TRANSPOWER

ENVIRONMENTAL HANDBOOK
FOR CONSTRUCTION AND MAINTENANCE

Transpower New Zealand Ltd The National Grid

ENVIRONMENTAL HANDBOOK
FOR CONSTRUCTION AND MAINTENANCE

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Relationships creating success

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DESIGN.BUILD.DELIVER

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TRANSPOWER

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DISCLAIMER

This handbook has been developed using information available from the field and other sources and is designed to help manage environmental events encountered on the New Zealand National Grid. Particular conditions, projects or localities will require special or different practices. It is the responsibility of the service provider and the individual involved to ensure that work practices are adequately applied in accordance with environmental legislation and service specifications applicable to the work.

All businesses must rely on their own systems and procedures to identify all sources of existing or potential environmental harm, assess the risk and apply adequate control methods to minimise that risk. This Handbook can help in the identification and management of those situations. It provides guidance on the basis of good practices rather than determined practices identified in a controlled document or legislation.

Transpower disclaims any and all liability to any person persons for any procedure, process or any other thing done or not done, as a result of this Handbook.

The Handbook does not attempt to cover safety requirements, please refer to your organisation's health and safety procedures.

Contents

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Transpower's Environmental Commitment

Transpower is the owner and operator of the National Grid – the high voltage transmission network made up of lines and substations connecting areas of electricity generation with towns and cities across New Zealand.

Transpower is committed to developing and managing its assets in a way that has regard for the environment and the interests of communities.

To meet this commitment, Transpower will comply with relevant environmental legislation and take all reasonable and practical steps to:

- Comply with applicable laws, legislation, regulations, standards and codes of practice through consenting and environmental risk assessments.
- Minimise any adverse environmental effects resulting from its activities.
- Improve environmental performance.

Transpower will achieve these outcomes by:

- Setting objectives and developing procedures and programmes for managing identified environmental effects.
- Consulting with local communities and stakeholders about proposed activities.
- Ensuring environmental considerations are embedded into practices and processes.
- Auditing and reporting on environmental performance.
- Requiring all employees, contractors and service providers to abide by all environmental policies, procedures and other directives.
- Provide training and development for our people on environmental issues.

For further information, please contact:
environment@transpower.co.nz

Alison Andrew
Chief Executive Officer

1. INTRODUCTION

The purpose of this Handbook is to encourage the application of effective environmental protection practices when undertaking work on National Grid assets; that legislative requirements are met as well as Transpower's own environmental commitment.

Many of the practices can be applied as part of our day-to-day maintenance, construction, and operational activities. These practices do not need to be mandated to be applied. Their general application will contribute to good stakeholder relations and reduce the risk of adverse effects and regulatory attention. However, particular conditions, projects, localities, or legislative requirements may require different practices. Project Managers, Maintenance Managers, service provider staff, and the individuals involved in activities on the National Grid are all responsible for managing work practices in accordance with the applicable environmental legislative requirements[1].

Who should use this Handbook?

This Handbook is primarily for communicating good practices to personnel who undertake physical activities on the National Grid.

All personnel who undertake activities on the National Grid are required to have environmental knowledge appropriate to the type of activities they are engaged in. The Handbook communicates good practices to align with Transpower's commitment to improve performance, and recommends that:

1. Personnel who CONDUCT WORK on the National Grid will require awareness of most sections of this Handbook.
2. SUPERVISORY, PLANNING AND MANAGEMENT personnel will require a thorough knowledge of all sections of this Handbook to enable communication of its guidance to personnel conducting work. This Handbook does not cover areas of knowledge that supervisory, planning and management personnel would be expected to additionally know. For example, the legislative framework is not covered in great detail and a range of environmental management tools are not covered. This includes guidance on corporate environmental management systems, development of construction environmental management plans, undertaking environmental audits, and incident categorisation.

[1] Transpower's maintains a web based system (ENVi) for storing environmental authorisations, communicating compliance responsibilities and confirming compliance is achieved. Each service provider company has access to ENVi. See Section 3 for more information.

How should this Handbook be used?

The Handbook is divided into sections. Each section refers to the environmental issues which need to be managed when undertaking activities on the National Grid.

Sections 5 to 25 provide techniques to minimise effects on either:

- particular environmental resources such as air or water quality, historic places, etc; or
- specific areas of risk such as use of pesticides, managing spills etc.

To assist in identifying which sections of the Handbook are relevant to the work at hand, and encourage use, an Activity Reference Check Sheet is provided in the next section (Section 2).

Managers and supervisors can refer to the Handbook ahead of undertaking activities to assist in project planning and job set-up. Supervisors can also use relevant sections during site inductions and toolbox talks with site staff upon start of work, or to reinforce good practices following any incident. The Handbook has been designed for sections to facilitate on-site training. It may also be useful to management for developing more formal group training sessions.

PHOTOCOPY SHEET

2. ACTIVITY REFERENCE CHECK SHEET

This Activity Reference Check Sheet below contains questions to help you identify the procedures which apply to your work site. Tick the sections that apply prior to commencing work and review those sections.

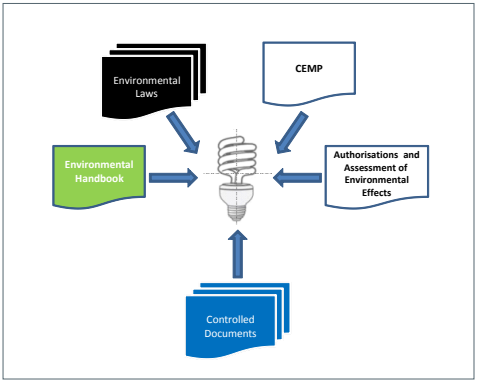
QUESTION	REFER TO	YES?
Does the activity require resource consent?	Check with your supervisor if this has been established, if in doubt contact the Environmental Advisor, see Section 29	
Are there specific conditions in an environmental approval, which apply to the activity, for example during a construction project?	Refer to your supervisor who has access to ENVi, Transpower's web based system for storing environmental approvals. See Section 3	
Are all personnel aware of their environmental responsibilities and any relevant instruction given or training been done?	Section 4 – Responsibilities	
Does the activity involve use of a Depot?	Section 5 – Depot Operations	
Have you considered resource use for the project, including purchasing materials and recycling?	Section 6 – Resources and Energy Management	
Do water restrictions apply to the project?	Section 7 – Water Use	
Will the activity involve the generation, transportation, storage or disposal of waste?	Section 8 – Waste Management	
Will the activity be undertaken outside the following hours? Monday – Friday 7am to 6pm; & Saturday – 8am to 3pm	Section 9 – Hours of Operation and Noise	
Will the activity require the use of a naked flame or present a fire risk?	Section 10 – Rural Fire Precautions	
Does the activity involve noisy activities (using loud equipment, machinery)?	Section 9 – Hours of Operation and Noise	
Could the activity result in air pollution (dust, fumes from vehicles or machinery, SF_6, asbestos, etc)?	Section 11 – Air Section 12 – SF_6	

PHOTOCOPY SHEET

QUESTION	REFER TO	YES?
Does the activity require anything (other than toilet waste) to be discharged to sewer?	Section 13 – Water Quality (Including Erosion and Sediment Control)	
Could the activity result in anything (other than clean water) entering a waterway or stormwater drain?	Section 13 – Water Quality (Including Erosion and Sediment Control)	
Does the activity involve excavating, disturbing soil, concrete cutting or creating sediment?	Section 13 – Water Quality (Including Erosion and Sediment Control)	
Are the works taking place on land that is, or could be contaminated?	Section 14 – Contaminated Land	
Does the activity involve storing, transporting, handling or disposing of oils, fuels, chemicals?	Section 15 – Handling, Storage and Transport of Oil, Fuel and Liquid Chemicals Section 16 – Hazardous substances in the Workplace	
Could an environmental incident occur (oil spill, damage to flora or fauna, excessive noise, etc)?	Section 17 – Environmental Incidents and Emergency Management & Section 29 – Emergency Contact Numbers	
Will the activity take place near vegetation (trees, shrubs, roots, etc)?	Section 19 – Vegetation and Habitat Management	
Does the worksite contain weeds or could the activity result in the transport of noxious weeds?	Section 20 – Weed and Pest Control (Biosecurity)	
Will the activity involve the use of pesticides (including herbicides, insecticides, fungicides, etc)?	Section 21 – Pesticides	
Will the activity take place in the vicinity of fauna habitat (clearing or trimming trees, removing ground cover, etc)?	Section 19 – Vegetation and Habitat Management	
Will the activity take place in the vicinity of any heritage items or in areas where such items could be found?	Section 22 – Heritage and Archaeology	
Will you need to liaise with landowners or other stakeholders?	Section 23 – Iwi Engagement & Section 24 – Stakeholder Engagement, Notification and Access	
Are you tower blasting or painting	Section 25 – Tower Painting	

3. ENVIRONMENTAL DOCUMENTS

There are several documents that need to be consulted to ensure activities meet legislation, guidelines, and procedures. This is illustrated in the diagram, and tabled below.



This Handbook can be used as a reminder of the issues to consider, and in particular, the practices that can be applied in any event to mitigate potential environmental effects.

Other information may also apply, including:

- Environmental legislation;
- Environmental approvals (eg resource consents);
- Construction and Environmental Management Plans;
- Transpower's Controlled documents.

When should I expect these documents to apply?

This Handbook	Always
Environmental Legislation	Always
Construction and Environmental Management Plan (CEMP) and associated work instructions	For all projects or activities where the contract requires or where there might be a potential or actual impact on the environment which would warrant one.
Specific environmental requirements of controlled documents	To specific activities such as oil handling, vegetation control, SF_6 work etc. See Section 28 for a list of some key controlled documents.
Environmental approvals (e.g. resource consents and designations) and any associated commitments in an assessment of environmental effects.	To a range of new build and maintenance activities. All environmental authorisations and associated conditions are held in ENVi, as described below.

Transpower's contractors on site are often responsible for compliance with conditions of environmental approvals. Environmental approval conditions are communicated to contractors and Transpower managers using ENVi, a web based software application which enables proactive tracking of compliance with conditions.

ENVi provides the tools to view and manage conditions easily and effectively. Good compliance management results in improved compliance, reduced costs and an improved reputation with environmental regulators. ENVi should be used to obtain all environmental approval information as well as to track condition compliance throughout the duration of works. It is good practice to check with the Transpower Environmental Advisor that the information is complete and up-to-date. Contact details for the Environmental Advisors are in Section 29 of this Handbook. Information on how to get access to ENVi can be found in the consultants/contractors area of Transpower's internet under Environmental Resources\ENVi.

Upon receiving this Handbook, please ensure site specific and or current contact information is entered in Sections 26 and 29.

Key environmental legislative requirements

The following is a high level description of some of the key environmental legislative requirements applicable to project and maintenance activities at a national, regional, local or corporate level of operation:

REQUIREMENTS	CATEGORY	ITEM	RELEVANCE
Legislative	National	Resource Management Act 1991 (RMA)	The RMA is New Zealand's principal legislation for environmental management; it promotes the sustainable management of natural and physical resources such as land, air and water. See further information following this table.
		RMA - National Policy Statement on Electricity Transmission (NPSET)	Provides a planning policy framework which other instruments and decision makers under the RMA must consider and follow.
		RMA - National Environmental Standards for Electricity Transmission Activities (NESETA)	Provides a nationally consistent rule framework applied for activities on existing transmission lines. This is in place of rules within the plans of individual councils.
		RMA National Environmental standard for Assessing and Managing Contaminants in Soil to Protect Human Health	Ensures that the disturbance of soils containing elevated levels of contaminants at substations are identified, assessed and if necessary consented.

REQUIREMENTS	CATEGORY	ITEM	RELEVANCE
Legislative	National	RMA - National Environmental Standards for Fresh Water	Protects wetland ecosystems, which are broadly defined, (see Section 13). Has implications for culvert designs and other structures in waterways, (see Section 19).
		Hazardous Substances and New Organisms Act 1996	Protects the environment, and people's health and safety by preventing or managing the adverse effects of hazardous substances and new organisms.
		Waste Minimisation Act 2008	Encourages the reduction of waste generation and disposal to reduce its environmental harm.
		Biosecurity Act 2003	Manages unwanted organisms and pests. Includes the Regional Council pest management strategies which include rules which put responsibilities for controls on landowners.
		Heritage New Zealand Pouhere Taonga Act 2014	Makes it unlawful to damage or modify the whole or any part of an archaeological site without the prior authority of the Heritage New Zealand Pouhere Taonga.
	Regional	Regional Council Plans	Regional Plans contain policies and rules for water, contaminant discharge, coastal management, river and lake management (including flood and drainage control), regional land management, and biosecurity / pest management.
	Local	District and Unitary Plans	Local authorities are responsible for local-level land use management (urban and rural planning) aspects of the RMA, stormwater infrastructure, solid waste management, and parks and reserves.
Standards	Corporate	Service Specifications	Key controlled documents identified in Section 28 cover environmental controls associated with some specific activities such as oil handling, vegetation control, SF_6 work etc.

Some of the broad considerations of the RMA which are useful to know are tabulated below:

RMA (1991)
Avoid, remedy and mitigate discharges and avoid unreasonable noise.
S17 every person has a duty to avoid, remedy or mitigate environmental effects arising from an activity.
Rules in Local Authority Plans giving standards which activities must comply with or otherwise require consent.
Rules will differ between districts, however concepts are often the same, e.g. divert stormwater around site, capture and treat any on-site.
Resource consents with conditions that must be met.
All legally responsible, principal through to site staff.

A guide to works which do and don't require input from Transpower's environment and property groups is available on the contractors/consultants accessible area of the Transpower internet site under 'guidelines and resources'.

When the environment is being adversely impacted, the RMA can rely on:

- Infringement notices, (instant fines like a parking ticket),
- Abatement notices and enforcement orders which can require that actions be taken, effects be managed or that damaging activities stop, both can stop or slow the job,
- Maximum fines of $300,000 for an individual and $600,000 for a company,
- and $10,000 a day for a continuing offence,
- Up to two year jail sentences.

Specialist advice on the application of environmental legislation to our assets and work activities can be obtained from Transpower's Environmental Policy and Planning Group, see Section 29 Table 29.3.

The Environmental Policy and Planning Group (EPPG) only can engage approved consultants to provide Transpower with:

- advice on environmental approvals requirements under the Resource management Act 1991; and
- other environmental legislation eg Heritage NZ Act.

Approved consultants work under our General Services Agreement (GSA). EPP Group representatives prepare a detailed Statement of Works and issue this to a consultant under our Contract Management System. Where Transpower staff or service providers require environmental advice, they must first seek that advice from EPPG who will support through the engagement of approved consultants where required.

4. RESPONSIBILITIES

It is the responsibility of all personnel to:

- Be familiar and comply with the requirements in all environmental documents relevant to their activities. See Section 3, Environmental Documents.
- Exercise the due care, skill and foresight expected of a reasonable person to manage and minimise the potential for environmental harm.
- Speak up when it is believed an environmental document is missing or cannot be followed.
- Speak up when something appears to be wrong, difficult to understand, or something could be improved.
- Report all environmental incidents to your supervisor and your Environmental Advisor, (see Section 17).

It is the responsibility of the site supervisors/team leaders to:

- Consider if a pre-works site meeting with a Transpower Environmental Advisor would be beneficial.
- Make sure people doing the work are aware of any environmental approval requirements and conditions associated with the task at hand.
- Make certain that all employees reporting to you have been inducted in their environmental responsibilities and are adequately resourced to meet them.
- Be able to interpret the required environmental controls from a work plan.
- Ensure that sufficient environmental records are maintained to be able to demonstrate due diligence as needed.
- Understand environmental risks and legal requirements relevant to your area of the organisation.
- Use appropriate communication methods to educate and provide information on environmental issues.
- Ensure that there are appropriate contingency plans for dealing with environmental problems and emergencies.
- Implement appropriate remedial actions following problem identification and incidents.
- Investigate all relevant environmental concerns; report on potential risks and suggested measures to mitigate environmental aspects.

Management would be expected to have, or have available, staff with an understanding of the legislative framework and a range of environmental management tools for example corporate environmental management systems, development of construction environmental management plans, experience with environmental audits, incident categorisation etc.

Everyone has a legal duty of care and all personnel must contact their supervisor and environmental advisor, (see Table 29.3) if they become aware of an environmental incident whilst working on site. Failure to do so can result in individual fines and prosecution.

5. DEPOT OPERATIONS

Good environmental management at depots is necessary to comply with the law, but is also essential for good relations with neighbours. Housekeeping is of foremost importance and the site should be left tidy at the end of each day. This section outlines some key considerations for depots:

Tidy organised depots with good environmental controls are an important part of a safe and well-managed business.

REQUIREMENT	HANDBOOK REFERENCE
Ensure staff and contractors are aware of the site layout and environmental requirements.	Section 26 – Site information
Turn off non-essential lights and equipment in buildings and outside areas when not in use.	Section 6 – Resources and Energy Management
Ensure spills and leaks of any type are quickly and properly reported and managed.	Section 17 – Environmental Incidents and Emergency Management
Ensure noise is kept to a minimum and work within allowable hours.	Section 9 – Hours of Operation and Noise
Minimise water use and comply with water restrictions and relevant trade waste permits.	Section 7 – Water Use
Ensure drains are regularly inspected and free of sediment and debris.	Section 13 – Water Quality
Remove unused materials and waste materials from site.	Section 8 – Waste Management
Ensure wastes are appropriately classified, handled and stored.	Section 8 – Waste Management
Minimise fumes and dust generation.	Section 11 – Air Pollution
Ensure unsealed areas are stabilized and erosion and sediment controls are in place.	Section 13 – Water Quality
Ensure oil, chemicals and fuels are stored in a manner that prevents risk to staff and the environment.	Section 15 – Handling, Storage and Transport of Oil, Fuel and Liquid Chemicals
Ensure any suspected land contamination is immediately reported.	Section 14 – Contaminated Land

6. RESOURCES AND ENERGY MANAGEMENT

The benefits of good resource management and energy efficient processes include reduced cost of resources including materials, water and power, reduced greenhouse gas emissions, increased resource conservation, healthier ecosystems, reduced waste disposal costs, and an enhanced public image for the organisation.

It is everyone's responsibility to protect our ecosystems, and minimise raw materials, water, energy and fuel usage.

How can you do your part?

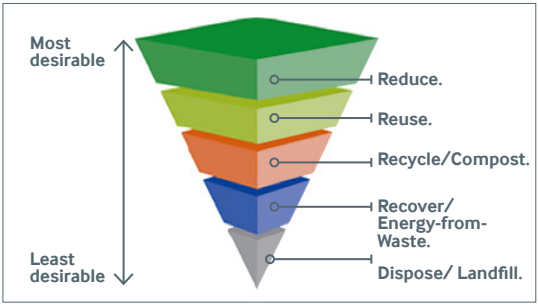
- Turn off your computer monitor at the end of each day.
- Switch off lights and electric equipment when not required.
- Plug device chargers onto a power bar which can be switched off when not in use.
- Use energy saving light bulbs when possible.
- Only print documents when absolutely necessary.
- Install trigger devices on water hoses.
- Only purchase the amount of materials required, preferably with minimal or recyclable packaging.
- Only order the amount of supplies needed for the job.
- Minimise the number of trips/meetings taken, use car-pooling or video-conferencing when possible.
- Follow efficient driving techniques to reduce fuel use.

Did you know?

A telephone charger plugged in the wall but not in use still consumes the equivalent of 20 kWh per year?

On NIGUP project, satellite offices were positioned close to site to reduce driving times for field crews

All areas of Transpower should follow the hierarchy of good resource management practices as summarised here:



REDUCE	■ Look at opportunities to reduce future waste when purchasing equipment, consider the whole of the equipment's life including resource use and waste generation. ■ Purchase goods and materials with low energy and water usage. ■ Purchase only what you need and where possible, reduce material use and waste generation.
REUSE	■ Consider reuse of equipment/materials and coordinate use of materials between jobs. ■ Return over-supplied quantities of materials and, when possible, packaging to the supplier. ■ Keep unused materials segregated from waste so that they can be reused or recycled later.
RECYCLE/ COMPOST	■ Recycle as many materials as possible to reduce waste disposal costs. See Section 8 – Waste Management. ■ Compost green waste and recycle as ground cover or send it to a facility that processes it. ■ Engage a recycling contractor to remove recoverable materials from the site.
DISPOSE/ LANDFILL	■ Classify wastes and dispose of them using a reputable contractor to an authorised disposal facility. See Section 8 – Waste Management.

Segregation of general waste, scrap metal, Paper and Cardboard at a depot. This depot also recycles aluminium and insulators (which are crushed, the metal being recycled and the porcelain/glass used in sealing roads)

7. WATER USE

Water is a finite resource and must be managed accordingly. Water can become scarce during periods of drought if local authorities establish water restrictions. Where water is used for cleaning, dust suppression etc, it can create polluted water which needs to be managed. Minimising water use can therefore also reduce wastewater treatment requirements and costs.

Water usage at job sites

- Do not take water from a stream for site works unless that use is consented or confirmed as a permitted activity.
- Despite what resource consents allow, water should always be used sparingly.
- Consented activities must be undertaken in accordance with the conditions of resource consent, (such as volumes or time of use).
- Resource consents must be held at the worksite.
- For any question regarding requirements for resource consent, contact your supervisor or Environmental Advisor, (see Table 29.3).

Confirm legal requirements prior to taking water.

General water saving tips

- When selecting equipment for construction and maintenance activities, select water efficient options.
- Consider the use of alternate water supplies such as rainwater tanks, bore water and water re-use systems where available.
- Report leaking water taps and water pipes immediately.
- Clean footpaths and driveways with a broom.
- Use trigger hoses to limit the indiscriminate use of water.
- Limit the amount of disturbance during excavation or clearing activities to reduce the need for dust suppression.


Trigger guns limit indiscriminate use of water.

8. WASTE MANAGEMENT

Good resource management reduces waste quantities and disposal costs, conserves resources and minimises environmental damage. Segregation and appropriate disposal can reduce waste management costs significantly. Waste is any substance or material that is discarded, rejected, unwanted, surplus or abandoned. It is still waste even if it can be processed, recycled, re-used or recovered.

Planning

To manage waste effectively, consider the following points during the planning stage of any project:

- Follow the hierarchy of good resource management; see Section 6 Resources and Energy Management for tips.
- Before works start, determine the types and quantities of waste which will be generated.
- Classify wastes appropriately to determine storage, transport and disposal requirements.
- If applicable, comply with any Waste Management Plan.

Storing waste

- Use signs to label waste types such as green waste, concrete, metal, mixed recyclable (paper, cardboard, plastic, glass), and general waste.
- Do not overfill or overload waste bins.
- Flatten cardboard and compress plastic bottles to optimise bin containment.
- Keep waste containers covered and secure, but still accessible for loading and unloading.
- Make sure containers are in good condition and placed on impervious surfaces, especially skip bins as they may leak.
- Use bunds to store containers of liquid waste and have spill kits available nearby.

- Position waste containers away from drains and waterways and segregate from hazards such as incompatible substances or potential fire sources.

Disposal and transportation of waste

- Make sure wastes have been classified correctly.
- Dangerous goods must be transported in accordance with the Transport Rule: Dangerous Goods 2005 and Land Transport Rule: Dangerous Goods Amendments 2010 and 2016. If you're unsure call the New Zealand Transport Agency (NZTA) contact centre on 0800 699 000.
- Maintain vehicles which are used to transport waste in a clean condition.
- Safely secure all containers on the vehicle.
- Cover loads to prevent spillage, loss of waste and the emission of odours.
- Comply with licensing and documentation requirements.
- Liquid and Hazardous waste (or potentially hazardous) must be removed and disposed of by a suitably licenced hazardous waste disposal operator, (see Section 29, Table 29.1 for code compliant contractors).
- Code compliant contractors will track liquid hazardous waste giving assurance the waste gets to the treatment or disposal facility.

Did you know?

- **Waste from construction makes up 40-50% of all waste sent to landfill.**
- **New Zealanders dispose of around 3,200kg of waste per year of which only 35% is recovered, the rest goes to landfill.**
- **New Zealanders send the most municipal waste to landfill per capita in the OECD.**

Special considerations

Some wastes may have special requirements in addition to those described above and should never be combined with general waste. Examples include PCBs, e-waste, hazardous waste, dangerous goods, soil from some transmission trenches, radioactive waste and special waste (tyres, asbestos, and clinical.) See Section 15 for PCB management. Refer to your safety manager for instructions on disposal of other types of waste.

List of recyclable items

This is a partial list of recyclable items that can be found on your site. Feel free to amend the list as required.

- scrap steel
- copper wire
- cable drums
- paper and cardboard
- hard hats
- all types of batteries
- glass
- brick
- concrete
- plastics
- timber
- clean fill
- vegetation
- oil (not contaminated with PCB)

9. HOURS OF OPERATION AND NOISE

Background

Construction work is often accompanied by noise, bright lighting, vibration and changed traffic conditions. This can be disruptive to landowners and the disruptive effects can be mitigated by notifying residents prior to the works, avoiding unsociable operating hours, and following good work practices.

Noise is the most disruptive of the impacts of construction work as it can be annoying, interrupt communication and disrupt sleep or work. Exposure to loud noise can result in anxiety, frustration and adverse health effects. The impacts of noise depend both on the noise level and character, the environment, and how it is perceived by those affected. The New Zealand construction noise standard NZS 6803:1999 provides methods for the measurement, assessment and prediction of noise and guides those involved in managing noise in the construction industry. It includes guidance on the control of construction noise.

Examples of equipment and activities which cause the most noise complaints include reverse backup alarms, piling, excavators, pneumatic rock breakers and tools, saw cutting, chainsaws, and large power tools.

Remember

- **Minimise and control noise when working in noise-sensitive areas**

Operating equipment, notably transformers and reactors in substations and newly strung conductors and dirty insulators on transmission lines can create noise. Factsheets on substation and transmision line noise are available on the transpower website, (search noise). Neighbourhood complaints about noise from operating equipment should be initially reported to the LOLO.

Echo noise barriers deployed around truck undertaking hydrovac excavation near residential properties.

Useful information and "how to"

Standard operating hours

In sensitive areas such as residential areas and near hospitals, works should be undertaken during the following hours where possible:

- Monday to Friday – 7am to 6pm
- Saturday – 8am to 3pm
- No work on Sundays or Public Holidays.

Exemptions to standard operating hours

Works may be undertaken outside of Standard Operating Hours if the following criteria are satisfied:

- The work complies with out-of-hours conditions of any environmental approval.
- The works cannot be undertaken during Standard Operating Hours (eg in an emergency, roads authority requirements).
- Any potentially affected residents are given prior notice of work times and reasons.

Factors which can influence the impact of noise include:

- Existing background noise levels.
- Distance between site and area affected by the noise.
- Duration and time of the activity.
- Nature of noise – volume, pitch, frequency.
- Transparent communication with residents.
- Application of noise controls

Planning and site layout

- Notify affected residents.
- Check any approval conditions.
- Schedule works to consider the local conditions and community needs (noise, traffic conditions).
- Select low noise machinery where practicable, (eg electric instead of internal combustion, vibratory piling instead of impact).
- Arrange the work site to minimise the projection of noise and lighting to sensitive receivers by taking advantage of natural barriers (eg hills, trees) and structures or temporary screening (eg fences, work trucks, stockpiles).
- Where appropriate, install portable screening around high impact equipment/activities so that noise/light is mitigated.
- Avoid rowdy behaviour on work sites (eg shouting, radios on high volume, and inappropriate vehicle use).

During works

- When possible, site and orientate the noisiest equipment furthest away from noise-sensitive areas.
- Operate and maintain plant and equipment according to site procedures.
- Shut down machines that are used intermittently or throttle down to a minimum.
- Avoid dropping materials from a height, e.g. either into or out of trucks, trays or bins.
- Restrict vehicle speeds on, or near, the work site.
- Consider scheduling works to provide respite periods throughout the duration of the project.
- Place and angle lighting to minimise light spill outside the construction area.

New muffler on a conductor wiring machine to mitigate noise when used in urban areas.

For all works outside of standard operating hours, consider scheduling the noisiest works to be completed before 3pm.

Remember

- **When emergencies occur and notification to residents is not possible, notify the local council(s) providing work times and reasons.**

Special considerations for implosive jointing

- Implosive jointing can give rise to noise levels which might cause annoyance, (120dBC L_{peak}) at some distance from the worksite.
- For the smallest charges anticipated, such levels might occur out to 600m from the site of the implosive jointing and for the largest as far as 1450m.
- Where buildings are within 1450m resource consent may be required.
- Closer to the worksite noise and vibration levels can be high enough to cause building and hearing damage and where this is possible precautions should be taken or alternative jointing methods used.
- People should not be exposed to noise levels in excess of 140dBC L_{peak} without hearing protection.
- Livestock may also be startled.
- Notification of the public and emergency services etc, needs to be carefully considered and planned.
- Seek advice from Transpower Environmental Planning and Policy Group on these matters, see Table 29.3.

10. RURAL FIRE PRECAUTIONS

Background

During a restricted or prohibited fire season, no fire may be lit in the open unless in accordance with an approved fire permit. Where exemptions apply, ensure compliance with relevant conditions.

Useful information and "how to"

Activities which increase bush vegetation fire risk include:

- Hot works – cutting (including concrete cutting), grinding, welding, drilling, machining, burning, brazing, soldering, heat shrinking, etc;
- Disposing of cigarettes;
- Leaving combustible waste on site, such as vegetation, pallets, etc;
- Driving vehicles through long grass;
- Storing flammable liquids;
- Implosive jointing; and
- Refuelling equipment.

General precautions for all hot work:

- To check the rural fire season status in your area contact Fire and Emergency NZ on 0800 658 628, or you can either email firepermit.enquiries@fireandemergency.nz or check http://www.checkitsalright.nz/check-fire-season-status you can also check fire weather conditions at https://fireweather.niwa.co.nz/
- Light and maintain fires in a manner which will prevent the escape of fire, sparks or incandescent material.
- Keep a space of at least 3m around flames clear of flammable matter.
- Watch lit equipment/fires during the entire time it is burning.
- Keep a shovel and fire extinguishing equipment immediately at hand.
- It is good practice to wait on site for 30 mins after finishing high risk activities in remote areas in very high to extreme fire risk conditions.
- Follow the requirements of any hot work permit.

Remember

- **Despite any exemptions, businesses may still be responsible if a fire is started by their activities.**

11. AIR POLLUTION

Background

Air pollution including dust generation on a work site can have health and nuisance implications for workers and residents and cause adverse effects on network assets including transmission line insulation and electronics including protection controls. It can also affect surrounding crops, natural vegetation, and waterways.

Minimising fuel consumption reduces cost and improves profits, while reducing emissions of air pollutants to the environment including greenhouse gases.

Measures should be employed to reduce smoke, hydrocarbon emissions, chemical vapour emissions and dust generation during works.

Useful information and "how to"

Ways to reduce dust generation:

- Reduce traffic movement and minimise speeds over surfaces that might generate dust, including disturbed areas and unsealed roads.
- Vehicles should follow approved roads and tracks within the site (where possible) to reduce disturbed areas.
- For trucks loaded with exposed earth, cover the load with tarps. For short journeys wetting to ensure spoil is damp is a useful alternative.
- When required and particularly during dry windy periods, keep disturbed ground surfaces and stockpiles damp, (but avoid water flow).
- Consider using rainwater tanks as a water supply.
- Control dust when cutting, drilling or sanding; particularly concrete, e.g. consider wetting and using a wet vac to prevent the solution reaching waterways.
- Prevent dust from entering relay, control and communications rooms by closing windows and doors or otherwise sealing.

Use of a dust cart on a substation construction site.

The following measures can also usefully reduce sediment erosion by rainwater.

- Phase works to minimise the duration of soil disturbance and avoid soil excavation on windy days.
- Install wind breaks (silt fence or shade cloth) to reduce wind erosion of soil.
- Cover or stabilise exposed areas. Options include mulch, hydro-seed, plastic or geotextile sheets.

Ways to reduce vehicle/machinery emissions:

- Drive smoothly, have properly inflated tyres.
- Plan jobs to minimise the numbers of vehicles needed to travel to and within the site.
- Do not leave machinery or vehicles idling when not in use or parked up.
- Service vehicles regularly and operate them efficiently with adequate mufflers and vehicle exhaust emission controls.
- If fumes are unavoidable, position vehicles and machinery where the fumes will least affect staff health and neighbours.

Regular vehicle maintenance is vital for safety, maintains good fuel efficiency and reduced exhaust emissions.

Other emissions to air:

- When working with chemicals or substances that can release vapours, work during the coolest part of the day to reduce evaporation.

12. SULPHUR HEXAFLUORIDE GAS

Sulphur hexafluoride gas (SF_6) is used in circuit breakers and gas insulated switchgear to prevent arcing. This inert gas is a very powerful greenhouse gas - one kilogram of sulphur hexafluoride has the same global warming effect as 23,500 kilograms of carbon dioxide once released into the atmosphere. SF_6 is odourless, colourless and non-combustible but during usage can decompose and generate hazardous by-products that can have a strong rotten eggs odour.

Useful information and "how to"

Maintenance of equipment containing SF_6 should only be undertaken by staff competent in this activity. Service specification, TP.SS 02.29, Sulphur Hexafluoride (SF_6) Gas and Handling Equipment Maintenance and Management must be followed.

- Prevent all SF_6 release to the environment.
- Check for leaks following maintenance and installation of assets.
- Check soundness of filling equipment, hoses and couplings and service regularly to minimise leaks during top ups and other gas transactions.
- Record the trends of all pressure gauges when visiting a substation to enable early detection of leaks rather than relying solely on low level alarms.
- If equipment is seen to be losing pressure find the source of the leak. Besides use of snoop liquid and the modern Transpower supplied SF_6 sniffers, an SF_6 camera is available for this purpose.
- Fix leaking equipment quickly, avoid repeated top ups.
- There is a lot of experience with equipment leak characteristics and typical fixes, this is documented in TP.SS 02.29. If you are uncertain of the best approach to managing a leak, contact Transpower asset engineers who have awareness of the wider network experience.
- Record all gas transactions and report as required by TP.SS 02.29.
- If you suspect an enclosed area contains sulphur hexafluoride, treat as a confined space, do not enter. Contact your supervisor immediately.

Using an SF_6 gas camera for leak detection.

- Immediately evacuate any building if you become aware of equipment failure that has released gas and contact your supervisor immediately.

13. WATER QUALITY (INCLUDING EROSION & SEDIMENT CONTROL)

Background

Clean water is essential to a healthy diverse aquatic environment, for potable water supply and so future generations can continue to enjoy the local swimming hole and a bit of fishing. Water can become polluted through a number of mechanisms associated with National Grid activities, including:

- Rainwater running over and eroding exposed ground (for example due to earthworks) and picking up sediment;
- Water contacting chemical or oil contaminated surfaces;
- Paint wash water; and
- Concrete works.

Remember

- **All stormwater drains lead to our rivers, lakes and oceans.**

Only clean rainwater is allowed to enter a waterway, wetland or stormwater drain. All reasonable and practicable measures must be taken to achieve this. Any other liquid or solid entering or with the potential to enter a waterway or stormwater system is considered pollution and can have adverse effects on plants animals and our waterways. Polluting our waterways can result in fines and/or prosecution for companies and individuals.

Useful information and "how to"

When working with or near water:

- Do not store or use any potential pollutant (eg transformer oil, contaminated soil or a chemical) where it might enter a waterway or storm water drain.
- Wetlands too have a significant level of protection and are broadly defined, for example a wet paddock, particularly in otherwise dry conditions, could well be a wetland. Plants such as rushes and bullrushes (Raupo) rather than just grasses are also indicators of a potential wetland. If in doubt about whether you are about to undertake work in a wetland, seek advice from the Environmental Policy and Planning Group, see Section 29).

Uncontrolled sediment in site run-off water can severely pollute water-ways

- On earthworks sites, minimise the volume of stormwater that needs to be treated by diverting clean surface water away from exposed ground. For example, placing sand bags or other barriers around earthworks and trenches to effectively divert clean water away. Follow the more detailed guidance provided in the first sub-section below ('General Site Management Practices for Earthworks').
- Ensure storm water treatment measures are in place to remove sediment from storm water, which could otherwise discolour and pollute waterways. Also attend to the control of concrete and paint discharges. Follow the more detailed guidance in the second sub-section ('Examples of Control Measures').
- Any discharges to stormwater must be in accordance with the process at the third sub-section ('Managing Water Discharges').
- Any discharges to sewer must be in accordance with a trade waste certificate from the relevant local authority.

The remainder of this chapter is divided into the following sub-sections:

1. General Site Management Practices for Earthworks
2. Examples of Control Measures
3. Managing Water Discharges

General Site Management Practices for Earthworks

The preparation of and compliance with an Erosion and Sediment Control Plan (ESCP) may be a condition of an environmental approval. Even where it is not, an ESCP should be considered for most earthworks. Use of the following six general site management practices for earthworks will help to minimise surface erosion and control the possibility of sediment leaving the site and entering waterways.

An ESCP would document the outcome of consideration of the following 6 steps and include;

- a site plan;
- design and rational of controls;
- implementation timing of works;
- contingency planning;
- identify responsible people: and
- the maintenance of controls.

Work method and equipment selection can minimise the earthworks footprint. In tower foundation work, use of a low drill can remove the need for a separate crane pad to be constructed and then reinstated.

1. **Assess the site and proposed works for risks of erosion and sedimentation before work commences.**
   - Identify slopes/contours (the steeper the slope the greater the erosion risk).
   - Locate drainage lines and waterways.
   - Locate areas of soil disturbance and exposed surfaces.

2. **Plan your works and implement measures to prevent erosion.**
   - Minimise the removal of natural stabilisers such as grass, vegetation and mulch. This is particularly relevant to work near water ways where retention of vegetation would reduce erosion and minimise sediment loss. Consider rotary slashing tracks to gain access rather than using an excavator or bulldozer to clear down to mineral earth.
   - Minimise the amount of site disturbance and the time that areas are left exposed.
   - Minimise the number of vehicle access points (preferably one) to and from the site. Ensure this access point is stable to avoid mud being tracked offsite by vehicle wheels. (see specific guidance later in this section).
   - Avoid causing site disturbance during wet weather.
   - Divert clean upstream 'run-on' water around the exposed area when permitted by resource consent or where council permitted activity rules allow this activity.
   - Stockpile stripped turf and topsoil for reuse in stabilisation and landscaping.
   - Transport soil and materials in a way that prevents dropping material on surrounding streets. Wheels, tracks and body surfaces of plant and vehicles leaving the site should be free of mud or sediment.

Poorly designed entrance ways and/or absence of wheel cleaning can spread mud off-site creating a neighbourhood nuisance including a source of sediment and dust.

3. Install erosion and sediment controls.

- Protect all existing drains, such as substation drainage kerb drains etc, (see protecting kerb drains later in this section).
- Place controls such as clean water diversion bunds uphill of works to divert runoff around work areas and stockpiles, thereby reducing the quantity of sediment laden water to treat.
- Stabilise exposed areas as soon as possible by mulching, hydro-seeding, turfing, covering with geotextile and hardfill. Simply applying grass seed to an exposed surface and walking away is not effective stabilisation.
- Geotextile such as bidum cloth, hessian or even ploythene can provide a cheap and effective temporary cover over exposed surfaces thereby minimising erosion and sediment. This is effective on stockpiles or any exposed soil.

Mulching during vegetation clearance works to reduce sediment in run-off.

- Place controls downhill of disturbed areas and stockpiles, around drainage pits, along slopes, and around culvert inlets and outlets to intercept any migrating sediment.
- Silt socks can be easily laid across a site or water flow route to divert and slow water down. Water that is slowed will cause far less erosion.
- Place controls so that sediment is trapped as close to the source as possible.
- Install controls (eg stabilised entranceway, rubble bed, or wheel wash) at site exit point to prevent sediment tracking onto roads.
- Ensure all runoff from disturbed areas is directed towards sediment controls.

Hydroseeding can provide stabilisation of exposed soil and slope faces by providing for rapid grass growth.

4. **Employ good site management practices during the course of works.**
   - Avoid making a mess and clean as you go.
   - Ensure surrounding areas and hard surfaces are clean and free of sediment.
   - Avoid placing soil in areas outside of the disturbed area, (eg pushing soil over banks and slopes where it can run into waterways).

5. **Inspect and maintain erosion and sediment controls to ensure they are working effectively.**
   - Inspect and maintain all controls regularly and after every rain event. Remove built up sediment and repair devices as necessary.
   - Inspect and maintain as often as is required to ensure the work site and surrounding areas are clean, adequately protected and only clean water is entering any drain or waterway.

This sediment control fence return badly needs maintenance to prevent the sediment bulk over whelming the fence.

6. **Rehabilitate all disturbed areas as soon as possible after excavation or completion of work.**
   - Restore all surfaces to their original condition (or as specified by your work method or the environmental approval).
   - If practicable, progressively reinstate areas as works are completed.
   - Ensure rehabilitated lands establish sufficient ground cover to prevent erosion - (a rule of thumb is 80% ground cover is required to prevent erosion). To achieve this quickly and promote re-vegetation consider the use of a biodegradable hessian mat and seed or plant into this mat.
   - Remove temporary erosion and sedimentation control works as soon as revegetation/site stabilisation is established, recycle where possible and dispose of any waste responsibly.

Examples of Control Measures

A number of specific activity considerations and key stormwater and erosion control measures are identified below. These represent only some of the more commonly used controls. Information on a wider range of available measures (e.g. sediment retention ponds) can be found in a number of sources including guidelines provided by regional councils e.g. Auckland Council's, Guidance for Erosion and Sediment Control, GD05, available here :
GD05 Erosion and Sediment Control.pdf (aucklanddesignmanual.co.nz)

See Section 29 for Regional Council contact details; guidelines are usually available on their websites.

When stockpiling cannot be avoided:

- Order only the material quantities required.
- Choose an appropriate sheltered location away from possible hazards such as areas of concentrated water flow, channels, gutters, drains, steep slopes (eg flat grassed areas).
- Limit height of stockpiles according to your erosion and sediment control plan.
- Place stockpiles on a tarpaulin where possible.
- Adequately protect stockpiles so that no material can escape, especially if the site is left unattended or rain is expected. PVA or Latex binding sprays can be used to protect longer term stockpile, or well-fixed tarpaulins or mulch for shorter term stockpiles. Applying polythene and or bidum cloth will quickly cover the stockpile and prevent rain and wind erosion.
- Provide sediment control (eg sediment fences, sandbags) to protect and divert runoff water around stockpiles where required.
- Set up sediment control devices downhill of disturbed areas to intercept mobile sediment.
- Remove stockpiles and clean up as soon as possible.
- Check with your District and/or Regional Council to ensure that the stockpile is a permitted activity and if not, then ensure appropriate resource consents are applied for before the stockpile is formed.

When trenching:

- Avoid trenching during periods of high rain, or when the water table is high (such as in winter), where possible. Divert surface water runoff away from trenches.
- Limit the length of time trenches are open to less than three days, where possible.
- Place excavated material up gradient of the trench.
- When discharging water offsite, refer to the end of this section.

When underboring:

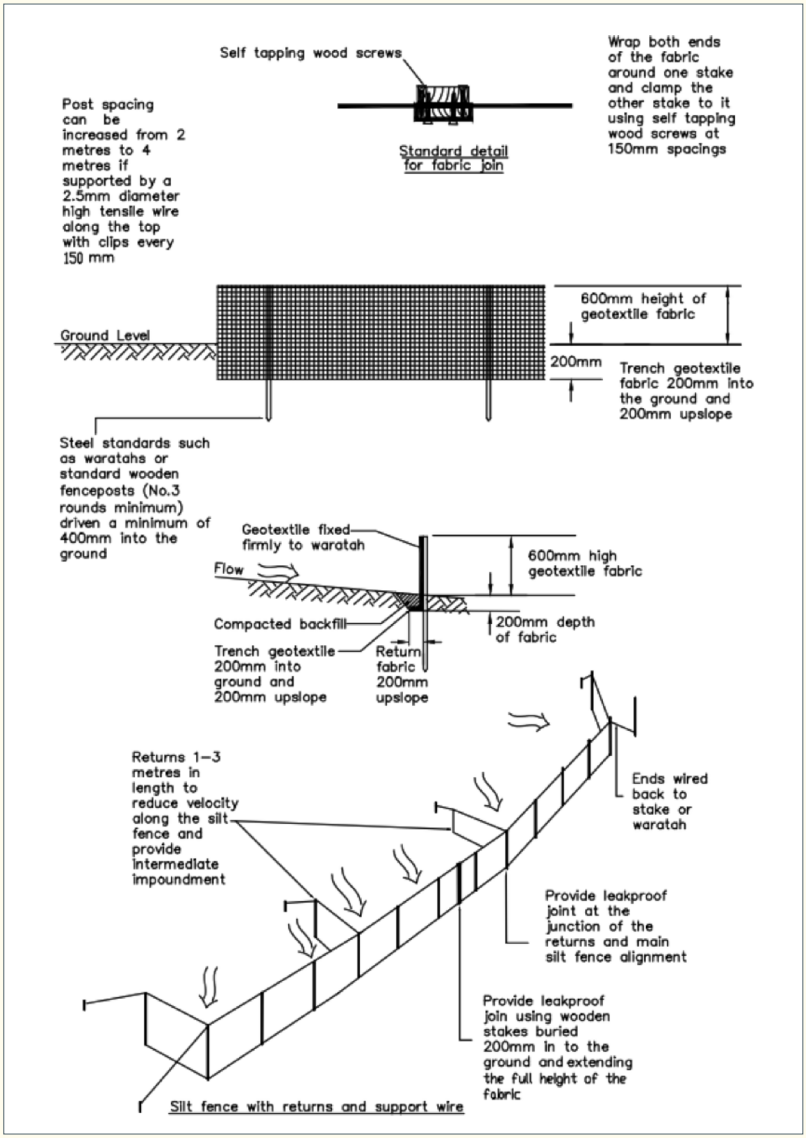
- Use a closed recirculatory drilling mud system.
- Prepare contingency plans to deal with "frac outs" (when drilling mud propagates toward the surface and can escape).

Installing a sediment control (silt) fence

1. Identify the natural drainage flow and construct sediment control fences as close as possible to parallel to the contours of the site, i.e. across a slope and not down it.
2. Install small returns (often 2m in length, off the main fence) to limit the catchment area of any one section.
3. Cut a 200mm deep trench along the upslope line of the fence location and place the bottom of the fabric into the trench. Backfill the trench and compact to secure the fabric.
4. Drive 1.5m long star pickets or warratahs into the ground at 2m intervals (maximum) at the downslope edge of the trench.
5. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire as recommended by the manufacture. Only use geotextile specifically produced for sediment fencing.
6. If required, join sections of fabric at a support post with a 150mm overlap.

Sediment control fence installed along the contour to control sediment runoff from a large area of earthworks.

The schematic below shows the Auckland Council requirements. Requirements differ from council to council, but these were the most conservative at the time of publication.



Protecting kerb drains

1. Form a seal with the kerb to prevent sediment bypassing the filter.
2. Geotextile devices should only be filled to 2/3 capacity with 25mm to 50mm aggregate so a good seal with the kerb can be achieved. If the bag ruptures, it must be cleaned and replaced.
3. Cover the drain or use a bag inside the drain sump to further catch sediment.

NOTE: Sandbags do not allow matter to filter through and hay bales offer inadequate filtration. Geotextile devices should be used in cases where filtering is required. ***These measures will also not be effective with paint and concrete washings which arise when concrete cutting or using a water-blaster to create an exposed aggregate finish on fresh concrete for example.***

There are purpose made cess pit inserts that will allow the drain to function and let high flows through the device. Otherwise your control may block the drain and cause diversion of stormwater, localised flooding and danger to traffic and pedestrians.

When using a geotextile sausage

- Make a sleeve from geotextile longer than the length of the inlet pit and fill with 25mm to 50mm aggregate.
- Leave at least a 100mm space between the filter and the kerb inlet using spacer blocks.

Geotextile sausage and material used to protect a kerb drain. A geotextile sump bag would be better still but must be regularly inspected and emptied.

Construction site access

If there is a high potential for mud to be taken from site on to the public road network on vehicle wheels, site access should to be designed to dislodge the mud, this is often referred to as a stabilised entrance.

- Make it wide enough to accommodate the traffic, at least 4m.
- use coarse crushed rock and ensure sufficient length, at least 10m.
- Use a geotextile layer beneath, particularly where overlying clays. This can save money as the cloth reduces the chance of the rock being contaminated with the underlying soil, keeping the rock cleaner for longer.
- Use a hump at the exit to divert run-off from going off-site.

Preparing an access track to a tower construction site.

On this access track a sock has been added to a culvert outlet to provide for discharge on a gentler gradient and avoid rill erosion of a steep face.

Managing concrete wash water and saw cutting slurry

Slurry from saw cutting operations must be treated with extra care, as the slurry has a high pH and will cause pollution if released to soil or waterways. Using minimal water during cutting creates thick slurry which is more readily contained.

1. Contain all runoff from saw cutting activities including when cleaning wet concrete from tools and equipment (eg using sandbags or wet-vac).
2. Sweep slurry into a contained area before the slurry dries.
3. Allow the slurry to dry sufficiently so it can be collected and removed from the site. Slurry must not be left on site.
4. Dispose of dry slurry as "solid waste". If it cannot be sufficiently dewatered, it needs to be disposed of at a liquid waste treatment facility by a liquid waste contractor, see Section 29.

Poor implementation and maintenance of controls can lead to concrete discharge.

A nice example of potential controls during concrete cutting including placement of a barrier to water discharge.

Managing concrete pours

The same environmental issues identified above are relevant when pouring concrete foundations etc.

- Capture all wash water
- Provide for cleaning of tools
- A Concrete Washout Bag provides a quick, convenient, low cost solution to contain concrete washout waste. The bag is simply placed under the chute or hopper of the concrete truck and the slurry is contained in the plastic/polyethylene inner liner in the bag. Available in New Zealand from Powerpac
- Current users of these bags suggest the bag be tied to the trucks to ensure they maintain their shape while pouring into them, (see photograph).
- Before heavy rains, washout bags should be covered to prevent overflow.
- The washout bag contents can be left to evaporate and harden before recycling or disposal. The bags have loops to allow lifting by crane or forklift.

Concrete washout bag in use, tethered to vehicle to keep bag open to receive washout material.

- Excess wet concrete should not be buried or dumped on bare ground to harden at construction sites.
- Ahead of the work, arrange for excess volume (over that of the Concrete Washout Bag, 0.7m3) to be taken back by the supplier.
- Further guidance is provided in a guidance sheet on Management of Concrete Wastes in the Environment found on the contractor area of the Transpower Website, See Environmental Resources.

Managing paint and wash-water

- Paint waste and wash-water should be prevented from entering drains and waterways.
- As much paint as possible must be retained from brushes, dispensers etc for future use.
- A number of paint suppliers (Dulux, Wattyl and Resene) provide self-contained paint wash systems and these provide a useful wash-water control option.

Managing Water Discharges

Before discharging water from a worksite or substation, you must be able to answer NO to all of the following questions:

- Is a discharge consent required, (seek advice from Transpowers environmental advisor, see Section 29, Table 29.3) ?
- Is there oil in the water?
- Has your work altered the pH (normal pH is between 6.5 and 8.5)?
- Is there any other contamination (unusual smells, colours, slime, or foamy scum)?
- Is there a large quantity of sediment that will not be removed by a filter bag, baffle tank or other treatment device?
- Is the water still cloudy with sediment after passing through the filter bag?

If you answered **YES** to any of the above questions, the water must disposed to an authorised disposal facility by a licensed liquid waste disposal contractor. Section 29 contains contact information for liquid waste contractors.

If you answered **NO** to all the questions, ensure when dewatering that the pump inlet is kept in the clear surface of the water to avoid pumping sediment and mud. Depending on the water clarity, when dewatering, pumping to baffle tanks is a common means of removing coarse sediment. They comprise a series of weirs to provide for sediment settlement. The water can be discharged via a further settlement pond or through a sediment filter bag to a nearby grassy or vegetated surface to allow water to slowly filter into the soil.

Baffle tank and discharge pipe.

Baffle tank weirs to provide sediment settlement prior to discharge.

A filter bag can provide useful polishing and assurance of discharge of clean water from earthworks etc.

Hydro-vaccing slurry must be disposed of appropriately, off-site.

14. CONTAMINATED LAND

Background

Soil and groundwater may be contaminated from previous activities on site. Exposure to contamination presents a potential risk for workers, the public and the environment. In addition, contamination can damage our infrastructure, may require special treatment/ disposal and could cause future liabilities.

Useful information and "how to"

Some indicators of potentially contaminated land are:

- oil impacted soil;
- oil sheen on groundwater;
- odorous material (eg fuels, solvents, rotten egg gas);
- underground storage tanks (USTs);
- buried waste (eg asbestos, construction waste, containers);
- imported fill (eg ash, asbestos); and
- unusually coloured material.

REMEMBER

If you suspect that you have exposed contaminated land, YOU MUST STOP WORK, RESTRICT ACCESS AND NOTIFY:

- **your site Supervisor who will follow the guidance in Section 17.**
- **the local Safety Advisor.**

Sites contaminated by transmission activities are typically found where fuel storage tanks are present, in areas where oil filled equipment is being or has been used, or industrial sites. In rural locations, activities like sheep dipping and application of agrochemicals can lead to contamination which may need to be managed at our worksites.

Oil stain from historic contamination associated with a former transformer bund discharge.

Substations are identified in NZ legislation as potentially contaminated sites as they are on the Hazardous Activities and Industries List of sites. On sites like substations with known or potential contamination; where soil is to be disturbed the sites should be investigated by specialists. Regional Councils keep registers of known or potentially contaminated sites. Resource consents are likely to be required for earthworks on such sites.

Although there are sites where contamination risk is heightened, contamination can be present anywhere. For any earthworks including hydro-vaccing and air excavation it is advisable to contact Transpower's Environmental Policy and Planning Group, (see Section 29 Table 29.3) to arrange appropriate assistance.

More detailed guidance is available in the document 'Contaminated Site Management Plan' which can be found under the 'environmental resources' section of the contractor accessible area of Transpower's website.

REMEMBER

If you suspect that you have exposed contaminated land,

YOU MUST STOP WORK, RESTRICT ACCESS AND NOTIFY:

- **your site Supervisor who will follow the guidance in Section 17.**
- **the local Safety Advisor.**

It provides further guidance on the management of any ground contamination encountered on Transpowers substation sites, transmission line support structures or corridors. Guidance includes how to deal with unexpected contamination and how/where to dispose of contaminated material. It also outlines procedures for managing the effects of contaminated land during site works.

With the input of Transpowers Environmental Advisors, the document can also support resource consent applications.

Further guidance on contamination around substations sites and recommendations for managing the risks posed by soil contamination can be found in the document 'Best Practice Guide for Managing Contaminated Soil at Transpower Substations', which can also be found under the 'environmental resources' section of the Transpower website. The Guide also provides options for the reuse, remediation, and disposal of contaminated soil, with a decision-making framework to support this.

Where suspected asbestos containing material (ACM) is uncovered Transpower Service Specification TP.SS.06.55, Asbestos on Transpowers Sites', provides guidance on identification and appropriate management and controls of the material.

Work on contaminated sites must be planned and managed, which may involve the use of specific PPE and require specialist testing and waste classification.

15. HANDLING, STORAGE AND TRANSPORT OF OIL, FUEL AND LIQUID CHEMICALS

Background

Oil, fuel and liquid chemicals must be handled, stored, transported and disposed of in a way that minimises the risk of spill or leak. Spills and leaks can impact on human health and the environment. Hazardous substances are discussed in Section 16.

Useful information and "how to"

Best practice in the workplace

- Store oil and other chemicals in a contained area secure from vandalism and theft.
- For flammable and combustible liquids, the net capacity of the bund should be maintained at a minimum of 110% of the volume of the largest tank.
- Ensure all plant and equipment used in the handling and transport of oil, fuels or chemicals are regularly checked for serviceability, all hoses checked for deterioration, and hose ends and fittings checked for distortion. This includes hydraulic hoses on earth moving plant etc.
- Use absorbents and drip trays as an appropriate precaution when undertaking tasks involving oils and other liquids.
- Do not leave oil hoses and pumps unattended whilst in use.
- Oil and chemicals should be positioned as far away as possible from drains, water bodies and boundaries.
- Stormwater drains should be protected during high risk operations, see Section 18 Spill Containment and Clean-up.
- Drums on bunded pallets must be covered if stored outside to prevent bunds from filling with water.
- Emergency spill kits should be maintained and readily available whenever oils, fuels or chemicals are handled, transported, stored, processed or tested.

Contents of Transpower supplied wheelie bin oil spill kit deployed at all substations. Use of its contents is described in Section 18.

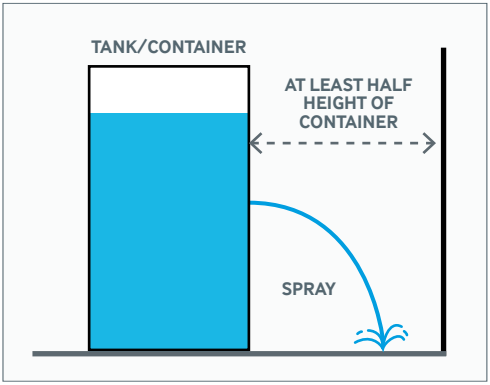
- Bund valves including those around oil containing equipment should normally be in the closed position when works on assets is undertaken.
- Do not reduce bund containment volume through placement of non original items inside bunds.
- Check and empty bunds of clean rainwater regularly and after storms.
- If rainwater is contaminated with oil, it must be treated as liquid waste and the water must be taken by a licenced liquid waste disposal contractor and disposed to an authorised disposal facility. See Section 29 to gain contact information for liquid waste contractors.
- Oil interceptors should be inspected and drained of oil and excess water in line with TP. SS.02.97 AC Stations: Asset Maintenance Requirements Service Specifications.
- Substation discharges should be monitored for hydrocarbon content in line with TP. SS.02.97 AC Stations: Asset Maintenance Requirements Service Specifications.
- Where possible and within the provisions of AC Stations: Maintenance Companion Guide, (found in the SMP Sharepoint site) oil should be recycled and used oil should be regenerated.
- Maintain spray distances. Leaks should not be able to spray outside the bund wall.
- All personnel involved in the storage of oil, fuel and chemicals should be familiar with the procedures for cleaning up spills and using spill kits (see Section 18).
- Spills should be reported, (see Section 17).

Equipment should be set back from the bund wall at a distance of at least half its height.

In most circumstances, chemical, fuel and all other oil storage must be within a bunded area.

Temporary oil storage which does not require a bund should meet the following criteria:

- the total volume is less than 2000L; **and**
- the oil is being stored for less than 24 hours; **and**
- the containers are on an impervious surface and under cover; **and**
- accidental spills will not enter the environment (eg stormwater drains); **and**
- the oil does not contain PCBs; **and**
- a spill kit is nearby of adequate type and capacity.



Spray distance is at least half the height of the container

Note: spill kits are available in 3 types, hydrocarbon only, (perfect for oil/fuel spill use), chemical, (for mild acid/alkali spills) and general purpose spill kits.

PCBs

Polychlorinated Biphenyls (PCBs) are a group of synthetic compounds which were used as a dielectric fluid in electrical transformers for their insulating properties and chemical stability. That stability makes them dangerous as they bio-accumulate throughout the food chain if released into the environment. They are now known to pose risks to human health and the environment and have been banned from use.

Although the majority of the equipment using PCBs has been removed from service, PCB levels in oil still require to be tested in line with MCG-02.97 AC Stations: Maintenance Companion Guide. If ppb levels above acceptable levels within that guide, manage the oil in line with the NZ EPA Code of Practice, 'Safe Management of PCB's https://www.epa.govt.nz/assets/Uploads/Documents/Hazardous-Substances/Guidance/d678c5e5d4/Safe-Management-of-PCBs.pdf

16. HAZARDOUS SUBSTANCES IN THE WORKPLACE

Background

Hazardous substances can readily explode, burn, oxidise or corrode and/or be toxic to people and the environment. They must be stored, handled and transported in a controlled manner. Talk to your HSE advisor or Worksafe for advice on management of hazardous substances.

Useful information and "how to"

Typical hazardous substances

- Transformer oil
- PCBs
- Diesel fuel
- Mercury
- Hydrogen
- Pesticides
- Lead (e.g older cable sheaths)
- Battery acid (including that in sealed and vented batteries)
- Chemical cleaners
- Paints and /or thinners
- Solvents
- Asbestos
- Contaminated Soils
- SF_6 gas breakdown products

Two useful online resources are:

The Governments' 'Hazardous Substances Toolbox' available at http://www.hazardoussubstances.govt.nz/
The WorkSafe site at https://worksafe.govt.nz/topic-and-industry/hazardous-substances/managing/ which has simple information covering all the main issues.

Haywards hydrogen gas compound.

Best workplace practices

- Consider if there are non-hazardous material options that can be used as alternatives.
- Follow Hazardous Substances Regulations 2017 (http://www.legislation.govt.nz/regulation/public/2017/0131/latest/DLM7309401.html) requirements which include:
  - ☐ An inventory of hazardous substances.
  - ☐ Hazardous substances signage is in place and hazardous substance containers, including process vessels are labelled and the labels maintained.
  - ☐ Safety Data Sheets (SDS) are available onsite for each hazardous substance that is handled, stored and transported at/to the site.
  - ☐ Supervision and training of workers is required to ensure workers can safely use, handle and store the hazardous substances in their workplace. This training and supervision needs to be recorded in writing.
  - ☐ Appropriate emergency plans are developed for the site.
  - ☐ Risks associated with hazardous substances must be assessed, eliminated or minimised. Eliminate risks where this is reasonably practicable to do. Personal Protective Equipment is one of the ways to minimise the risks to workers posed by hazardous substances.
- Check if quantities being transported require their management as a 'dangerous good' or if a certified handler is required.
- Follow advice of SDS's including use of personal protective equipment.
- Ensure the appropriate storage standard is followed for corrosives, oxidizers and other chemicals. Only compatible chemicals are to be stored together.
- Be aware of the location and contents of the site Hazardous Substances Inventory and the Emergency Response Information (at substations and comms sites) which contain useful information as to their control and what to do in the event of an emergency including useful contact details.
- Ensure correct labelling of all containers. Contact your HSE section if you discover an unlabelled container as it can pose a hazard to you and your co-workers.
- Store all chemicals as determined by your site procedures.
- Know the location of SDS for all site substances and ensure you are familiar with properties of each chemical prior to its use.
- Report all leaks as per Environmental Incidents and Emergency Management, see Section 17.
- Various tools are available for you to assess chemical/substances compatability, such as the WorkSafe Hazardous Substances Calculator and the Chemwatch Inventory tool. A key is to have an accurate and up to date inventory of your substances and their location/s.

17. ENVIRONMENTAL INCIDENTS AND EMERGENCY MANAGEMENT

Background

An environmental incident is defined as "an unplanned event that has the potential to cause harm or impact the surrounding environment". Environmental incidents include: oil spills and leaks, land contamination, damage to heritage and archaeological items, unauthorised land clearing, pollution of waterways, air releases, or anything that could harm people or the environment.

Useful information and "how to"

REMEMBER

If you become aware of a serious environmental incident while working on site, you must:

- **Stop work!**
- **Make the scene safe and restrict access;**
- **Prevent any further pollution or damage, if safe to do so;**
- **Act in accordance with relevant Emergency Response Plans; and**
- **Immediately report the incident to your supervisor who will contact their Transpower manager or Environmental Advisor (see Section 29 Table 29.3) If they are not available, the Regional Council must be contacted, see Section 29 Table 29.2.**
- **Report incidents into the Incident Reporting system.**

Clean up of oil resulting from a dropped bushing.

Reportable incidents include a leak, spill or escape of a substance that threatens harm to people or the environment. It is a legal requirement to report pollution as the organisation and the person who knew of the pollution incident may be guilty of a greater offence and risk fines and prosecution if it is established that they were aware of the incident and did not respond, including reporting the incident. For more information on handling leaks and spills, see Section 18 Spill Containment and Clean Up.

It is also useful to report near misses as the information can help prevent future incidents.

18. SPILL CONTAINMENT AND CLEAN UP

Background

The risk of material spill needs to be managed for a range of activities including: refuelling and use of machinery, maintaining oil containing assets, and using chemicals e.g. pesticides. Spills represent a waste of materials, can lead to serious environmental effects (including land and water contamination), and can represent a serious safety hazard where the material comes into contact with skin or may be inhaled or ingested.

Useful information and "how to"

Where there is a potential for a spill occurring on site, have a plan.

- Plan for activities where there is a known potential for spills such as use of hydraulic systems, refuelling, work on oil containing equipment and with chemicals including pesticides.
- All substations should have an oil spill management and contingency plan (See TP. SS.05.10 Environmental Management of Existing Assets).
- Know what materials are on site.
- Know where spill kits are and practice how to use them. Keep a written record of any practice.
- Ahead of undertaking a high risk activity take measures to contain potential spills such as covering drains, using drip trays or absorbent to catch drips.

Spill containment measures deployed ahead of high risk activity during substation construction.

Different strategies can be employed to contain and clean up liquid spills.

HERE IS A PROVEN 8-STEP METHOD THAT CAN BE FOLLOWED:

1. ASSESS

- Do you know the nature of the spilled liquid?
- Is there enough response equipment available?
- Can you safely handle the situation by yourself? If not, request help from trained colleagues or external agencies.
- Can you safely stop the source of the spill (roll drum, close valve, apply putty to leaking area)?
- Advise your supervisor and other required personnel.

2. SECURE

- Make the area safe for others.
- If material is hazardous
  - post a guard immediately
  - erect barricade to restrict access to area of spill.

3. PPE

- Check SDS to determine appropriate Personal Protection Equipment (PPE).
- For oil spills, check the PCB register, test on site or arrange for PCB testing.

4. CONTAIN

- If safe, contain the spill by surrounding with booms, socks, or pads secured in place.
- Prevent the liquid from entering stormwater drains and waterways by placing absorbent barriers. If liquid has entered a waterway and floats, use floating booms to prevent the spread of the spill.

5. ABSORB
■ Use absorbent materials (absorbent, pads, socks, pillows) to convert most of the liquid into solid material. ■ Use absorbent powder to completely remove the liquid on solid surfaces. ■ Contact your Environmental Advisor, (see Table 29.3) or supervisor for instructions on disposal of spent absorbent. (see Section 8 Waste Management).
6. DISPOSE
■ Place spent absorbent and contaminated PPE in appropriate disposal bags and seal or place in other container. ■ Clean up materials must be treated as a hazardous waste, and disposed using a licensed contractor. ■ If using biodegradable fibre or granules that contain microorganisms which can digest hydrocarbons, the resulting material will be compostable and, in some cases, can be used for in-situ treatment.
7. REPORT
■ Report as identified in Section 17.
8. RESTOCK
■ Inspect and restock used spill kit contents as soon as possible. For supplier contact details see Table 29.1, Section 29.

Spill response materials

There are several different types of spill response materials available to mitigate liquid spills. Information on the materials in kits on Transpower's substation sites are provided on the following page.

All Transpower substations with oil filled equipment have an oil spill kit available. There will be at least 1 kit for every 2 power transformers and located close to them, but not within bunded areas.

Service providers supply their own oil spill equipment. Service providers undertaking oil treatment or filling plant, have trailer size spill kits complete with booms and tools.

The following materials are available in Transpower's substation wheelie bin spill kits.

- The Rubber Drain Mat can be placed over a drain to block spilled material. A Sock or Plug N Dike can be used to seal any gaps between the Drain Mat and the grating.
- Plug N Dike is a non-toxic material used to form a temporary seal over leaking containers. It can be used on oils and can be used over wet surfaces.
- Plug N Dike will plug up to a 2 metre head of liquid.

Rubber Drain Mat

The wheelie bin kits contain the following range of absorbent materials.

- Heavy Duty Disposal Bags are supplied standard with all Transpower substation spill kits. These bags help ensure captured spills in saturated absorbents do not re-spill into the environment.
- Disposal of harmful chemicals and fuels must be handled in a responsible way with minimal risk of leakage.
- On-site oil spill kits are to be immediately refilled following an oil spill. They are also to be regularly inspected and any missing items are to be replaced.

Plug N Dike

Matsorb pillow

Matsorb Sock

Matsorb Pad

DID YOU KNOW?

The origins of the SDS can be traced to hieroglyphics on the inside of the pyramids which gave users of various chemicals information about how to use them safely etc. In the 19th century, chemists were recording safety precautions, etc and making them available to their customers. By the 1940's the Manufacturing Chemists Association had a series of sheets available on commodity chemicals. From a US regulatory standpoint, the first requirements were adopted in the late 1960's in the maritime industry. In 1983, they were required by OSHA in the manufacturing industry, this was later expanded to cover all employers in 1987. SDSs are also required in Europe, Canada, and Australia, and there are international activities currently underway to have an internationally harmonized approach to these requirements.

Source: http://jrm.phys.ksu.edu/safety/msdshist.html

19. VEGETATION AND HABITAT MANAGEMENT

Background

While Transpower controls vegetation around its transmission lines to maintain safe clearances, this section addresses vegetation protection while undertaking construction activities, such as laying communication cable and other maintenance activities. Healthy vegetation keeps soils healthy, filters the air, improves water quality, produces oxygen and supports natural habitat. Protecting the soil around trees using correct trenching and generally minimising impacts can help to maintain healthy vegetation. The removal of native, significant and threatened species can lead to significant penalties.

Native animals for example our birds, lizards, bats, fish etc need protecting. As part of our works planning we evaluate the ecological value of planned worksites and in some instances a ecological management plan will be developed setting out how our work must be undertaken in order to best protect the ecological values. That might be through timing of works, temporary relocation of species, developing habitat to offset any lost through our works etc. It is important that any such measures are carefully implemented and some may require onsite support from an ecologist.

Gecko habitat at Danseys Pass

Juvenile Korero Gecko identified in Danseys Pass

Useful information and "how to"

Minimise impacts on vegetation and habitats

- Ensure any work involving the removal of vegetation is legally compliant. See Section 3 on whether resource consent should be sought.
- Minimise clearance and disturbance of all vegetation, particularly along watercourses.
- Where possible, work outside the Tree Protection Zone (TPZ). The TPZ is generally a minimum distance 10 times the trunk diameter at 1.5m above ground (eg For a 30 cm trunk, the TPS is 300 cm or 3m).

- Clearly mark sensitive vegetation to avoid unintended damage.
- Where possible, avoid the removal of ground cover and understorey vegetation, particularly native vegetation.
- Consider mulching wood waste and use on site for earthworks stabilisation, weed suppression etc.
- Minimise the movement of vehicles and use existing access roads where possible.
- Where necessary, clear along the edge of vegetated areas rather than through the middle to maintain wildlife corridors, and discourage spread of weeds.
- Where practicable, use locally endemic species for landscaping.
- Provide an escape route for fauna if trenches/pits will be open for extended periods (eg log or stick to use to climb out).
- If you come across unanticipated species, which you believe may be of value and might be impacted by our works, contact Transpowers environmental advisor (see Section 29, Table 29.3).
- The ability of fish to move along waterways is important to maintain populations of native migratory fish. Culverts must be designed to provide fish passage and should simulate normal flow conditions. They must be sized based on water flow and be buried by at least a third into the bed of the stream. This maintains the natural riverbed through the culvert. A culvert that pours water like a spout (at its base) would not be suitable, as fish would struggle to swim up such as obstacle.

Illustration of a well designed and maintained culvert

The National Environmental Standard for Freshwater has specific requirements including those above, if in doubt seek advice from the Environmental Policy and Planning Group, see Section 29.

- If clearing works will impact known wildlife habitat, contact the Environment Policy and Planning Group, (See Section 29) at least two weeks prior to the commencement of works.
- Look for opportunities to conserve native fauna found on assets, e.g. nesting birds. Consider contacting the Environment Policy and Planning Group, (See Section 29) ahead of removal.
- Manage and control the spread of weeds. See Section 20: 'Weed and Pest Control'.
- Avoid using pesticides near fauna habitat or waterways. See Section 21: 'Pesticides'.
- If a native animal is injured, contact DoC or the local authority.
- Evaluate fauna deterrents and determine if they need to be repaired or replaced.

Protect the soil within the drip line of trees

Works within the TPZ, such as trenching, stockpiling soils or parking vehicles and plant can directly impact the health of a tree.

Where works could impact trees:

- Keep fill material, storage areas, stockpiles, vehicle parking, and access tracks clear of the TPZ.
- Where changes in soil level are unavoidable, keep as large an area of the drip zone at the original level and backfill with coarse material such as gravel.
- If surface sealing around trees is required, use a material which allows aeration, eg gravel, unit pavers, or coarse sand (no mortar).
- Never wash down contaminated material on the ground.
- Consider watering of affected trees during construction to reduce stress upon the trees.
- Avoid discharging water on an on-going basis in the same area as it may waterlog the soil and affect the trees health.

Trenching

Roots provide for uptake of water and nutrients, and store food reserves. They also provide anchorage and support.

When trenching near trees:

- Trench outside the TPZ where possible to avoid damage to the tree's root system and make the tree unstable.
- If it is not practicable to trench outside the TPZ, underbore/directional drill at least 600mm beneath the ground surface (if possible, directly under the centreline of the tree) or hand dig or use an air knife within these areas.
- If roots must be severed, cut the roots with a clean sharp implement at the trench edge and do not apply any type of liquid or material to the severed root end.
- Avoid using backhoes or excavators around trees to minimise damaging roots.
- Where the structural integrity of a tree could be affected, contact a specialist to carry out an assessment of the on-going stability of the tree.

Pruning trees

- Ensure all minor (branch diameters <50mm) trimming or pruning of branches protects the branch collar. If the branch collar is injured or removed during pruning, the trunk tissues can be rapidly infected and decay may develop.
- When pruning a branch use the step cut method.
- Care must also be taken to retain the branch bark ridge.

All trimming or pruning of trees should be under the supervision of personnel trained in an approved tree trimming techniques course, unless in an emergency situation.

Follow the guidance in Section 10 ('Rural fire precautions') if burn off of vegetation is practiced.

20. WEED AND PEST CONTROL (BIOSECURITY)

Background

Weeds and pests are one of the most serious threats to New Zealand's native vegetation and wildlife. They take over native species habitats, contribute to land degradation and can have serious impacts on agriculture, the economy, human health and the environment. Examples include the devastating impact of PSA on kiwifruit production, the appearance of Chilean needle grass and more recently, Microplasma bovis.

Most pests in New Zealand only occupy a tiny fraction of the land they could invade. Machinery movements are a high-risk pathway for the spread of pests and weeds. At least 80 known pest species can be moved by machinery.

Seeds and plant parts can attach to footwear, tools and vehicles. Cleaning these is the key way to manage their spread, particularly following activities in infested areas.

Planning

Each Service Provider maintains a Biosecurity Management Plan that is specific to their region. These plans are stored in the Connect Dashboard.

Connect should also be checked for any biosecurity alerts before entering land.

A biosecurtiy information sheet for landowners, which describes Transpower biosecurity management approach, is held on the Transpower website. https://www.transpower.co.nz/sites/default/files/publications/resources/Biosecurity%20info%20sheet%202017.pdf

Useful information and 'how to'

When to clean machinery

Machinery hygiene should be practiced where:

- Pest infestation is known. Speak to the landowners about whether there are any known pest issues.
- For long distance machinery transfer. Inter-regional or inter-island machinery movements should always be subject to very strict hygiene standards.
- For ground engaging machinery, (soil can contain seed and viable fragments of numerous weed and disease species).
- For waterway engaging machinery, (aquatic environments are particularly pest prone, many pests can only move between catchments with our help).
- For wet machinery, (disease, spores, fungus and aquatic pests are more easily able to survive transfer in damp environments).
- A place is a "restricted place" under the Biosecurity Act 1993 due to a serious pest issue, (there will be signage to this effect, and the occupier will know).

An organic wash-down facility developed to meet landowner biosecurity commitments.

REMEMBER

The standard to achieve is:

That no visible soil or plant matter remains which might spread pests or weeds.

How to clean machinery

Machinery includes associated implements, attachments, and service vehicles.

Ideally machinery should be washed down on the property prior to movement, thereby containing any problems at source. Alternatively machinery may be cleaned in a purpose built wash-down facility, but care should be taken to ensure there is not a risk of pest spread during transport to that facility. Work with the occupier to agree to a suitable wash-down site:

- Within, or near any areas where weeds or pathogens need to be contained.
- Away from any watercourse or water body. A buffer of at least 30m is desirable to avoid runoff into waterways.
- Away from muddy areas, preferably a hardstand area or well grassed or graveled sites.
- Away from potential hazards, e.g. power lines.

Consider if effluent runoff controls need to be established.

Equipment used to clean machinery will depend on the type of machinery and facilities available. Cleaning can be by any one or a combination of;

- Physical removal
- Pressure water
- Pressure air
- Vacuum
- Pesticide use such as Virkon S
- Clean thoroughly with decontamination solution* (5% any common dishwashing liquid/ nappy cleaner or 2% household bleach) for one minute, including spraying the underside of the vehicle and any other parts of the vehicle that have had contact with river or lake water.
- Commercial carwashes with an underside spray are suitable.

Be careful not to damage sensitive equipment, particularly with high pressure water. Consult and comply with manufacturer recommended cleaning methods if in doubt. Follow selective and responsible use of herbicides. See Section 21: 'Pesticides'.

The following guidelines apply to general cleaning procedures:

- Remove only those cover plates etc that can be quickly and easily removed and replaced.
- No clods of dirt or loose soil should be present after wash-down. Smeared soil stains and soil firmly lodged in difficult to access areas are acceptable, except for known high risk scenarios.
- Dirt and seed will accumulate around the hinges of the engine bonnet.
- In higher risk situations the spare wheel may need to be lowered in order to check for accumulated mud and seeds on top of the wheel.
- The top of the air filter is often recessed and where seeds accumulate.
- Radiator, grills, and the interior of vehicles should be free of accumulations of seed and other plant material.
- Check the machinery inside and out, where dirt or plant material including seeds are lodged. Pay attention to awkward places such as the underside, radiators, between dual wheels, spare tyres, hollow sections, foot wells and bumper bars.
- Dirt and seed will accumulate around the hinges of the engine bonnet.
- In higher risk situations the spare wheel may need to be lowered in order to check for accumulated mud and seeds on top of the wheel.
- The top of the air filter is often recessed and where seeds accumulate.

Suggested vehicle cleaning checklist:

- ☑ Interior of vehicle: footwells, check carpets for burrs and seeds.
- ☑ Inside the boot: carpet, spare wheel area, and other recesses.
- ☑ Engine bay: radiator, grill, recess under windscreen wipers, air filters.
- ☑ Underside: wheel arches and trims, step treads, bumpers, mud flaps, wheel rims, spare wheel on 4WDs.
- ☑ Clean toolboxes, ladders and storage compartments.
- ☑ Back tray of trucks and 4WD: remove soil, seed and plants.
- ☑ Trailers: wheels, guards, trays, channels of drawbar and under body.

Other useful strategies

Time

Allowing sufficient drying time after cleaning will kill many aquatic pest species, e.g. didymo. If the equipment is not being left to dry or if weather conditions don't allow for drying you will need to clean thoroughly in line with machinery cleaning guidance above.

Local knowledge

Regional Council biosecurity officers can provide guidance on high-risk pests for the environment you are working in. Learn how to recognise these pests. Furthermore, take the time to notify the regional council of any potentially new pests, species you have not seen before, and which seem out of place. Your efforts will be appreciated. Links to the relevant parts of regional council websites and their management plans for particular pest can be found here:

https://www.bionet.nz/

It is a legal offence to knowingly spread most pest species.

When an area is known to be infested with a high-risk pest, consider options with the occupier and biosecurity officers. Options include:

- Schedule high-risk infested areas last to reduce clean down requirements at earlier sites and to prevent weed dispersal.
- Encourage occupiers to work infested areas with "on farm" machinery.
- Use dedicated machinery for working the infested sites (e.g. an older machine which is rarely used otherwise).
- When working on a known contaminated site undertake operations outside of critical times, e.g. peak seeding times.
- Avoid moving potentially contaminated machinery over ground which is suitable for weed establishment.
- Keep to defined vehicle tracks as much as possible and drive around infestations of weeds rather than driving through them.
- Create ground cover with leaves, twigs and low growing plants to prevent weed growth.
- Mulch vegetation which has been cleared from the site and use for weed suppression and erosion control.
- Replant and re-vegetate with native plants.
- Dig out and remove known noxious weeds by hand, or with suitable machinery.
- Dispose of weeds and clippings to an appropriately licensed facility.

Further information

There are a number of well-established sources of information on the current problematic weeds and their control. The National Plant Accord identifies species already in New Zealand which cannot be sold, propagated or distributed. The accord manual contains photos and information on plants included in the accord and is available here:

http://www.biosecurity.govt.nz/nppa

Weedbusters is an inter-agency weeds awareness and education programme. Their website contains useful information on weed identification and controls, including a weed control Handbook.

weedbusters.org.nz

If you suspect you have found an unwanted pest or disease please call the Ministry of Primary Industries pest and disease hotline on 0800 80 99 66.

REMEMBER

For information on biosecurity issues commonly found in your area, contact your regional council officer (see Table 29.2) or visit their website.

21. PESTICIDES

Background

Pesticides can help control or remove problems associated with unwanted pests. If these chemicals are mishandled they can often have harmful effects on the surrounding environment. Pesticides include herbicides, insecticides and fungicides.

Useful information and "how to"

Training

- Ensure people have the necessary training for the pesticide being applied as some substances can pose a serious health hazard if used improperly.
- All pesticide users should be familiar with NZS 8409:2004 Management of Agrichemicals.
- See www.growsafe.co.nz for training in safe, responsible and effective use of agrichemicals.

The Certified Handler scheme under 'Health and Safety at Work Act' is required to be followed for those using the most acutely toxic agrichemicals (hazard classes 6.1A or 6.1B).

Planning and use

- Only use approved pesticides. Contact your Environmental Advisor (Table 29.3) if you are uncertain of a pesticides status.
- Most pesticides are classified as hazardous chemicals so the information in Section 16: 'Hazardous Substances in the Workplace' will be relevant.
- Always wear the right personal protective equipment (see SDS).
- Handle, store, mix, use and dispose of pesticides in accordance with the label and New Zealand standard.
- Do not spray on rainy, windy or very hot conditions. Check the weather warnings on the pesticide label. Monitor and stop if weather conditions deteriorate.
- Keep pesticides away from waterways, plants, animals and sensitive receivers.
- Avoid using herbicides in the vicinity of trees.
- Prepare mixtures carefully and do not prepare any more mixture than is required for the job.
- Use only well maintained equipment that is in good working order.

Record keeping and notifications

- Ensure pesticide usage records are kept which detail when, where, what, how much and why the pesticide was used.
- Display appropriate notification signage when pesticides are applied in public places.
- Have the SDS available during application for staff or members of the public.
- Notify owners and occupiers of private property prior to application on their property. Make the spray plan available on request.

Storage

Store pesticides in a container with an appropriate label.

Store in areas that are bunded, secure, cool and well ventilated.

Transport

Transport only enough pesticide as is required for the job.

Secure and protect the pesticide during transport and load and unload carefully.

Carry an appropriate spill kit in all vehicles.

Pesticide application.

Disposal

Treat as hazardous waste, see Section 8 Waste Management.

Follow instructions on labels for disposal of the product and containers.

Incidents

Have contingency plans to handle adverse events including spillage, first aid and complaints.

See Section 17 'Environmental Incidents and Emergency Management' and Section 18 'Spill Containment and Clean Up'.

22. HERITAGE AND ARCHAEOLOGY

Background

Heritage is our legacy from the past, what we live with today, and what we pass on to future generations. Our cultural and natural heritage are irreplaceable sources of life and inspiration and need to be protected.

Heritage items may include archaeological, Māori , or more recent regional parks and buildings. All activities that will take place near Heritage places are likely to require an authority from the Heritage New Zealand Pouhere Taonga and/or resource consent from the territorial authority prior to commencing.

Useful information and "how to"

Examples of heritage items:

- Māori Pa Sites.
- Remains of cultivation areas and gardens such as lines of stones, terraces and pits.
- Middens (dumps of shells, bones and artefacts, cooking stoves and charcoal).
- Rock art sites.
- Burial sites.
- Buildings which preserve our cultural history and identity (e.g. Cottages, churches).
- Places that are of historical, cultural, social, architectural, natural or aesthetic value, including historic industrial sites.
- Natural items (e.g. trees, camp sites) and tribal landmarks such as mountains, rivers etc.

Example of material typically found in a midden.

Preparing to do ground disturbance works:

Transpower has developed an archaeological risk GIS layer to identify the risk for each of our sites across the transmission line network and our access tracks. This layer can be found in Asset Map (under "Environment Layers"). The risk layer is designed to be an additional tool to assess the archaeological risk for a work site. The Archaeological Sites (NZAA) layer in Asset map as well as Heritage New Zealand's list of Historic Places should also be used to accurately assess the risk to your project.

Risk Level	Response
Low	Works in these areas can proceed under an accidental discovery protocol. If suspected archaeological material is encountered during works within green areas, the Environment Group must be contacted immediately, and works must stop in the area.
Medium	Further research is required by an archaeologist in these areas to determine if archaeological input is required for the proposed works. Depending on the nature of these works these areas will likely be reviewed and changed to either low or high archaeological risk. Often a site visit will be necessary. Contact the Environmental Group if you are planning any work within a medium risk area.
High	Works in these areas will require input from an Archaeologist as soon as possible in the planning process, who will advise the correct course of action. Usually an archaeological authority will be required for works in these areas, which can be a lengthy process. Further archaeological work, including monitoring and reporting, will also be required before, during and after the project. Contact the Environmental Group if you are planning any work within a high risk area.

Working on or near heritage items:

- Ensure that works comply with the requirements of any Heritage New Zealand Pouhere Taonga or council approval. This could include having an archaeologist and mana whenua representatives on site during the works and/or conducting a karakia (site blessing) before works start.
- Clearly identify the location of heritage items using temporary flagging or fencing prior to commencing works.
- Create exclusion zones around heritage items to prevent damage from excavation, vibration, or plant or machinery.

If you are unsure if a site may be of archaeological or cultural heritage significance, contact Transpowers environmental advisors, see Section 29.3.

Accidental Discovery Protocol (ADP)

If you discover a heritage item while working on a site you must:

- **Stop work immediately and inform your supervisor;**
- **Restrict access to ensure that any artefacts or remains are not further disturbed;**
- **Establish a buffer zone (preferably of 20 m) around the discovery; clearly marked out with pegs and tape, or similar;**
- **Remove all machinery and plant from the buffer zone where possible;**
- **If the discovery is of human remains, inform the New Zealand Police;**
- **Inform Transpower environmental advisor (see Section 29 Table 29.3) and if they are not available ensure Heritage New Zealand Pouhere Taonga is contacted (04 472 4341)**
- **Works in the area of the discovery shall not recommence until authorised.**

Fencing erected to visually demarcate a Pa site to be protected during transmission line construction activities.

Helicopters were used on the construction of the NIGUP transmission line to protect and preserve archaeological sites by minimising both machinery on site and earthworks for access and construction.

23. IWI ENGAGEMENT

Background

Transpower is keen to ensure its work is culturally safe as well as physically safe.

In Te Ao Māori (the Māori world) everything is connected, and for the wellbeing of the whole (Wai ora) it is important to look after the individual parts. Our work can disturb the equilibrium between these parts if not appropriately acknowledged or understood.

We respect the rohe (areas of interest) of the iwi and hap ū who represent the mana whenua where our lines, substations and telecommunications assets are. This typically means talking to the iwi or hapu about earthworks in their rohe before we begin. In cases where our work is particularly culturally sensitive then we may seek to engage kaumatua from the mana whenua to perform a blessing or acknowledgement before work commences, or to monitor the work.

Useful information and "how to"

Examples of culturally sensitive work

- Where we're undertaking earthworks that are, either:
  - on Māori land
  - near significant culturally important sites
  - within the rohe of an iwi/hapu that we have a relationship with (e.g. Ngāti Koroki Kahukura, Ngāti He, Ngāti Raukawa ki te Tonga, Nehenehenui (Maniopoto))
- Where we're doing work on towers that are within waterways or estuaries

Transpower assesses new works for cultural significance but sometimes the situation changes, if you think your works needs involvement from the mana whenua then contact Transpowers Environmental Advisor for assistance, see Section 29 Table 29.3

Blessing by Ngāti Tukorehe of a midden site discovered on the BPE-HAY line'.

24. STAKEHOLDER ENGAGEMENT, NOTIFICATION AND ACCESS

Background

Most of the transmission lines that make up New Zealand's National Grid are located on, or cross, private land. It is important we work with landowners (and occupiers), as despite legal rights, it is only with good open relationships that we provide for our ongoing work on our assets on their land.

It is important to work through your Landowner Liaison Officer (LOLO) who is familiar with the notification requirements detailed in Transpower's Service Specification 05.20 'Stakeholder Liaison'. Following the LOLOs guidance will ensure compliance with the Electricity Act and with any easements, and minimise potential impacts on landowners or occupiers.

Useful information and "how to"

- Work with the LOLO to ensure the stakeholder receives a notice of entry at least ten working days prior to the entry date. The Notice must clearly specify:
  a) Location of proposed entry and work;
  b) the reasons for entry and work and nature of work to be undertaken; and
  c) that Transpower staff and or agents may visit the site for example to review work.
- The LOLO has access to Transpower's 'Connect' landowner database. This should be checked for any special access information or requirements such as exclusion periods due to lambing or cropping etc.

For landowner inquiries requiring more specialist input, the LOLO should be the first point of reference for either responding directly to the landowner or gaining specialist input from Transpower. Enquiries can include issues such as:

- Electric and magnetic fields and health effects;
- The ability to build near transmission lines;
- Compensation
- Use of farming equipment such as irrigators, elevated work platforms etc.

- Safe areas to plant trees near transmission lines and safe harvesting near lines
- Excavation near assets
- Burn-offs near Lines

Guidance to landowners on these issues and more are covered in the brochure 'Working on Your Land' and other landowner guides found on the Transpower website.

Conduct of staff

Once on the land, it is important to the enduring relationship that workers behave in a profession manner:

- Manage all works safely for on-site staff and the landowner.
- Leave all gates as found.
- Remove all material, debris and rubbish after all work is completed.
- Comply with stakeholders reasonable requirements.
- Avoid and mitigate localised contamination.
- Provide a feedback form when significant work is completed.
- Provide landowner/occupier with TPNZ information which is listed on the TPNZ website.
- Discuss any bio-security requirements; see Section 20 'Weed and Pest Control (Biosecurity)'.

Undertake work as committed to in the notice and communicate any substantive variations.

25. TOWER PAINTING

Background

Tower blasting and painting is an essential part of Transpower's maintenance activities and is undertaken by specialist contractors. It is also one of Transpower's more environmentally contentious activities, due to the discharges associated with tower preparation.

Useful information and "how to"

Mitigation tool box for air assisted and wet abrasive blasting

Standard blasting mitigation to be applied at all work sites

- Communicate the intention to undertake the work to landowners and how impacts will be controlled.
- Comply with any relevant environmental approvals. Transpower has region-wide resource consents for abrasive blasting across the whole of New Zealand.
- Use only abrasive material that has less than 5% free silica.
- Do not use paint strippers, fungicides, acids, alkalis, sodium hypochlorite or other oxidising agents for surface preparation.
- Do not apply paint using pressurised spray.
- Do not undertake blasting works where the wind speed exceeds 50 km/h, blasting in low winds avoids spray drift. Windspeeds should also be considered to manage worker safety.
- Remove debris from the abrasive blasting site following work to the extent practicable.
- Restrict dry abrasive blasting to less than 1m above ground and use screens.
- Minimise exposure to other workers and the public to discharges from blasting.
- Place geotextile cloth over the ground to capture majority of debris which deposits around the tower. Consider the prominent wind direction in placing the ground cover.

Site specific blasting mitigation options for dwellings

The following measure should be considered for owners / occupiers of dwellings within 100m of the blasting works:

Consent will be required under the NESETA, consult with Transpowers Environmental Advisor, see Table 29.3.

- Cover gardens, vehicles and buildings.
- Complete building wash down post works.
- Directing blasting away from dwellings.

Vehicles covered to avoid fouling from tower cleaning discharges.

Site specific blasting mitigation options for roads

- Within 50m of a road, consent will be required under the NESETA, consult with Transpowers Environmental Advisor, see Table 30.3.
- Direct blasting away from the road.
- Notify the roading authority.
- Erect warning signage on roads.
- Implement traffic management during the works.
- Sweep or clean the road at regular intervals and at completion of works to minimise hazards.

Site specific blasting mitigation options for waterways

- Over a water body or within the coastal marine area consent will be required under the NESETA, consult with Transpowers Environmental Advisor, see Table 29.3.
- Use silt screens around tower base to prevent run-off of water from the site, see Section 13 'installing a sediment control fence'.
- Use silt screens at the margins of any waterway to prevent run-off into the waterway.
- Direct blasting away from the waterway.

PHOTOCOPY SHEET

26. SITE INFORMATION

Site diagram

PHOTOCOPY SHEET

SITE INFORMATION

Stormwater diagram

PHOTOCOPY SHEET

SITE INFORMATION

Emergency response equipment locations

27. ACRONYMS

CEMP	Construction Environmental Management Plan
DOC	Department of Conservation
ESCP	Erosion and Sediment Control Plan
LOLO	Landowner Liaison Officer
SDS	Safety Data Sheet
PCB	Polychlorinated Biphenyl
pH	measure of the acidity or alkalinity of a solution
PPE	Personal Protective Equipment
PVA	Polyvinyl Acetate
SF_6	Sulphur Hexafluoride
TPZ	Tree Protection Zone

28. OTHER USEFUL DOCUMENTS

Controlled documents

TP.SS.05.10	Environmental Management
TP.SS.05.20	Stakeholder Liaison
TP.SS.06.40	Hazardous Substances Inspections
TP.SS.02.29	Sulphur Hexafluoride (SF_6) gas and handling equipment, maintenance and management
TP.SS.02.18	Tree Control near Transmission Assets and Access Ways
TP.SS.02.12	Protective Coatings of Transmission Line Structures and Foundations
TP.SS.06.55	Asbestos on Transpower sites
TP.SS.02.97	AC Stations: Asset Maintenance Requirements Service Specifications
TP.SS.03.72	Protection, Metering and Communication Asset Maintenance Requirements
TP.SS.02.98	Transmission Line Asset Maintenance
TP.DS.54.01	Substation oil containment systems
AC Stations:	Maintenance Companion Guide Protection, Metering and Communication Maintenance Companion Guide

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29. CONTACTS INCLUDING EMERGENCIES

Please take a moment to fill in the following table with contact details relevant to your area, site or project.

If available, Transpower's maintenance manager and/or Environmental Advisor (see Table 29.3) should be contacted in the event of an environmental emergency, ahead of contact with a regional council (see Table 29.2). Any contact with media should be by Transpower only.

Table 29.1 Contact list by issue

SITUATION/ISSUE	CONTACT	NUMBER
Life-threatening emergency	Fire brigade, ambulance, police	111
Chemical spill	Fire brigades	111
Rural fire season status	Contact Fire and Emergency NZ on 0800 658 628, or you can either email firepermit.enquiries@fireandemergency.nz or check http://www.checkitsalright.nz/check-fire-season-status	
Impact on fauna/flora	Regional council	See list in Table 29.2
Any environmental incident, emergency, issue or question	Environmental Advisor:	See Table 29.3
	Supervisor:	
	Transpower Maintenance or Project Manager	
Oil, fuel or chemical release to air, soil, waterway	Regional council	See list in Table 29.2
Need more spill response equipment/ supplies	Response Contractor:	
	Supplier of Transpower Kits:	Fire Rescue and First Response Ltd, www.firerescueandfirstresponse.co.nz 09 947 5241

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SITUATION/ISSUE	CONTACT	NUMBER
Waste disposal contractor		
Waste disposal facility		
Liquid and Hazardous waste disposal contractor. Contractors compliant with the liquid and hazardous waste code of practice should be used.	Regional code compliant contractors can be found at the web site of the New Zealand Trade and Industrial Waters Forum http://nztiwf.org.nz/wp/code-compliant-operators/ Search for liquid and hazardous waste code compliant operators.	
PCB disposal contractor		
Questions of weeds classification/ identification	Regional Council	See list in Table 29.2
Local DoC office		
Heritage	Heritage New Zealand Pouhere Taonga (National Office) Local council	04 472 4341
Noise/hours of operation	Local council	

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Table 29.2 Regional Council contacts no.'s

REGIONAL COUNCIL OR UNITARY AUTHORITY	GENERAL CONTACT	POLLUTION HOTLINE
Auckland Council	09 301 0101	09 377 3107
Bay of Plenty	0800 884 880	0800 884 883
Hawkes Bay	06 835 9200	0800 108 838
Gisborne	0800 653 800	0800 653 800
Horizons (Manawatu Wanganui)	0508 800 800	0508 800 800
Northland	0800 002 004	0800 504 639
Taranaki	0800 736 222	0800 736 222
Waikato	0800 800 402	0800 800 401
Greater Wellington	0800 496 734	0800 496 734
Marlborough	03 520 7400	03 520 7400
Tasman	03 543 8400	03 543 8400
Nelson	03 546 0200	03 546 0200
Canterbury	0800 324 636	0800 76 55 88
Otago	0800 474 082	0800 800 033
Southland	0800 76 88 45	0800 76 88 45
West Coast	0508 800 118	0508 800 118

Table 29.3 Environmental Advisor contact no.'s

Your Companies Environmental Advisor	
Transpower Advisors	
Upper North Island	**Lower North Island**
Cassie Severin 04 590 7427 027 564 6477	Sarah Silk 04 590 6572 021 519 662
South Island	
Scott Pearson 03 590 8741 021 557 856	