



Zero Waste Productions

WOZ Productions Case Study

An addition to the
**Green Screen Guide &
Directory of Contacts**
For Film Production

A joint project between:

Queenstown Lakes District Council
Film Queenstown
WOZ Productions

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1 EXECUTIVE SUMMARY

Who

This Zero Waste Case Study was a joint project between the Queenstown Lakes District Council, Film Queenstown and WOZ Productions. It was implemented to investigate typical waste management practices in the film industry and to identify ways in which the diversion of waste from landfill could be maximised through the use of more sustainable waste management practices.

Why

This initiative is aligned with the Council's Waste Management Strategy 2003. The Strategy outlines 43 waste minimisation initiatives that contribute towards achieving 35% waste diversion from Landfill. Initiative 18 of the Strategy states that all Film Companies operating within the Queenstown Lakes District are to manage their waste appropriately in accordance with the Strategy objectives.

This Zero Waste Case Study for Film Productions has enabled the Council to investigate, support and assist the film industry during the filming of a major feature film and to develop an understanding of the typical waste management practices employed by a production company.

Throughout the project, WOZ Productions granted the Council access to key departments and shooting locations, allowing a waste management officer to observe, consult, improve and report on the waste management and recycling systems employed. The outcomes of these findings are detailed in this report and a Zero Waste Film Production Toolkit was produced by the Council to provide an ongoing resource for future visiting film companies operating in the District.

What

The initiative concentrated on 4 key departments within WOZ Productions:

- Production Office
- SPFX
- Art & Construction
- Main Unit

These 4 departments were monitored to establish their key waste streams, quantity of waste produced and waste management practices; of which detailed figures can be found within this report. Improvements for reducing, reusing and recycling waste types and quantities were recommended and wherever possible waste management costs were determined.

Results

During the production of *Wolverine*, approximately **670 tonnes of waste** was produced across 4 departments. From this, an estimated 615 tonnes was diverted from the landfill through reuse and recycling, resulting in an outstanding **92% diversion rate**.

Costs

Overall the cost for recycling in the Queenstown Lakes District is significantly cheaper than disposing of waste to landfill. The potential cost savings that could have been made if the total quantity of waste produced during *Wolverine* was recycled rather than being disposed of to landfill was \$60,000. This highlights the significant cost savings that can be made if successful recycling systems are set up throughout a film production.

Conclusion

WOZ Productions achieved a high diversion rate during the production of *Wolverine* due to established recycling systems already being in place and the implementation of new systems where necessary. Staff were motivated and consciously made efforts to reduce and recycle and support was provided by selected Heads of Departments.

Improvements could be made in certain departments where efforts were limited and new initiatives could be implemented for future productions. With a top-down management approach, sufficient education and the use of local resources, managing waste appropriately within the film industry sector is an achievable and realistic goal.

2 INTRODUCTION

Queenstown Lakes District is the fastest growing District in New Zealand. Our 20-year growth forecasts tell us that this is a trend that is likely to continue in the near and distant future. Economic growth and waste arisings are inextricably linked, and with an increased number of residents and tourists attracted to the area the quantity of waste produced in our District is set to rise substantially.

It is our responsibility as a Council to ensure that, amongst other things, the infrastructure of our District keeps in step with the needs and demands of a growing community. Queenstown Lakes District Council (Council) is a Zero Waste Council committed to developing an integrated waste management system that diverts significant quantities of material from landfill to alternative and more sustainable waste management options. In order to achieve this vision and to maintain and fulfill community expectations and outcomes into the future the Council has adopted a comprehensive Waste Management Strategy (Strategy). The Strategy outlines the steps the Council is taking to introduce 43 waste minimisation initiatives that will impact upon all waste generated in and transported to the District.

Primary objectives of the Strategy are:

- To minimise the quantity of waste being landfilled by preventing waste production and maximising waste diversion;
- To ensure that those who produce waste meet the cost of waste management;
- To ensure the District's special environment is respected; and
- To undertake initiatives and partnerships with community groups and private enterprise.

The Council is committed to the principles of Zero Waste and working towards the target of achieving Zero Waste to the Landfill by 2020.

Initiative 11 of the Strategy states that all visiting production companies are to appropriately manage their own waste by reducing, re-using and recycling waste wherever possible¹, including productions for:

- Feature Films
- Documentaries
- TV content
- TV commercials
- Still shoots
- Promotional content

This document combines the objectives of the Strategy and the concepts of the New Zealand film initiative known as 'Greening the Screen'²; which is a guide that encourages visiting and resident production companies to make their productions as environmentally sustainable as possible and provides useful ideas and tips on how to

¹ Towards Zero Waste and a Sustainable District, Waste Management Strategy, Queenstown Lakes District Council, April 2003, Item, 11.8, Page 17.

² www.greeningthescreen.co.nz/

achieve practical environmental improvements. These may be adapted by any film production company regardless of size or length of production.

In order for the Council to gain an understanding of the types and quantities of waste produced by production companies operating in the Queenstown Lakes District and to assist the film industry manage its waste more sustainably the Council collaborated with WOZ Productions Ltd. to create this Green Screen Guide (Guide).

The objective of this Guide is to enable the Council and production companies to monitor and record current waste types and quantities and to identify areas where more sustainable waste management practices may be achieved. In addition the Guide provides resident and visiting production companies with the necessary information to maximise the diversion of waste from landfill and assist the Council achieve its Zero Waste goal.

In particular the Guide identifies how a film production company operates when shooting on location, what types of waste are produced and how these waste streams are managed.

The Guide includes:

- Waste Hierarchy and Minimisation Strategies;
- Overview of WOZ Productions and *Wolverine*;
- Key Departments and Waste Streams;
- Diagrams identifying current waste management practices;
- Landfill diversion rates;
- Problem Solving and Constraints; and
- Recommendations for future productions.

2.1 THE WASTE HIERARCHY

The waste hierarchy (Figure 1) is a simple communication tool used to demonstrate waste management priorities with the most preferred waste management option at the top and the least preferred option at the bottom.

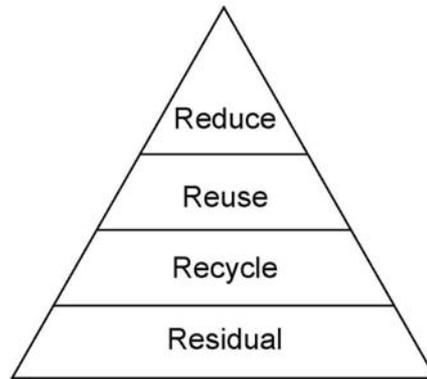


Figure 1: Waste Hierarchy

The waste hierarchy consists of four major stages:

- **Reduce** – reduce the quantity of waste produced;
- **Reuse** – reuse items wherever possible;
- **Recycle** – recycle old materials into new products; and
- **Residual** – dispose of residual waste to landfill.

The principles of the waste hierarchy should be adopted as the basis for any waste management plan. It has been used as a prerequisite in this Green Screen Guide.

2.2 OVERVIEW: WOZ PRODUCTIONS LTD. - *Wolverine: X-Men Origins*

Wolverine: X-Men Origins was managed and produced by WOZ Productions Ltd.; a New Zealand based production company operating in the Queenstown Lakes District for the making of the film.

Shot on location in Southern New Zealand, the filming took place in areas surrounding Queenstown, Glenorchy and Dunedin over a 4 month period from December 2007 to March 2008. WOZ Productions Ltd. were based in Queenstown for the duration of the project. In addition to these locations the film was also shot at a studio in Sydney, Australia.

Wolverine was a significantly-sized production of approximately 500 people incorporating large scale crews and multiple resources involving Location & Unit Crews, Production Office, Transport and Logistics, Special Effects, Art and Construction and Catering Services.

The Green Screen Guide focuses on the four largest Queenstown-based departments which include the Production Office, Special Effects, Art and Construction and Main Unit Base. These departments were audited on the basis that they produce the greatest quantity of waste and also the most harmful waste types. Each department was monitored to:

- Audit waste streams;
- Assess quantities of waste and recyclables produced;
- Review current methods of waste disposal; and
- Identify opportunities to reduce, reuse and recycle throughout the production.

Table 1 shows the four departments audited as part of the Green Screen Guide:

	DEPARTMENT	LOCATION	FUNCTION
1	Production Office (Headquarters)	<ul style="list-style-type: none"> • Peppers Beacon, Queenstown 	Administration and Department Coordination
2	Special Effects (SPFX)	<ul style="list-style-type: none"> • Queenstown Ice Rink 	Special Effects design and construction
3	Art and Construction (includes Wardrobe and Makeup)	<ul style="list-style-type: none"> • Production Office • Deer Park Heights • Glenorchy • Moke Lake Workshops 	Design and construction of all sets and props
4	Main Unit Base	<ul style="list-style-type: none"> • Deer Park Heights • Glenorchy 	Coordinates and supports all departments at filming locations

Table 1: Green Screen Guide Departments

Several smaller departments operated during the production however these were not assessed as they either worked in collaboration with the larger departments, were located on set and therefore used the waste management facilities provided on location or they did not to produce a significant amount of waste. The small departments included:

- Camera
- Sound
- Lighting
- Grip (lighting and camera structures)
- Script

3 WASTE AUDITS

This section of the Guide provides a department overview of WOZ Productions during the filming of *Wolverine*.

The department responsibilities, waste streams and waste methods used during this production are listed in Table 2.

DEPARTMENT	RESPONSIBILITIES	WASTE STREAM	WASTE MANAGEMENT PRACTICES	WASTE HEIRARCHY STRATEGY
<p>PRODUCTION OFFICE: HEADQUARTERS</p>	<ul style="list-style-type: none"> • Nerve centre of production; • Responsible for coordination and administration of all departments; • Permanently at one location; • Offices for: <ul style="list-style-type: none"> - Art Dept - Locations Dept - Transport Dept - Script - Producers - Directors - Production Coordinators - Administration Staff • Organises shooting schedules and call sheets. 	<ul style="list-style-type: none"> • Paper • Cardboard • Plastics 1-7 • Glass • Aluminium and steel • Printing Cartridges • Stationary • Confidential Paper • Packaging • Food Waste • Food Packaging 	<ul style="list-style-type: none"> • Recycling bins located within HQ Offices for paper, plastics, aluminium and steel and steel and glass; • Confidential documents collected by company in Christchurch for shredding and recycling. 	<p>Reduce:</p> <ul style="list-style-type: none"> • Print double sided • Reduce plastic bags <p>Reuse:</p> <ul style="list-style-type: none"> • Reuse printer cartridges • Green reusable bags for runners <p>Recycle:</p> <ul style="list-style-type: none"> • Recycle all plastics, paper, cardboard, glass and aluminium and steel <p>Residual:</p> <ul style="list-style-type: none"> • Minimal residual waste to refuse bins

DEPARTMENT	RESPONSIBILITIES	WASTE STREAM	WASTE MANAGEMENT PRACTICES	WASTE HEIRARCHY STRATEGY
<p>LOCATIONS</p>	<ul style="list-style-type: none"> • Based at Production Office; • Responsible for coordination of shooting locations; • Coordinates all departments required when filming on location, i.e. SPFX, Camera, Cast and Unit; • Responsible for disposing of bulk items on set including vehicles, SPFX equipment and props. 	<ul style="list-style-type: none"> • Paper • Cardboard • Plastics 1-7 • Glass • Aluminium and steel • Packaging • Printer Cartridges • Stationary • Confidential paper • Food waste • Vehicles • Electronics 	<ul style="list-style-type: none"> • Used recycling bins at production office for plastics, paper, cardboard, aluminium and steel and steel and glass; • Vehicles sent to Landfill for dismantling before being recycled. 	<p>Reduce:</p> <ul style="list-style-type: none"> • Print double sided • Reduce plastic bags <p>Reuse:</p> <ul style="list-style-type: none"> • Reuse printer cartridges • Green reusable bags for runners <p>Recycle:</p> <ul style="list-style-type: none"> • Recycling all vehicles and props; • Recycle all plastics, paper, cardboard, glass and aluminium and steel <p>Residual:</p> <ul style="list-style-type: none"> • Minimal residual waste to refuse bins

DEPARTMENT	RESPONSIBILITIES	WASTE STREAM	WASTE MANAGEMENT PRACTICES	WASTE HEIRARCHY STRATEGY
<p>MAIN UNIT</p>	<ul style="list-style-type: none"> • Reports to Locations and Production office; • Provides equipment, resources and support for other departments on set; • Works closely with Transport; • Responsible for implementing a waste management system on set for <i>Wolverine</i>; • Coordinated the transportation of waste from set to necessary resource recovery parks. 	<ul style="list-style-type: none"> • Paper • Cardboard • Plastics 1-7 • Glass • Aluminium and steel • Gaffer Tape • Packaging • Food scraps • Timber • Metal • Electronics 	<ul style="list-style-type: none"> • Implemented recycling bins on set for paper, cardboard, glass, plastics 1-7 and aluminium and steel and steel on set; • Electronics and other waste into refuse bins on set and taken to landfill. 	<p>Reduce:</p> <ul style="list-style-type: none"> • Reduce plastic bags <p>Reuse:</p> <ul style="list-style-type: none"> • Green reusable bags for runners • Refill water bottles • Refill coffee cups <p>Recycle:</p> <ul style="list-style-type: none"> • Recycle all plastics, paper, cardboard, glass and aluminium and steel <p>Residual:</p> <ul style="list-style-type: none"> • Minimal residual waste into refuse bins

DEPARTMENT	RESPONSIBILITIES	WASTE STREAM	WASTE MANAGEMENT PRACTICES	WASTE HEIRARCHY STRATEGY
<p>CATERING</p>	<ul style="list-style-type: none"> • Provides meals for cast and crew on location; • Responsible for portion control. 	<ul style="list-style-type: none"> • Food scraps • Plastics 1-7 • Glass • Aluminium and steel • Aluminium gel burner containers • Glad wrap • Packaging • Plastic cups 	<ul style="list-style-type: none"> • Recycling bins on set for paper, cardboard, glass, plastics 1-7 and aluminium and steel and steel; • All crockery, cutlery and food preparation equipment was washable and reusable; • Water dispensers available to refill water bottles and reduce wastage; • All food waste given to local farmers for chicken feed. 	<p>Reduce:</p> <ul style="list-style-type: none"> • Reduce plastic bags • Replace glad wrap with aluminium foil <p>Reuse:</p> <ul style="list-style-type: none"> • Reuse containers for food storage • Reusable crockery and cutlery • Refill drink bottles <p>Recycle:</p> <ul style="list-style-type: none"> • Recycle all plastics, paper, cardboard, glass and aluminium and steel • Food scraps to local farmer for stock feed <p>Residual:</p> <ul style="list-style-type: none"> • Minimal residual waste into refuse bins

DEPARTMENT	RESPONSIBILITIES	WASTE STREAM	WASTE MANAGEMENT PRACTICES	WASTE HEIRARCHY STRATEGY
CRAFT SERVICES	<ul style="list-style-type: none"> • Provides light snacks and refreshments for cast and crew on set; • Prepares refreshment boxes for satellite crews situated around shooting locations. 	<ul style="list-style-type: none"> • Paper • Cardboard • Plastics 1-7 • Glass • Aluminium and steel • Plastic water bottles • Disposable coffee cups • Snack bar wrappers • Glad wrap • Food scraps 	<ul style="list-style-type: none"> • Recycling bins on set for paper, cardboard, glass, plastics 1-7 and aluminium and steel and steel; • Plastic water bottles diverted into recycling bins; • Food waste given to local resident for chicken feed. 	<p>Reduce:</p> <ul style="list-style-type: none"> • Reduce plastic bags • Replace glad wrap with aluminium and steel and steel foil • Use biodegradable disposable coffee cups <p>Reuse:</p> <ul style="list-style-type: none"> • Reuse containers for food storage • Refill water bottles <p>Recycle:</p> <ul style="list-style-type: none"> • Recycle all plastics, paper, cardboard, glass and aluminium and steel • Food scraps to local farmer for stock feed <p>Residual:</p> <ul style="list-style-type: none"> • Minimal residual waste into refuse bins

DEPARTMENT	RESPONSIBILITIES	WASTE STREAM	WASTE MANAGEMENT PRACTICES	WASTE HEIRARCHY STRATEGY
<p style="text-align: center;">ART & CONSTRUCTION</p>	<ul style="list-style-type: none"> • Designs and creates all scenery, set and props; • Art office based at production office headquarters; • Construction based on set; • Construction report to Art office for briefs and plans. 	<ul style="list-style-type: none"> • Paper • Cardboard • Plastics 1-7 • Plastics not 1-7 • Glass • Aluminium and steel • Timber • Gaffer tape • Metal fixtures • Plants and turf • Hardfill and stone • Paint and solvents • Hazardous waste • Stationary • Confidential paper • Food waste • Packaging 	<ul style="list-style-type: none"> • Recycling bins at production office for paper, cardboard, glass, plastics 1-7 and aluminium and steel; • Scrap metal given to local residents and scrap metal merchants for reuse; • Main structures transported to Sydney studio for further shooting; • Excess timber, turf, plants and hardfill given to local residents; • Props taken back to Sydney or sold to local secondhand stores; • Solvent based paint recovered and recycled by external company; • Water based paints donated to local school. 	<p>Reduce:</p> <ul style="list-style-type: none"> • Print double sided • Reduce plastic bags <p>Reuse:</p> <ul style="list-style-type: none"> • Recycle printer cartridges • Green reusable bags for runners • Reuse props, set and wardrobe when possible or donate • Refillable coffee cups <p>Recycle:</p> <ul style="list-style-type: none"> • Recycle all plastics, paper, cardboard, glass,aluminium and steel • Recover paint and solvents • Recycle building materials or donate <p>Residual:</p> <ul style="list-style-type: none"> • Minimal residual waste into refuse bins

DEPARTMENT	RESPONSIBILITIES	WASTE STREAM	WASTE MANAGEMENT PRACTICES	WASTE HEIRARCHY STRATEGY
<p>SPECIAL EFFECTS (SPFX)</p>	<ul style="list-style-type: none"> • Based at Queenstown Ice Rink; • Prepares and repairs special effects equipment which is used during filming, including: <ul style="list-style-type: none"> - Vehicles (motorbikes, cars, trucks & helicopters etc); - Machinery and electronics; - Specially designed props (guns and weapons); - Pyrotechnics and explosions (stored for limited time and then relocated). 	<ul style="list-style-type: none"> • Cardboard • Paper • Glass • Aluminium and steel • Plastics 1-7 • Plastics not 1-7 • Gaffer tape • Machinery and engine parts • Car batteries • Car tyres • Electrical components • Scrap metal • Aerosols • Hazardous waste • Paint and solvents • Timber • Polystyrene • Food waste 	<ul style="list-style-type: none"> • Paper, cardboard, glass, plastics 1-7, aluminium, steel and aerosols separated into recycling bins supplied by Streetsmart; • Scrap metal collected by scrap metal merchant and reused; • Car batteries taken to Wakatipu Recycling Centre; • Hazardous waste, engine oil and solvents collected taken to Wakatipu Recycling Centre; • Timber, polystyrene and electrical components taken to landfill. 	<p>Reduce:</p> <ul style="list-style-type: none"> • Print double sided • Reduce plastic bags <p>Reuse:</p> <ul style="list-style-type: none"> • Reuse printer cartridges • Green reusable bags for runners • Reuse materials <p>Recycle:</p> <ul style="list-style-type: none"> • Recycle plastics 1-7, paper, cardboard, glass and aluminium and steel • Recover solvents, batteries and oil • Donate spare materials where appropriate <p>Residual:</p> <ul style="list-style-type: none"> • Minimal residual waste into refuse bins • Hazardous waste disposed of appropriately

DEPARTMENT	RESPONSIBILITIES	WASTE STREAM	WASTE MANAGEMENT PRACTICES	WASTE HEIRARCHY STRATEGY
<p>TRANSPORT</p>	<ul style="list-style-type: none"> • Responsible for transporting cast, crew and equipment from location to location; • Works closely with Unit and provides logistical resources to all other departments when required i.e. SPFX. 	<ul style="list-style-type: none"> • Occasional car battery • Engine oil • Food waste • Food packaging • Paper • Cardboard • Glass • Aluminium and steel 	<ul style="list-style-type: none"> • Recycling bins on set for paper, cardboard, glass, plastics 1-7 and aluminium and steel. 	<p>Reduce:</p> <ul style="list-style-type: none"> • Switch engines off when idle • Use high gears & low speed for fuel efficiency • Reduce plastic bags <p>Reuse:</p> <ul style="list-style-type: none"> • Green reusable bags <p>Recycle:</p> <ul style="list-style-type: none"> • Recycle all plastics, paper, cardboard, glass and aluminium and steel <p>Residual:</p> <ul style="list-style-type: none"> • Minimal residual waste to refuse bins

DEPARTMENT	RESPONSIBILITIES	WASTE STREAM	WASTE MANAGEMENT PRACTICES	WASTE HEIRARCHY STRATEGY
CAMERA	<ul style="list-style-type: none"> Responsible for all filming and camera work on set; Works alongside Lighting, Grip, Sound, SPFX and Cast. 	<ul style="list-style-type: none"> Used and discarded photographic film Cardboard Paper Plastics not 1-7 Gaffer tape Food and packaging 	<ul style="list-style-type: none"> Recycling bins on set for paper, cardboard, glass, plastics 1-7 and aluminium and steel. 	<p>Reduce:</p> <ul style="list-style-type: none"> Reduce material consumption <p>Reuse:</p> <ul style="list-style-type: none"> Reuse materials where possible <p>Recycle:</p> <ul style="list-style-type: none"> Recycle all plastics, paper, cardboard, glass, aluminium and steel <p>Residual:</p> <ul style="list-style-type: none"> Minimal residual waste to refuse bins
SOUND	<ul style="list-style-type: none"> Responsible for recording sound; Works alongside Camera, Lighting and Grip. 	<ul style="list-style-type: none"> Electronic cables and components Scrap metal and broken equipment Plastics not 1-7 Gaffer tape Food and packaging 	<ul style="list-style-type: none"> Recycling bins on set for paper, cardboard, glass, plastics 1-7 and aluminium and steel. 	<p>Reduce:</p> <ul style="list-style-type: none"> Reduce material consumption <p>Reuse:</p> <ul style="list-style-type: none"> Reuse materials where possible <p>Recycle:</p> <ul style="list-style-type: none"> Recycle all plastics, paper, cardboard, glass, aluminium and steel <p>Residual:</p> <ul style="list-style-type: none"> Minimal residual waste to refuse bins

DEPARTMENT	RESPONSIBILITIES	WASTE STREAM	WASTE MANAGEMENT PRACTICES	WASTE HEIRARCHY STRATEGY
LIGHTING	<ul style="list-style-type: none"> Responsible for lighting during filming; Works alongside Camera, Sound and Grip. 	<ul style="list-style-type: none"> Electronic cables and components Light bulbs & lighting gels (polycarbonate) Broken equipment Gaffer tape Food and packaging 	<ul style="list-style-type: none"> Recycling bins on set for paper, cardboard, glass, plastics 1-7 and aluminium and steel. 	<p>Reduce:</p> <ul style="list-style-type: none"> Reduce material consumption <p>Reuse:</p> <ul style="list-style-type: none"> Reuse materials where possible <p>Recycle:</p> <ul style="list-style-type: none"> Recycle all plastics, paper, cardboard, glass and aluminium and steel <p>Residual:</p> <ul style="list-style-type: none"> Minimal residual waste to refuse bins
GRIP	<ul style="list-style-type: none"> Provides rigging and structure support for Lighting and/or Camera; Works alongside other technical departments. 	<ul style="list-style-type: none"> Scrap metal Plastics Gaffer tape Broken equipment Food and packaging 	<ul style="list-style-type: none"> Recycling bins on set for paper, cardboard, glass, plastics 1-7 and aluminium and steel. 	<p>Reduce:</p> <ul style="list-style-type: none"> Reduce material consumption <p>Reuse:</p> <ul style="list-style-type: none"> Reuse materials where possible <p>Recycle:</p> <ul style="list-style-type: none"> Recycle all plastics, paper, cardboard, glass and aluminium and steel <p>Residual:</p> <ul style="list-style-type: none"> Minimal residual waste to refuse bins

DEPARTMENT	RESPONSIBILITIES	WASTE STREAM	WASTE MANAGEMENT PRACTICES	WASTE HEIRARCHY STRATEGY
SCRIPT	<ul style="list-style-type: none"> Responsible for all script writing and distribution; Works alongside Locations and Cast. 	<ul style="list-style-type: none"> Paper Food and packaging waste Plastics 1-7 Glass and Aluminium and steel 	<ul style="list-style-type: none"> Recycling bins on set for paper, cardboard, glass, plastics 1-7 and aluminium and steel. 	<p>Reduce:</p> <ul style="list-style-type: none"> Provide electronic copies of scripts to reduce paper Reduce material consumption <p>Reuse:</p> <ul style="list-style-type: none"> Reuse materials where possible <p>Recycle:</p> <ul style="list-style-type: none"> Recycle all plastics, paper, cardboard, glass, aluminium and steel <p>Residual:</p> <ul style="list-style-type: none"> Minimal residual waste to refuse bins
WARDROBE & MAKEUP	<ul style="list-style-type: none"> Provides costume and make-up for all cast members; Works alongside Art Dept, Locations and Cast. 	<ul style="list-style-type: none"> Paper Plastics 1-7 Glass Aluminium and steel Aerosols Fabrics Makeup removers Solvents Bleach 	<ul style="list-style-type: none"> Recycling bins on set for paper, cardboard, glass, plastics 1-7, aluminium and steel and aerosols; Fabric and clothes donated to Salvation Army; Bleach and solvents recovered by external company and recycled. 	<p>Reduce:</p> <ul style="list-style-type: none"> Reduce material consumption <p>Reuse:</p> <ul style="list-style-type: none"> Reuse materials where possible <p>Recycle:</p> <ul style="list-style-type: none"> Recycle all plastics, paper, cardboard, glass, aluminium and steel <p>Residual:</p> <ul style="list-style-type: none"> Minimal residual waste to refuse bins

Table 2: Shows Department Responsibilities and Waste Production

4 WASTE FLOWS

To assess and monitor current waste practices, a full understanding of departmental relationships is required.

This section illustrates the following the department relationships, waste flows and waste management practices used during the *Wolverine* production. These are listed as follows:

- Department relationships within WOZ Productions Ltd.;
- Waste flows by the following departments;
 1. Administration Headquarters
 2. Art and Construction
 3. SPFX
 4. Unit and Location
- Waste management practices employed during filming.

4.1 DEPARTMENT RELATIONSHIPS

Figure 1 shows department relationships within WOZ Productions.

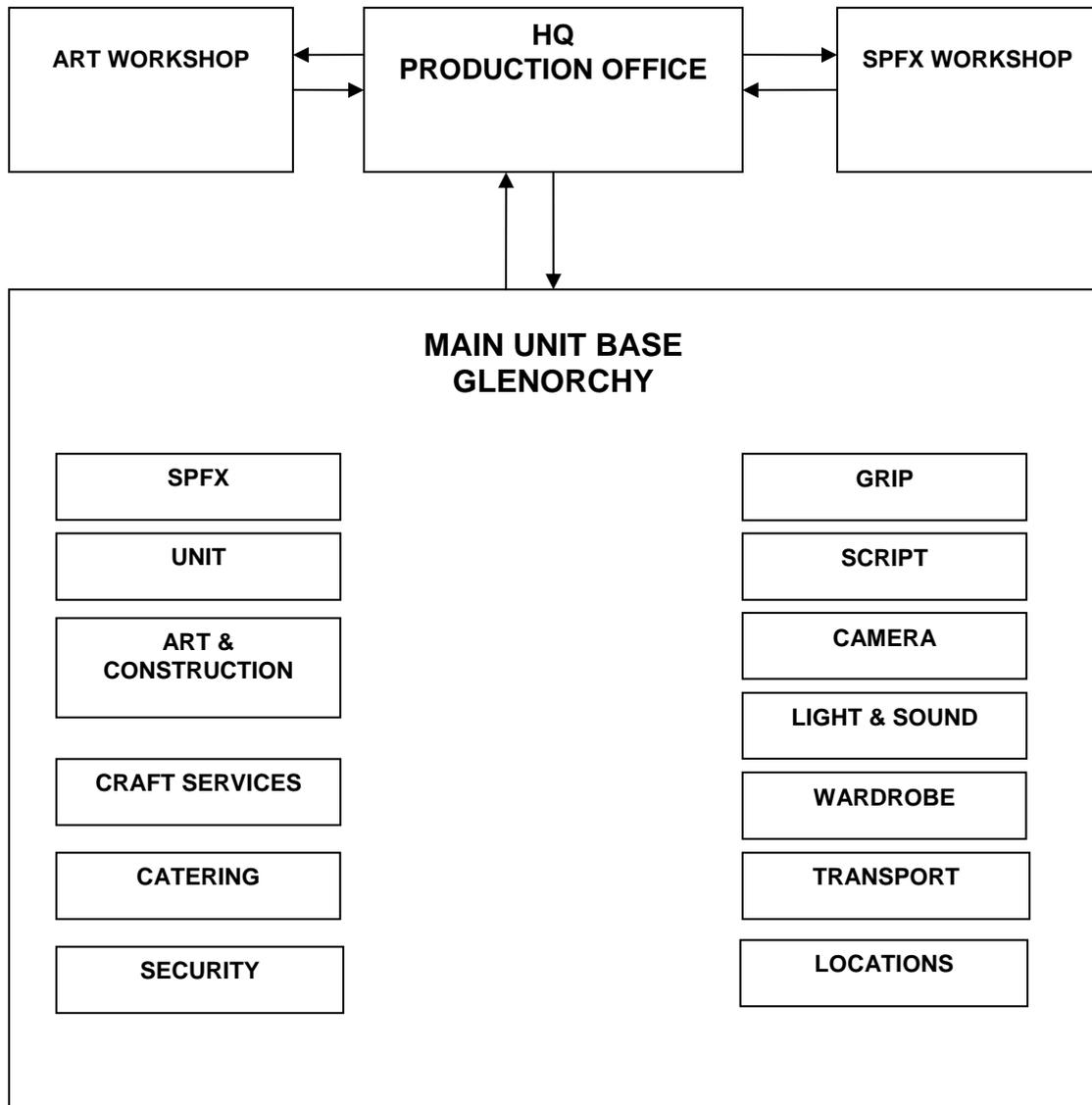


Figure 1: Department relationships in WOZ

4.2 SITE MAP (MUD MAP)

Figure 2 shows a site or 'mud' map of Main Unit Base for Wolverine when shooting on location in Glenorchy.

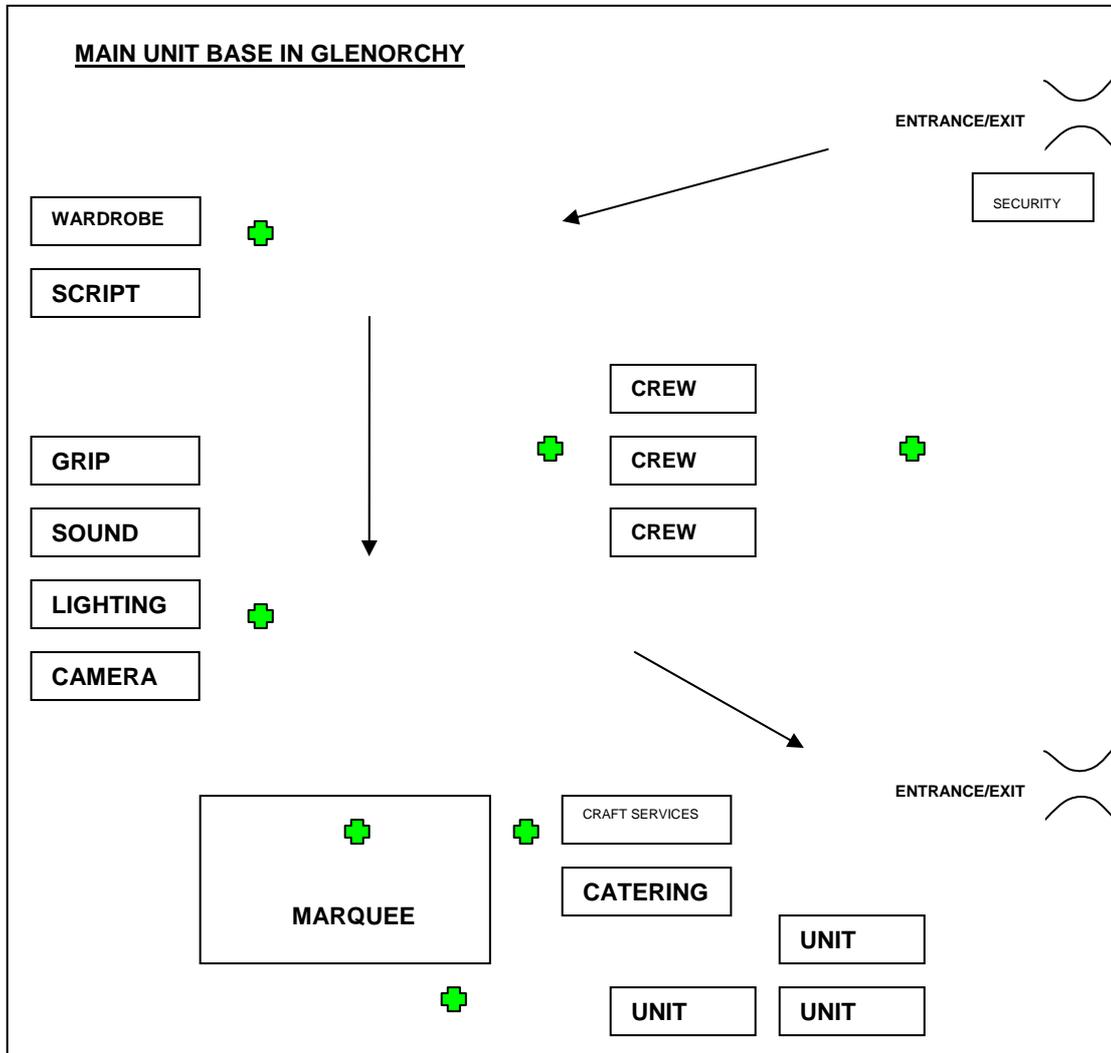
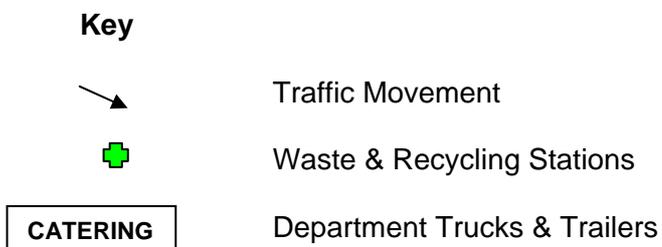


Figure 2: Mud Map of Main Unit Base in Glenorchy



4.3 WASTE FLOW BY DEPARTMENT

The following diagrams show waste types and flows by department.

4.3.1 PRODUCTION OFFICE

Figure 3 shows waste materials and waste flows within WOZ Production Office.

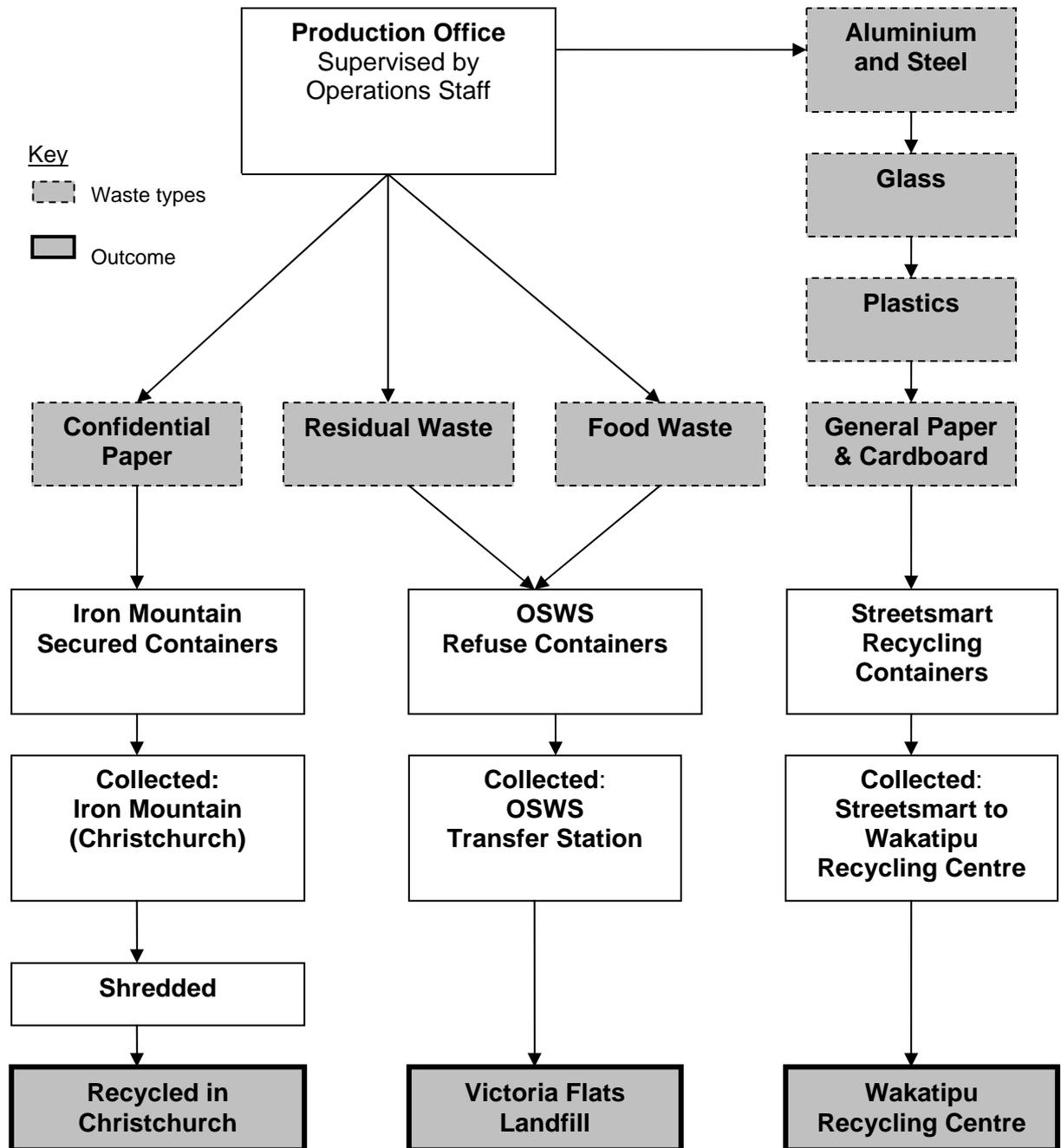


Figure 3: Waste materials and flows at WOZ Production Office

4.3.2 ART AND CONSTRUCTION: GENERAL

Figure 4 shows waste materials and flows within Art and Construction.

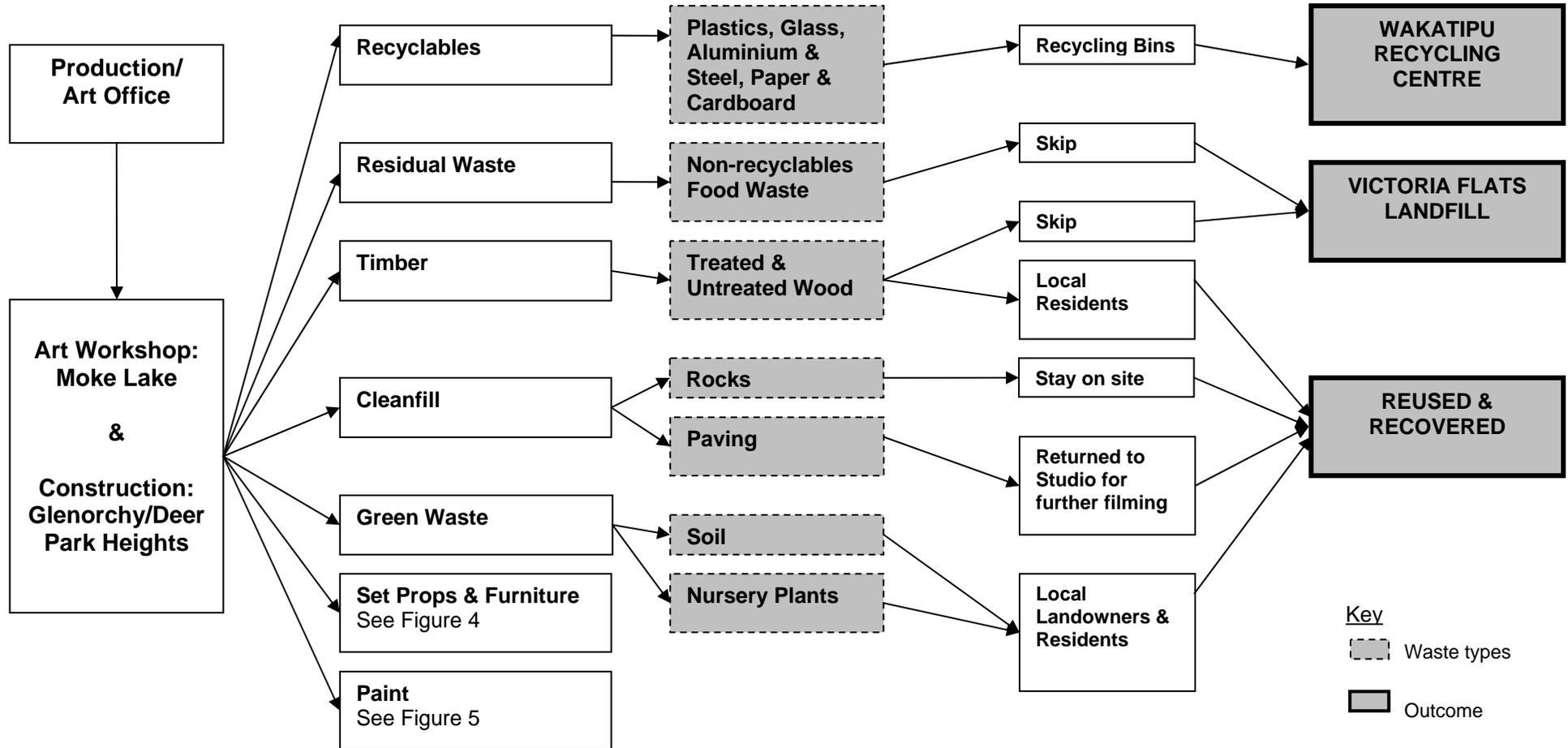


Figure 4: Waste materials and flows in Art and Construction

4.3.3 ART AND CONSTRUCTION: SET & PROPS

Figure 5 shows waste materials and movement of Set and Props within Art and Construction.

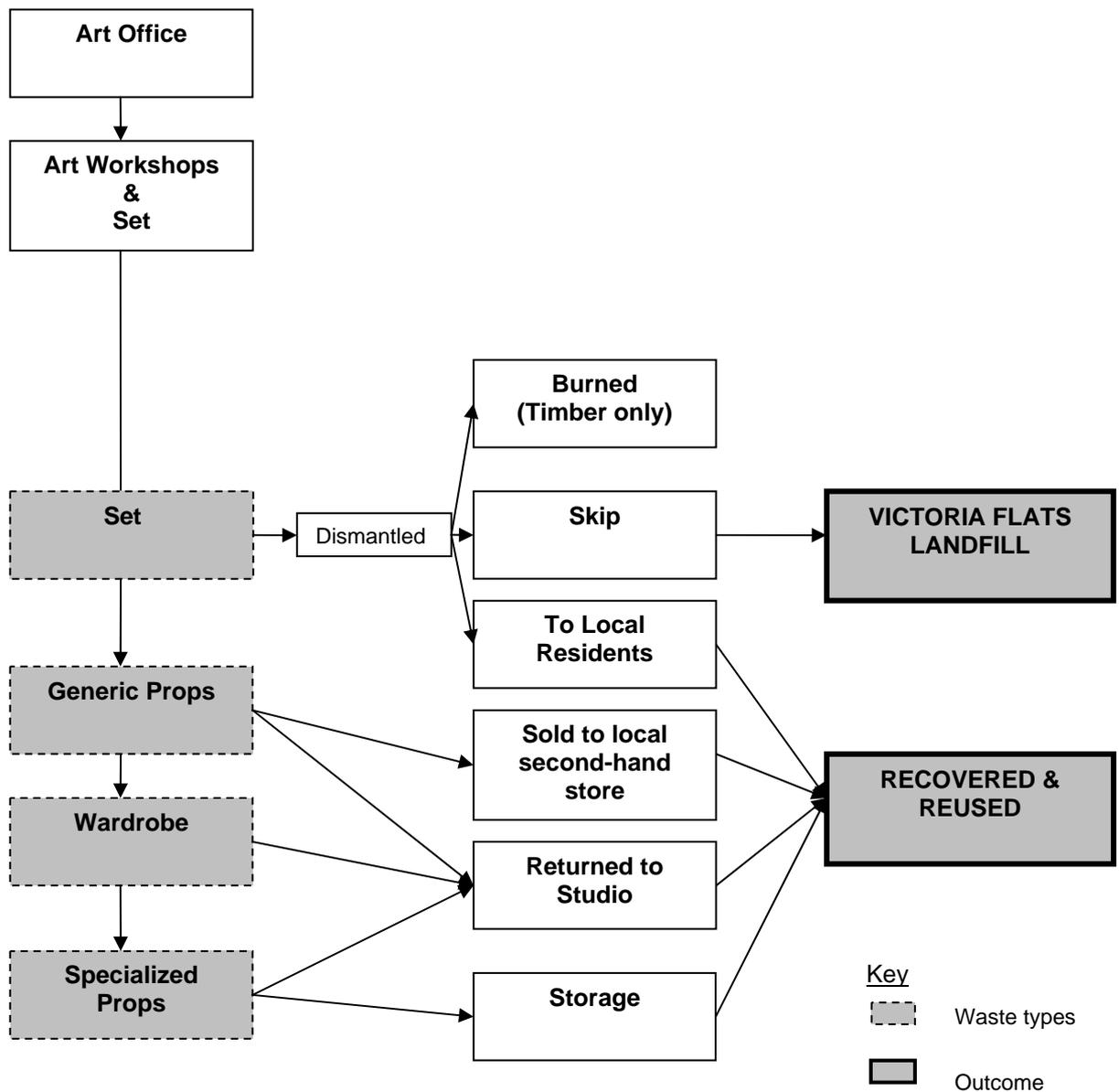


Figure 5: Waste materials and flows of Set and Props in Art and Construction

4.3.4 ART AND CONSTRUCTION: PAINT & SOLVENTS

Figure 6 shows waste materials and flows of Paint and Solvents within Art and Construction.

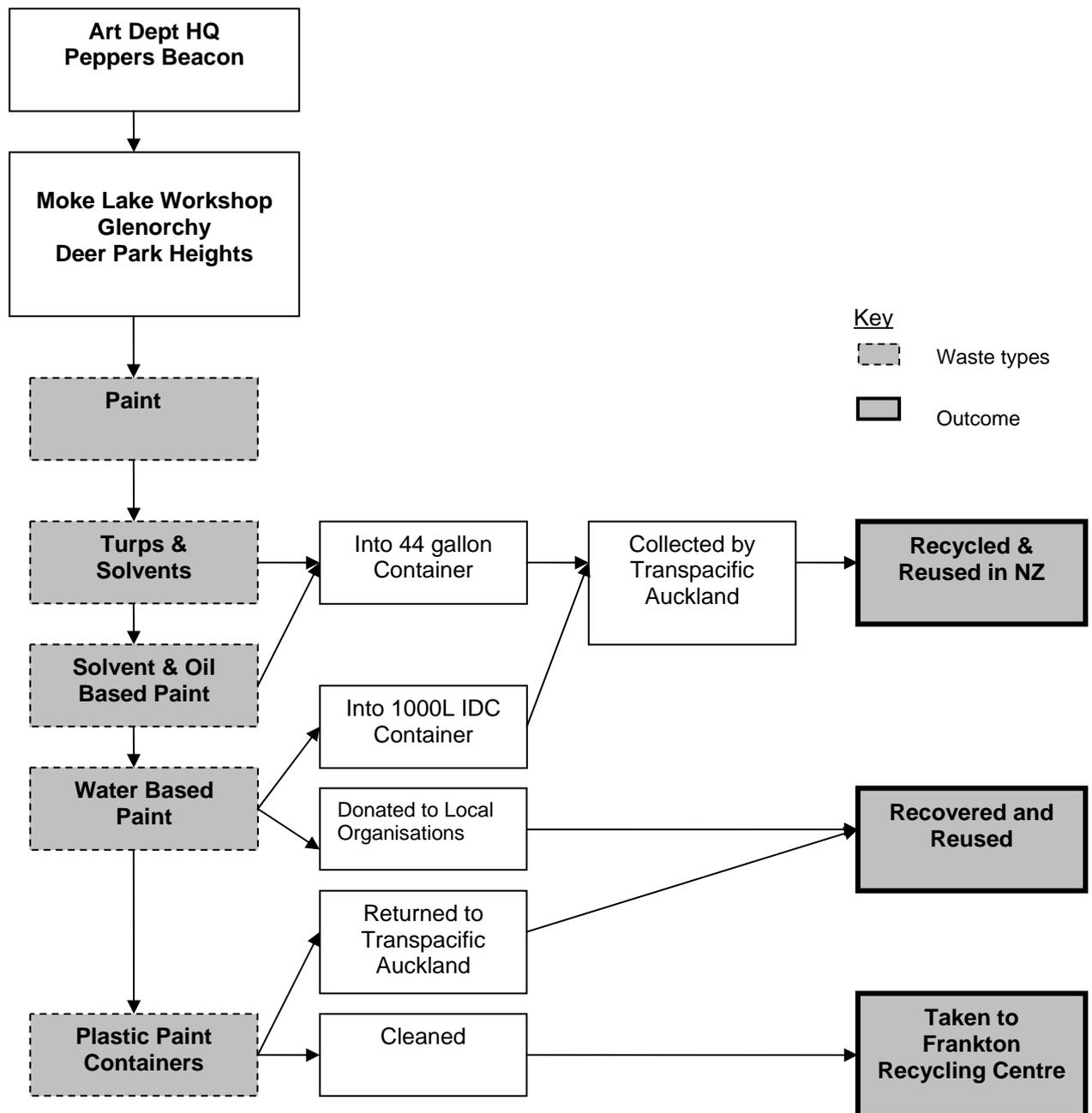


Figure 6: Waste materials and flows of Paint and Solvents in Art and Construction

4.3.5 SPFX

Figure 7 shows waste materials and flows within SPFX.

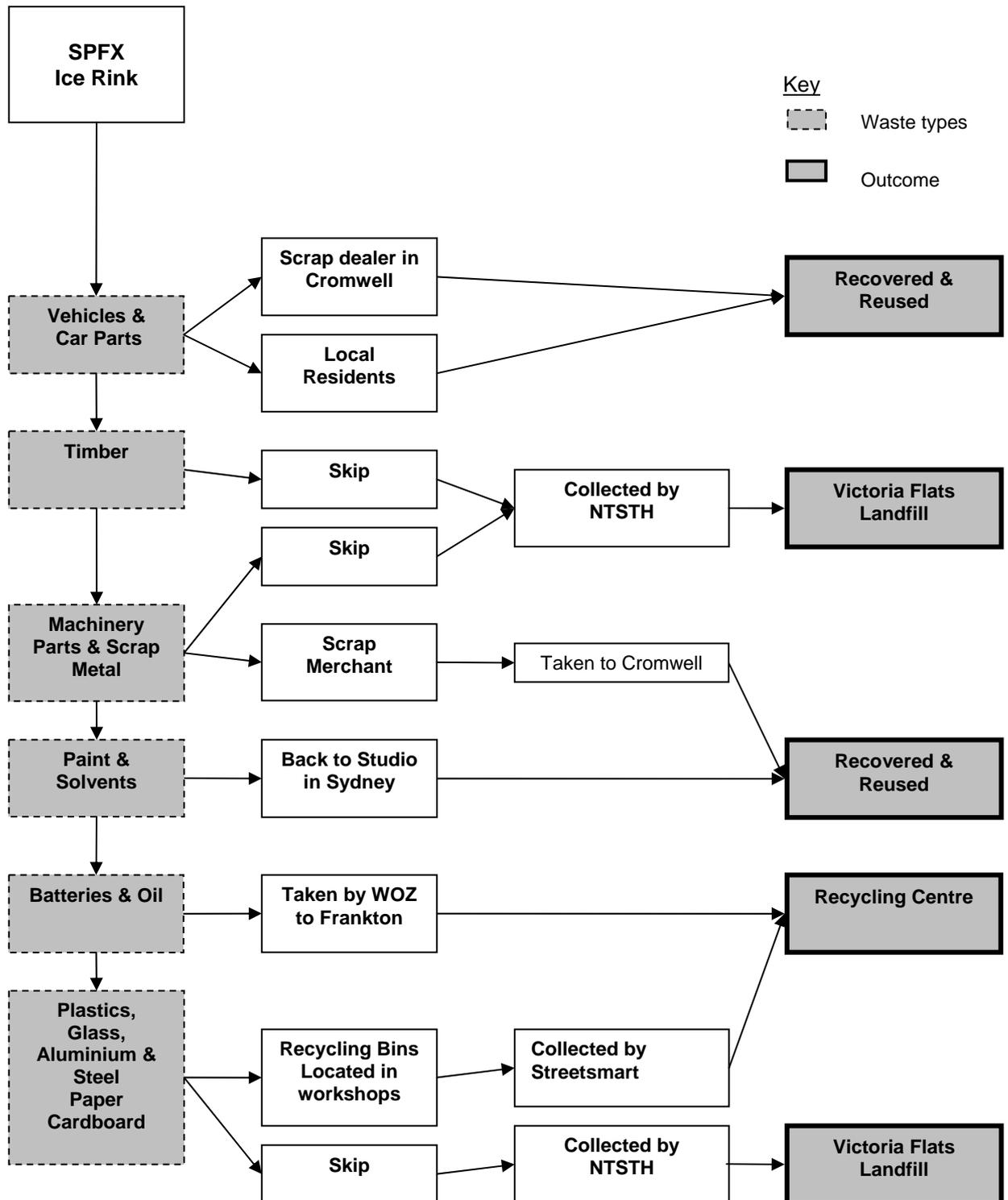


Figure 7: Waste materials and flows within SPFX

4.3.6 MAIN UNIT BASE

Figure 8 shows waste materials and movement at Main Unit Base.

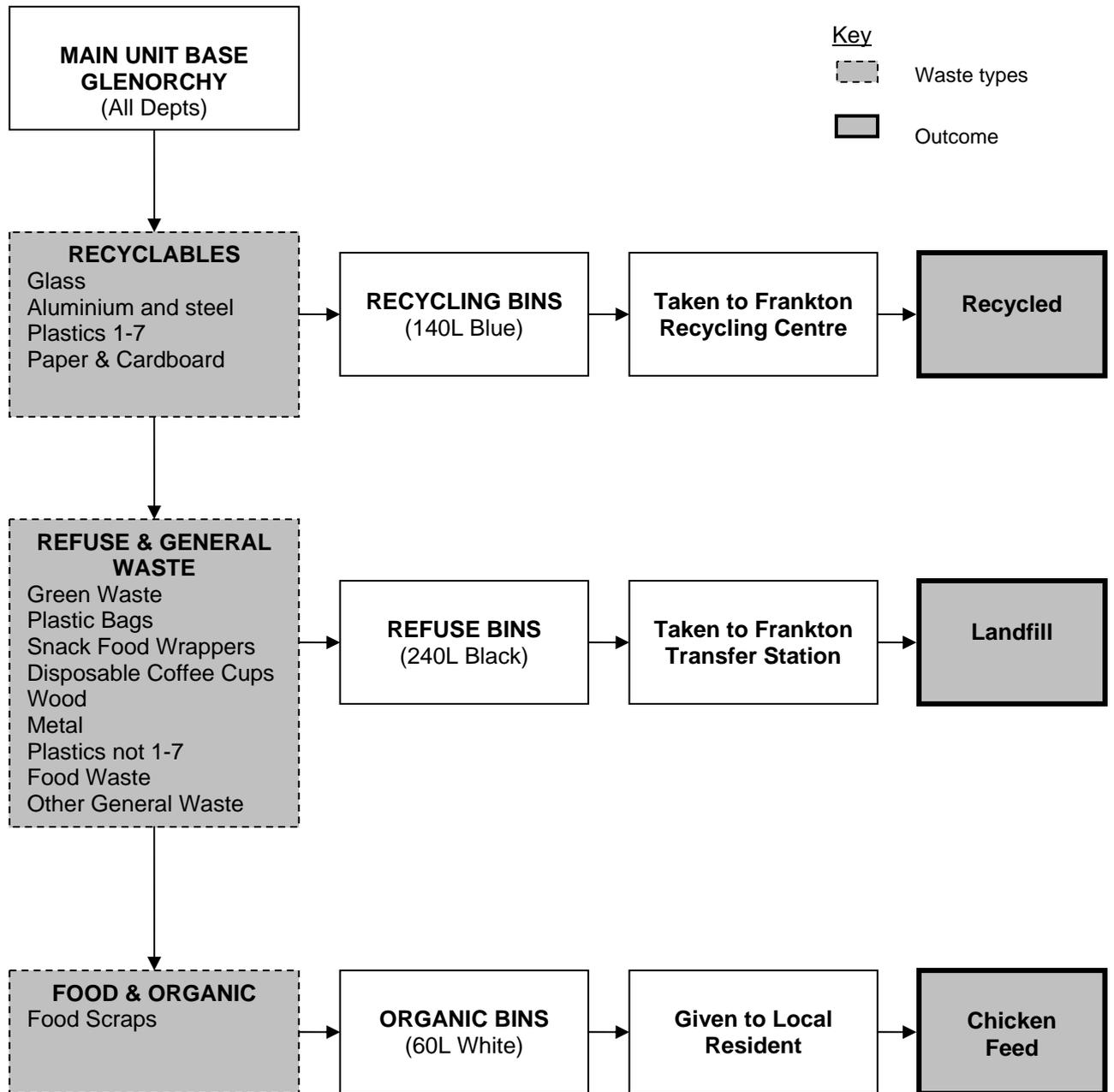


Figure 8: Tracks waste materials and movement at Main Unit Base.

5 LANDFILL DIVERSION RATES

This section of the report quantifies landfill diversion rates. This was achieved by measuring the amount of refuse and recycling produced during the production of *Wolverine*. This was predominantly achieved using waste management facility weighbridges, or where quantities were too small to warrant using a weigh bridge or materials did not enter a waste management facility, approximations were made.

The level of waste produced throughout a project is ultimately dependant on the size of the production. *Wolverine* was considered a large production creating significant quantities of waste compared to smaller, more modest film productions which frequently operate in the District. However, the type of wastes produced by certain key departments in *Wolverine* will be largely typical in form to that of any other film production with exceptions of polystyrene, which was used in minimal quantities for this production.

The below table demonstrates the quantities of refuse and recyclables produced within each department throughout the duration of this production. The information provided below was collated from local waste and recycling contractors and head of departments and staff within WOZ Productions.

5.1 WASTE BREAKDOWN AND DIVERSION BY DEPARTMENT

Table 3 shows the quantity of refuse and recyclables created by each department during the production of *Wolverine*.

DEPARTMENT	TOTAL (tonnes)	RESIDUAL TO LANDFILL (tonnes)	RESIDUAL TO LANDFILL (%)	RECYCLED & REUSED (tonnes)	RECYCLED & REUSED (%)
Production Office	4.1	2.5	61%	1.6	39%
Art, Construction & Makeup	572.1	35.5	6%	536.6	94%
SPFX	90.5	14.7	16%	75.8	84%
Main Unit Base	3.7	3	81%	0.7	19%
Total	670.4	55.7	8%	614.7	92%

Table 3: Quantity of refuse and recyclables produced by department

Table 3 illustrates the diversion rate achieved in each department and the overall diversion rate for the production of *Wolverine* in the Queenstown Lakes District.

Overall, WOZ Productions achieved a high diversion rate of 92%. It is important to note that this diversion rate is based on the weight and tonnage of material diverted from landfill, not the volume of recycling produced. Heavy materials including timber, soil and metals, such as vehicle and helicopter chassis, had a significant impact on the diversion tonnage. If the diversion had been quantified using volume the overall diversion rate would have been significantly lower.

The department with the highest diversion rate was Art & Construction with 94%. A significant quantity of recycling was produced in this department and performance was good in terms of overall commitment to recycle. However, this high diversion rate is partially due to the density and weight of the materials used in this department, specifically timber and soil, which constituted the majority of the tonnage diverted. Efforts to recycle within the Art offices exceeded expectations and a large quantity of recyclables were produced. Staff performance was good and consistent support and motivation was provided from the relevant Heads of Departments.

SPFX achieved the second highest diversion rate of 83%. Like Art & Construction, the predominant contributing factor for this was the density and tonnage of recycled material which included car bodies, helicopter chassis and timber houses. This high diversion rate was primarily achieved due to the density of the materials. Staff performance and motivation to recycle was relatively low and could be improved considerably. Improved education systems such as signage and support from the Head of Department could greatly improve results in this department for future productions.

The Production Office achieved a 39% diversion rate. This was achieved through an established recycling system in the offices and staff performance and efforts to recycle were good. A higher diversion rate could have been achieved if recycling was implemented in Makeup, as a substantial quantity of the refuse was produced through this department. Examples of the recyclables that could have been diverted from Makeup include plastic makeup containers, aerosols, fabrics and cardboard. Improved education system incorporating more signage, recycling initiatives and staff awareness would also increase diversion from landfill. A recycling champion to supervise the recycling efforts and lower contamination levels could bring significantly improved results here.

The Main Unit Base achieved a 19% diversion rate. Considering that the recycling system was only implemented mid-way through production, this is a reasonable diversion rate. A substantial volume of recycling was produced in this department, and the level of staff motivation and commitment to establish a recycling system was high and exceeded expectations. Support and enthusiasm was provided by the Head of Department and there was motivation to develop new ideas and waste minimisation initiatives for future productions. A higher diversion rate could have been achieved if a recycling system had been implemented at an earlier stage. Due to limited staff awareness and education one truck of recyclables was taken to the transfer station for disposal to landfill as opposed to the recycling centre. If Transport and Logistics staff were more informed this incident could have been avoided. Better education systems such as more signage and staff information could also have significantly improved the results for this department.

During the production of *Wolverine* a significant quantity of dense material such as metals (i.e. vehicle and helicopter chassis) and timber (i.e. houses and sheds) were used. Unlike other major film productions undertaken in the District, *Wolverine* used limited quantities of polystyrene. Films such as 10,000BC, which do use large quantities of polystyrene, would have a very different waste management system and landfill diversion profile.

5.2 DIVERSION BY DEPARTMENT

This section provides details of how the diversion rates for each department were achieved. The departments include:

- Production Office; Headquarters
- Art & Construction
- SPFX
- Main Unit Base

The tables below show the approximate percentage of waste diverted from landfill during the production of *Wolverine* by department.

The methodology for managing waste in each department differed considerably throughout the production due to the location at which the department was based and also the type and quantity of materials used.

5.2.1 PRODUCTION OFFICE

Diversion Rates

Table 5 shows the material breakdown for Production Office for *Wolverine*.

MATERIAL	QUANTITY (TONNES)	%
Recycling	1.6	39%
Residual to Landfill	2.5	61%
TOTAL	4.1	100%

Table 5: Material breakdown for Production Office for *Wolverine*

Cost

Table 6 shows the actual and potential costs of recycling and landfill disposal rates for the Production Office.

MATERIAL	ACTUAL TONNAGE	ACTUAL COST
Recycling	1.6	\$64.00
Residual to Landfill	2.5	\$325.00
TOTAL	4.1	

MATERIAL	POTENTIAL TONNAGE	POTENTIAL COST
Recycling	4.1	\$164.00
Residual to Landfill	4.1	\$533.00

N.B. Prices are according to drop-off rates: Recycling: \$40.00 per tonne/Residual \$130.00 per tonne.

Table 6: Actual and potential recycling and landfill disposal costs

Strengths

- Efficient recycling system set up from the start of production;
- Bins allocated in offices for recycling and refuse;
- Printer cartridges recycled;
- External service provider collected confidential paper for recycling;
- Call sheets sent electronically to all crew off-set;
- Key member of staff responsible for monitoring the system;
- Staff well educated about recycling facilities;
- Staff motivated and proactive in efforts to recycle; and
- System successful and worked efficiently.

Areas for improvement

- No food waste recycled;
- No recycling system in place for wardrobe and makeup dept;
- Replace disposable coffee cups with reusable mugs;
- Reduce plastic shopping bags, use green reusable bags;
- Paper minimisation scheme, i.e. default printing double sided;
- Further education for staff to:
 - promote awareness; and
 - increase overall diversion from landfill;
 - prevent contamination
- Environmental award for best office recycler and/or new ideas; and
- Develop further waste minimisation methods into current system e.g. composting food waste with a Bokashi.

5.2.2 ART AND CONSTRUCTION

Diversion Rates

Table 7 shows the material breakdown for Art & Construction for *Wolverine*.

MATERIAL	QUANTITY (TONNES)	%
Wood	169.6	30%
Paint & Solvents	1.2	0.2%
Rocks & Hardfill	11.9	2%
Turf & Soil	350	61%
Nursery Plants	3.2	0.6%
Recycling	0.7	0.2%
Residual to Landfill	35.5	6%
TOTAL	572.1	100%

Table 7: Material breakdown at Art & Construction for *Wolverine*

Costs

Table 8 shows the actual and potential costs of recycling and landfill disposal rates for Art & Construction.

MATERIAL	ACTUAL TONNAGE	ACTUAL COST
Reuse	535.9	NIL
Recycling	0.7	\$28.00
Residual to Landfill	35.5	\$4615.00
TOTAL	572.1	

MATERIAL	POTENTIAL TONNAGE	POTENTIAL COST
Reuse	572.1	NIL
Recycling	572.1	\$22,884.00
Residual to Landfill	572.1	\$74,373.00

N.B. Prices are according to drop-off rates: Recycling: \$40.00 per tonne/Residual \$130.00 per tonne.

Table 8: Actual and potential recycling and landfill disposal costs

Strengths

- Efficient recycling system set up from the start of production;
- Achieved highest diversion rate (94%);
- Bins allocated in offices for recycling and refuse;
- Printer cartridges recycled;
- Key member of staff responsible for monitoring the system;
- Staff and crew well educated about recycling facilities;
- Staff and crew motivated and proactive in efforts to recycle;
- Organic and reusable construction materials used;
- Highly limited use of plastic and polystyrene products;
- Timber donated to local residents and land owners;
- Metal donated to local scrap metal merchant and land owners;
- All solvent based paint collected and recycled;
- Water based paint donated to local school;
- Greens and nursery plants donated to local land owners;
- Recycled all paper, cardboard, plastics 1-7, glass and aluminium and steel on set; and

- Support from Head of Department - ensured all non-recyclable waste was disposed of appropriately.

Areas for improvement

- Pre-arrange donation agreements with local community and organisations for clean-up;
- Advertise on community notice boards for material donation days;
- Develop alternatives to burning material for quick disposal i.e. green waste mulching, composting;
- Further education for staff and crew (e.g. information memo to staff);
 - prevent contamination;
 - promote awareness; and
 - increase overall diversion from landfill.
- Environmental award for best department recycler and/or new ideas.

5.2.3 SPFX

Diversion Rates

Table 9 shows the material breakdown at SPFX for *Wolverine*.

MATERIAL	QUANTITY (TONNES)	%
Paint and Solvents	Trace	0%
Wood	56.5	62%
Metal	18.6	21%
Hazardous Waste	0.2	0.3%
Recycling	0.5	0.7%
Residual to Landfill	14.7	16%
TOTAL	90.5	100%

Table 9: Material breakdown at SPFX for *Wolverine*

Costs

Table 10 shows the actual and potential costs of recycling and landfill disposal rates for SPFX.

MATERIAL	ACTUAL TONNAGE	ACTUAL COST
Other Materials Reused	75.3	NIL
Recycling	0.5	\$20.00
Residual to Landfill	14.7	\$1911.00
TOTAL	90.5	

MATERIAL	POTENTIAL TONNAGE	POTENTIAL COST
Reuse	90.5	NIL
Recycling	90.5	\$3620.00
Residual to Landfill	90.5	\$11,765.00

N.B. Prices are according to drop-off rates: Recycling: \$40.00 per tonne/Residual \$130.00 per tonne.

Table 10: Actual and potential recycling and landfill disposal costs

Strengths

- Recycling system set up from the start of production;
- Achieved high diversion rate (84%);
- Recycling bins allocated in workshop;
- Scrap metal collected by local metal merchant for recycling;
- Vehicles recovered and recycled;
- Minimal use of solvent waste;
- Engine oil recycled;
- Car batteries recycled.

Areas for improvement

- Increased effort to use allocated recycling bins;
- Reduce quantity to refuse skip;
- Reduce contamination levels in recycling bins;
- Recycle printer cartridges;
- Limit use of plastic and polystyrene materials;
- Reduce plastic shopping bags;
- Define methods for recycling or recovery for each material and outline to staff;
- Allocate a key member of staff to monitor the system;
- Encourage staff to recycle and educate about the benefits of waste minimisation;
- Educate staff about local resources and recycling facilities;
- Champion recycler to supervise recycling and reduce contamination levels.

5.2.4 MAIN UNIT BASE

Diversion Rates

Table 11 shows the material breakdown for Unit and Location for *Wolverine*.

MATERIAL	QUANTITY (TONNES)	%
Recycling	0.7	19%
Residual To Landfill	3	81%
TOTAL	3.7	100%

Table 11: Material breakdown for Unit & Location for *Wolverine*

Costs

Table 12 shows the actual and potential costs of recycling and landfill disposal rates for Main Unit Base.

MATERIAL	ACTUAL TONNAGE	ACTUAL COST
Recycling	0.7	\$28.00
Residual to Landfill	3	\$390.00
TOTAL	3.7	

MATERIAL	POTENTIAL TONNAGE	POTENTIAL COST
Recycling	3.7	\$148.00
Residual to Landfill	3.7	\$481.00

N.B. Prices are according to drop-off rates: Recycling: \$40.00 per tonne/Residual \$130.00 per tonne.

Table 12: Actual and potential recycling and landfill disposal costs

Strengths

- Implemented efficient recycling system on set midway through production;
- Supplied own recycling bins;
- The system benefited Catering, Craft Services, Technical Depts, Cast and Crew;
- Recycling transported to Wakatipu Recycling Centre;
- Food and organic waste diverted to local farmer for stock feed;
- Key member of staff responsible for monitoring the system;
- Recycling education printed on daily call sheets for all cast and crew;
- Staff and crew motivated and proactive in efforts to recycle.

Areas for improvement

- Use reusable or biodegradable coffee cups instead of disposable ones;
- Improved monitoring – recycling was taken to landfill on occasion;
- Further education for cast and crew on set (e.g. posters & signs);
 - prevent contamination;
 - promote awareness; and
 - increase overall diversion from landfill;
- Staff award for best recycler and/or new ideas.

5.3 OTHER WASTE

Throughout the production of *Wolverine* a wide range of materials were produced across all departments. These consisted of vehicles, car and helicopter parts, wood, scrap metal, engine oil, paint and solvents, car batteries, soil, turf and plants, rocks, stone, cleaning products and props.

The waste management methods for many of these materials involved donations to local residents and organisations e.g. schools and local charities and diverting materials such as set and props to the main studio of production in Sydney for future use. Other materials were stockpiled throughout the production and then taken independently to a local recovery centre by production staff for recycling or recovery. These have proven to be popular and successful methods for ensuring materials are not landfilled and are reused or recycled.

Table 13 shows the variety of materials produced during the production of *Wolverine* and the methods used to divert these from landfill. The amounts are approximates and have been included in the overall diversion rates in Tables 5 to 12.

MATERIAL CATEGORY	MATERIAL TYPE	QUANTITY	DIVERSION METHOD
PAINT & SOLVENTS	Acrylic based paint	90 litres	Given to local Primary School
	Other paint, turps and bleach	1200 litres	Collected by Transpacific Auckland and recycled
OIL	Engine Oil	44 gallons	Taken to Recycling Centre
HAZARDOUS WASTE	Car tyres	6	Given to local residents & reused
	Car Batteries	4	Taken to Recycling Centre
WOOD	Timber & Plywood	1 ton	Burned
		265 tonnes	Given to local residents and organisations, and taken back to studio in Sydney
METAL	Scrap	4 tonnes	Collected by local scrap metal merchant & reused
	Hummer Chassis	2	Sent to landfill, stockpiled and sent away for recycling and recovery
	Helicopter Chassis	1	
	Land Rover Chassis	2	Given to local residents for scrap
	Car seats	4	Given to local residents & reused

Table 13: Shows material type, quantity and diversion methods

6 COSTS

This section highlights the overall costs of recycling and residual waste disposal during the production of *Wolverine*.

In the Queenstown Lakes District the cost for recycling per tonne is significantly lower than the cost for landfill disposal and considerable savings can be made by reusing, recovering and recycling waste during film production. Therefore, efforts to recycle have a direct impact on cost by reducing the high cost of landfill disposal.

Departments involved in the production of *Wolverine* could have made substantial cost savings by recycling more of their waste. This can be demonstrated with the SPFX department, which, although achieving a high diversion rate through the tonnage of metal and timber, still disposed of a significant amount of residual waste to the landfill. The cost of disposing of this waste in the landfill could have been dramatically reduced if it had been recycled.

Table 14 shows the potential cost saving for SPFX.

QUANTITY OF RESIDUAL WASTE DISPOSED IN SPFX (TONNAGE)	COST TO LANDFILL	COST TO RECYCLE	POTENTIAL SAVING
14.7	\$1911.00	\$588.00	\$1323.00

Table 14: Potential cost saving for SPFX

All departments can achieve higher diversion rates and increased cost savings by improving the levels of recycling during production. This can be done with simple methods, including more education methods and staff awareness as suggested in section 6.

Overall for the production of *Wolverine* 92% (approximately 615 tonnes) of waste material was either recycled, reused and/or recovered. The remaining 8% of residual waste sent to landfill for disposal was approximately 56 tonnes. In total, approximately 670 tonnes of waste was produced during the production of *Wolverine*.

Table 15 demonstrates the potential cost savings that could be made if the total quantity of waste produced during *Wolverine* was recycled rather than being disposed of to landfill.

QUANTITY OF WASTE DISPOSED DURING WOLVERINE (TONNAGE)	COST TO LANDFILL	COST TO RECYCLE	POTENTIAL SAVING
670	\$87,000	\$27,000	\$60,000

Table 15: Potential cost saving for *Wolverine*

For future productions it is possible to achieve minimal quantities of residual waste to landfill through education systems, communications and increased staff awareness. Ultimately the more waste which is recycled, the more cost effective it will be.

7 RECOMMENDATIONS

During the project a range of elements were identified that may be modified to improve the way waste from production companies is managed. These are listed as follows:

- Communications
- Education & information
- Access
- Services
- Logistics
- Feedback
- Monitoring and reporting

7.1 COMMUNICATIONS

Top-down Management Approach

Good communication is a prerequisite to any successful waste management system. For the best results to be achieved, a top-down approach from senior management, directors and producers is needed. When senior management advocate the Green Screen Initiative it is more likely to send a clear message to all staff throughout the production to achieve the following:

- Motivate and promote Green Screen initiative to production heads of departments;
- Motivate heads of departments to inform staff about the Green Screen initiative and resources available;
- Increased staff awareness which will result in maximum effectiveness.

Key Point of Contact

A consistent line of communication, allocation of responsibility and accountability for waste management services and systems is essential to maximise the diversion of waste and achieve the Green Screen objectives and outcomes. To accomplish this the following approach is needed:

- Key staff member responsible for monitoring recycling and waste management. For the various production staff employed, the following positions are suggested:
 - Feature Film - Operations staff
 - TV Commercial/Content - Production manager
 - Promotional shoots - Media Contact
- Plan and identify waste streams and disposal methods across production prior to commencement;

- Develop an a waste management systems that incorporates education and monitoring;
- Set goals, objectives and target diversion rates (%);
 - Monitor and inspect waste management systems, maintain education methods, introduce new ideas;
 - Outline credentials and/or awards that you would like to achieve through the initiative i.e. EMA Awards; and
 - Apply company values to the proposed system and develop a philosophy of continuous improvement.

Communication and Awareness

A general level of education and awareness of the Green Screen Initiative across all departments is fundamental to achieving full cooperation and motivation from staff. Consistent communication between senior management and staff is paramount. To achieve this, the following methods are recommended:

- Include all staff sectors, volunteers, runners and cast;
- Specify clear objectives and goals for the initiative;
- Empower staff to ensure maximum effectiveness; and
- Provide consistent feedback; highlight methods for improvement.

7.2 EDUCATION AND INFORMATION

Ongoing and integrated education systems across all areas of the production are key to maintaining staff awareness and motivation. Implementing multiple methods is advocated and new ideas from staff can be realised through incentives and encouragement. Recommended methods to achieve a high level of education include:

- Signage (e.g. clear signs located on containers and at recycling stations);
- Posters & leaflets (e.g. posters located in communal and smoko areas);
- Information printed on daily call sheets (e.g. information on available recycling facilities on set)
- Information sent by text or email to staff mobile phones and Blackberry's etc;
- Recycling champion to monitor recycling systems (e.g. staff member in each department to take responsibility for waste management);
- Foster new ideas and incentives for staff;
- Media interest and promotion (e.g. local media attention to promote the Green Screen Initiative being used for the production);
- Enter submissions for local awards e.g. Zero Waste Award; and
- Achieve recognition for Hollywood Green Events, e.g. EMA Awards, Global Green Oscars etc.

7.3 ACCESS

In order to successfully manage and monitor the quantity of waste and recycling throughout the production, access to all departments and set locations is necessary:

- Key staff member with allocated responsibility of waste management systems to have full access to all departments and set locations;
- Key staff member to access all areas to monitor the recycling systems and provide feedback to senior management and heads of departments on progress, shortfalls and recommendation for improvement; and
- Access provides opportunities to liaise with department staff and crew and identify constraints, areas for improvement and new ideas.

7.4 CONTRACTORS AND SERVICES

An essential part of a successful waste management system is to develop a good level of understanding and support from the local service providers and contractors that will be used to deliver the Green Screen initiative. This will ensure that your waste management system works to its full potential and the service requirements are identified and delivered:

- Build relationships with waste management contractors, Council staff, local businesses and organisations;
- Identify resources available in the district;
- Recognise your full waste management service requirements and needs;
- Review and compare costs from contractors and suppliers;
- Ensure that all chosen contractors meet your service requirements;
- Use local resources where possible;
- Seek feedback from service providers and stakeholders to improve your best practice; and
- Work with stakeholders and environmental organisations to achieve continuous improvement.

7.5 LOGISTICS

Transport and logistic requirements are likely to increase with the implementation of a waste management system. Material will need to be transported to various centres for recovery or recycling as well as landfill disposal. Providing additional resources for support is recommended:

- Allocate extra resources to logistics for additional transportation requirements;
- Ensure transport and logistics department staff are educated on the location of local resources and recycling centres;
- Provide support to Transport staff to ensure material is transported to the necessary centres efficiently and appropriately;
- Obtain feedback from staff; acknowledge constraints and areas for improvement.

7.6 FEEDBACK AND REPORTING

Providing and obtaining feedback is an important requirement for any successful waste management system. Identify, report and assess current methods to improve levels of practice:

- Provide and obtain feedback on performance, costs and efforts to/from departments;
- Report diversion rates (%) quantified and/or qualified for department feedback.
- Identify and acknowledge advantages, constraints and areas for improvement for initiative.

8 CONCLUSION

Overall, the standard of waste management during the production of *Wolverine* was high in terms of maximising the diversion of materials from the landfill through sustainable waste management practices and systems. Cooperation and motivation from Heads of Departments and key staff members to improve the levels of diversion was high, with key departments such as Unit making considerable effort to incorporate new systems and adapt existing and historical procedures.

A high diversion rate of 92% was achieved throughout the production of *Wolverine*. 8% of the total waste produced was landfilled. Although this is a good result, this figure does not appropriately reflect the volume of recyclables produced due to heavy materials including timber, soil and metal having a significant effect on the quantity diversion figures. It was not possible to accurately quantify materials such as props and hazardous waste therefore they were estimated. The main focus of the project was on key waste streams including residual waste, construction materials and recyclables.

Waste disposal costs could have been significantly reduced if a greater volume of plastics 1-7, glass, aluminium and steel, paper and cardboard had been recycled. Quantities of recyclable materials were unnecessarily disposed to landfill from the Main Unit Base which ultimately decreased diversion figures and increased costs.

Improvements for future productions include:

- Develop communications systems using a top-down approach from senior management;
- Implement a waste management strategy which can be adapted across all departments of production;
- Set diversion targets;
- Develop education systems to increase staff awareness and motivation;
- Improve waste management collection systems by implementing more containers and increased frequency of service;
- Assign recycling champions to monitor the recycling and reduce contamination; and
- Report and provide feedback on diversion rates, monitor performance and highlight key areas for improvement.

9 GLOSSARY OF TERMS

Art & Construction:	<i>Department responsible for designing and constructing set and props.</i>
Camera:	<i>Department responsible for filming and camera work.</i>
Catering:	<i>Department responsible for providing pre-made meals and food for cast and crew on set.</i>
Cleanfill:	<i>Cleanfill material includes virgin natural materials such as clay, soil and rock, and other inert materials such as concrete or brick.³</i>
Craft Services:	<i>Department responsible for providing beverages and light snacks for cast and crew on set.</i>
Crew:	<i>Production company staff members who work on-site at shooting locations and any other locations designated by the Company.</i>
Gaffer Tape:	<i>Duct tape.</i>
Grip:	<i>Department responsible for providing lighting and camera rigs.</i>
Hazardous Waste:	<i>Waste which is explosive, flammable, corrosive, chemical reactive or toxic that requires treatment before it can be safely disposed of or recycled.</i>
Landfill:	<i>A Council approved solid waste disposal facility.</i>
Lighting:	<i>Department responsible for providing all lighting during filming.</i>
Locations:	<i>Department responsible for co-ordinating crew and cast when filming on location.</i>
Mud Map:	<i>Shooting location site map.</i>
Organic:	<i>Natural material, including food and green waste that can biodegrade independently and contains no man-made or chemical components.</i>
Plastics 1-7:	<i>Recyclable plastics which are coded by numbers 1 to 7 to according to plastic type.</i>
Production Office:	<i>Department responsible for the coordination and administration of all departments.</i>

³ www.mfe.govt.nz/

Recyclables:	<i>Materials which can be recycled including plastics numbered 1 to 7, glass, aluminium and steel, paper and cardboard.</i>
Refuse:	<i>Residual or non-recyclable waste which can only be disposed of in a landfill.</i>
Residual:	<i>Non-recyclable waste which can only be disposed of in a landfill.</i>
Script:	<i>Department responsible for writing and distributing scripts to cast and necessary departments.</i>
Set:	<i>Designated area where the production is being filmed.</i>
Sound:	<i>Department responsible for recording all sound during filming.</i>
Special Effects:	<i>Department responsible for preparing and repairing all special effects equipment used during filming. SPFX is usually an extension of the Art department.</i>
SPFX:	<i>Abbreviation for Special Effects department.</i>
Still Shoot:	<i>Production of still images and photographs only.</i>
Transfer Station:	<i>Council approved facility where residual waste is transferred from waste collection vehicles, weighed, compacted and then sent to landfill.</i>
Transport & Logistics:	<i>Department responsible for transporting equipment, material, cast and crew from location to location.</i>
TV Commercial:	<i>Production of short films or commercial material for TV.</i>
TV Content:	<i>Production of programmes, series and content for TV.</i>
Unit:	<i>Department responsible for providing equipment, resources and support for other departments on shooting location.</i>
Wardrobe:	<i>Department responsible for designing and providing all costumes and makeup for cast. Wardrobe is an extension of the Art department.</i>