Operational Safe Work Instruction
Agrichemical Spraying: Procedures and Equipment - General Procedure

ROTORUA LAKES COUNCIL
Te Kaunihera o ngā Roto o Rotorua

INTRODUCTION AND PURPOSE

The Parks & Open Spaces and Utilities team at Rotorua Lakes Council maintain, manage and construct infrastructure and facility assets.

A variety of work is carried out across gardens, reserves, sports fields, roadways and forest blocks which involves agrichemical spraying of herbicides, insecticides, fungicides and fertilisers. The purpose of this Safe Work Instruction is to document the requirement for workers carrying out agrichemical spraying to hold appropriate certification and describe how spraying will be completed in a safe, controlled and professional manner with documentation completed and filed.

“Hazardous substances” (including chemicals) are a recognised Critical Risk. The main risk from chemicals is personal illness/injury, and environmental contamination. Before deciding to use an agricultural spray, users should always consider whether there is a safer alternative.

Spraying Methods Covered:

- Knapsack spraying for herbicide, broad-leaf weeds, fungicide and organic fertilisers
- Greenhouse spraying at the RLC Nursery including herbicides, insecticides, fungicides and fertilisers
- Boom Spraying
- Battery-Powered Spray Units (120L & 400L)
- Spray Ute with Hose Reel

Workers should read this Safe Work Instruction in conjunction with A Guide to Applying Agrichemicals: Responsibilities of Applicators (BOP Regional Council); and the Critical Risk “Hazardous Substances”.

Before carrying out any work covered by this Safe Work Instruction, workers must read and show they understand this document. Line managers (supervisor/managers) will sign off to confirm competency.

RISK AND HAZARD MANAGEMENT

POTENTIAL RISKS AND HAZARDS (please refer to centralised hazard register for controls)		
	Our Critical Risks	**Generic and Team Specific Hazards**
	▪ Confined spaces ▪ Driving ▪ Hazardous substances ▪ Physical Strain ▪ Geothermal and Environment ▪ Violence and Aggression ▪ Working Roadside ▪ Workplace Stress and fatigue	▪ Agricultural spraying ▪ Spraying greenhouses ▪ Driving off road ▪ Poisons ▪ Aggression (public) ▪ Working around animals including livestock ▪ Effects on respiratory system or skin ▪ Environmental contamination

REQUIRED PPE					
					
Protective footwear	Spray suits (disposable)	Approved Hi-Vis	Chemical resistant	Head protection	Chemical splash goggles

“AS REQUIRED” PPE		
		
Respirator	UV protection	Hearing protection

REQUIRED EQUIPMENT							
							
Safety data sheets for chemicals	Sprayer / knapsack / spray ute	Spill kit	Spraying in Progress signage	Water for flushing chemical off skin (eg container)	Device: Phone/ tablet	Fire extinguisher	First aid kit

"AS REQUIRED" EQUIPMENT			
			
Decanting equipment	Radio transmitter (RT)	Sharps container	Cones and barriers

REQUIRED CONSUMABLES (agrichemicals)				
				
Glyphosate @ 10 ML/LTR	Trichloram @ 6ML/LTR	Conquest @ 6ML/LTR	Triclop @ 6ML/LTR	Terbuthylazine @ 40 ML/LTR

"AS REQUIRED" CHEMICALS	
	
Petrol/fuel	

REQUIRED DOCUMENTATION/RECORDING		
	▪ Hazard ID – daily workplace risk and hazard assessment (filled in on phone/device) ▪ Vehicle Check (filled in on phone/device) ▪ BA Check Sheet	▪ Safety data sheets ▪ Time sheet to record hours worked

GENERAL SAFETY REQUIREMENTS

Storage of Agrichemicals

Storage of agrichemicals is subject to the Health & Safety at Work Act 1995 and the Hazardous Substances and New Organisms Act 1996. Agrichemicals are stored at the Depot and Nursery as well as satellite sites (Smallbone and Kuirau Park).

Chemical storage should be subject to regular inspection by a certified handler. This will be documented and action plan prepared for follow up as required.

Staff undertaking any agrichemical spraying should be aware of content of and storage for Safety Data Sheets.

TRAINING REQUIREMENTS

Certification of Users

Unless under an approved training programme, all staff undertaking agrichemical spraying must:

Certification:	Be certificated as a "GrowSafe Certified Operator" under the Agrichemical Users Code of Practice NZS 8409:2004 *Note:* For training purposes, a non-GrowSafe holder may spray only under the direct supervision of a Certified Operator.
First Aid Certification:	Hold a current first aid certificate

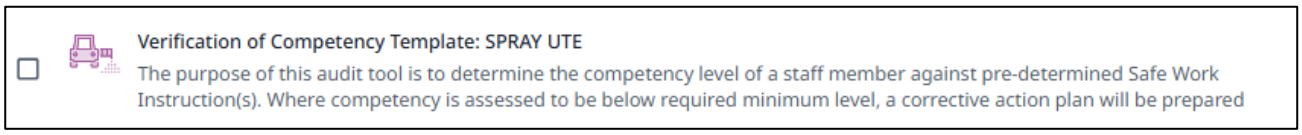
Verification of Competency

Operators must demonstrate competency in:

- Safe handling and preparation of agrichemicals
- Correct operation of assigned spraying equipment
- Use of PPE and emergency procedures

Verification is confirmed by a Supervisor prior to any independent work.

Prior to commencing work with the spray ute, operators must be verified as competent. The Verification of Competency template for Spray Ute (as pictured below) can be accessed via Safety Culture.



STANDARD OPERATING PROCEDURE

Pre-Work Safety Checks

Standard Requirements for all Work	Task Specific Requirements
1. Toolbox meeting: Discuss tasks and roles 2. Check and test communication devices (RTs, tablets, phones) are working effectively. 3. Check machines, tools and consumables are available and safe to use. 4. Complete and record Hazard ID (daily risk and hazard assessment)	*Manager / Supervisor* is responsible for: 1. Completing initial risk assessment 2. Ensuring staff are physically and mentally fit for the work (high risk task) 3. Referring to Service Level Agreement with Rotorua Lakes Council for specifications for weed spraying in different areas 4. Ensuring staff are GrowSafe certified

Standard Requirements for all Work	Task Specific Requirements
5. Complete Vehicle and Plant checks on device 6. Check machines, tools and consumables are available and fit for purpose. 7. Determine if traffic management is required and arrange 8. Load equipment and consumables. Ensure loads are correctly 9. Risk assess likelihood of environmental spill and source spill kit if needed	5. Ensuring decontamination and emergency response procedures are in place and appropriate 6. Ensuring appropriate notice of spraying operations provided to the public where required *All operators* are responsible for: 1. Checking weather forecast and Wind Speed Guide* 2. Checking that spray equipment has been calibrated 3. Completing a vehicle check if using a mobile unit 4. Determining rate of application 5. Determining chemical to be used 6. Identifying appropriate Safety Data Sheet (SDS) 7. Determining spray team 8. Determining location and type of vegetation to be sprayed 9. Determining completion date

WorkSafe NZ tells us we need the following for ALL hazardous substances:

- An inventory and Safety Data Sheets (SDS) for all hazardous substances we use, handle, and store
- Risk assessment when eliminate or minimise the hazard
- Information, instruction, training an supervision
- An emergency response plan
- Labels for all hazardous substance containers including waste
- Personal protective equipment (PPE)
- Substance-specific controls if hazardous substances are used, handled or stored over specific levels (eg include fire extinguishers, signage, certified handlers)

1. Emergency Procedure: First Aid

- If in doubt, call emergency services on 111 for immediate medical assistance
- Advice can be sought from the National Poisons Centre (0800 POISON – 764 766)
- Eye contact – immediately flush with flowing water for at least 15 minutes, seek medical attention
- Skin contact – wash with plenty of soap and flowing water for at least 15 minutes while removing contaminated clothing, dispose of clothing or wash prior to re-use

- Inhalation (breathing in) move victim to fresh air, contact emergency services if ongoing effects
- Ingestion (swallowing) – seek immediate medical attention

2. General Principles (Environment Bay of Plenty)

- Agrichemical use must not result in any harmful concentration beyond the boundary of the subject property or target area
- Where agrichemical is Toxicity Class 6 or Ecotoxicity Class 9 poison then the applicator must be a Certified Approved Handler
- The agrichemical must be used in a manner that does not contravene any requirement of the manufacturer's precautions and instructions
- The agrichemical must be used in a manner complying with the New Zealand Standard Management of Agrichemicals NZS8409.

3. Environmental Spills

- Spills must be cleaned up immediately using Spill Kits and reported in Vault as an incident
- Minimise runoff into waterways and drains
- In case of spills apply Zeolite provided to absorb chemical, clean up, and place any contaminated material in a blue waste bin or black fish bin (provided with Spill Kits)
- When bin is full, dispose of spill into a plastic rubbish bag and dispose of into landfill waste bins at Depot or Nursery

4. Spray drift and Spraying around Water

Spray drift occurs due to weather conditions, operator method of application or the landscape spray moves outside the target area. It is important to prevent spray drift to prevent damage to non-target plants, pollution to water, land, animal and plant systems or side-effects in humans. Accurate discharge methods are particularly important next to streams, rivers, lakes and wetlands.

Environment Bay of Plenty provide the following guidelines for spraying around water, and note that discharge must not be directly into streams, rivers, lakes or wetlands or contaminate any authorised water take.

Location	Land Slope	Area as Measured from edge of the surface waterbody
Lakes (Rotorua, Rotoiti, Rotoehu, Rotoma, Okataina, Okareka, Tikitapu, Rotokakahi, Tikitapu, Rotokakahi, Tarawera, Okaro, Rotomahana, Rerewhakaaitu)	0 to 7◦	Between 0-5 metres from edge of lake
	>7 to 25◦	Between 0-10 metres from edge of lake
	>25	Between 0-40 metres from edge of lake
Streams, rivers, wetlands and all other lakes	0 to 7◦	Between 0-2 metres from edge of water body
	>7 to 15◦	Between 0-5 metres from edge of water body
	>15 to 25◦	Between 0-10 metres from edge of water body
	>25 to 35◦	Between 0-25 metres from edge of water body

	>35◦	Between 0-40 metres from edge of water body

5. Weed Control in Streams/Rivers/Lakes/Wetland

Rule 21 of the Regional Water and Land Plan allows the discharge of aquatic herbicides over water for emergent aquatic weed control. This is limited to identified plant pests and vegetation in drains and other artificial watercourses. Only aquatic herbicides approved by the Environmental Protection Authority can be used.

Note that RLC does not have staff certified in aquatic spraying, therefore this is prohibited

6. Chemical Preparation (General Guidelines)

- Always refer to Safety Data Sheet (these are stored in individual Chemical Stores and also electronically on 'The Core')
- Chemical preparation must occur either at the Depot Chemical Store or Nursery site (pre-mixed chemicals can be taken to the work site)
- Wear full PPE/safety equipment when filling chemical tanks or containers
- Always check the appropriate chemical is being used for the task
- Always check the application rates on the chemical label
- Ensure chemical being used is identified
- Read safety precautions on chemical labels before pouring concentrate and mix as per instructions
- Only mix enough spray required to complete the job
- Use clean water to decant
- Use measuring cups provided for decanting
- Use hose specific to chemical store
- Complete "stock out register" from Chemical Store
- Any chemical that is decanted into smaller bottles must have the chemical label on the bottle – never place a chemical in an unlabelled container
- Install public notification spray signage informing of chemicals used and re-entry time, at entry points to site (If applicable)
- Do not use empty chemical containers to store any other liquid
- Some containers are eligible for recycling via AgRecovery. For containers that are HDPE plastic, 0-60 litres:
  - do not remove label
  - do not puncture
  - remove lid, triple rinse
  - drop off at Agrecovery site (Farmlands, 60 Marguerita Street, Rotorua or Farm Source, 40 Marguerita Street, Rotorua)
- For all other containers, triple rinse containers in wash bay and puncture empty containers before storing in cage by Chemical Shed at Depot.

7. Pre-Start (General Guidelines)

- Notify supervisor or manager before commencing spraying including estimated time of completion
- Check public, staff and animals are clear of spray area AT ALL TIMES while spraying
- Follow specifications when spraying herbicides
- Install public notification spray signage informing of chemicals used and re-entry time, at entry points to site

Weather conditions:

- Monitor wind and general weather conditions throughout
- Do not use in wind that will cause excessive spray drift

Wind speed guide for spraying (GrowSafe Manual 2020)

Approx airspeed at nozzle height	Description	Visible signs	Spraying
Less than 2 km/hour	Calm	Smoke rises vertically	Use only medium or coarse spray quality
2-3 km/h	Light air	Direction shown by smoke drift	Avoid fine spray on warm, sunny days
3-6 km/hour	Light breeze	Leaves rustle, wind felt on face	Ideal spraying conditions
6-10 km/hour	Gentle breeze	Leaves and twigs in constant motion	Good spraying
10-15 km/hour	Moderate breeze	Small branches move, raises dust or loose paper	Increased risk of spray drift, avoid fine sprays
15 – 20 kms/hour	Fresh breeze	Small trees sway	Extreme caution with any spray
20 km/hour plus	Strong breeze	Large branches sway	Unsuitable for spraying

10. Completion of Work (general guidelines)

- Remove spray signs after appropriate period to indicate sprayed areas safe to return to
- Complete Spray Applicators Report on iAuditor
- Wash vehicle and other equipment if possible contamination has occurred
- Clean (triple rinse) all spray equipment, including tanks, mixing equipment and decanting equipment. Triple-rinsed containers can be disposed of at a landfill.
- Dispose of spray suit if possible contamination has occurred or sufficient wear
- Place respirator filters in airtight container when not in use
- Make sure all safety gear is cleaned and dried after use

Knapsack Spraying

Pre-Start

1. Always check correct knapsack is used (these are clearly marked with **Herbicide only** or **Insecticide/Fungicide only** and kept in separate storage areas).
2. Check operation of knapsack including spray wand is working before adding chemical
3. The knapsack should be filled to reflect size of spray area. Staff should always take into account their own physical capability and wear shoulder padding if required
4. Avoid overfilling knapsack, always check application rates on chemical label for knapsack operation
5. Use measuring cups supplied – ensure no mixing – use separate cups for herbicide, insecticide and fungicide
6. Use appropriate spray nozzles task

Operation

1. Install public notification spray signage informing of chemicals used and re-entry time, at entry points to site (If applicable)
2. Pump the lever to appropriate pressure for the job at hand
3. Always hold spray wand as near to the ground as possible to avoid drift
4. Carry out spray operation
5. Rest arms from time to time to avoid fatigue

Completing spray work:

1. Never leave any chemical in knapsack when finished.
2. If clean-out of knapsack is required, this must be at designated wash down site

Greenhouse Spraying (Nursery)

Set Up

1. Make arrangements for watering of plants in greenhouses late afternoon, day before spraying Inform staff at least one day ahead to ensure plants have been watered well enough to last until at least midday on the following day
2. Inform all staff at morning meeting that spraying will be occurring at the Nursery, indicating areas and times for spraying
3. Refer to 'General Guidelines' for set up
4. Place "spraying in progress signs in front of all greenhouses where spraying will take place as well as each area where public usually travel from the retail area to back areas, place signs behind sales office and tractor shed and also put up barriers and cones
5. Place signage on the doors at either end of the glasshouse being sprayed stating date, chemical being sprayed and safe re-entry time.

Operation

1. Turn fans off
2. Close green house doors behind you. Only spray with doors closed
3. Spray target vegetation only from above to give an even coverage of all foliage. Use extended spray wand to spray high foliage as needed
4. Rest arms from time to time to avoid fatigue
5. Notify supervisor when spraying complete

Boom Spray Units

Set up

1. Ensure tray lock clip is in place
2. Tank - two people to load by hand
3. Position onto buggy tray
4. Tie down tank on vehicle
5. Connect leads to battery: Red to positive and black to negative
6. Test by turning switch to on and pump will start working
7. Mount brackets to rear of buggy and attach boom
8. Connect hose from boom to tank
9. Fill tank with water
10. Check spray flow and nozzles by turning pump on

Operation

1. Fill tank with water (only enough to complete job)
2. Check spray flow and nozzles by turning pump on
3. If operational fill with chemical to correct dilution (on site if possible)
5. Turn switch on to start pump
6. Start spraying
7. Spray out remainder (as much as possible) on site

Operation Complete

1. Wash tank down and rinse out
2. Remove tank from buggy
3. Store tank in Parks Shed at Kuirau Park

Decontamination after boom spraying:

1. Decontamination to be undertaken at Depot Wash Bay
2. All equipment should be cleaned using clean water, by flushing large volume of water through tank, pump hose lines and general washing of vehicle

3. Tanks to be flushed with ammonia solution to remove any residue (flushing with ammonia solution may need to be carried out two-three times)

Battery Powered 400L and 120L Spray Unit

Pre Start

1. Check respirator filter expiry dates
2. Replace respirator filters regularly

Set Up

1. Ensure tray lock clip is in place (back of the mule/buggy)
2. Large Tank - use forklift to lift on to truck or Ute
3. Small Tank - two people to load by hand when empty
4. Position at front of tray behind cab
5. Tie down tank on vehicle
6. Connect plug to outlet
7. Fill tank with enough water to calibrate before use and check for leaking and pressure. Test by turning switch to on and pump will start working

Operation

1. Mix in chemical (on site if possible)
2. Turn switch on to start pump
3. Start spraying
4. Pump is pressure operated and will start and stop depending on usage
5. Spray out remainder (as much as possible) on site

After Spraying

1. Wash tank down and rinse out
2. Off load and store tank in correct location
4. Triple rinse (in wash bay) empty spray containers before recycling
5. Return respirator filters to airtight container when not in use
6. Remove public notification spray signage after set time – depending on withholding period for chemical used

Spray Ute

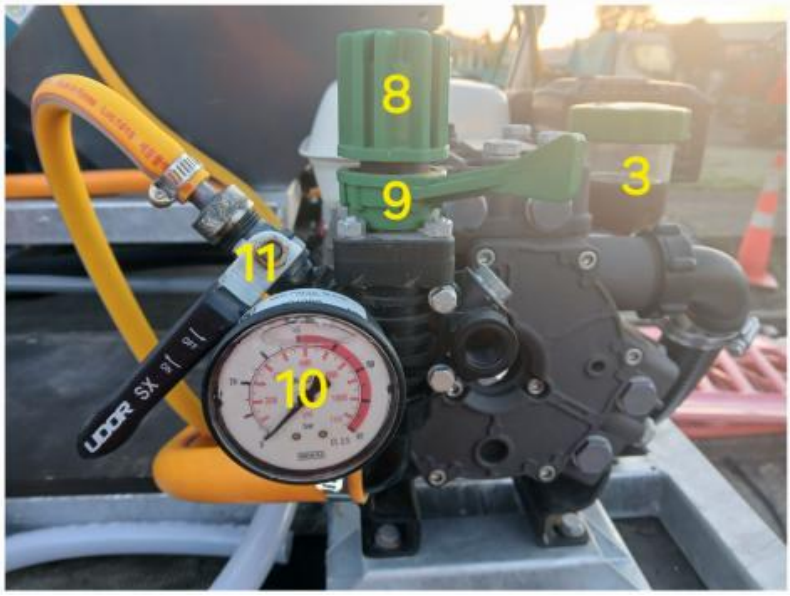
Pump motor (on deck) operation:

1. Check fuel (petrol) (1) and oil levels (engine (2) and pump (3)).
2. Ensure fuel tap (7) and engine switch (14) is set to on.
3. Set choke (4) on full and set throttle (5) to ¼
4. Ensure pressure tap (9) is turned to off
5. Ensure tap from pump to reel (11) is off
6. Pull cord (6) to start
7. Turn choke (4) off
8. Turn both pressure (9) and tap to reel (11) on and check for any visual leaks
9. Adjust throttle (5) and pressure using pressure regulator (8) to suit task
10. Shut down pump with engine switch (14)

Hand Gun Operation:

1. Set pump rpm at 1/2 -full throttle
2. Adjust pump pressure regulator (8) (Ensure throttle is set before changing pressure on regulator as any change in motor rpm will change pressure at regulator, check pressure psi by watching pressure gauge (10) while adjusting throttle (5) and regulator (8)) Usually set between 5< for low pressure minimal spray drift obstacle spraying eg. Blackberry gorse etc. adjust as needed) Maximum 120psi (DO NOT EXCEED – it is not a target!)
3. Check handgun is operational and nozzle is clear.
4. Pull hose out from reel ensuring reel motor (13) is turned on via toggle switch and screen shows an illuminated 0. Ensure remote is in hand.
5. Full trigger pull gives full jet flow.
6. Half trigger pull gives fan flow

7. To return hose to reel, pull slack out of hose and use remote ensuring no kinks or obstructions before retracting hose.
8. Remote function fast (20) slow (21)



Knapsack filling:

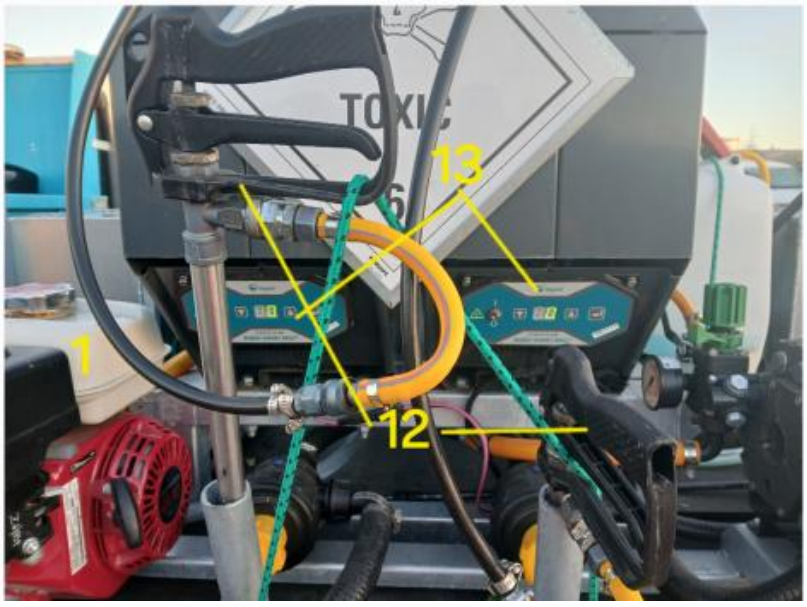
1. Position knapsack under outlet of decanting hose (16).
2. Open decanting tap (15) slowly at first to ensure no splash back occurs and adjust accordingly.
3. When knapsack is full turn off decanting tap (15) Before removing decanting hose (16) from knapsack ensure that you lift hose at tap (15) end to ensure all chemical is removed from decanting hose (16) securely and tidy on back of ute deck.

Working operation:

1. Ensure 4WD is engaged on slippery and undulating terrain (refer to manufacturer handbook on procedure)
2. Position truck at starting point of Spray task to be completed. If work area is greater than 100m (length of hose on reel) then position vehicle 100m downward from spray start.
3. Start pump motor (refer to pump motor operation).
4. Unwind reel hose to start of job or furthest end and spray your way back towards ute. This is to ensure when reeling hose back in you don't reel the hose through chemical you have applied.
5. Once job is complete stop motor ensuring pressure tap (9) and tap to reel (11) is off.

Decontaminating tank and pumps:

1. Decontamination to be undertaken at Depot Wash Bay. Located next to spray shed in depot.
2. All equipment should be cleaned using clean water, by flushing large volumes of water through tank (18), pumps and hose lines (19) and general washing of vehicle. This may need to be carried out two-three times.
3. After tank has been rinsed and drained sufficiently operate pump motor and flush chemical from pump hoses (19) (see pump motor operation).
4. Tanks and pump hoses to be fushed with ammonia solution to remove any residue (flushing with ammonia solution to remove any residue (flushing with ammonia solution may need to be also carried out two-three times).
5. Final decontamination process is to open decanting tap (15), this removes final water within line and allows tank (18) to drain fully.



Post-Work Safety Checks

Standard Requirements for all Work	Task Specific Requirements
1. Toolbox meeting: Discuss any new risks or hazards, make sure events (incidents, injuries, illness or near misses) are recorded 2. Check machines, tools and consumables are appropriately stored and fit for purpose.	1. Completing Spray Applicators Report on iAuditor after handling any concentrated chemical 2. Triple-rinse spray equipment and containers 3. Wash down vehicle if contamination occurred 4. Store equipment and PPE properly

LINKS-OTHER APPLICABLE DOCUMENTS

Legislation:

Hazardous Substances and New Organisms Act 1996

Local Government documentation:

A Guide to Applying Agrichemicals: Responsibilities of Applicators (BOP Regional Council)

Safe Work Instructions:

- RLC-OPS-GENERAL-008 Environmental Contamination Management
- RLC-OPS-GENERAL-020 Working Alone and High Risk Activities

APPENDIX 1: Spray Notice

AGRICHEMICAL SPRAY NOTICE

DATE:	
PRODUCT USED:	
AREA SPRAYED:	
APPLICATION TIME	
DATE/TIME SAFE FOR RE-ENTRY:	
CONTACT DETAILS (contact details for Manager and Council contact number)	