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ASSOCIATION

ACCA Mentor Report

Natural Burials

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1.0 EXECUTIVE SUMMARY

“Show me the manner in which a nation or a community cares for its dead and I will measure with mathematical exactness the tender sympathies of its people, their respect for the law of the land and their loyalty to high ideals.”
W. E. Gladstone

There are a number of factors influencing the drive towards the development of natural burial cemeteries. They are; the increased consumer demand for choice as a way of expressing individuality; an increased awareness and resulting demand for products that are more environmentally friendly; an increased demand from the customer and the business that operations be more sustainable; the increasing local and global awareness of the environmental impact of business operations; and the development of tools and techniques that are able to more accurately measure and compare the effects of environmental impact of business operations.

Generally the public and those managing cemeteries can articulate some of the processes, practices and products that are associated with natural burial but the ability to articulate more broadly, the concept of natural burial, is not as clear. This report offers definitions of natural and eco-burials that are more generically focussed as opposed to process, practice and product focussed.

In response to the demand for natural burials an organisation can choose to provide natural burials in three ways; either solely as a product for customer choice within its portfolio of products and in response to customer demand; as part of an overall organisation and/or business unit environmental strategy or both.

Further in responding to the demand for “greener” operations an organisation can embark on a gradual and sustainable approach in working towards natural burials. This process can begin with gaining an understanding of environmental impact issues and lead through to reviewing established operations in terms of environmental impact. By taking a step-by-step approach, an organisation is able to identify and undertake potential small affordable changes to its current operations that will enable it to legitimately claim the practice of environmental responsiveness.

In engaging a sustainable approach to developing a natural burials strategy each organisation will need to consider and resolve the conflict between the goals that drive the pursuit of economic prosperity, environmental quality and preservation, social and political equity and cultural diversity and responsiveness. Articulating objectives and goals that balance the often competing demands of these four strands is essential for business sustainability. The pinnacle of natural burial ground establishment being one that achieves conservation level of environmental restoration and maintenance.

To ensure success and buy-in of any strategy, an organisation (especially central and local government) has a duty to consult with key stakeholders at the beginning of the process and, following development, clearly communicate its strategy and its impact on all stakeholders in a timely fashion. Prior consultation and timely communication alerts and enables stakeholders to respond to any potential operational change that may affect the way they work or the products they provide. Developing a natural burial strategy has the potential to evoke a range of emotional responses to issues that are often industry myths. Information and subsequent communication of information that supports strategy decisions should be defensible and factually based.

2.0 GLOSSARY

Conventional (Standard) Burial is defined as any regular burial of a body or interment or scattering of ash that does not necessarily conform or take account of the usual or ordinary course of nature.

Natural burial is defined as the interment of a body that conforms to the usual or ordinary course of nature and adds to the biodiversity of the area. This definition includes the terms Green Burials, Woodland Burials and Bushland Burials.

Eco burial is defined as the disposal of the deceased, either as the burial of a body or as cremation and dispersal of ashes, **that mitigates any negative impact** of the process of burial and cremation (or any other disposal process) on the environment.

Natural Burial Ground is an area in a cemetery or other location, fulfilling an environmental and public amenity purpose, set aside solely for natural burial.

Environmental Impact

In a study undertaken for Centennial Park Cemetery Authority (1) by GHD Consultants Pty Ltd 2007 (2) the assessment of the environmental impact of disposal of the dead can be defined as being measured in two ways. These are:

1. Environmental Impact Risk Assessment

Based on four key environmental factors:

1. Resource consumption (casket and land)
2. Air emissions
3. Soil and ground water contamination
4. Waste disposal

2. Greenhouse Gas Assessment – a calculation of the levels of greenhouse gas emissions generated for each **process**. A carbon footprint calculation can then be established based on fuel usage figures for each process. The assumption in these calculations is only equipment **directly** involved in each process is included. No calculation for memorial production is made.

Evaluation of emissions relating to burials can be calculated on the inclusion of:

- a. Grave excavation
- b. Soil removal
- c. Back filling of grave
- d. Construction of cemetery beam / berm

Evaluation of emissions relating to cremation is based on the inclusion of:

- a. Gas Consumption

- b. Cremulation process
- c. Interment of ashes:
 - i. Grave excavation
 - ii. Soil removal
 - iii. Back filling
 - iv. Construction of concrete beam / berm

To calculate an accurate reflection of the environmental impact risk and green house gas emissions of an organisation, it is necessary for each cemetery to have its processes assessed separately due to the individual nature of the burial and cremation processes and equipment of used by each organisation.

Economical Burial (Eco / Econo Burial) can be defined by some customers as economy burial. That is one that is the more affordable than other choices. There is sometimes an assumption or confusion that natural or eco burials are more affordable than standard burial and this is not necessarily so.

Sustainability is the resolution of the conflict between the competing goals that drive the pursuit of economic prosperity, environmental quality and preservation, social and political equity and the additional strategy of cultural diversity and responsiveness.

Geographical Information System (GIS) is an electronic information system capable of integrating, storing, editing, analysing, sharing, and displaying geographically referenced information.

Global Positioning System (GPS) uses a constellation of between 24 and 32 Medium Earth Orbit satellites that transmit precise microwave signals, that enable GPS receivers to determine their current location, the time, and their velocity (including direction). GPS is a standard tool used for land survey.

3.0 BACKGROUND AND STRATEGIES FOR THE PROVISION OF NATURAL BURIALS

Natural (Woodland) burial grounds are the fastest growing environmental movement in the United Kingdom. The first woodland burial ground was opened in 1993 and there are approximately 200 natural burial grounds in the United Kingdom. These burial grounds are run by councils, farmers or private individuals, businesses or not-for-profit organisations making donations to a wildlife trust. Burials in these grounds account for about 5% of all burials.

In New Zealand there are two cemeteries currently providing the option of natural burials; Waikumete, administered by the Waitakere City Council that opened in 1999 offering a total of 17 plots. In 2008 there are 7 plots remaining for use, giving a burial rate of approximately 1 per year. The second natural burial ground is located at Makara and administered by the Wellington City Council. This natural burial cemetery is the only cemetery in New Zealand affiliated with and certified as a natural burial cemetery by the Natural Burial Grounds Association in the United Kingdom. The Makara Natural Burial cemetery opened in June 2008 has 230 plots, with 3 plots being used as of August 2008 (pers.com. August 2008). All burial rights in New Zealand are held in perpetuity.

In Australia, three cemeteries are reported to have natural burial sites. They are located at Lismore Memorial Park, Northern Rivers region, NSW; Lilydale Cemeteries Trust, Victoria and Kingston Cemetery, administered by Millingtons in Tasmania. The Metropolitan Cemeteries Board in Perth, Western Australia promotes Pinnaroo Valley Memorial Park as a natural burial area but on further evaluation this area is more a lawn cemetery with environmental practices that are “greening” the cemetery and enhancing the surrounding supporting eco-system. They are however in the early stages of developing a natural burial area that conforms to the definitions of a natural burial (pers. com.). Kingston opened in the early 1980’s with 24 burial plots and 74 ash interment plots. As at June 30th 2006 it had 6 burials, 9 pre-purchase plots and 6 ash interments. Burial rights in Australia are usually of fixed tenure.

An organisation can choose to provide natural burials in three ways; either solely as a product for customer choice within its portfolio of products and in response to customer demand; as part of an overall organisation and/or business unit environmental strategy or both.

The results of a survey undertaken for this report indicate the majority of respondents in both Australia and New Zealand do not have a formal environmental strategy for their cemetery(s). Exceptions to this, identified through the survey, are Lilydale in Victoria, The Metropolitan Cemeteries Board in Perth and the work being done by Centennial Park Cemetery Authority, South Australia. The latter is engaged in measuring and assessing the environmental impact risk and calculating the carbon footprint of its

business activities and introducing strategies to offset the impact of their activities on the environment.

It is acknowledged that a number of groups such as those of the Jewish and Muslim community engage in well established burial custom and practice that can be deemed in many ways natural burial, the preparation of the body excludes embalming; containment of the body is in a shroud; burial is at single depth and memorialisation and memorial tributes are minimal.

4.0 GOVERNMENT AND LOCAL BODY ENVIRONMENTAL POLICY AND STRATEGY

Kyoto Protocol

The Kyoto Protocol was first approved by a number of nations in 1997 as an addition to the United Nations Framework Convention on Climate Change but to become effective was required to be signed and ratified by 55 countries (including those responsible for at least 55 % of the developed world's 1990 CO₂ emissions). New Zealand ratified the Kyoto Protocol on December 10 2002 and following the signing of Russia in November 2004 the Protocol came into force on 16 February 2005. Australia signed in December 2007 and on 11 March 2008 Australia's ratification came into effect.

The Kyoto Protocol provides for more powerful and legally binding targets and measures for Annex 1 Parties to limit or reduce their greenhouse gas emissions. Only parties that have ratified the Protocol are bound by its commitments and to date the ratifying parties number 163 countries.

The timeframe for meeting the reduction targets in developing countries spans 2008 to 2012 as a "first commitment period".

The Kyoto Protocol aims to reduce the total greenhouse gas emissions of developed countries (and those countries with economies in transition) to 5% below the level they were in 1990. In practice, this will require lower energy use (especially that generated from fossil fuels such as oil and coal), reduction in transport pollution and encouraging the use of alternative fuels such as hydrogen and bio-fuels and renewable energy sources (solar and wind). Another option is to develop or set aside areas such as lands which can regenerate forests that remove carbon dioxide from the environment.

Different countries have different strategies and targets in response to the Kyoto Protocol. In New Zealand the Climate Change Bill establishing an Emissions Trading Scheme (ETS) covering all greenhouse gases and all sectors has been presented for consideration. This Bill is supported by a number of strategies. The New Zealand Waste Strategy will introduce a waste levy on all waste disposed at landfill and the Sustainable Land Management will administer an Afforestation Grants Scheme. The New Zealand Energy Efficiency and Conservation Strategy provides for sustainable building and the application of renewable technologies to local government and domestic buildings. New Zealand's target is to reduce its greenhouse gas emissions to the level they were in 1990, during the 2008-2012 period. This target may not seem ambitious at first; however, carbon dioxide (CO₂) emissions during the period 2008-2012 are projected to be 39% percent above 1990 levels. This is only partially offset by projected reductions in emissions of non-CO₂ gases. Overall New Zealand's emissions of greenhouse gases for this period, when converted into CO₂ equivalent figures, are estimated to be some 34 million tonnes above New Zealand's target level.

New Zealand has taken a different approach on emissions reporting compared to Australia in it requires the fossil fuel consumers to report. They in turn will then pass on their compliance costs to the end user who would have no opportunity to measure, monitor and adapt other than through waste minimisation and energy efficiency strategies. The detail of the New Zealand ETS is still being worked through so the full implications are not known, other than that there will be a price signal.

Australia has committed to meeting its Kyoto Protocol target and has set a target to reduce greenhouse gas emissions by 60 per cent on 2000 levels by 2050.

In Australia as of July 1 2008 the following criteria has been set for reporting entities:

- Facilities that emit 25 kilo tonnes or more of greenhouse gas (CO₂ – e)
- Corporate groups that emit 125 kilo tonnes or more.

There is increasing emphasis and awareness of environmental impact of operations and this is reflected in the increased number of government agencies involved in environmental policy development and monitoring.

Greening of Government Organisations (GOGO) – Australia

The ultimate aim of the GoGO Framework (3) is to have the whole of government including its public sector agencies, corporatised entities and statutory bodies embrace the principles. The objectives of the GoGO Framework are to:

- Deliver greater environmental benefits as part of each agency's core business
- Ensure economies of scale are created as part of a change process
- Model best practice environmental management in the delivery of Government products and services
- Avoid duplication of effort in the process.

Zero Waste

New Zealand and Australia are responding to the international zero waste strategy at both local government and central government levels.

A zero waste strategy (4) generally has three core goals:

- Lowering the social costs and risks of waste,
- Reducing the damage to the environment from waste generation and disposal.
- Increasing economic benefit by more efficient use of materials.

Zero waste strategies are reflected in environmental policies across both countries and generally have the following objectives:

- Deliver greater environmental benefits as part of each organisation's core business.
- Ensure economies of scale are created as part of the change process.
- Model best practice environmental management in the delivery of products and services.
- Avoid duplication of effort in the process.

Sustainability

The Brundtland Commission coined the most often-quoted definition of sustainable development as socio-political, environmental and economic development that “meets the needs of the present without compromising the ability of future generations to meet their own needs.” (5)

The sustainability concept has been further elaborated by the inclusion of cultural diversity in response to *The Universal Declaration on Cultural Diversity* (UNESCO 2001) statement that “cultural diversity is as necessary for humankind as biodiversity is for nature”.

Further, Hasna (6) purports that sustainability of processes in the development of all aspects of human existence affecting sustenance means resolving the conflict between the competing goals that drive the pursuit of economic prosperity, environmental quality and preservation, social and political equity and the additional strand of cultural diversity.

With the increasing pressure on land available for cemetery use and topical and increased awareness of the environmental impact of practices of disposal of the deceased, sustainability is an ongoing consideration in relation to natural and eco burials. Balancing economic, socio-political, environmental and cultural requirements is reflected in issues and decisions such as those considering shallow single depth burials versus double and triple depth burial and re-tenure and reuse of cemeteries as is the practice in Australia.

The two natural burial grounds in New Zealand practice single depth burials only and the pre purchase or reservation of plots for another family member side-by-side is only an option in the Makara Cemetery. There is no provision to reserve plots at Waikumete. Consequently families can not be placed side-by-side in the natural burial area in this cemetery. In Australia; Lilydale burials are single depth and they allow for reservation for family side-by-side; Lismore Bushland Cemetery offer single depth burial and grouping of family plots and pre selection of own site. Kingston allow for a second interment. Their reservation policy is not known.

5.0 ENVIRONMENTAL IMPACT OF EMISSIONS AND THE CREMATION PROCESS

Consumers and businesses are adopting an ecological mindset more than ever before and there is increasing research on the impact of our after life environmental footprint, specifically from the cremation process (7).

Further, systems and technology are yielding advances in the reduction of particulate matter (PM), visible emissions (VE) and carbon monoxide (CO) from the cremation process. PM and CO are the two most commonly regulated pollutants from the cremation process. However more recently there has been a focus on mercury emissions. Mercury is a naturally occurring element that can be found through-out the environment but different human activities can increase or decrease the amount of mercury moving among the atmosphere and bodies of water and soils. The top human activities of recycling mercury into the environment include municipal incinerators, fluorescent tube lamps breaking and releasing contents, dental facilities, batteries, household waste disposal and residential (oil) heating (8). The operation of crematoria is one of the lowest sources of mercury cited. The most notable way that mercury enters the cremation cycle and therefore crematory emissions, is through silver amalgam dental fillings found in some deceased human bodies.

6.0 EXTERNAL INFLUENCERS

With the “baby boomers” reaching the age of 65 plus, there is a sharp rise projected in the death rate in the next 5 – 10 years leading to the death rate exceeding the birth rate (see Figure 2 below).

Fig. 2: Births and Deaths, 1901-2051



Source: (New Zealand Ministry of Economic Development, 2003, p.17)

The 'baby boomers' cohort is more demanding, environmentally aware and participative in a society that is increasingly exposed to the spectrum of environmental issues that include the effects on the environment of green house gases, global warming, resource consumption and waste management. Looking ahead cemeteries will need to take account of the projected demands and preferences of this cohort and balance those to maintain a "sustainable" business model in the drive to build formal sustainable development and management plans.

Traditionally funeral directors are the first point of contact for grieving families unless the deceased has adopted a funeral plan in advance of their death. Consideration of choices or preferences, circumstances and implications of embalming or not embalming and using sustainable coffin materials are currently not usual options that are discussed in detail and or promoted by the attendant funeral director with the grieving family. Moreover the selection of a natural burial in New Zealand is currently an option that is most frequently planned and made in advanced and communicated to those who are required to carry out the deceased wishes at the time of their death. It is unlikely that those left with no instruction as to the deceased wishes will currently make the choice of natural burial.

The choice of natural burials is further limited by the lack of widespread availability of this option (2 choices in New Zealand and 3 choices in Australia) along with the current low rate of uptake.

7.0 SUMMARY OF RESULTS OF ENVIRONMENTAL SURVEY

A survey was been conducted of the major cemeteries in New Zealand and of the membership of the Australasian Cemetery and Crematoria Association (ACCA).

There were seventeen responses from New Zealand cemeteries and thirteen responses from **Australian** ACCA members. The results are represented in Figure 1 below.

| Survey Area | NZ Cemeteries (17 responses) | Australia (13 responses) |
|--|-------------------------------------|------------------------------------|
| Impact of business on environment | 17 | 12 |
| Formal organisational environmental strategy | 7 (41%) | 5 (42%) |
| Formal cemetery environmental strategy | 0 | 4 (33%) |
| Clear generic definition of natural burial | 14 responses 0 clear definition | 8 responses 2 clear definitions |
| Clear generic definition of eco burial | 13 responses 0 clear definitions | 8 responses 0 clear definitions |
| Natural burial site | 2 | 3 |
| Environmental awareness of community | Broad range | Broad range |
| Significant impact of cultural needs of community on cemetery management | High | High |
| General environmental awareness of community | Broad range | Broad range |

Fig. 1: Results from the Environmental Survey

Note: Care should be taken with these statistics due to the small sample population

Almost all of the respondents reported that their organisations acknowledged the impact of their business on the environment but less than half have a formal environmental strategy plan and even fewer individual cemeteries have a formalised environmental management plan.

The definition of natural burial and eco burial, by the survey respondents, focussed on descriptions of products and processes as opposed to concepts. Many respondents indicated that eco burial often inferred a burial that was more affordable.

Customer and cultural awareness of environmental friendly choices of products and processes was recorded as an even distribution from low to high across all the respondents with no identified trends.

8.0 OPPORTUNITIES FOR CEMETERIES

The climate is ripening for both product development and environmental responsiveness aligned to strategy and legislative expectations and at the same time support growing customer preference. There is an opportunity for cemeteries to respond proactively in the provision of more environmentally sustainable choices from the “greening” of traditional burials through to building alliances with conservation organisations and identifying areas of land suitable for both burials and the introduction of indigenous flora and fauna, Establishing such “wildlife corridors” could be funded via contributions (fees) from the natural burials taking place.

9.0 GUIDELINES FOR NATURAL BURIAL STRATEGY

Natural burial strategy should take into account the diverse nature and location of the businesses within the cemetery industry and provide guidelines that are adaptable to this diversity. This report recommends a ladder or tiered approach to strategy with level one being the “greening of conventional burials through to level five being the development of a natural burial ground. Even within the development of a natural burial ground there are a variety of levels at which a natural burial ground can be established within the Principles of Natural Burial. These further levels reflect an increasing commitment to sustainable operation the natural burial ground strategy is direct towards. The pinnacle of natural burial grounds being one that has an alliance with and embraces objectives directed at a restoration and conservation level.

A table representing a guide to the levels of strategy development can be found in Appendix 2.

10.0 PRINCIPLES OF NATURAL BURIAL

The following concepts are accepted as normal practice for natural burial:

- Burial plot held in perpetuity.
- The body is not embalmed.
- The body is contained in a casket of untreated renewable materials such as pine, wicker or willow.
- The fittings and contents of the casket (including clothing) all made of natural materials.
- No beams or headstones or grave markers.
- Clear plan and GPS / GIS records or similar or other reliable procedure for accurate body location.
- Interment at single depth.
- The addition of soil rich in organic matter as back fill.
- Fresh flowers only permitted as tributes.
- Area reforested to reflect the local natural eco-system.
- Ash interment either contained in an untreated renewable wood, silk or cardboard urn or directly into the soil as opposed to interment contained in the standard supplied plastic urn.

Options

- Temporary memorials made of biodegradable or natural materials or no memorials.
- Temporary natural biodegradable grave markers
- The option of erecting an unpretentious centralised memorial to satisfy the need to memorialise.

11.0 PRACTICES FOR “GREENING” CONVENTIONAL BURIALS AND CEMETERY OPERATIONS

The following concepts are accepted as normal practice for natural burial:

- The body is not embalmed.
- The body is contained in a casket of untreated renewable materials such as pine, wicker or willow.
- The fittings and contents of the casket contain all natural materials.
- Interment at single depth.
- The addition of soil rich in organic matter as back fills.
- Fresh flowers only permitted as tributes.
- Ash interment either contained in an untreated renewable wood, silk or cardboard urn or directly into the soil as opposed to interment contained in the standard supplied plastic urn.
- Donation (via pricing structure) made to conservation trusts for tree planting projects to offset greenhouse emissions of mechanical digging or cremation.
- Locally sourced materials for memorials or no memorials.

12.0 CONSIDERATIONS IN ESTABLISHING NATURAL BURIAL SITES

The following list contains some considerations when establishing burial sites:

- Sustainability of rate of use
- Capital Cost of land
- Restoration of land
- Alliances with conservation and restoration groups
- Infrastructure – level and standard including:
 - Access for digging, interment and visitation (disability considerations)
 - Fencing
 - Landscape design intent statement
 - Storm water
 - Car parking
- Plot location identification
 - Plot maps
 - GPS / GIS location
 - Grave markers
- Management Plan
 - Reforestation and vegetation
 - Maintenance
 - Tribute management
- Security
- Marketing
- Safety

13.0 GUIDELINES FOR NATURAL BURIAL POLICY

Memorials to the deceased in the form of the planting of trees or memorial gardens is a well established practice and the nature and the design of such memorialisation is often unique to the flora, fauna, weather conditions and geographical location of the individual cemetery and country it is in. The policy proposed in Appendix 3 is a generic policy guideline that does not, for example, specify actual variety (flower, shrubs or trees) and levels of planting (one per plot), which may not reflect the local indigenous environment. This policy has been adapted by one that was adopted by the Kapiti Coast District Council, New Zealand.

14.0 POTENTIAL ISSUES WITH NATURAL BURIAL GROUNDS

A number of issues have been experienced in the administration of natural burial grounds. These include:

- The erection of non complying grave markers
- The placing of non complying memorabilia such as plastic, glass and ceramic materials
- Installation of other unauthorised memorials such as seats

It would appear that regardless of the information provided prior to and at the time of a natural burial, often the surviving family find it difficult to comply with the wishes and choices of the deceased. The need for memorialisation of some degree is prevalent amongst next-of-kin, relatives and friends, especially in the early period of the grieving process. This would appear to be an on-going issue that requires careful consideration and continual marketing and education, in the management of natural burial grounds that do not have traditional forms of memorialisation.

In addition there are many myths that surround the processes of the handling and managing of the bodies' deceased persons. These myths relate to the impact on the environment of the processes and procedures that surround the preparation and presentation of the body and the final process of decomposition of the body. Such myths are often perpetuated through lack of understanding on the public's behalf, of the processes involved and sometimes a vested interest by key stakeholders in maintaining the status quo. There are, however, an increasing number of businesses who are responding to the changing needs of customer demand by developing and bringing to the market, products that assist the customer to achieve a burial that is more environmentally friendly. (24)

15.0 FAQ'S ON FACTORS IN ESTABLISHING AND MANAGING CEMETERIES AND NATURAL BURIAL GROUNDS

Impact on ground water and soil

Pathogenic organisms

Bacteriological quality of groundwater depends on the soil type and the depth to the water table (9). Cemeteries that are built in medium-textured soil materials with a water table at a depth of at least 2.5m, with graves at the customary depth of 1.8m, leaving an unsaturated filter zone of 0.7m, should be void of groundwater contamination. A deep water table and fine-grain soil, preferably clay, are concluded to be ideal conditions to prevent leaching of organic contamination. Distances between potable water supplies and cemeteries in European countries are set at 15-90metres and 10– 250metres in the United Kingdom, depending on water use.

Coliform bacteria in groundwater are considered an indicator of contamination by organic matter including faecal material and decomposing flesh. Microbial monitoring of groundwater has been reported in a number of studies in Australia, Brazil, Canada and Germany. These have been summarised in a technical report by Young et al (10) which concludes that the “general lack of evidence in the United Kingdom and elsewhere, of widespread pathogens in **groundwater** around burial grounds is due to the relative immobility and attenuation of organisms in the ground.”

No data relating to the potential pathogenic pollution of **soil** from cemeteries has been found in the literature.

Organic and inorganic chemical compounds

Studies in the United Kingdom and the Netherlands (10) and Canada (11) (12) on organic and inorganic residues indicated low leaching potential and consequently no elevated levels of concern in either groundwater or soils for the accumulation or leaching of formaldehyde, methanol, arsenic, dissolved organic carbon, total organic carbon and heavy metals. The use of embalming products containing arsenic is now prohibited mitigating any potential contamination issue of this compound.

General

The United Kingdom is guided by a report aimed at informing operators and local authority planners on how to assess the potential pollution risks to ground water from new and existing cemetery developments (13). This extensive report covers standard cemetery burials and green burials and reports that location controls to comply with best practice should be implemented as follows:

- 250m distance from potable groundwater supply source
- 30m minimum distance from watercourse or spring
- 10m minimum distance from field drains
- No burials in standing water

With pressures on cemetery land internationally including Australia, where there are varying lengths of interment and management practices of grave re-tenure and reuse, the practice of lift and deepen is used in some cemeteries. Dent and Knight (14) concluded that proposals for cemetery development and management generally did not seem to generate a high level of investigation and geoscientific focus; however, there was evidence that cemeteries must have buffer zones on all boundaries and more particularly on “topographic lows and lowermost portions of hydraulic gradients”. Buffer zones should be larger in sandy soils compared to clayey soils but they proposed no specific recommendations for buffer zone size. Further, buffer zones should be planted with substantial deep-rooting, native trees that consume large volumes of ground water as opposed to lawns that are unlikely to do this and may also permit excessive infiltration. Dent and Kent proposed that there should be no interments at the cemetery boundary and a practice of

developing cemeteries from the outside-in may assist in dispersing any deleterious solutes, microbiological organisms and nutrients.

Health risks of dead bodies

One of the most frequent questions raised when considering the burial of un-embalmed bodies is the threat to the health of the people, including family members, who are likely to come into contact with the deceased's body. This issue is covered in many publications and by a variety of organisations including the World Health Organisation (15), the Natural Burial Association (16) and those studying the likelihood of infectious disease following disasters (17) (18). Despite consistent evidence and reassurance the question continues to be asked.

In reality the human body is host to many organisms of which occasionally some are pathogenic. When the body dies, the environment in which the pathogens live can no longer sustain them (15). However, this does not happen immediately, and transmission of infectious agents from a cadaver to a living person **may** occur. The infectious hazards for individuals or families who handle a body include tuberculosis, group A streptococcal infection, gastroenteritis, transmissible spongiform encephalopathies (such as Creutzfeldt-Jakob Disease), hepatitis B, hepatitis C, HIV infection and possibly meningitis and septicaemia (especially meningococcal) (15). Although some of these diseases are highly contagious, their causative agents are **unable to survive long in the human body following death**. Microorganisms involved in the decay process (putrefaction) are not pathogenic.

Further, information published by Nehring et al (18) indicates the potential prevalence of pathogenic sterility in three cases at 9 days, 17 days and 35 days postmortem respectively, where patient death was due to degenerative and moribund organ failure in the absence of pathogenic infection.

If the bacterial status of the body of the deceased is known to be non pathological, such a body can be confidently handled with the normal care and precaution from contamination from any leaking body fluids including blood.

Formaldehyde and embalming

The process of embalming is undertaken for three purposes; presentation, preservation and sanitation. There is no legislation in New Zealand or Australia that requires a body to be embalmed. In unusual circumstances, such as those where a body is required to be kept for an extended period of time, embalming may be advised.

Formaldehyde based preservative is used in the embalming process and is produced and supplied as a water based solution containing variable amounts of methanol (alcohol), surfactants and organics dyes. Almost all of the formaldehyde is used up as the primary ingredient in the embalming procedure with the main purpose of retaining as much formaldehyde in the body tissue as possible so as to inactivate enzymes and bacteria and react with the body proteins to harden and preserve the body. Alcohols are biodegradable at various rates as are surfactants and organic dyes.

Formaldehyde is registered as a hazardous substance with the greatest potential effect on the embalmer. Some studies have indicated a higher incidence in nose and throat cancer in people exposed to formaldehyde in workplace air. This has not been confirmed in other studies; however, the Department of Health and Human Services in the U.S. has determined that formaldehyde may reasonably be considered a carcinogen (23).

Formaldehyde can enter the body by inhalation, ingestion or adsorption through skin. Formaldehyde is quickly absorbed from the nose and the upper part of the lungs and very quickly absorbed when ingested. Very small amounts are probably absorbed from formaldehyde that comes in contact with the skin. Once absorbed formaldehyde is very quickly broken down. Almost every tissue in the body has the ability to break down formaldehyde and it is usually converted to a non-toxic chemical formic acid, which is excreted in the urine and carbon dioxide that is breathed out of the body. Formaldehyde can also be broken down so the body can use it to make larger molecules needed in tissues, or it can attach to deoxyribonucleic acid (DNA) or to protein in the body. It is not stored in fat. Formaldehyde in the air breaks down during the day and does not build up in plants and animals.

Formaldehyde use is well established in New Zealand and Australia while the European Union decided on September 22, 2007 to ban formaldehyde use throughout Europe due to its potential hazardous properties.

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APPENDIX 1

PEST Analysis (External Drivers)

Political

- Kyoto Protocol
- National Kyoto Protocol reporting standards (New Zealand and Australia)
- Zero Waste Strategy
Greening of Government Organisations
- Local and State Government Act requirements
- Hamilton City Council Strategic Framework
- Bylaw governance

Economic

- Waste removal from site
- Water and energy use improvements
- Increasing fossil fuel costs
- Increasing cost of emission control and compliance.
- Efficient use of land
- Sustainability

Social

- Ethnic diversity.
- Increasing awareness and receptiveness of public in the areas of environmental risk impact and greenhouse gas emissions.
- Society has become more demanding of the products offered by local bodies and does not readily accept the status quo.
- Genealogy has become increasingly popular, increasing the interest in plot location, memorialisation and maintenance.

Technology

- Increasing tools and techniques to assess and measure environmental risk impact and green-house gas emissions of business activities.
- Electronic data capture systems of plot location and client records becoming more sophisticated.
- Potential of e-memorials on the genealogy demand for access to information of the deceased

Environment

- Increase demand for more environmentally sustainable practices.
- Increased awareness and more rigorous implementation of monitoring of environmental resource consent requirements.
- Overseas trends away from crematoria due to environmental impact of emissions.
- Trends towards becoming carbon neutral or offset carbon emissions – tree planting for every cremation that occurs – cost built into cremation cost.
- Overseas trends seeking more environmentally sustainable ways of interment and management.

APPENDIX 2

Guidelines for Natural Burial Strategy

| | |
|----------------|---|
| Level 1 | “Greening” of conventional burials |
| | Assessment of operation for practices that can be “greened” (with minimal resource requirement) |
| | Stakeholder consultation where applicable |
| | Establish policy and protocols for operational practices that “green” the business. |
| | Communicate, train, educate and market |
| | Measure, monitor and review |
| Level 2 | Develop a formal Environmental Management Strategy. |
| | Identify and understand the (complex) environmental issues. |
| | PEST & SWOT analysis |
| | Identify organisational environmental strategy plan and link to this |
| | Develop and Complete an Environmental Management Strategy Plan for cemetery |
| | Adopt, Review |
| Level 3 | Implementation of Environmental Strategy Plan to improve sustainable environmental performance of business (include natural burial strategy). |
| | Develop Policy and Protocols for operational implementation to include: |
| | <ul style="list-style-type: none"> o Waste management / maximise recycling and green waste use o Optimal energy use o Optimise water use, collection and conservation o Environmental building practices o Decrease fossil fuel use o Education and Marketing |
| | Communicate, train, educate and market |
| | Measure, monitor and review |
| Level 4 | Calculation of environmental impact risk and greenhouse gas emissions calculation of operations. |
| | Measure the environmental impact risk and greenhouse gas emissions calculation of operations using the GHD model. Assess <ul style="list-style-type: none"> o Burials o Cremations o Cremation + Ash Interment Assessment |
| | Develop a policy and protocol to mitigate risk impact and offset carbon emissions. |
| | Communicate, train, educate and market |
| | Measure, monitor and review |
| Level 5 | Natural Burial Cemetery Development |
| | Stakeholder consultation |
| | Develop policy and protocols for natural burial grounds. <ul style="list-style-type: none"> o Principles and objectives o Goals o Conditions for natural burials o Legal requirements o Adoption of policy o Implementation of policy o Review of policy |
| | Identifying land for natural burials. Consider alliance organisations and levels of commitment to sustainability i.e. stand alone conservation objectives. |
| | Procurement of site |
| | Formal planning and preparation of site <ul style="list-style-type: none"> • Landscape plan • Site preparation • Plot location • Site maintenance • Memorialisation options |
| | Set fees and charges |
| | Communicate, train, educate and market |
| | Measure, monitor and review |

APPENDIX 3

Natural Burial Policy Guidelines

NATURAL BURIAL POLICY GUIDELINES

1. Principles and Objectives

The objective of natural burial is to facilitate the burial of a body in a manner that conforms to the usual or ordinary course of nature and adds to the biodiversity of the area.

At all times the materials and processes used to contain, transport and inter a body for natural burial must maintain the principles of dignity and respect; for the deceased in their desire for a natural burial and for the attending family and members of the public.

NATURAL BURIAL POLICY GUIDELINES

2 Goals

- 2.1 To provide people with a choice of an alternative burial type.

The cemetery shall provide an area of land set aside for the purpose of natural burial. The cemetery may undertake to precede this provision by educating the public and commencing with “greening” its conventional burial practices. The Conditions for Natural Burials in Part 3 of these guidelines may be used as a reference for this undertaking.

- 2.2 To reduce the impact of conventional burial and cremations on the environment.

To support this objective no embalming of the body will be permitted and only biodegradable receptacles and contents of receptacles will be permitted. Burial sites will be planted with indigenous flora. Burial shall be at a depth and in a layer of soil high in organic matter to facilitate more rapid natural decomposition.

- 2.3 To maintain or enhance the quality of the natural environment.

A green field site is required. Land that is not normally suitable for conventional burial but ideal for reforestation may be identified as fit for natural burials. Plots will be laid out in a similar way as a conventional cemetery but reforestation will be used in place of traditional memorial practices. Additional flora may be grown around the plot to create a green or natural setting that will provide a haven for fauna in the future. Depending on the individual natural burial management plan, plots may not necessarily be used for a second interment due the programme of reforestation. Plot location may be recorded using GPS / GIS technology or similar.

- 2.4 To achieve rapid and real return of the body to the earth.

Natural burial is defined as burial than conforms to the ordinary course of nature. The aim is to return the body to the soil as quickly as would naturally occur. The absence of embalming and the addition of organically rich soil to fill the plot may assist this.

- 2.5 To provide a more affordable and sustainable alternative to conventional burial.

Natural burial aims to lower the environmental impact risk and carbon footprint of burial, in the reduction of use of fossil fuels. In the absence of embalming and the use of caskets that are simpler and less ornate, a reduction in cost may be reflected. More marginal land may be used, as grave sites do not need to be on flat or gentle gradients and can be placed in a more informal layout to use up available space should the contour of the land dictate.

- 2.6 To ensure low ongoing sustainable maintenance requirements

Less maintenance will be carried out in a natural burial cemetery due to the reduced need for landscaping, plot manicuring, headstone upkeep and memorabilia management. Natural cemeteries do not required regular mowing and only require minimal upkeep such as initial watering, tending of juvenile trees and weed control.

NATURAL BURIAL POLICY GUIDELINES cont.

3 Conditions for Natural Burials

- 3.1 Natural burials must comply with all legislative and regulatory requirements.
- 3.2 The cemetery must be contacted at least eight working hours prior to any burial taking place. This is a normal requirement for all burials and takes into account other funerals happening in the cemetery.
- 3.3 A cemetery plan for natural burial grave/plot locations will be available from the cemetery management.
- 3.4 Burial Warrant
- This documentation will be provided by the funeral director, or person responsible for the funeral, prior to the interment.
 - Families not using a funeral director may obtain the required forms from, and complete and return them to the cemetery administration the day prior to the interment.
- 3.5 Cemetery fees and payment
- Fees for natural burials may be obtained from either the cemetery administration or from the funeral director.
 - Fees will be invoiced and paid for according to the incumbent policies of the organisation.
- 3.6 Conditions of burial plot sales
- 3.6.1 Plots shall be held in perpetuity.
- 3.6.2 Material that **can** be used.
- Caskets made of sustainably grown timber.
 - Wicker or willow caskets or shrouds made of natural fibres will be accepted.
 - Casket fittings and contents shall be made of sustainable natural biodegradable materials only.
- 3.6.2 Material that **cannot** be used.
- Any types of plastic or metal fittings (exclusive of nails and screws).
 - PVC, glass, ceramic, metal, treated varnished timber, toxic glues or plastic sheeting inside the casket.
 - Non-biodegradable material inside or outside the casket.
- 3.7 Acceptable shrouds
- Shrouds made of natural materials such as silk, cotton or wool, with a solid base are acceptable. The solid base assists with the lowering into the ground and can be made of sustainable natural timber and contained within the shroud.
 - Contents of shrouds must be fastened to a solid base to prevent movement to one side.
 - Shrouds without a solid base are acceptable if used in conjunction with a suitable industry recognised transport and lowering system.
 - Shroud preparation and burial procedures involving shrouds must comply with the bylaws of the day.

NATURAL BURIAL POLICY GUIDELINES cont.

3.8 Unacceptable casket or shroud

- Cardboard caskets with PVC or synthetic coverings.
- Caskets with varnish and plastic or metal fittings.
- Caskets leaking fluids.
- Caskets having obnoxious smells.

3.9 Acceptable clothing and casket Items

- The deceased should be dressed in natural fibre clothing, with no undue additional synthetic substances.

3.10 Chemicals

- No embalming fluids are permitted. The body may be sanitised.

3.11 Communicable diseases

- If the deceased has died of or was suffering from a communicable disease at the time of death they must be transferred to the gravesite and buried in a leak proof eco-casket.

3.12 Natural Burial location

- Natural burials pertaining to this policy shall be in areas of the cemetery set aside specifically for the purpose of natural burials.
- The conditions of burial laid out in this policy may provide a guideline for the “greening” of conventional burials.
- All plots will be allocated by the cemetery administration and in sequence.
- Plot location will be recorded using GPS / GIS technology or other accurate recording system.
- Plots may be reserved either allocated on a next available or beside next-of-Kin according to the practice of the individual cemetery.
- Second interments will not be permitted.
- Due to Health and Safety Regulations, the digging of graves will only be done by cemetery staff.
- Bodies will be buried one metre below the surface to the top of the casket or shroud.
- Cemetery staff or family under staff supervision will fill the plot.

NATURAL BURIAL POLICY GUIDELINES cont.

3.13 Families will be made aware of memorial restrictions

Whilst the desire of people to plant a living monument of their life may be to reflect life blossoming from death the reality of a planting for every burial may not be conducive to establishing a healthy ecosystem. If each grave supports a monument tree the natural forest and undergrowth density may not be balanced or conform to nature. Supporting a sustainable landscape planting plan is the principle goal.

- Indigenous flora will be planted in lieu of a headstone or any other memorial and will include deep-rooting, native trees that consume large volumes of ground water, attracting indigenous fauna.
- The cost and maintenance of any shrub or tree is included in the plot purchase price.
- The cemetery shall be responsible for staking trees and managing the natural burial site.
- Indigenous flora will be planted only in seasons and at times that maximise establishment and long term survival.
- No memorials or additional planting will be allowed on burial plots other than that prescribe for the site.
- The cemetery staff will manage maintenance and re-grassing of burial plots to avoid soil erosion and ensure consistency of management.
- Trees and shrubs will be replaced should they not survive or become damaged in any way.
- The planting of the site will be in accordance with the site landscape plan

4 Legal Requirements

The Natural Burial Policy will comply with the following requirements

- Burial and Cremations Act
- Resource Management Act
- Health (Burial) Regulations
- Bylaws and Regulations pertaining to Burial and Cremation

5 Adoption of Policy

The Natural Burials Policy was adopted by on of 200.., and at the appropriate time the will set the fees and charges for natural burials.

6 Implementation of Policy

The Natural Burial Policy will be implemented on the location, establishment and operating of a Natural Burial cemetery.

7 Review of Policy

This policy will be reviewed with any changes to central government and local government legislation but no less than every two years.

APPENDIX 4
Survey Template

Available on request from glenys.parton@extra.co.nz