal protective equipment as you will potentially be exposed to smoke, heat and fire. For this reason, have a wildfire kit ready for action. Include the following:

- Leather Gloves. (Elbow length leather welding gloves are a cost-effective solution).
- Leather Boots. (Leather hiking boots work well).
- Full length cotton or fire-resistant overalls or full-length cotton pants and shirt.
- Firefighting Goggles. (Note they must be heat rated).
- Flash Hood. (Fire resistant balaclava for your head and face).
- Helmet.
- Headlamp.
- Bottles of drinking water (Not a PPE requirement but essential nevertheless).

All PPE items should be stored together, be easily accessible and be checked prior to each fire season.

Wildfire - What to Expect

- Wildfires can be a terrifying situation.
- Strong, gusty winds and intense heat will make you tired quickly.
- Thick, heavy smoke will sting your eyes and choke your lungs making it difficult to see and breathe.
- The roaring sound of the wind and the fire approaching will make it hard to hear.
- Embers will rain down causing spot fires all around you.
- Power and water may be cut off.
- You may be isolated.
- It will be dark, noisy, and extremely physically and mentally exhausting.

Please refer to the General Wildfire Information Document provided with this report which guides you through the property defensive action you can take to defend your property.

General Guidelines for Wildfires

Keep non-essential people away from the fire

The only people who should be in close proximity of a wildfire are those who are trained to deal with wildfires. All non-essential members of the Simon's Kloof community must be kept away from a fire scene. It is a dangerous and rapidly changing environment. Wildfires are especially fast moving. Bystanders who think they are far away from a fire can get compromised very quickly. You need to try and implement measures to keep all non-essential people away from fires especially visitors to Simon's Kloof who are not accustomed to wildfires and the risk they pose.

Be aware of weather

No fire is ever the same and this is largely due to the variables that effect fire. Weather is one of the critical variables you need to be aware of. Make sure you have a forecast for the day of a wildfire occurring as well as look at subsequent days so you can anticipate what you might be dealing with.

Be aware of the condition of your fuels, grass

Fuels are constantly in a state of change. Their moisture levels will have a role to play in how readily they ignite and spread. In periods of drought, you can expect fuels to burn easily and there to be a high rate of spread.

Fire spread and direction can change rapidly

Due to the nature of fynbos, which is a very flashy fuel, it will ignite and burn very quickly. It will move faster when burning upslope as well as with the wind. The flank of a fire can rapidly transition into the head with a shift in wind direction. You need to be mindful of this if you are in an area that is burning.

Do not underestimate the danger of wildfire smoke.

The smoke which comes from a wildfire can turn day into night. It can be incredibly thick and result in difficulty in breathing, headaches, nausea, dizziness and even death. Do not spend prolonged periods of time in smoke and avoid areas of smoke if at all possible.

General Guidelines of What Residents and Workers Can Safely do Before and During Wildfire Incidents (Who, What, Why, How, When)		
Status of Wildfire	**Who**	**Within your Control**
Before	Residents	***Proactive Measures Before a Wildfire Occurs:*** - Community wildfire and all hazard strategic plan. - Wildfire risk reduction measures homeowners can put in place around their property, homes & assets. - Initiate a good working relationship with neighbours, CPFPA. - Develop a community incident response team with training in the Incident Command System. - Intelligence gathering and putting together a plan for wildfires.
Wildfires Ignitions	Residents & Staff	Limit ignition risks through education about the risk of human ignition sources within your suburb.
Limit Wildfire Spread	Residents & Staff	- Rapid identification that a wildfire has started and fast and accurate reporting of wildfire to relevant resources to deal with wildfire. - Pre-planning and measures to reduce the spread of fire within your areas of control. - Fuel reduction areas and controls within your suburb. - Defendable space and risk reduction measures around homes and assets on suburb. - Fuel reduction initiatives such as alien vegetation control and fuel management.
Wildfire Operations	Residents & Staff	Structured and well-organised relationship with local Municipality and Fire Suppression agencies in order to provide intelligence and support for fire services: - Location of working water points, hydrants. - Best access routes. (Maps of your area). - Knowledge about previous fire behaviour. - Community representation at the Incident Command Post - Basic logistical support: staging area location, office area for Incident Command, internet connection, refreshments for fire crews.
Evacuations	Residents & Staff	- Voluntary evacuation of the young, frail, infirm, sick etc. well before a wildfire impacts the suburb. - Community must plan for when an evacuation is ordered. - Community rally points can assist to gather community. - Have a community led communication plan for evacuations but also ensure you obey official orders from the emergency services.

Understanding When to Stay and When to Leave

Evacuation Planning

Simon's Kloof is in a wildfire area where being put in a position where you must make a decision about evacuating is highly likely. The process of evacuations is complex, and you need to assess whether or not evacuations are necessary for an incident. As a suburb community, you can help guide the process and initiate voluntary early evacuations of some residents however when it comes to mandatory evacuations, this will be in the charge of the official authorities. It is importance that:

a) Simon's Kloof has a plan for all types of evacuations and,

b) If you choose to evacuate or stay, you inform the authorities through good channels of communication. Contact the relevant authorities, to inform them of your plan to voluntarily evacuate or stay. This is of importance as they may have crucial information or instructions for you, which may assist or guide your actions. For example, roads might be cut off by fire and your evacuation routes may be blocked.

Making the Decision

With wildfire you must look at the location of the wildfire, the potential paths it can burn based on forecast weather, the fuels and the topography and determine if your residents, workers, or community will be in harm's way or under threat in any way. Take into account the Fire Danger Index and be aware of severe fire behaviour with regards to temperature, wind and relative humidity. Be cognisant of these factors as well as drought conditions to determine your community risk level based on the severity of the wildfire potential on that day.

Set trigger points which will determine when evacuation of areas will begin. Trigger points may be:

- when a wildfire reaches a specific geographic location.
- when the smoke from the wildfire starts to come across the suburb.
- right at the outbreak of any wildfires in close proximity to people and homes.

Every situation will be different, and you will need to make an assessment and then set an appropriate trigger point.

Have a Plan for Evacuation Procedures

An evacuation is a stressful process to undergo so before activating this process you need to be prepared and have a plan and make sure community members know the plan. Important to the process is:

- Communication channels/methods you will use.
- Workers/Residents understanding of what is expected of them.
- Travel arrangements to get from their current location to a safe area.
- Locations to house the evacuees.
- Safety and security considerations for the area once it has been evacuated.

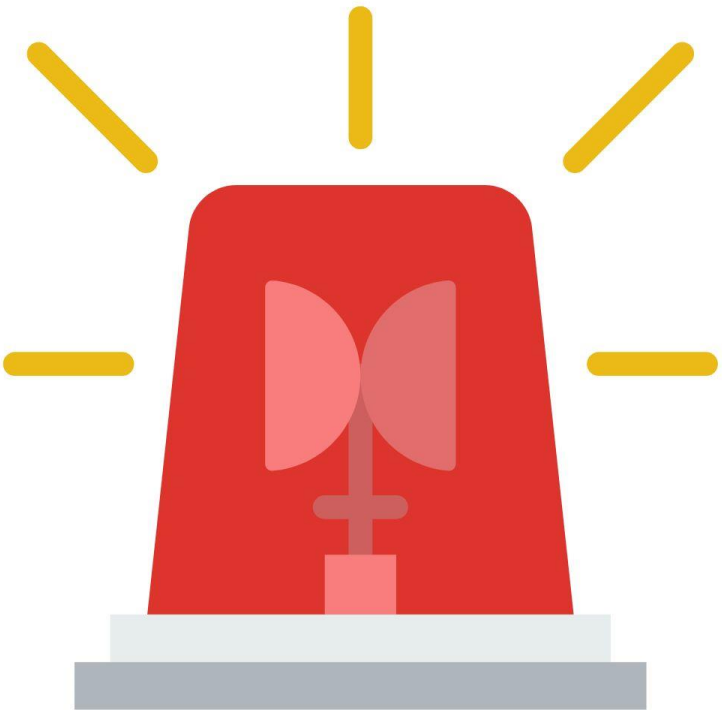
How will the alarm be raised? What communication method/s will you make use of?

It is important to consider all your communication options and consider what method or methods of communication will:

a) Be effective and reliable.

b) Reach your intended workers/residents.

You may need a combination of communication methods to cover different scenarios. With the possible threat of cell phone signal being lost due to wildfire, consider alternative, less high-tech solutions as well.



Possible Stages of Evacuation

Before you arrive at a situation where you suddenly must evacuate the suburb all at once, it would be preferable to initiate a staggered process based on who is one the property at the time. The possible phases include:
(Note: You can add or subtract stages from this process based on your knowledge of your area or the specific needs of the incident).

a. **Evacuation Alert**
b. **Early Voluntary Evacuation of High-Risk Homes / Residents**
c. **Secondary Voluntary Evacuation of Residents**
d. **Mandatory Evacuations**

Evacuation Alert

Before evacuating you may wish to issue an evacuation alert. The purpose of this alert is to inform the people concerned of potential or impending danger. An evacuation alert may allow for the affected workers and residents to begin an orderly preparation to leave the area while also affording you the opportunity to inform them of the evacuation routes and procedures they might need to follow.
Communication with the community is important prior to any incident or evacuation to ensure the following is understood:

- Individual roles and responsibilities.
- Threats, hazards, and protective actions they might need to consider.
- Notification, warning, and communications procedures.
- Means for locating family members in an emergency.
- Procedures to run through prior to evacuation.
- Evacuation, rally points, shelter procedures.

Early Voluntary Evacuation of High-Risk Homes / Residents

- Alert the relevant authorities you are going forward with an Early Voluntary Evacuation of High-Risk Homes / Residents on the property.
- An early evacuation should focus on the most vulnerable in the community first. Well before the wildfire reaches Simon's Kloof this evacuation must prioritise the young, old, infirm, sick and vulnerable.
- Include the evacuation of high risk, high exposure areas and homes/buildings in your early evacuations. These are your properties with the highest wildfire exposure bordering the property boundary.

Secondary Voluntary Evacuation of Residents

- Alert the relevant authorities you are going forward with a Secondary Voluntary Evacuation of workers, residents at risk.
- This process takes into account the rest of the community that has not evacuated in the Early Evacuation phase.
- At this stage the evacuations are still voluntary as you cannot force residents to leave their property unless mandatory evacuations have been ordered.

Mandatory Evacuations

- By establishing good working relationships and communications with the local fire services and CPFPA you will hopefully receive forewarning when these types of evacuations are about to take place.
- You will be in a position to inform them of the residents who have already evacuated.
- You will be in a position to assist with communicating this to the community.
- Forcing anyone to leave the area or their home is only a function that can be performed by the relevant authorities.

Reminder of Evacuation Decisions

- Careful consideration of the roads or routes you choose to use when evacuation occurs is important. Give clear instructions as to which are the safest routes to travel.
- You will want to evacuate away from any danger or risk towards a rally point. This rally point must be communicated in the evacuation order.
- Ensure the evacuees are informed and prepared for the evacuation process before an incident occurs to allow for this process to be as calm as possible.
- Each homeowner can have a predetermined location for where they will go. This is something we advise you put in place and practice for your community.
- Have an official communication method to activate evacuations.
- As you are evacuating early or in stages you should not hamper the emergency services incoming 'traffic' however be mindful of this factor.
- During an emergency it is important that the main gate be opened immediately, and stay open.

Rally Points and Evacuations

- Consider evacuating the community to pre-determined Rally Point areas, from which you can then determine the appropriate actions.
- Constantly assess your rally points for suitability based on the incident severity and location.

Safety Zones / Areas

Evacuating may not be possible and may put residents in danger by travelling along roads that are already surrounded by wildfires. (Always remember if an evacuation is required, evacuate early for this reason).

It these instances it will be safer for residents to stay in predetermined house that is deemed to be safe from main wildfire risk. This home must have had the Home Ignition Zone principles applied and defendable space around it. All residents should gather in the same location and resources must be assigned to stay alert as to the conditions outside. If the home does become compromised an alternative safety zone must serve as a backup option. Always stay in touch with emergency services to inform them where you are sheltering.

Community members and residents who choose not to evacuate and stay to defend their property

- These members do so at their own risk.
- They must have done proactive planning and work around their home to safely commit to this option. *WildfireReady principles must be applied, such as creating defendable space, having water capabilities etc. and they must be adequately prepared with the right personal protective equipment to defend their homes. They must also be physically fit to do so.

*We have supplied a WildfireReady document along with this report. This contains information about evacuation and ‘what-to-do’ in different eventualities. We do not wish to duplicate this content in this report.

C O N C L U S I O N

Simon's Kloof is an extension of the natural surroundings which makes it a beautiful place to live in but also a place that has very real elements of wildfire danger. It is not a question of if, but rather a question of when, the next wildfire will occur.

High Risk / Low Frequency Wildfire Incidents
This is a category of wildfires where there is potential for loss of life, property, infrastructure and assets in Simon's Kloof and surrounding suburbs. The threat can come from a small or a large wildfire, but in both cases the extreme nature of the incident and fire behaviour is the factor that will put the incident into a High Risk / Low Frequency category. We believe this threat comes from a large wildfire driven by a southerly wind, but stay alert as any incident can result in risk. Disaster can strike when factors align such as drought, high fuel loads, extreme weather, elements of topography, location of ignition, direction of fire spread, proximity of structures, stretched resources, rapid escalation of the incident. ***Be prepared to deal with the worst-case scenario.***

It takes hard work to prepare for this threat level, but it is vital. Small details matter and it is the reason why certain themes and topics have been highlighted and repeated throughout the report. There is no way to eliminate risk however having an action plan and performing the necessary preparation before wildfires occur in your area will help guide you through an incident and significantly reduce the chance of damage or loss. Acting on this report and preparing the Simon's Kloof community is an important, ongoing task. A big part of the challenge is also having a positive influence on your neighbouring landowners.

This report is aimed at increasing your awareness about the risks and providing the possible solutions; however, no report can guarantee complete protection. There are a multitude of variables that can have an impact on fire behaviour and how it impacts the structures, and assets within your suburb. Even if all the recommendations are implemented, loss and damage from wildfire is still a possibility which you must plan and be insured for. We have highlighted the variables that could be identified at the time of the assessment, and we recommend that you update and refresh your wildfire risk planning on an annual basis. There is no need for a detailed report such as this but rather a short site visit to see if you are on track, and problem-solve any challenges.

The Vulcan Wildfire Management Team wishes you all the best on your path to becoming WildfireReady. Should you have any questions about your report or need any further advice, please contact your Vulcan Wildfire Management assessor.

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