PATHWAYS FOR CHANGE

Advocating thought leadership, innovation, economic development and job growth for the industry

WRINT

Essential for community Essential for environment

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Introduction

The Northern Territory waste management and recycling sector is an essential services industry. It contributes directly to the Territories economy and society through employment, investment and assisting with the efficient use of waste materials and resources protecting both public health and the environment. The industry comprises companies involved in the collection, transfer, handling, sorting, re -processing and disposal of all waste materials, liquid, hazardous and solids generated by society.

The Waste Recycling Industry Association (NT) (WRINT) is the premier industry association represents owners and operators of the waste and recycling industry in the Northern Territory. The organisation members represent large multi – national and international corporations and small family based and social enterprises. WRINT engages and advocates with its stakeholders a wide range of legislative and regulatory issues members have identified as impacting the industry. It promotes thought leadership, innovation, economic development and jobs growth for the sector.

The Association members have prepared these five (5) important industry plans demonstrating industry's leadership to reforming the Northern Territories waste management and secondary resources / recycling performance. The industry roadmap sets out to explain what can be achieved in building a more resilient and robust waste management and secondary resource industry. Each plan is interlinked, designed to achieve and deliver outcomes. If these are implemented and embraced by all stakeholders collaboratively, the industry will expand, it will create jobs, it will protect the environment and it will increase landfill diversion.

Our Plans will:

- Recover waste produced by significant generators across all sectors
- Make the best use of waste materials through the adoption of 'secondary-resource' thinking
- Mitigate the risks of environmental pollution and harm to human health
- Move waste treatment and management opportunities up the waste hierarchy
- Provide new business and employment opportunities for all Territorians

The Waste Management and Recycling Industry as part of its role will:

- Provide integrated, safe, efficient and dependable services to the community
- Extract value from wastes generated where this is economically practical and viable
- Enter into partnerships with waste producers and all other service providers including the social enterprise sector to improve resource recovery and overall Territory integrated waste management systems
- Assist government policy designers and regulators to oversee delivery of this important policy initiative.

These plans support and interface the Northern Territory Environment Protection Authority 2015-2022 Waste Management Strategy and align with the Northern Territory Balanced Environment Strategy (NT BES) objectives published in February 2016.

In the NTBES Government articulates a vision of being "committed to working with industry to improve environmental management practices, including the enforcement of regulation regarding the correct disposal of waste and hazardous material. The establishment of recycling centres and places to treat solid waste and waste water are generally market driven economic decisions, however the government is keen to investigate opportunities for treating our waste as a resource".

According to the EPA work, the Australian Bureau of Statistics 2014) projections for the Territory, predict population to grow from 235,000 in 2012, to just over 285,000 by 2025. Despite its predicted population growth, the Territory has the lowest population density of any state or territory. At June 2012, the population density of the Territory was 0.2 people per square kilometre and three quarters of the Northern Territory's population reside in its five regional centres, which also serve as vital supply and service bases for dozens of smaller remote communities, with an expanse of distance between all.

Our industry commonly hears that the cost of waste management is too expensive and the distances too great to make resource recovery viable. However, this is in comparison to what?

In an era where the protection of human health and environmental values, coupled with resource security and maximising resource efficiency are the main objectives; the true cost of providing waste management services and the recovery of secondary-materials is rarely discussed or transparent.

Regrettably this is in conflict with current community culture where it is common place and acceptable to operate and use open pit and unlined non-engineered waste disposal facilities, with little or no fixed financial systems to support them. Arguments therefore for improving resource recovery must be balanced with a mature conversation about creating a systemic change for enhanced resource recovery and recycling services with what is, and is not acceptable, in terms of the territories current waste disposal and landfill diversion methods

It is an obligation by all stakeholders that an honest conversation led by our elected representatives educates the community of the real costs to providing and operating acceptable waste management systems and that an understanding of the need to apply full costing of all externalities, current and future is transparent.

Only after a genuine understanding by the community and acceptance of the real costs of managing waste can we then hold a conversation for moving (waste) materials up the Waste Hierarchy from disposal to resource recovery.

The linear model for consumption assumes that the 'waste sector' ultimately picks up the responsibility (paid of course) for dealing with and treatment of the waste at end of life disposal. Industry advocates that principles that promote a "circular materials economy", in particular the substitution of secondary resources in primary manufacturing processes must replace this outdated linear model.

The Association believes that the Northern Territory due to its remoteness and sparse demographics should be moving to conserve and secure all material flows as part of the future capital required to keep industry operating in a sustainable manner. This is a 'circular materials economy model' and by keeping valuable secondary materials circulating in the economy, additional jobs are created and sustained and greater business opportunities, including social enterprise can be realised. It thereby creates enduring investments.

The five (5) industry plans are:

1 Pathways for Change, include discussion on Legislative, the Waste Hierarchy, Data management, Emerging new waste stream management and Regulation

2 Social Enterprise Participation and Community Procurement

3 Market Strategy and Development

4 Resource Recovery

5 Emergency Waste Preparedness

Industry advocates that in order to achieving these plans the future ownership of the sectors policy agenda should be moved into a business and industry portfolio of Government and away from the regulator of the industry.

The recently published EPA Waste Strategy 2015 – 2022 provides an insight to the gaps that exist in that model. It articulates prescriptive operational actions that are aimed to improving waste management practices which are really operational intent, they are not strategic actions that are capable of delivering the economic and system changes Government requires.

Our plans provide the Territory Government and all stakeholders with a clear insight to the opportunities for the industry. They outline key objectives sought by industry over the next 5-10-year period. The plans are not inclusive of all tools and mechanisms available, rather they represent the minimum industry positions based on the current regulatory drivers and limitations the sector has identified.

Implemented these five plans underpin the desired vision, key principles and objectives the Government aspires to achieve in driving economic growth, protecting the environment and the waste management and secondary resources industry being central to that development.

It is through this industry leadership and by us partnering with Government and all our stakeholders the Territory will improve its waste management and recycling performance.

Professor Adam Read, Practice Director – Resource Efficiency & Waste Management for Ricardo-AEA[1] and a Fellow of the Chartered Institution of Wastes Management and Royal Geographical Society in the UK.

International Peer Review

by Dr Adam Read

Professor Adam Read, Ricardo Energy & Environment's Practice Director for Resource Efficiency and Waste Management, is a recognised authority on waste management strategy, services and delivery, with over 20 years of operational and consultancy experience. Adam's approach to his work has gained him a well-earned global reputation as a knowledge leader and innovator in terms of municipal strategies, recycling service design and stakeholder engagement.

He is responsible for directing, managing and contributing to a range of consultancy projects in the areas of waste strategy, procurement, due diligence, product policy, resource scarcity, life-cycle thinking and behaviour change. He has worked with the UK Government on waste strategy and service delivery projects, including the Defra funded New Technologies Training Programme, the WRAP Business Resource Efficiency Programme, and the Welsh Assembly Government Community Engagement Training Guide. Adam has worked internationally on waste management projects for over 15 years, with key assignments in North Africa, the Middle East, Eastern Europe and Australasia, building decision-maker capacity, leading on community engagement programmes, and designing new collections services. He is currently Project Director for the development of the Riyadh Integrated Waste Management Strategy, bringing together public and private sector stakeholders to build a vision for the city's services and infrastructure for the next 20 years.

Adam is recognised as a leading international waste management academic, with an extensive portfolio of research papers, both in the academic press and at international research events. He still examines PhD candidates at a number of UK universities and supervises post-doctoral research students specialising in waste management topics. He is regional editor for a leading academic journal and is a regular contributor to the leading trade journals.

According to Adam:

The Industry Plans were presented to me for their assessment and structure to ensure they align with and lead the work already conducted by Government. The concepts outlined build upon readily adopted international and national best practice and the actions identified are known to work and are achievable in the timeframe identified.

The Waste Management Strategy 2015-2022 prepared by the NT EPA contains no mandatory landfill diversion targets, nor sets any principle objectives, but rather sets out a series of actions. It is critical for the 'pathways for change' to be successfully delivered, that there is clear government commitment, a strong effective and enforceable legislative environment, and an assurance that over the next seven years a stable policy environment is developed and retained.

Making progress on all these aspects is vital to ensuring that opportunities to create new jobs as well as protecting existing employees are not lost. The attraction of new approaches to the innovative management of wastes and increasing recycling and business opportunities in the Territory can be achieved, but only if progress identified is driven forward actively and in an open and engaged way with the sectors in question."

[1] Ricardo-AEA is a leading global consultancy specialising in analysis, advice and support for economically sustainable solutions to the most pressing global energy and environmental challenges including waste management and the sustainable use of resources in a circular economy. Ricardo-AEA have extensive experience in supporting Governments, International Agencies and business leaders globally and they are a proud sponsor of the Waste, Recycling Industry Association of Queensland (WRIQ) to whom they provide valuable peer-review and international perspectives and insights.

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WRINT Plan 1 — Pathways for Change

This Plan provides an overview of the following items for consideration:

- An effective legislative and regulatory framework
- Adoption of the waste heirarchy
- Data and reporting requirements for waste generators
- Licencing of all waste management transport activities
- Infrastructure and planning
- Proposed modelling framework looking at demand and supply side
- Reclassification of major projects to include critical infrastructure/utilities
- Emerging waste streams
- Future market concerns

An effective legislative and regulatory framework

Northern Territory Waste Management and Pollution Control Act 1998 (and its subordinate regulatory framework) (WMPC Act) prescribe the necessary legislative requirements of how the industry is to be managed. Its objectives are principally pollution prevention measures but it also has responsibility for providing the legislative intent to ensure, avoidance and reducing the generation of waste; increasing the re-use and re-cycling of waste; and effectively managing waste disposal. It also aspires to encourage ecologically sustainable development

Acknowledged by all stakeholders the existing legislation is increasingly under pressure and becoming ineffective in its ability to properly manage the complexities of this industry, in particular address effectively the changes that are occurring result industrial and mining expansion, in addition to the region's population increases and the challenges that presents.

It is therefore critical that in parallel to any process of reshaping and reforming the territories waste management policy agenda, through the adoption and consideration of these industry plans, Government must also commit to undertaking a formal and structural review of the WMPC Act and its subordinate regulation to ensure these concepts can be realised

By promoting beneficial reuse and, where possible, diverting wastes from landfill, any new regulatory framework can improve the Territories environmental performance and move wastes and their management to a more circular economy.

1 WRINT Plan 1 — Pathways for Change continued

Action Item

WRINT advocates a new regulatory framework in the Northern Territory that:

- Places a 'Duty of Care' principle on all waste generators
- Ensures all hazardous and non-hazardous wastes are safely and environmentally managed by all stakeholders;
- Applies an appropriate waste hierarchy to wastes from the point of generation through to final disposal;
- Is sufficiently flexible to manage new and emerging waste streams and materials as they arise;
- Aligns, where possible, to other States and federal practices, including the revision of all definitions to describe waste and types used in the Waste Management and Pollution Control Act and subordinate regulatory legislation.
- Characterises wastes based on their properties rather than their point of generation;
- Provides a clear framework for the beneficial use of waste materials as secondary resources. This includes clear definitions of when a waste ceases to be a waste;
- Provides a robust and transparent framework for the classification and treatment of hazardous and regulated wastes. This will require the immediate commencement of an industry stakeholder and multi-departmental committee to determine a best practice regulatory framework which takes into account the state's diversity;
- Safeguards that ensure hazardous wastes are not mixed or diluted or permitted to be released into the environment;
- Confirms that the most appropriate technologies are applied, whilst not specifying prescribed treatment techniques for individual waste streams;
- Tracks and validates all liquid wastes generation, and those solid streams that require tracking movements to ensure only lawful/ suitably licenced operators receive and manage waste materials and secondary resources;
- Requires large waste generators to report their waste a risings annually and also their waste management practices to ensure adherence to the principles enshrined into the waste management hierarchy;
- Provides consistent and accurate data to decision/policy makers and industry;
- Prohibits unlawful operators from managing waste streams and eradicates sham recovery and exports;
- Provides certainty to industry so as to facilitate the provision of appropriate infrastructure and investment for the sustainable management of wastes and secondary resources;
- Revise all existing terms and definitions to prescribe the activity and waste types;
- Conduct an audit of all licenced waste collectors and receivers against the list of operators advertising or conducting activities and are not licenced;
- All waste operators and transporters be licenced to operate

Revise all definitions to describe waste and types used in the Waste Management and Pollution Control Act and subordinate regulatory legislation

Northern Territory Waste Hierarchy

Investments, in new treatment, recovery and disposal technologies require confidence that those facilities are secure with the knowledge all operations will receive sufficient minimum tonnages (be it for reuse, recycling or specialist treatment) to make the investments economically viable.

From a cultural perspective one of the difficulties in maintaining this flow, historically, has been waste generators and waste managers have not always sought to move waste generated up the hierarchy – even where ultimately this can lead to cost savings, such as in the prevention of hazardous waste, or in gaining value from recovered/ secondary materials.

The principles of the Waste Hierarchy date back to the 1970s where enshrining the waste hierarchy was specified in the European Waste Framework Directive. The aim of this principle is to reinforce that all policy and regulatory designs provide a clear ranking system for waste management options.

WRINT welcomes the discussion and adoption of the waste hierarchy in the 'Waste Management Strategy for the Northern Territory 2015-2022' (Appendix A). However, industry notes the limitations of this hierarchy as sourced from Rockhampton Regional Council, Queensland.

Action Item

WRINT proposes that the waste hierarchy in fact has seven steps which should be applied to all waste prevention approaches, regulation and policy: These are:

1 Prevention / Avoidance;

2 Preparing for Re-use

3 Recycle (Local, National, International)

4 Other Recovery (Local, National, International)

5 Pretreatment

6 Dispose (licenced facility)

7 Waste Trafficking

All of these factors adopt a key principle of local, national and lastly international perspective if a truly circular economy is to be realised.

1 WRINT Plan 1 — Pathways for Change continued

WRINT advocates an alternate hierarchy for managing wastes making reuse more important, moving from simply 'reuse' to 'prepare for reuse' (see Figure 1). WRINT notes the difficulty with identifying the precise point at which an article is deemed to have qualified as having been prepared for re-use, for example with a donated computer to charity, is it when the computer is donated or when it is resold by the charity? This will require clarification within regulation (through an 'end of waste determination').

WRINT's hierarchy forms the basis to move NT's economy away from a linear model of production, consumption and disposal towards a circular economy that maximises economic potential by creating cycles to flow continually throughout the NT and, more widely, Australia. The hierarchy aims to clearly identify the preferences for NT and Australian solutions (including, but not limited to, recycling and energy recovery) over off-shore solutions, and clearly states its position with regards to waste trafficking. This will reduce NT's reliance, where practical and possible, on new commodities and raw materials that are becoming increasingly costly (both financially and in their environmental externalities); and recognises that many wastes have beneficial reuse options. It is essential that exports are recycled achieving the same environmental benefits as recycling domestically.

Waste trafficking is the illegal export of waste which is being driven by increasing commodity prices. Whilst Australia is a signatory to both the Basel and Waigani Conventions, wastes may be incorrectly identified as in 'working order' or resources to facilitate export or may be subject to mixing or dilution to facilitate 'lawful export'. WRINT acknowledges the impacts from waste trafficking and the improper handling of waste which often causes serious harm to the environment, human health as well as to society, the economy and to the ongoing resource security of NT and, indeed, Australia. As such, WRINT regards waste trafficking as the least preferable activity of the Waste Hierarchy (see Figure 1b).

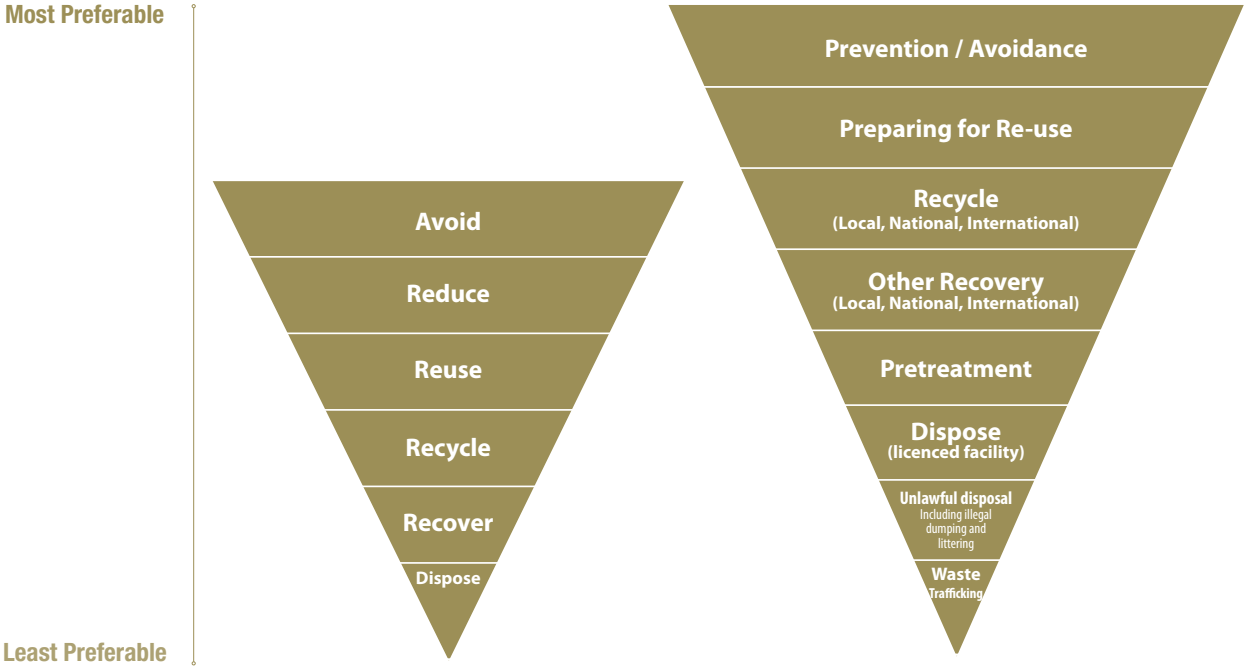


Figure 1: Waste hierarchy (as contained in Appendix A of the Waste Management Strategy for the Northern Territory 2015-2022) and proposed WRINT Waste Hierarchy

There are circumstances for deviating from the waste hierarchy and adopting a life-cycle approach or carbon-cycle approach that compares the environmental impacts of managing wastes, particularly for 'specialist or hazardous' waste streams and in remote and regional communities.

Revised Legislative Conditions for Waste Generators

The performance and practices of waste generators are critical to good waste management outcomes. For example, mixed waste streams are more difficult and costly to manage and also limit the opportunities for material reuse. Whereas the contamination of general waste with hazardous wastes creates unnecessary costs as well increases risks to workers and the receiving environment.

It is the experience of the waste management sector that waste generators have little perceived responsibility for the waste they generate, whilst leaving waste transporters and waste receivers with full accountability and subject to attention from any negative outcomes, including regulatory enforcement. Given the current ambiguity which may arise when classifying wastes, particularly hazardous and regulated wastes WRINT advocates it should be the responsibility of the waste generator to provide specific advice to operators managing the waste on their behalf of its composition.

Environmental Duty on Generators

WRINT advocates an 'Environmental Duty' on all waste generators that prescribes the 'responsibilities of all generators' to include as a minimum:

(1) When the generator gives the waste to the transporter, the generator must—

(a) record the prescribed information about the waste; and

(b) give to the transporter the prescribed information about the characteristics of the waste.

(2) The generator must give the prescribed information about the waste to the administering authority in the prescribed way and within the prescribed time after giving the waste to the transporter.

(3) The generator must keep the record of this data for at least 5 years.

Industry experience indicates that these provisions meet a minimum standard only.

...it should be the responsibility of the waste generator to provide specific advice.

International Case Study

Other jurisdictions have recognised the importance and responsibilities of waste generators. For example, under Europe's Waste Framework Directive, Article 4 of the revised Directive requires Member States to apply the hierarchy in waste prevention and management legislation and policy, whilst Article 15 requires all Member States to ensure that waste producers apply the waste hierarchy to the waste they produce. Options include embedding the hierarchy more clearly in the waste permitting and waste planning processes, through to the application of the duty of care (as in the case of the UK).

The UK in its duties to the Waste Framework Directive, has also imposed a Duty of Care which extends to all waste handlers (including waste generators). Section 34 of the Environmental Protection Act 1990 (as amended) lays out a number of duties with respect to the management of waste. Waste must be managed correctly by storing it properly, only transferring it to the appropriate persons and ensuring that when it is transferred it is sufficiently well described to enable its safe recovery or disposal without harming the environment.

It is the duty of all waste generators and handlers to take all reasonable steps to apply the waste hierarchy. The hierarchy must be applied as a priority order to the management of wastes including hazardous wastes. This goes hand in hand with the duty to promote 'high quality recycling'. This approach would help NT drive wastes up to higher order recycling (the current model does not). Under the Duty of Care, even waste collectors and transporters must apply the waste management hierarchy.

A significant step in the Duty of Care is to ensure that any waste being transferred to another holder is covered by a waste transfer note (WTN) including a written description that will enable anyone receiving it to manage it in accordance with their own Duty of Care. This process is easily undertaken electronically and does not impose undue regulatory or administrative burden.

If a waste generator or anyone handling the waste has not described the waste properly or failed to inform the next holder of the properties of the waste, then the previous 'member of the chain' may still be liable if something goes wrong after the waste is transferred. An important element of this is a duty to ensure that any person or business that waste is transferred to or who organises waste transfers on your behalf is registered with the UK's Environment Agency and able to do so. This is crucial in the effort to tackle waste crime.

WRINT Plan 1 — Pathways for Change continued

Capture of the Territories Waste and Recycling Data

Large-scale industry sectors must receive recognition and support by policy makers as major waste generators. This acknowledgement should include the gathering and dissemination of data which is critical to the ongoing strategic planning of the sector as a whole and to the organisations operating within it. Unfortunately, waste arisings and movements including recycling and reuse within NT (and the rest of Australia) are not accurately recorded nor widely understood of their importance to decision makers.

Solid, reliable and good data supports a culture for designing good policy and regulation that delivers economic growth. Inaccurate data reporting undermines those principles.

Therefore, the need for accurate data relating to wastes is imperative for improving capacity for more rigorous research and analysis, to inform decision making and to ensure the adequate provision of infrastructure. Such data is also essential to support the monitoring and review of progress against the generation, minimisation, and treatment of waste streams.

It is critical at a time of increasing public awareness of waste management issues that Government can provide accurate data regarding the generation, movement and final destination of all wastes. According to an ABS survey, the awareness of hazardous waste disposal services has increased across Australia from 32% in 2006 to 40% in 2009, whilst the NT had the largest increase rising from 27% to 43%.

Given the current constraints associated with the collection of data relating to waste arisings and management, and the discrepancies in the data available for review, it is difficult to see how the administering authorities are able to track, with confidence, the fate of all wastes and secondary resources and to confirm to their satisfaction (and the satisfaction of all other stakeholders including industry and the general public) that hazardous and regulated wastes are being managed using the optimal methods in accordance to the waste hierarchy and best available technologies.

Action Item

WRINT advocates that an audit of large waste generators (mining and major development projects for example) be conducted to determine materials generated and current disposal practices. Such an approach will identify suitable reporting entities, and also opportunities for waste minimisation by the adoption of best practice and the reuse and remanufacture of secondary resources where applicable.

Action Item

The establishment of a central register for sites generating specific waste types ie regulated waste.

[1] Data taken from ABS, Information Paper: Waste Account, Australia, Experimental Estimates Australia 2013. 4602.0.55.055.

Reporting of the Territories Waste Generation

A critical element for tracking and effectively managing wastes is to obtain data on their generation, movement, recovery and treatment; and to validate that they have been handled and received by appropriately licenced operators.

Overseas measures for improved data collection for wastes include the recent introduction for the reporting for commercial and industrial entities by the Singaporean and United Arab Emirates Governments. To cut waste generation and boost recycling, these Governments have made it compulsory for entitles such as large hotels, shopping malls and manufacturers to report how much waste they generate and their targets for reducing and recycling it. Under the new mandatory measures, generators are responsible for reporting overall waste data and producing and reporting against improvement plans.

The utilization of an external, suitably accredited body for the collection, management and analysis of data may be an option for NT as it builds critical mass and also expertise in this area. This would permit for the detailed and complex statistical analysis of the data and appropriate modelling required to produce a mass balance for the State and may assuage industry concerns over data confidentiality and privacy. This data could then be applied for the purposes of policy design, industry enforcement and compliance, as any leakage from lawful operators and licenced facilities would be transparent. It also provides for the establishment of an on-line register of wastes, designed to promote local / domestic reuse and local recycling opportunities.

Large hotels, shopping malls and manufacturers to report how much waste they generate and their targets for reducing and recycling it.

Licensing all Waste Management Activities (Transport) – Movement to a 'Level Playing Field'

According to the Northern Territory Environmental Protection Authority , "the City of Darwin and Crown Lands collectively spend well in excess of $100,000 a year cleaning up illegally dumped material which is on an upward trend". However, it is worth noting that this is likely to be a significant underestimation of the true financial cost or volume of the problem across the NT, not least because:

- Councils have not historically collected systematic data on litter and illegal dumping, so the data provided in the majority of cases is approximate;
- Only incidents over 2m3 are recorded;
- There is no mandatory reporting;
- Many cases of illegal dumping are not identified and therefore are not reported.

The report does not include the costs borne by State Government departments (such as the Department of Infrastructure) or private landowners who are also increasingly suffering from illegal dumping events, nor does it calculate the costs to the receiving environment.

As the costs (financial, environmental and social) of illegally dumped waste are rising across all of the States, there is an increasing need for the community and regulators to manage this growing problem.

Radio frequency identification (RFID) technology presents technological opportunities of tracking wastes, particularly hazardous waste streams or 'problem/rogue' operators. A RFID technology-based system presents three components: tags, readers, and operational software, with the RFID tag containing a chip inside which stores data. There are different presentations of tags to offer the best match for each kind of material to be tagged allowing easy tagging by the waste generator and allowing them to monitor performance against their own legal obligations. The tags are 'contactless' and can be read/written thousands of times by means of electromagnetic signals conveniently modulated and coded by the readers. In fact, the readers are not only 'readers' since they can both read and write data on the chips, as long as they respect some technical parameters limitations, such as signal strength, chip memory size, and security requirements to protect them against unauthorized data access. Typical reader presentations are pad (table top), gate/tunnel (aisle), and handheld. Finally, there is the operational software in charge of controlling all the system components and the data flow processing, using communication modules that employ specific protocols.

A great advantage of this proposal compared with the traditional barcode technology (in which data can be read, but not updated) is that it allows simultaneous and secure reading/writing operations, which improves operational performance. Additionally, the reading/writing operations can be made remotely and is contactless in non-metallic materials such as plastics, wood, and glass as well as in metallic materials although, in this case, special tags should be used. Therefore, the human operators remain as far as possible from the direct contact/proximity to the hazardous waste, preventing contamination and reducing the risk of accidents.

There are already a range of technologies used across Australia to track vehicles, by location, routes travelled and even down to their mass. For example, Queensland's Department of Transport and Main Roads currently deliver an all Intelligent Access Program (IAP) service under delegation from the National Heavy Vehicle Regulator (NHVR). IAP is a national program which utilises satellite tracking and wireless communication technology to remotely monitor where, when, and how heavy vehicles are being operated on the road network. The IAP can also include on-board quantity monitoring to record the mass of the vehicle where required. In Queensland, the IAP is mandatory for higher mass limits and some special purpose vehicles (such as mobile cranes and concrete pump trucks which operate under permit).

The IAP technology and service providers are chosen by the transporter operator (subject to approval and registration with Transport Certification Australia) with the IAP service provider monitoring the vehicle directly and simply sending the Department a report on system performance and any vehicle non-compliance.

With these increasingly innovative technologies and its reducing associated costs, coupled against the rising incidence and cost of unlawful dumping and a growing shadow industry in NT (which includes regulated waste transport); is it timely for a feasibility study for the adoption of these technologies into the current waste tracking of hazardous/regulated wastes; and in future, investigating opportunities for wider industry applications for all waste transport.

During 2014, New South Wales substantially increased penalties for land contamination coupled with the installation of mandatory GPS systems for 'problem waste transporters'. Whilst this is a starting point.

Many operators currently deploy various methods of tracking vehicles principally to enhance more efficient methods and to increase business productivity. The NT Government should consider regulating that all waste transporters be subject to GPS requirements.

Current technology is cost-effective and industry software solutions manage administrative burden of tracking all waste transports.

It is critical a central register be established to record all operators transporting, handling and managing wastes in the Territory.

Case Study – Reporting and Data

Taiwan's Environmental Protection Administration (now known as the Ministry of Environment and Natural Resources) has implemented a sustainable materials management system (SSM) to achieve its zero waste goal and ensure resource-efficient economic growth is maintained.

Taiwan recently combined its Waste Disposal Act and Resource Recycling Act in order to provide further leverage of its database. Since 2000, specific industries have been required to use the EPAs online waste tracking and reporting system (the Industrial Waste Control Report System - IWCRS) to report waste within 24 hours of it being shipped, received or completely treated. The Waste Disposal Act stipulates that all garbage trucks must have permits for transportation and disposal as well as GPS tracking systems which transmit the truck's location every 30 seconds to the IWCRS.

Around 7,000 trucks are connected to the IWCRS. Industrial hazard and toxic waste trucks are closely monitored and employ bar-code scanners to check manifests and compare data between generators and transporters. If a truck enters a water course protection area, an alarm system automatically dispatches inspectors for on-site investigation.

On 30 Dec 2011, the EPA also launched their on-line Illegal Dumping Management System to create a database of dump sites and discover unreported sites using GPS satellites. This database is now aligned with IWCRS to verify violations and prosecute offenders.

The Waste Disposal Act requires 25,861 generators, 4963 transporters and 865 treatment, storage and disposal facilities to make on- line reports on the IWCRS, and altogether over 466,000 companies voluntarily use the system (comprising of 22% of the total waste generators and 80% of the waste generated annually).

The IWCRS permits waste disposal facilities to track quantities as well as condition of post-treatment materials for possible reuse, and illegal dumping has been almost eliminated.

1 WRINT Plan 1 — Pathways for Change continued

Future Infrastructure and Planning

WRINT advocates the importance of planning for future waste streams, volumes and the associated specific infrastructure requirements (as outlined in 4.2.3 of the Waste Management Strategy for the Northern Territory 2015-2022). Maximising resource recovery relies on having the right mix of infrastructure and the right supporting mechanisms – essentially the best possible facilities in the best locations.

Both the volume of waste generated in NT and the means by which it is processed and/or disposed are crucial parameters to understand the future requirements and opportunities for waste management across the state. WRINT strongly suggests the sourcing of external expertise to undertake an 'infrastructure assessment/identification study' and accompanying 'Resource Recovery Infrastructure Plan'.

A critical element of this work must be the identification of preferred development zones and buffer distances for waste infrastructure; as well as minimum requirements for stakeholder consultation. This must include targeted consultation with the community so that they are included in determining waste management and resource recovery priorities for their community and participate in long-term planning. This is essential to build the social licence to operate the infrastructure needed to manage the waste currently being produced and its growth into the future. Only in partnership will the waste and secondary resource sector meet the needs of future generations and economic growth for the state whilst protecting the community, environment and public health.

A robust modelling framework will be required to analyse current and anticipated trends in the sources of waste, composition of waste streams and the level of resource recovery, as well as identifying gaps that presently exist and are projected to exist through the forecast timeframe.

Considerations for the Modelling Framework

It is crucial to consider supply and demand aspects to inform the modelling framework:-

1. Supply Side – The identification of current and planned waste processing, disposal and facility infrastructure, including transfer stations, resource recovery centres, materials recovery facilities, drop-off facilities, composting facilities, Energy from Waste and Alternative Waste Technology facilities, landfills and incinerators (including those located as 'ancillary activities'), in addition to their capacity, capabilities and lives.
2. Demand Side – Quantification of current and anticipated volumes of waste by source and type (i.e. composition), in addition to levels of resource recovery.

A robust forecasting model must allow for the baseline supply and demand position to be inputted from available data sources and the information sourced from stakeholder consultation and/or surveys, with relevant characteristics (for example, local government area, private or public, facility type, waste type), in addition to developing demand projections based around a set of reasonable assumptions for each area using:

- Historic trends.
- Population and industrial growth projections.
- Other influencing factors as identified during the consultation process.

Demand projections must be made over a reasonable timeframe to ensure that outputs are capable to inform waste and resource recoverable management strategies through the short (current-10 years), medium (10-20 years) and long term (20+ years).

When designing the base model inputs and assumptions, appropriate consideration must be given to the differing factors relevant to the current and future generation of waste across metropolitan, regional and remote NT which will be influenced by the specific characteristics of local and regional economies and communities. The regional availability, capacity and capabilities of waste management infrastructure, and the degree to which waste transactions and other information are recorded are also highly variable, and flexibility will be required within the data and forecasting model to produce meaningful outcomes at an aggregated regional and state level.

The volume of waste generated in NT and the means by which it is processed and/or disposed are crucial parameters to understand the future requirements and opportunities for waste management across the state.

Action Item

WRINT recommends the following types of data to inform the needs assessment and infrastructure gap analysis (see Table 2).

Waste Types and Point of Generation	Waste Infrastructure	Policies, Opportunities and Challenges
• Sources of generation (householders, commercial, industrial, hospital, construction and demolition etc.) • Total waste (volume/weight) • Composition of waste (metals, organics etc.) • Level of waste disposal versus waste diversion/recovery • Extent of transportation of wastes to processing/disposal destinations	• Location capacity (both operational and design), area to be covered, access requirements and expected life-span of waste processing and disposal sites • This includes a review of existing landfill and void space and when capacity is likely to be exhausted in each location • Costs of collection, transportation, treatment including reprocessing and/or disposal • Nature of treatment, reprocessing, disposal • Number of FTE (full-time employees) employed at each site and training levels • Remanufacturing facilities as identified • Role of new and emerging technologies	• Characteristics required by business for investment • Locations of markets for recovered resources • Transportation constraints and costs • Facilitating infrastructure needs • Perceived sustainability of current export markets for secondary resources • Role of resource prices and fluctuations • Market opportunities and failures • Implications of government policy and planning processes to operations and future business development • Details of public resistance e.g., public opinion, comments, criticism • Quick wins and actions required to make the biggest gains

Table 2: Data requirements for infrastructure assessment

Major Project Status

WRINT advocates a review of the current 'case management' award of 'major projects' to include essential infrastructure and utility (waste generation, water and energy) requirements. This would permit substantial waste infrastructure projects to receive a more focused and streamlined 'whole-of-government' coordination. This in turn reduces risks and expedites timeframes associated with project feasibility through to delivery and, in turn, will provide increased confidence to industry to invest in larger projects.

When considering whether to award Major Project Status, the NT Government currently only considers if the project has one or more of the following characteristics:

- Significance. This includes consideration of:
  - the capital expenditure (typically >$50M) required for the project;
  - the proportion of capital and operational expenditure which will be invested in the Northern Territory;
  - direct and indirect construction and operational workforce requirements; and
  - the proportion sourced from within the specific locality of the Northern Territory.
- Strategic Impact.
  - Consideration will be given to, among other things, the opportunity to leverage additional investment such as growth in the supply and service sector; benefits of the resultant infrastructure to other industries and future projects; and whether additional economic development opportunities may be unlocked by the project.
- Complexity.
  - Consideration will be given to, among other things, the regulatory approval requirements (that is, the number and diversity of licenses, authorisations, permits required); and project impacts (environmental, economic or social) beyond the project footprint.

1 WRINT Plan 1 continued

Considerations future markets for secondary resources / recyclables

WRINT acknowledges the growing instability and movement (and long-term viability) of export markets for the increasing amount of recyclables collected under Container Deposit Scheme and kerbside recycling schemes, amongst other systems. There is currently a lack of development and forward-thinking policy support to stimulate domestic (local) remanufacturing / reprocessing opportunities for these secondary resources and, in addition, growing national security and technology development implications associated with some of these materials (such as the rare earths) and their capture overseas.

The Asian regions growing life-style factors and increased consumption of a range of consumer products and the corresponding collected recyclables are creating new domestic-supported supply of secondary recyclables, such as plastics; all of which are being reprocessed locally and then, most importantly, re-entering the local market.

WRINT questions the ongoing longer-term demand for Australian recyclate / secondary-resources within the Asian region, particularly China.

The past few years have seen both fluctuations in commodity markets reflecting, in WRINTs view, future trends. The market price of some primary resources, such as crude oil - a building block for plastic manufacturing, has also fallen. The oversupply of iron ore and low coal prices have also directly destabilised secondary scrap metal markets. This is directly impacting Australia's recycling industry to source international markets for its scrap ferrous and nonferrous supply chains

Then there are policy and long-term strategy affects which also impact the market.

International Challenges

Operation Green Fence, for example, the joint operation by The Chinese Ministry of Environmental Protection and the General Administration of Custom's anti-smuggling bureau which operated between Feb – Nov 2013. Its objectives included, but were not limited to, checking of waste imports to ensure that the description on the paperwork matched the contents, and were free of contamination following a rise of 'wastes' being inaccurately defined as feedstocks or operational equipment. The investigations also looked at the chain of custody for recyclate, as import licences were knowingly being illegally traded between licenced and unlicenced facilities, and key documentation was being forged, driven by the profits derived from both legal and illegal imports. Based on these investigations, and also previous non-compliance of waste imports against quality criteria, many Chinese operators increased quality requirements, particularly for plastics and reduced or eliminated their demand for mixed-plastics. At the time these measures impacted the European recyclate exporters more than Australia's, triggering changes to these competing secondary-resources markets.

For example, as from 1 January 2015, UK local authorities, under the requirements of the Waste (England and Wales) (Amendment) Regulations 2012, must undertake the separate collection of selected recyclables, (paper, metal, plastic and glass) wherever it is necessary to achieve high quality recyclables, and where it is 'technically, environmentally and economically practicable' (TEEP) to do so. This and other factors are continuously raising the quality of Europe's exports of secondary-resources, a market far larger than ours.

WRINT also believes that secondary recyclables such as plastics will not be required off-shore for 'Energy from Waste' feedstocks and applications into the future. China has a strong and confident strategy seeking to be energy self-sufficient, much like the United States. The Three Gorges Dam alone, which became operational in 2003 and finalised in 2009, provides not only flood control and navigational waterways but 26 generators producing 18,200 MWh of power – ten percent of the power requirements. With a further six dams providing hydroelectric opportunity in planning and commitments to addressing emissions, local air quality (haze) and global warming; energy from waste, particularly other people's waste, does not appear to be a consideration.

In Australia, we have proven technologies which will facilitate the opportunities for domestic utilisation of the plastic recyclate we collect but their development is nascent. It is confined by a lack of policy direction, price signals, joined up thinking and acting between the States and federally; and the current international market values of secondary-resources, particular PET and PP. The PolyWaste Technology for example, involves the melting of mixed film and low-grade plastic feed-stocks using mechanical (friction) heat. The resulting new-melt plastic composite can then be extruded into non-structural products that can tolerate the characteristics of the in-feed materials

The 'Plastic Extruded Product Manufacturing Industry' includes companies that manufacture plastic pipes, shapes and sections using the extrusion manufacturing method. According to IBISWorld, the Australian Plastic Extruded Product Manufacturing industry has been restrained by weak performance in its traditional demand markets over the past five years. Operators have struggled to maintain profitability, with domestic demand faltering and competition from imports forcing prices down. Industry revenue is expected to decline by an annualised 0.6% over the five years through 2014-15. This performance includes estimated growth of 1.0% in 2014-15, to total $1.83 billion (see report by IBISWorld 2015). The after-effects of the global financial crisis have pushed down demand for plastic extruded products. The Australian-based industry makes almost all of its sales to construction, infrastructure and mining projects; however, demand from these areas has been subdued over the past five years due to the downturn in these industries.

Action Item

WRINT therefore suggests appropriate timeframes for resource stock-piles to be considered to facilitate the necessary economies of scale associated with their collection and transport, but to eliminate the risks of unlicensed disposal or waste abandonment.

Action Item

All stakeholders (the NT industry and government) need to critically examine risks to future markets and opportunities (domestic and overseas) for the recyclable materials that are collected in the NT. WRINT suggests a market feasibility analysis of the most 'prolific' resources within the NT market and opportunities for local re-use and application.

Also, the Australian Plastic Extruded Product Manufacturing industry is currently in the decline stage of its economic life cycle (see IBISWorld 2015). Industry value added, which measures an industry's contribution to the economy, is expected to decline by an annualised 2.9% over the 10 years through 2019-20 with the industry's contribution to the overall economy expected to decline. Rising import competition has caused the industry to consolidate, resulting in increased acquisition activity. With import penetration increasing, industry operators face a tough environment in which revenue sources are diminishing.

The recycled metals industry is fairing worse. According to IBISWorld's market report on scrap metal recycling in Australia (2015), the Scrap Metal Recycling industry has been through a tumultuous period over the past five years with industry revenue expected to contract by an annualised 5.7% over this time. Upstream activities have been affected by mixed demand, with manufacturing output declining and construction output growing. Overall, this has lowered the amount of scrap metal generated from domestic activities, which has reduced scrap metal volumes for the industry to process.

Declines in metal prices and reduced output have contributed to industry revenue falls in the past five years. Furthermore, lower domestic manufacturing levels have been detrimental to the industry's downstream markets, hindering demand growth for industry services. Lower industry volumes and weaker steel and scrap metal prices have resulted in large industry revenue declines in the five years through 2015-16. The industry has been declining at the same time as the overall economy has grown. While some scrap metal recycling firms have downsized their operations in favour of efficiency and productivity rather than scale, others have become more vertically integrated in an attempt to ensure supply and reduce transport costs. In the 10 years through 2020-21, IBISWorld estimates 'industry value added' to contract at a compound annual rate of 1.0%.

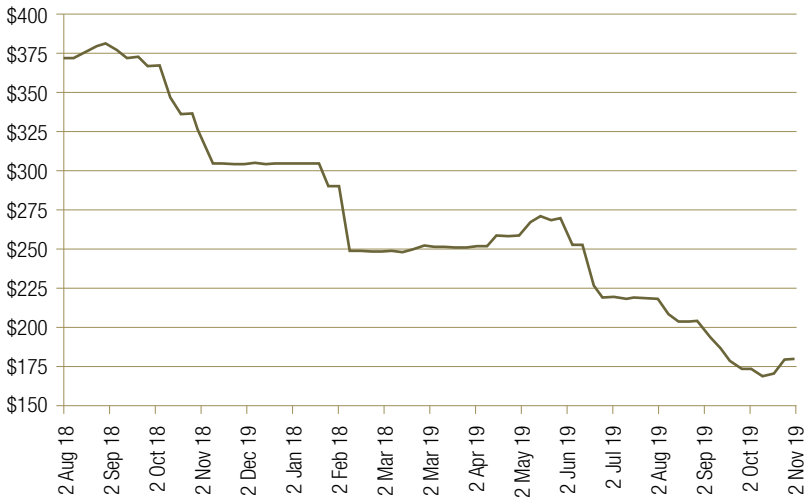
Most scrap is consumed in electric arc furnace (EAF) mills who make billet and then roll it into products. EAFS are costly to start and stop and cheap billet means unless scrap falls too, the best option is to import billet instead of scrap and turn off the EAF. The price of billet is key:

- Scrap prices will almost certainly follow the billet price
- Unless the price of billet rises, the price of scrap cannot rise

It is unlikely the price of billet will increase in the foreseeable future:

- Iron ore prices will not rise because of new mines coming on line (rather iron ore is forecast to get cheaper)
- Local Chinese steel demand has fallen but Chinese governments are likely to support local steel blast furnaces for both political and economic (employment) reasons
- Chinese blast furnaces will continue to operate and exceed market demand leading to cheap billet – exacerbated by the devaluation in the Yuan following a series of interest rate cuts by the government
- Industry demand has been low as downstream manufacturing levels decline.

'The TEX Report' No.1 HMS USD Ferrous Scrap Export Rates



The adjustment will create operational difficulties for everyone in the industry; suppliers, collectors, processors and end users; and it is likely that some scrap will no longer be viable to recycle, even if it's available free of charge for a variety of reasons including:

- Remote / Country (transport costs)
- Low grade or scrap with high waste content (high waste disposal costs)
- Complex materials including mixed material streams (high processing costs)
- Hazardous (processing and waste disposal costs)
- Scrap at locations with high compliance costs or inefficient work practices.

Lower prices means low margin and eliminates any ability to absorb additional costs and will, in some cases, mean collection costs will need to be back charged; whilst for low quality scrap, processing costs may have to be back charged, and waste disposal costs will need to be back charged for some items.

In an environment across Australia of policy drivers for increasing recycling capture rates through 'Container Deposit Legislation', recycling targets for local councils, through to increasing landfill/disposal taxes, there are no accompanying policies to support or mandate for local manufacture, remanufacture or utilisation of those materials once we have collected them, leading often to down-cycling.

Worst-case scenario in the short term, waste and recycling contractors and local government will start to stockpile recyclate/materials, waiting for the market conditions and values to recover so that they do not make a loss or more of a loss. WRINT has already seen this occurring – the stockpiling of materials waiting for market adjustment (or even a new market opportunity to appear) is becoming more common. Longer-term this is not a preferred outcome or sustainable.

1

The following section provides an outline of some of the immediate waste streams identified by WRINT for both regulatory and change management consideration.

Exploration and production Liquid and Drill Mud waste streams

WRINT recognises the economic contribution and future potential of minerals and energy resources across the Northern Territory (NT) both on-shore and off-shore. For example, the $US34B Ichthys LNG project which recently completed the gas export pipeline within the three nautical miles Territory waters, with regulatory oversight and guidance from the pipeline team that also managed the approvals for the Dingo Gas Pipeline construction in the Amadeus Basin.

In recent years these has been a continuous increase in levels of exploration, projects appraisal, development and increased production activities across all petroleum related activities. As example it is reported a total of nineteen new wells which were drilled in the Northern Territory. Sixteen wells were new shallow stratigraphic or deep exploration wells and three wells were drilled as part of the Mereenie Field Appraisal and Development Drilling (MADD) project, which commenced in 2013. Out of the sixteen wells drilled for exploration purpose, thirteen were plugged and abandoned after well evaluation and/or testing were completed and three wells are currently suspended. It is expected that operators will re-enter the suspended wells and conduct further evaluation and testing in 2015 /16.

As the mining and resources industry expands, the waste streams generated from the associated activities will also increase. The management of waste streams, such as drill muds and drilling waters present real risks to the receiving environment including oily wash down waters and waste processing waters, that must be carefully managed including tracking (of its characteristics and transport) by the administering authority through to appropriate treatment and/or disposal. In many cases, these wastes contain toxic chemicals added for operational purposes but can also contain naturally occurring contaminants including hydrocarbons and also naturally occurring radioactive materials through to salts (low-saline, high-saline and brine).

Drilling mud, is generated from drilling activities undertaken by the LNG industry in the exploration and production of coal seam gas and is predominantly comprised of sub-surface earth (drill cuttings) and water. However, a number of chemical additives are used in the drilling process including:

- Bentonite clay;
- Clay stabilisers such as potassium chloride, potassium sulphate, calcium chloride;
- Viscosifier (similar to detergent);
- Foaming agents (similar to detergents);
- Disinfectants;
- Biocides;
- Gelling agents such as guar gums.

When these additives are mixed with water they are termed ‘drilling fluid’. The drilling fluids may be water-based fluids and are therefore not the referred to ‘environmentally harmful’ oil-based drilling fluids that have historically been applied (Origin Energy, 2011; Arrow Energy, 2012; QGC, 2012). The drilling rigs generate drill cuttings at each well pad with the quantity of drill cuttings that will be generated is estimated to be approximately 600 m3/well (CSG PGN 2011).

During drilling, the drilling fluid together with the cuttings and groundwater are currently placed into pits to allow the material to dewater. The subsequent dewatered material is termed ‘drilling mud’. This drilling mud is usually composed of drill cuttings, bentonite, nutrient salts such as potassium, calcium, magnesium, groundwater salts and traces of organic material. Alternatively, surface tanks and solids control equipment may be used, in which case the material is de-watered prior to being placed in skips at the drill site.

The composition of the muds vary depend on soil types, geo structures and rainfall. The composition and characteristics of drill muds are well-documented and understood [for example, “URS Australia Pty Ltd (2011) Report: Characterisation of drilling by-products, prepared for Origin Energy”].

Drilling mud may be used in a range of applications including composting, direct land application for cropping, mine site rehabilitation and wetland remediation. There is also evidence to support the direct application of bentonitric drilling fluids to cropping land at rates of up to 100 tonnes per hectare (Bauder et al., 2005). Further applications have included mine site and land reclamation, where drilling fluids and cuttings have been used with compost to produce a soil conditioner for large-scale remediation (Nii-Annang et al., 2011; Total Environmental Technology, 2012).

Composters may accept drilling muds for compost manufacture and for blending in the production of soil conditioners. The beneficial components of drilling mud for composting processes include the following:

- Bentonite;
- Macro nutrients such as potassium and calcium;
- Trace elements;
- Organic material, such as guar gums.

Action Item

WRINT advocates that all drilling muds and waters from commercial and industrial and mining activities be classified as tracked wastes. As such these wastes may only be handled and transported for disposal by appropriately licenced waste transporters, with specialised equipment. This practice places strict waste tracking responsibilities on the entire supply generators, transporters and receivers.

That each load must be accompanied by a minimum level of documentation including sufficient information from the generator to accurately identify the waste stream characteristics so that waste transporters, and more importantly, waste receivers can verify exact concentrations of metals and other substances.

WRINT advocates that the Northern Territory EPA investigate moving to an online waste tracking system for the tracking and recording of all regulated and non-regulated trackable waste streams.

Any drill muds added to the composting process must have sufficiently low saline and metal content not to prohibit the composting process or jeopardise the production of unrestricted-use compost.

Industry best practice is to secure contracts with waste generators prior to acceptance on-site to assist in the management of variable waste streams; and a number of forms and processes must be completed prior to, during and after receiving such material including:

WRINT advocates that

1. A Waste Receival Enquiry Form – Must be completed prior to receiving the material and will form the basis of all contractual arrangements. Where possible, waste will be characterised prior to transport to, and acceptance at the facility; and a
2. Waste Compliance Inspection Form – To verify that the material being received is the same as described in the corresponding Waste Receival Enquiry Form. Analysis of a representative sample of drilling mud is assessed against the criteria presented in Table 1.
3. Feedstock Log – To be completed by the transporters for each load of material received in addition to all legal documentation. The manager then completes the form, and upon completion of the analysis, will document which windrows the load is added to so that materials may be quarantined and removed if necessary. To ensure quality control, all feedstocks will be tracked throughout the composting process.

Where the receiving waste management facility is not satisfied that the drill mud or drill water is compliant with the Waste Receival Enquiry Form or Waste Compliance Inspection Form, the drill muds may be refused at the gate or be quarantined for further assessment. Together these forms and procedures allow relevant information to be collated in order to minimise the possibility of non-conformances when dealing with variable feedstocks.

Analyte	Limit	
	Solid (mg/kg)	Liquid (mg/L)
pH	6-10	6-10
TDS	30,000	10,000
Sodium	10,000	3,000
Arsenic	20	3
Cadmium	1	0.2
Chromium	100	20
Copper	150	25
Lead	150	0.2
Mercury	1	10
Nickel	60	1
Selenium	5	50
Zinc	350	500
TPH	3,500	10
BTEX	25	5
Total PAHs	20	5
Phenols (non-halogenated)	65	10

Table 1: Suggested maximum allowable concentration limits of analytes within drilling mud acceptance criteria for composting

Action Item

WRINT advocates that any muds and muddy-waters exceeding these limits must be sent for hazardous waste treatment. All brines (TDS> 4000mg/l) must be appropriately treated and must not be composted or applied to land.

WRINT does not support the practice and use of evaporation ponds for waste water treatment of hazardous liquid wastes as this creates dis-amenity on future generations to address the remaining contaminants. Best practice is for timely treatment and/or disposal, unless supported by rigorous environmental assessment techniques which support the use of evaporation ponds – for example, where sites are not located within reasonable distance to appropriate facilities.

Any 'beneficial reuse' of drill muds and waters be subject to appropriate conditions articulated by the appropriate administrative authorities prior to their application/use and that a public register of all 'beneficial reuse' trails or applications be held.

Increasing Medical and Offensive Wastes generation

Over the past two decades, Australia has seen the number of persons aged 85 years and over increase by 153% and the number of centenarians increase by 263%, compared with a total population growth of 32% over the same period. As these trends continue, there will be impacts to kerbside collection services from the ageing population.

The Australian Bureau of Statistics (ABS) surveys information from people with disability, carers and older people to determine not only how ageing impacts on a person's life, but how the combination of age and other factors affect the quality of life a person experiences (see the Survey of Disability, Ageing and Carers [SDAC], 2012. Within this survey, older people are defined as those aged 65 years or over. In 2012, there were around 3.3 million older Australians, representing one in every seven people (14%). In the 12 months to 30 June 2014, the number of people aged 65 years and over increased by 118,700 people, representing a 3.6% increase. Around half of Australia's older population (1.7 million or 7.5% of Australians) have a disability and, as such, older people with disability now form a growing part of the Australian population.

The 2012 SDAC found that:

- Ninety per cent of older people lived in a private dwelling, such as a house, flat or home unit, with nearly three quarters (71%) living with others. For people aged 80 years or more, 77% lived in a private dwelling, with over half (58%) living with others.
- Around 1.4 million older people needed assistance with at least one activity because of disability or age (42%).
- 87% of older Australians reported having a long-term health condition. The long-term health conditions most frequently reported as causing older people the most problems were arthritis (16%), hypertension (11%) and back problems (9.4%).
- One third of older people reported needing assistance with personal activities (29%), most commonly health care (25%) and mobility tasks (18%). Property maintenance (23%) and household chores (18%) were other activities that older people needed assistance with.

As people age their physical and mental functioning sometimes deteriorates and they become more susceptible to age-related conditions. For example, in 2012, 87% of older Australians reported having a long-term health condition, compared with around one third (31%) of people aged less than 65 years.

This aging population can impact waste collections in two ways, firstly through the number of 'assisted collections' required. It is known that with current kerbside collection methods, as the population ages the number of assisted collections required also correspondingly increases. This, in-turn, impacts the service provision and resource requirements for both the residual waste collections and any collections of recyclable materials. These 'assisted services' will be intensified for certain kerbside collection infrastructure choices, such as the adoption of recycling crates or bags which require manual lifting.

The second impact is on the composition (and characteristics) of the residual waste stream. There will always be a component of household waste that is not recoverable through kerbside collection due to its properties (hazardous), cost considerations, market failure or the availability of appropriate technology. Presently, these materials may include:

- Hazardous and/or hard to handle wastes;
- Offensive Wastes; and
- Clinical Wastes.

Clinical waste, also referred to as healthcare and medical waste, requires correct identification, handling and disposal. Radioactive waste management involves the treatment, conditioning, transportation, storage and disposal of all categories of radioactive wastes, including administrative, operational and safety-related activities.

WRINT understands 'offensive waste' to be non-infectious waste (and not clinical), which is unpleasant and may cause offence to those coming into contact with it. It includes outer dressings that are not contaminated with

The volume of waste generated in NT and the means by which it is processed and/or disposed are crucial parameters to understand the future requirements and opportunities for waste management across the state.

body fluids through to sanitary hygiene waste, including nappies and incontinence pads.

There is also growing trend in 'Hospital in the Home' activities which involve the provision of acute care at a patient's usual place of residence as a substitute for inpatient care at a hospital. This approach is being prioritised to support patients in their homes, (under the care of their treating clinician) with indications of reduced costs and improved outcomes. As such, the amount of clinical wastes generated by householders (and therefore ultimately ending up in the residual waste steam) will continue to increase subject to regional provision.

Radioactive waste can be harmful if there is prolonged exposure or if high levels of radiation are involved. This can have genetic effects or contribute to the development of cancer. Radioactive waste generated from healthcare includes radionuclides used in therapeutic and diagnostic medicine. This waste is typically low-level radioactive waste and is subdivided into three categories:

- long half-life: 3H, 14C;
- radioiodines: 123I, 125I, 131I (any mixed waste containing radioiodine will be in this category);
- other Beta/Gamma emitters: 89Sr, 35S, 32P, 51Cr, 201Tl, 111In, 67Ga, 99mTc, 57Co, 75Se, 65Zn, 59Fe, 22Na, 24Na, 45Ca.

In Australia, radiation safety is sought through the regulation of the acquisition, possession, use, storage, and transportation of radioactive substances, through a variety of licensing regimes, legislative frameworks, and safety standards. A number of organisations regulate the storage and use of radioactive material in hospitals.

There is only one private autoclave in the Northern Territory and one government owned asset at Darwin Hospital. There are limitations on local disposal options in the event either of these assets break down or go offline.

These medical and offensive waste pose a significant challenge to the receiving environment particularly where open pit and ineffective waste disposal practices are being continued. It should be priority of both the health and other community departments to identify the communities with the greatest needs and implement new and effective disposal methods and mitigate risk to both the community and environment.

Action Item

WRINT recognises that there are significant risk but also opportunities for medical waste management across NT and, as such, proposes the formation of a government-led committee to gather the relevant data and trends and which can plan for critical future infrastructure and services.

2

This Plan provides an overview of the following items for consideration:

- Defining social enterprise and its scope
- Social Procurement models
- Job opportunities in waste management

WRINT Plan 2 — Social Enterprise Participation and Community Procurement

Background

A social enterprise may be easily defined as a business that trades to deliver social benefit. Such organisations may be led by social, cultural, economic and environmental missions which are consistent to community benefit. WRINT recognises the increasing and valuable contribution made by both social enterprises and an ageing population and the expertise and knowledge these groups within the community bring to the waste management and recycling sector, in particular:

- their ability to overcome traditional funding models for infrastructure and service development;
- their ability to stimulate positive economic, social and environmental outcomes from operating with bespoke employment programs supported by skills development solutions for those workers;
- the creation of community engagement and involvement in waste and resource management strategies stimulating the ownership of wastes
- their expertise, life skills and knowledge obtained from life's experiences

Local councils and communities working with 'third sector/social enterprise organisations' to deliver waste services can create added value and meet the challenging agendas of climate change, well-being of individuals, (particularly those traditionally classed as disadvantaged) and stronger communities, at the same time meeting the financial pressures facing public budgets. The third sector in the community internationally has been particularly successful acting as networking hubs or organisations to promote community action on waste and resources, often working in partnership with local authorities and others to develop 'local solutions' and in moving towards a waste-free and low carbon society.

In 2012, the Community Recycling Network Australia (CRNA) commissioned the Australian Centre for Philanthropy and Non-profit Studies (ACPNS) at Queensland University of Technology to undertake a Baseline Study of Australia's Community Recycling Enterprises (CRE). The CRNA defines community recycling enterprises as those that exist for the purpose of reducing waste to landfill while at the same time creating jobs and volunteer positions through the resale of materials and equipment.

This study determined that whilst reuse and recycling were their core business activities, the majority of CREs identified local employment creation as the dominant purpose of their enterprise, as evidenced by the fact that they employed at least 1,500 people, a considerable proportion of whom are facing significant barriers to employment in the open labour market. This was followed by the principle of environmental protection through resource recovery and reuse, and CREs were found to be critical in local resource recovery. On average, CREs participating in this study diverted 2,347 tonnes per year of resources from landfill culminating to over 152,000 tonnes per annum for the sector. Whilst some in the industry believe these estimates to be conservative, what is undisputable is the growing role and number of activities undertaken by social enterprises across the waste and recycling sector. This study also determined that CREs that undertake multiple recycling and reuse activities perform better financially than those that undertake a smaller number of activities.

According to IBISWorld (see Market Research Report D2922, July 2015), "the Waste Remediation and Materials Recovery Services industry, which includes materials recovery and sorting services, has a medium capital intensity; which has increased over the past five years due to higher waste sorting and recovery levels, greater recycling demand and associated increases in capital investment as industry revenue has increased. IBISWorld uses total wages from the industry cost structure as a proxy for the industry's labour, and depreciation as a proxy for capital. These show that for every dollar invested in plant, equipment, machinery, vehicles and buildings, approximately $4.82 is required for wage and labour on-costs".

In comparison to the private sector, social enterprises benefit from a range of different organisational structures as well as subsidised wage and training costs where applicable. Unlike their private sector counterparts, social enterprises have proven their ability to foster greater civic engagement, initiating and operating a range of innovative community activities evolving from the need to both secure enterprise sustainability and fulfil organisational missions. However, they can experience a range of barriers, from lower operating revenues and cash flow through to private sector competition which is often favoured through traditional procurement policies and practices; and falling prices for new goods which undermines the market for reconditioned items.

Social enterprises operating in the waste management and recycling sector are able to create a labour demand for low skilled jobs, with the mechanisms available to increase confidence and skills of those individuals with accredited training over time. They also have the capability of social capital building where like-minded businesses operate together to reinforce positive business and public behaviours. There is certainly an argument within social enterprise for 'active-cell sorting' which, whilst resource (labour) intensive, increases employment opportunities and the diversion of valuable secondary-resources and, from a cost model, increases revenue sales, saves landfill void space and landfill tax (where applicable). Thinking which sees every waste stream as a job!

Social enterprises operating in the waste management and recycling sector are able to create a labour demand for low skilled jobs.

2 WRINT Plan 2 continued

Social Procurement

One valuable construct within social enterprise includes Social Procurement which is the intentional generation of social value through procurement and commissioning processes. It occurs when organisations (such as state and local governments) purchase goods and/or services or delivering works, choose to purchase a social outcome - over and above the products or services required.

According to Social Procurement Australasia[1], "for governments, social procurement is a powerful tool that improves value for money outcomes by aligning multiple, and often complex, strategic objectives. Through linking and integrating social and economic policy objectives, social procurement strategies demonstrate how improving 'quality of life' outcomes can be embedded in the business of all public sector entities (and of course, beyond) – rather than being seen as the sole domain of social policy-focused agencies. Specifically, social procurement strategies assist the public sector to:

- *Build and sustain stronger communities, promoting social inclusion and breaking cycles of disadvantage*
- *Open new opportunities for strengthening local and state skill bases*
- *Strengthen local economic development*
- *Grow and strengthen innovative partnerships across all sectors*
- *Demonstrate leadership*
- *Achieve greater value for money whilst embedding triple-bottom line principles.*

Social procurement can take many forms, which can be loosely grouped into direct and indirect approaches. ***Direct approaches*** *involve purchasing from for-social-benefit entities, such as: not-for-profits, social enterprises, Australian Disability Enterprises, Aboriginal-owned businesses, social businesses, worker or community owned cooperatives and others.* ***Indirect approaches*** *involve including social clauses (e.g. employment targets for long-term unemployed) in 'regular' contracts with private sector providers, screening supply chains for ethical considerations, and the like".*

Action Item

WRINT believes that the Northern Territory Government has a role in leading by example, and also providing guidance to councils and communities so that they may determine the net benefits of their (social enterprise) involvement in local council waste management and quantify the 'value'. To aid this, there are now well designed 'knowledge transfer models' available to assist local councils and communities to move to social enterprise models.

WRINT suggests the immediate development of a Social Procurement Guide for Northern Territories Local Government to be developed with significant stakeholders to outline the relevant regulatory processes and appropriate assessment criteria.

Please see http://socialprocurementaustralasia.com/ for social procurement and http://www.resourcerecovery.org.au/ for a knowledge transfer model.

[1] Social Procurement Australasia. (2015). Insights into Social procurement: From Policy to Practice. Social Procurement Australasia. See http://socialprocurementaustralasia.com/wp-content/uploads/2015/07/SPA-Insights-From-Policy-to-Practice-2015_FINAL.pdf

Case Study

In the UK, the benefits for Social Enterprise participation (commonly termed as the Third Sector) in waste and recycling activities has long been established and encouraged. The UK Government's Social Return on Investment (SROI) methodology was devised in the early noughties to evidence the value of Third Sector-delivered waste management services, and to determine their net benefits through their involvement in local authority waste management and quantify their 'value'. In 2010, the UK Government published its strategy to support charities, voluntary groups and social enterprise, committing to ensuring that charities, social enterprises and cooperatives had a much greater role in the running of public services. More recently, the UK introduced its Public Services (Social Value) Act 2012 which further aims to align public expenditure with the delivery of better well-being. This is particularly poignant for UK local authorities (councils) many of whom have experienced significant budgetary cuts under austerity measures and are looking 'to do more with less'; stimulating further growth of social enterprise in the delivery of public services particularly across waste management and recycling services (including landfill management, composting, e-waste disassembly, municipal recycling collections and bulky waste collections).

Job Opportunities in Resource Recovery from Landfill Diversion

The waste and recycling sector provides direct employment for over 32,000 Australians[2].

The employment opportunities for diverting waste from landfill are well documented. An Access Economic study[3] which identified multipliers to determine employment in the waste management and recycling sector stated "a recent survey commissioned by the **Australian Government identified that for every 10,000 tonnes of waste recycled 9.2 jobs are created. Only 2.8 jobs are created if the same 10,000 tonnes are sent to landfill**".

Other studies have reported similar opportunities for landfill diversion and the utilisation of other waste and recycling technologies ranging from:-

- Incinerating 10,000 tons (1 ton is equivalent to 1.016 tonnes) of waste creates one job; landfilling 10,000 tons of waste creates six jobs; recycling 10,000 tons of waste creates 36 jobs[4].
- Recycling results in up to 36 times more jobs than landfilling[5].
- Product re-use created 470 jobs per 10,000 tonnes processed per annum; recycling-based manufacturers create 162 jobs per 10,000 tonnes processed per annum; and conventional recycling facilities create 15 jobs per 10,000 tonnes processed per annum[6].
- The high value reuse and remanufacture (retained by keeping the original design) creates between 8-20 jobs per 1,000 tonnes of product processed; whilst recycling (where moderate value is retained) creates between 5-10 jobs per 1,000 tonnes of product processed[7].
- Additionally, it found that for every job created in the recycling industry another 1.4 jobs are created through associated economic activity[8].

The waste management and recycling industry provides stable and secure employment options for all Northern Territorian's who seek alternate careers in multi-disciplined skilled and non-skilled roles, that include drivers, operators, engineers, sales, administration, mechanical and environmental roles.

It is critical local re-use of secondary materials be adopted in future government procurement policies.

[2] Australian Bureau of Statistics. (2015). Australian Industry 2013-2014. Catalogue Number 8155.0. Figure as indicated at 30 June 2014.
[3] Access Economics. (2009). Employment in Waste Management and Recycling. Report for the Department of Environment, Waste Heritage and the Arts.
[4] United States Environmental Protection Agency. (2002). Resource Conservation Challenge: Campaigning Against Waste. 530-F-02-033. U.S. Environmental Protection Authority. 2002.
[5] California Government. (n.d.). Recycling Means Business in California. http://www.stopwmx.org/calif.html#Fact Sheet #3.
[6] SITA UK. (2012). Driving Green Growth: The Role of the Waste Management Industry and the Circular Economy.
[7] Green Alliance. (2014). More Jobs, Less Carbon: Why we need landfill bans.
[8] Thomas, J. (2011). Recycling Equals Jobs. Resource Recycling. July 2011. Pp13-15

3

This Plan provides an overview of the following items for consideration:

- Development of a Market Strategy specifically for Northern Territory
- The use of Guidance Materials to support resource recovery
- Green Procurement Strategies
- State-Based Product Stewardship
  - Proposed materials for inclusion

WRINT Plan 3 – Market Strategy and Development

Background

WRINT recognises that improvement of waste management outcomes for the NT, as outlined in the Waste Management Strategy for the Northern Territory 2015-2022, and its Balanced Environment Strategy 'Discussion Paper" will only be realised where cultural change in the behaviours at all levels of community occur. Critically the principles and objectives outlined in these Government documents to improving the Territories Recycling performance and landfill diversion must be supported by sustainable long term local markets for recovered products. This, in turn, creates economic and long term growth opportunities beyond those associated with just disposal and resource loss.

Action Item

WRINT advocates that the government commits to the development and support of a focused, long-term and state-wide 'Northern Territory Market Strategy for Secondary Resources 2015-2030'. Such an approach will strategically address the barriers currently impacting the market and take up of resources and will provide support structure for product markets to grow and mature, allowing them to be sustainable long term.

Given the critical role that markets have on effective and sustainable resource management, Government (local and state) must adopt a critical role in the support of materials research and innovative projects as well as the investment in, and purchase of, products made from secondary resources by promoting their qualities and functionality.

Presently, NT (and indeed Australian) markets for secondary resources are being generated by a supply-side model (kerbside recycling and product stewardship) rather than a demand-side model, where there is demand for secondary resources for remanufacturing into new products, essentially substituting primary resources. Essentially a new model that moves waste streams up the waste management hierarchy.

The current supply-side model is unsustainable and has already resulted in negative and unintended consequences, such as those associated with used tyre and glass-stockpiles. The markets for secondary-resources are often beset with challenges ranging from low primary / virgin resources making their substitution unattractive, a lack of local remanufacturing and processing opportunities for secondary resources compounded by high transport and processing costs, and limited information and quality criteria for products with recycled content. More recently, market volatility associated with key resource (resource and primary) streams have resulted in market instability and risk.

It is noted that WRINT does not support significant government intervention within a highly regulated system in market development – markets needs to be sustainable. That said, proportionate government intervention may be appropriate. WRINT therefore suggests the consideration of the following interventions for market development:

- Improvement of the quality of the secondary-resources from a range of strategies including the identification of large waste generators and source segregation (to limit contamination/cross-contamination) of recyclables where practicable. This in return will improve the market opportunities and prices for these materials.
- Government promotion and formal acceptance in its engineering standards of the existing Australian based industry standards for secondary materials produced from waste products ie road base from recycled concrete, rubber reuse in asphalt from used tyres,
- Improve the consolidation and aggregation of recovered materials to support growth and manufacturing. This requires wastes to be defined and categorised by their characteristics and not their source. Industry-led product stewardship schemes such as those identified in Appendix B (see Waste Management Strategy for the Northern Territory 2015-2022) will be critical stakeholders in this process.
- Improve the performance and adoption (use) of products which incorporate secondary-resources. This will require product research, publication and dissemination of that research to critical market players, the development of material standards, product specifications and Codes, and government-led procurement strategies.

The Australian Government identified that for every 10,000 tonnes of waste recycled 9.2 jobs are created.

Guidance Materials International Perspective

Some international jurisdictions have produced 'Material Specific Guidance' on applying the waste management hierarchy to specific waste streams. For example, Scotland has produced guidance and options for 12 commonly collected recyclable materials ranging from food waste to tyres. Each material has a set of general guiding principles to adhere to when selecting options for managing the particular waste stream, a short summary of the main points of evidence associated with best environmental options and key points for waste producers, collectors and processors to consider to reduce the overall life-cycle impact.

By contrast, England has developed a Quality Action Plan which sets out measures aimed to support a market environment which is capable of promoting high quality recycling and delivering recyclates of sufficient quality to meet the standards of the relevant recycling sectors. It is critical to build relationships and transactions between the different actors in the supply chain, based upon and informed by robust, consistent and transparent information on quality and end destination. This information flow will improve confidence and participation in recycling, and resilience in the recyclate market.

WRINT supports both (Materials Specific Guidance and Quality Action Plans) of these approaches, particularly with regards to the 'evidence' component to support collection and treatment options for co-mingled collections and outputs from Materials Recovery Facilities where the quality of recyclate must be transparent and meet the necessary standards for the relevant recycling and reprocessing sectors.

However, it is noted that both England and Scotland have a large body of research and supporting Quality Standards for recycling products which are currently absent in the Northern Territories existing policy and regulatory framework. High quality recycling will need to be properly incentivised in the interim to stimulate change away from the historical 'easy' methods of exports to making 'down-cycling' the least attractive option and only a last resort.

This evidence component is critical to the enforcement and regulation of the waste hierarchy. Historically in NT there has been no mechanism or strategy for enforcing the waste hierarchy, thus leaving it redundant, whilst other jurisdictions have enforced it. For example, under the Waste (England and Wales) Regulations, all businesses and local authorities that produce or handle waste are required to apply the waste hierarchy. This is a legal duty and compliance with the hierarchy is declared through appropriate documentation (for England and Wales, the Duty of Care documentation). In practice, this duty is significant and adequately replaces the old recycling targets as a driver of local authority recycling performance, however, the hierarchy must be enforced to drive and deliver those changes.

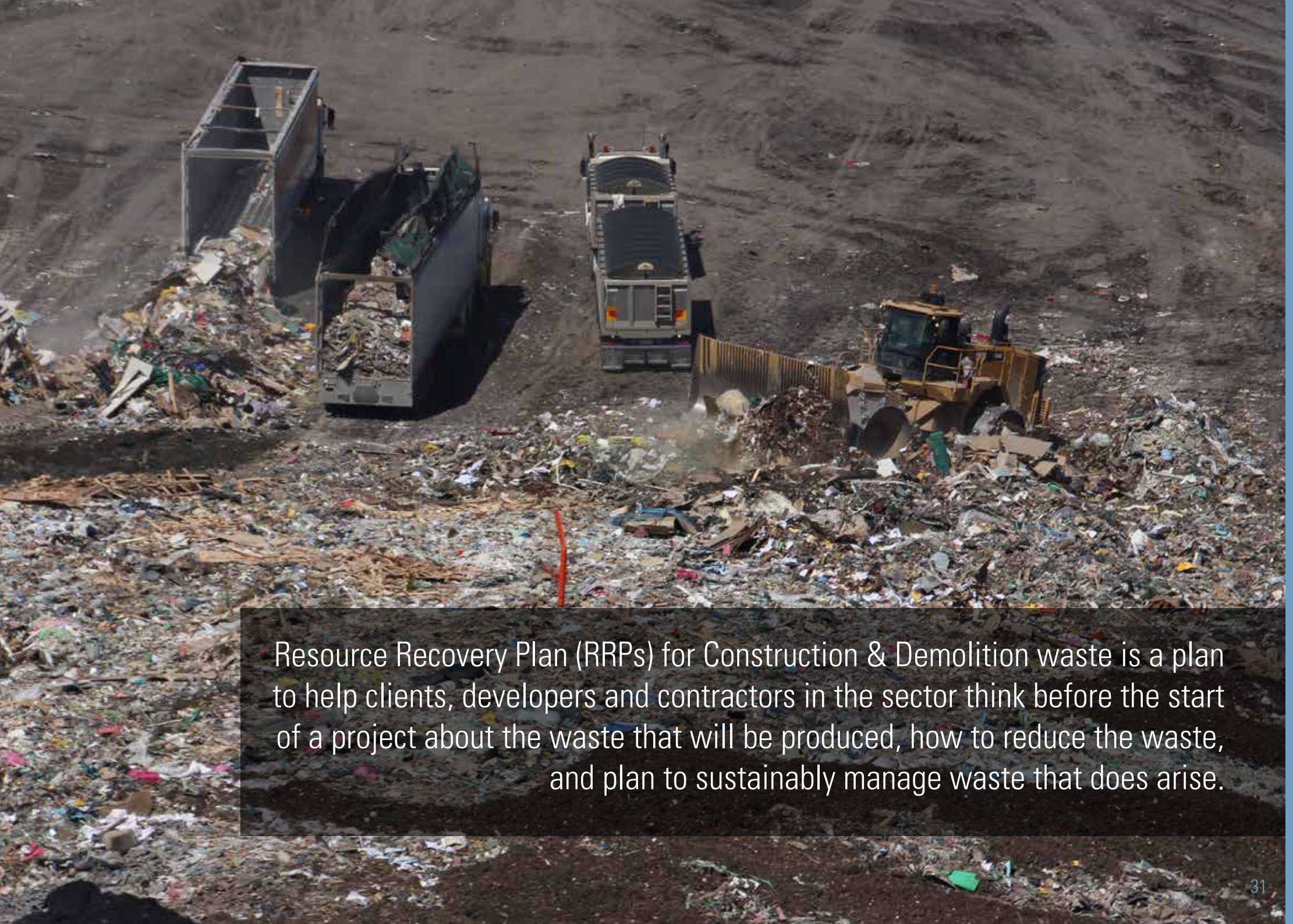
Tools for enforcing the Waste Hierarchy include Resource Recovery Plans as outlined in WRINTs Plan 4 (see C&D section). For example, a Resource Recovery Plan (RRPs) for Construction & Demolition waste is a plan to help clients, developers and contractors in the sector think before the start of a project about the waste that will be produced, how to reduce the waste, and plan to sustainably manage waste that does arise.

Action Item

WRINT advocates the review of this aspect of Queensland's regulatory framework for its suitability in a Northern Territory context.

RRPs are already a legal requirement for "Planning Entities" identified under Queensland's Environmental Protection Act 1994 and assist organisations to:

- tackle the large volume of waste sent to landfill that is generated by a sector or organization;
- help improve recycling and re-use of resources;
- address the number of illegal waste sites by requiring all contractors to identify in advance transport and recycling and/or disposal facilities and keep copies of all licences and insurances on file;
- help tackle the number of illegal dumping incidents;
- improve how hazardous waste is managed;
- innovate the industry by developing new ways of working involving waste;
- improve material efficiency and reduce a sectors/ organizations carbon footprint; and
- reduce the cost of waste and waste management to an entity.



Resource Recovery Plan (RRPs) for Construction & Demolition waste is a plan to help clients, developers and contractors in the sector think before the start of a project about the waste that will be produced, how to reduce the waste, and plan to sustainably manage waste that does arise.

Committing to Green Procurement Policies by all level of Government

Such guidance materials and policy drivers can also be used to set requirements/characteristics for identifying secondary materials that are no longer waste, thus allowing the industry and the regulator to maximise the value of resources enabling them to compete with primary materials. This can only be achieved by the Regulator and Industry working collaboratively to create market opportunities.

In order to secure NT's secondary resource sector the following issues must be addressed:

- The definition of waste and beneficial use must be re-considered within regulation.
- Industry needs guidance when a 'waste ceases to be a waste' and where there are opportunities for beneficial reuse. Industry believes that waste has been fully recovered if it is:
  - o Distinct and marketable
  - o Suitable for re-use/remanufacturing/processing etc.
  - o Poses no greater risk to the environment or human health than the virgin equivalent.

However, this is only one aspect of the solution. Markets need to be developed for secondary-resources and green procurement policies strengthened to secure demand. Government, at all levels, has a critical role to this end, by supporting the demand for those resources. Industry has a role in the development and production of quality standards which deliver consistent and safe secondary resources and confidence to the end-user.

Selected product standards already exist for secondary resources such as HB 155: 2002 but more needs to be developed, whilst existing standards (for example, local council specifications which prohibit the use of organic materials derived from wastes or glass beneficiation products) must be reviewed.

Case Study

In England 'end of waste' status is currently demonstrated through the use of 'Quality Protocols' - through an 'end of waste submission' to the Environment Agency's End of Waste Panel or compliance with EU 'end of waste' Regulations. The 'test' applied assesses whether:

- o the waste has been converted into a distinct and marketable product,
- o the processed substance can be used in exactly the same way as a non-waste, and
- o the processed substance can be stored and used with no worse environmental effects when compared to the raw material it is intended to replace.

In the UK Quality Protocol compliant material is free of any further waste permitting and currently includes:

- Aggregates from inert waste;
- Compost;
- Anaerobic digestate;
- Biodiesel; and
- Processed fuel oil.

Organisations can submit evidence to the environmental regulator to demonstrate that the product they manufacture has ceased to be waste. The EU have started to develop end of waste regulations which define criteria for materials to achieve end of waste status across all member states for materials including, but not limited to, composts, digestates and RDF (fuels).

Local Government tender frameworks for processing of green and organic wastes be amended to include a mandatory requirement that all Councils purchase a minimum 20% of processed quality organics back as a part of any future procurement arrangement.

Action Areas & Requirements	Pathways for Change	Regulatory Framework (Existing or Amended)
Green Procurement, Guidance Documents and Quality Protocols	Facilitate opportunities to connect waste recovery and reuse markets with key producers (e.g. organics, green wastes, construction and demolition wastes and commercial and industrial wastes) – Page 9. Peak agencies including the Local Government Association and its members should facilitate planning and resource sharing, and the development of local market outlets for materials. Local Government tender frameworks for processing of green and organic wastes are amended to include a mandatory requirement that all Councils purchase a minimum 20% of processed quality organics back as a part of any future procurement arrangement. All purchased organics must meet agreed approved and published industry standards. Local Government processing and mulching /grinding of green waste be required to meet approved industry quality standards if made available for community use to eliminate pests, weed and other flora problems as well as community health risks from pre-processed un treated organics. All government infrastructure projects (local and Territory) to specify and report on the use of recycled aggregates, compost / soils generated from waste and recycling operations, as well as used tyre rubber crumb in asphalt road laying operations. NT Recyclers and local business be afforded a higher order of purchase priority in the first instance as opposed to interstate and international sources The purchase of material streams related to secondary products cannot be used on any Government project unless the source of its generation is from an approved fully licenced operation registered in accordance with all state planning requirements. Territory significant projects be required to use a minimum 20% recycled content across the project cycle where this material meets engineering , quality and competitive pricing processes with substitute virgin material streams. This to be linked to all development conditions applied in all approval processes.	Enshrine green / recycled purchase requirements into the legislative framework of a State Purchasing Policy. Supports critical Government legislative drivers and published policy commitments to drive local investment, create and support jobs in the remanufacturing sector and leads to improved waste management practices overall

3 WRINT Plan 3 continued

State-Based Product Stewardship Schemes

Product Stewardship (PS) involves shared responsibility for reducing the environmental, health and safety footprint of manufactured goods and materials across the life cycle of a product .

In Australia, and internationally, various models of product stewardship have been adopted to manage the impacts of different products and materials. Product stewardship can take many forms and may have a whole of lifecycle focus, or focus on fixing a specific problem related to part of a product's lifecycle. More and more, organisations are participating in voluntary product stewardship as part of their environmental or corporate strategies. There are already a number of voluntary and co-regulatory product stewardship activities being undertaken across Australia achieving different outcomes, such as the collection and recycling of televisions and computers, mobile phones, fluorescent globes, newspapers and PVC products .

These programs acknowledge that those involved in producing, selling, using and disposing of products have a shared responsibility to ensure that those products or materials are managed in a way that reduces their impact, throughout their lifecycle, on the environment and on human health and safety.

According to the Product Stewardship Institute, in 2010 the potential US Financial Benefit was defined at approximately $2.0 billion from these style of programs. The critical point to note in this business estimate is the fact that the success of the programs were not based on a national approach rather aligned to separate jurisdictional approaches that delivered this economic benefit.

Whilst NT's regulation provides opportunities for container deposit schemes and single-use plastic bag bans, there is no opportunity for state-based product stewardship schemes as in other states –

Action Item

WRINT advocates that state-based product stewardship regulation provides both the structural framework and scope for implementing state based programs, and defines the interrelationship of these if adopted without compromising or duplicating current federal approaches as specified under the Product Stewardship Act 2011 (Cth).

WRINT advocates that the Northern Territory undertake a formal review of the potential products and problem waste streams that could be included in a Territory based Product Stewardship program: ie Mattresses, Agricultural Tapes.

Action Item

WRINT advocates that any adopted State Based Product Stewardship scheme is based on clear robust analysis of social, economic and environmental cost/ benefit policy; and WRINT requests that the Territory Government make a 'Call for Opportunity' for each 'priority material streams' proposed by WRINT as part of this Plan, before implementation. Such a process will provide clear evidence based facts for introducing new initiatives as well as likely uptake and scope of the long term success for their introduction.

Scope

State based Product Stewardship schemes, if implemented, would complement and reinforce the agreed principles proposed in the Strategy and would be an effective means of increasing recovery rates of various material / product streams.

A number of issues will need to be considered when determining the implementation and effectiveness of State Based Product Stewardship programs where base-line data and historic and current material flows are largely unknown. In particular, data relating to specific products (should specific product schemes be implemented) are either unknown or unreported by product manufacturers and retailers.

Lead-in times for commencement of any programs must also be appropriate to the development of markets, collection infrastructure, and reprocessing facilities.

Refer Appendix 1 for a suggested framework developed by GlobalPSC for the Product Stewardship Advisory Group discussions. This draws upon the objects and criteria of the Product Stewardship Act and other criteria WRINT felt were important.

This broader consultation process will assist government and industry in the identification of any unintended consequences, which can then be considered, as well as providing the opportunity for individual businesses within the waste and recovery sector to forward confidential business plans and costs to government so that a complete impact statement can be determined between all parties.

Sending the Right Signals

- Stewardship initiatives should meet their environmental objectives in the most efficient, cost effective manner, but must be under pinned with effective and enforceable regulatory measures.
- Appropriate incentives must be designed to send appropriate signals to all parties.
- Intended approaches must incorporate existing infrastructure, policies and programs to the fullest extent possible and seek to minimise negative impacts on existing programs.
- Industry leaders should be rewarded for improving sustainable practices, while laggards should be sent clear messages about the need for improvement and be given the opportunity to respond accordingly. Innovation should be encouraged, not stifled.
- Industry should be provided with significant flexibility to ensure environmental objectives are achieved in a sensible, cost-effective, manner.
- Environmental impacts of energy consumption should also be minimised across the supply and recovery chains, for example decision making should consider how the product is to be distributed and whether distribution requires special conditions such as refrigeration. The design of the product system should optimise transport efficiency (and therefore fuel consumption), for example by maximising the amount of product transported in a truck or container. This is an imperative for the NT when considering product stewardship (and expansion of CDL) into remote communities.
- The potential impacts of external influencers such as changing demographics should be understood and recognised.
- Stewardship initiatives should include promotion of market development and the use of recovered materials where appropriate.
- Appropriate mechanisms should be instituted to ensure effective transparent monitoring, data collection and public reporting.
- Where available, and where carried out under regulations imposing strict emission standards such as those in the EU, energy recovery and resource utilisation through energy from waste (EfW) or alternative waste technologies (AWT) are appropriate for residual materials remaining after cost-effective recycling.

The key opportunity for the Northern Territory in executing State Based Product Stewardship initiatives will be the opportunity to take advantage and leverage existing Federal Government programs, targeting like material streams which currently fall outside the Federal programs scope.

Adopting State-based initiatives that compliment, and add to, the existing industry infrastructure provides significant additional economic and employment benefits to existing businesses where the national programs have already had an influence.

The potential for environmental harm to occur to these sensitive receiving environments from items that may contain hazardous materials, as well as bulky items that consume valuable air space, provides the pivotal driver for underpinning state-based Product Stewardship Schemes for complex waste forms that contain solid economic value and opportunity for leveraging existing recovery and recycling industry infrastructure.

Action

The Global Product Stewardship Council (GlobalPSC) provides the following context to implementing such schemes. WRINT endorses the model and offers the following subject matter for consideration within the context of this industry plan.

Understanding when and how to implement product stewardship schemes is crucial to ensuring that product stewardship principles maintain their integrity and promote meaningful program development.

Determining Need

Products proposed in this Plan are more likely than less likely (under any future RIS assessment) to show that the benefits of taking action on a product have the potential to outweigh the costs of action, and can be backed up by a persuasive rationale and evidence.

- Intended policy objectives need to be made clear and prioritized, and options to achieve those objectives must be fully evaluated and strive to effectively balance social, economic and environmental outcomes.
- A comprehensive, carefully considered approach is necessary, as no single policy approach can deliver all desired outcomes nor reflect the full diversity of products.
- Extended producer responsibility (EPR) schemes, and to a lesser extent product stewardship schemes, are generally more appropriate and cost-effective for truly hazardous or expensive- to- manage products than for relatively benign or inert products where externalities are minimal or where such products do not impose net costs on the community. That said, product stewardship schemes should be facilitated in conjunction with stakeholders in instances where products are not hazardous, rather addressing them through a consensus-based approach which could provide significant externality reduction.
- Programs are more likely to be effective when similar EPR or product stewardship schemes exist overseas, as the programs can leverage existing frameworks and design principles. However, the relative costs, benefits and risks of such schemes need to be understood and examined within a local context prior to adoption, i.e. the NT operating landscape.
- Approaches requiring greater levels of regulation should be pursued only after market-based, voluntary and co-regulatory approaches have been clearly shown to be relatively ineffective in achieving desired outcomes.
- National, and to an extent practicable, international consistency is critical, and should reflect regional differences, available resources and commitment to common objectives.
- There is potential to significantly reduce the impact that the products have on the environment, or that substances in the products have on the environment, or on public and worker health.
- There is potential to significantly increase the conservation of materials used in the products, or the recovery of resources (including materials and energy) from waste from the products.
- Where necessary, underpinning legislation should be developed in cooperation with industry and effectively enforced by Governments.

Engaging Stakeholders

- Active stakeholder engagement, joint fact finding and constructive, good-faith commitment to achieving optimal outcomes are needed in clarifying objectives and priorities and in developing and implementing product stewardship programs.
- Stakeholders are more likely to collaborate on, and effectively implement, voluntary and/or co-regulatory approaches than where approaches are unilaterally mandated.

According to AgStewardship Australia the sector has developed world-leading voluntary stewardship programs in agriculture through the Industry Waste Reduction Scheme. Since 1999 the industry has diverted more than 75% of packaging that would have otherwise gone to landfill.

WRINT Advocates the following Material Stewardship Programs

Electronic waste for all electrical appliances with cords to power them

Recycling of E Wastes and other electrical appliances is currently non-existent in the Northern Territory. This fact is despite the Federal Government advocating the EWaste Stewardship scheme is a National Program.

In respect to the Territories receiving landfill environment this is a particularly challenging problem as most of its landfills are poorly designed and most do not meet any acceptable industry standards for disposing of these complex materials.

The current Federal Television and Computer Recycling scheme targets particular electronic items but fails to capture many other electronic items and small electrical items. The environmental impacts of these items that are not being captured have on the receiving environment are no different to the items currently being collected. NT industry infrastructure (local government, private and third sector) is already in place and has the capability to capture, reprocess and/or recycle additional electronic items.

By enforcing the national program and introducing an expanded phased bans across the Territory prohibiting landfilling of any electrical wastes that has a power cord (including electronic outside the scope of the existing federal scheme) this diverts a complex material stream from the environment and changes community behaviour enforcing a cultural shift.

Agricultural trickle tape, drip lines and fluming, and fruit growing bags

According to AgStewardship Australia the sector has developed world-leading voluntary stewardship programs in agriculture through the Industry Waste Reduction Scheme.

Since 1999 the industry has diverted more than 75% of packaging that would have otherwise gone to landfill. The key objective for AgStewardship Australia is to support and develop Australian agriculture's reputation for environmentally sustainable stewardship through waste management and other programs within the agribusiness supply chain.

AgStewardship's key priorities are to:

- Consolidate and continue to improve the drumMUSTER® and ChemClear programs, to ensure their long-term sustainable operation.
- Contribute to the ongoing development of waste management and stewardship policy relating to the agribusiness supply chain.
- Work with participating organisations to identify and capitalise on mutually beneficial partnership opportunities.
- Facilitate the development of new stewardship programs in Australian agriculture.

Agricultural plastics including Drip Lines, Trickle Tape, fluming, plastic bags used in fruit growing and other agricultural applications are typically formed from polyethylene or like plastics that, if recovered, have value as a recyclable material.

Current practices for the disposal of these are aligned to either landfill disposal, left on the farms or burnt by the users in rural and remote areas. The tyranny of distance and access to local rural recycling service providers are current program limiters. However, introducing a stewardship scheme aligned to the Drum Muster and ChemClear initiatives provides a positive additional source of product for recyclers to access as well as solving significant landfill and other issues currently facing these streams.

Polystyrene and foam form manufactured products

Landfilling of styrene and foam formed products, like mattresses, pose significant environmental and void capacity issues to operators of landfills. The materials cause major litter and processing problems due to their light weight and impact the transportation of wastes.

Introducing a phased in state- based program using existing and developing new collection systems would provide an opportunity to recover a complex waste that has major environmental issues but some resource recovery benefit if generators assist with its recovery process.

Batteries outside of the proposed Federal Product Stewardship Scheme

Pharmaceutical wastes (utilising take-back opportunities with chemist and doctors surgeries)

PVC healthcare waste (utilising volumes produced in large hospitals and eliminating this uncontaminated waste stream from higher risk healthcare wastes)

3 WRINT Plan 3 continued

Mattresses

Old Mattresses pose significant problems for all operators of waste facilities. The bulk size, highly flammable textiles and wood frames, as well as high tensile steel make these very difficult items to manage. Additional health and animal vector (in particular rat) problems can also arise when these items are not properly disposed of and typically they form a major element of 'fly tipping' and illegal dumping for local authorities.

Program Materials

The following materials have been identified by WRINT as suitable for a State Based Product Stewardship Scheme

Proposed Material	Sources & Volumes	Current Markets
Mattresses	Volumes significantly increase under disaster management situations. Community, Hotel, hospital and commercial accommodation refits generate significant quantities.	Currently sent to landfill in NT although metals, foams and textiles are suitable for recovery and both domestic and export markets exist. Mattress recycling is growing in VIC and SA through the third community sector. Saleable reuse of mattresses is unfeasible.
Electrical Wastes (small household)	Household, commercial and industrial, electronic and electrical wastes. Growing > 5% per annum in Australia. State based program to focus on collection and diversion of all small electrical goods (all sources), and domestic appliances.	Domestic – Substantial existing infrastructure for the active disassembly of electrical wastes across NT exists (including some regional areas – large third-sector processing capacity in particular). Domestic capacity exists for complimenting the Federal program operations and providing expanded employment opportunities in the sector Export – Electronic parts, Rare Earths, Plastics, Glass
Polystyrene	Retail, food and bulk warehouse operations, fit out of commercial building and industrial facilities	Export currently Industry members have indicated that in the event commercial quantities increase local conversion and remanufacturing operations would prove economically viable
Batteries	All batteries – handheld through to motor-vehicle that fall outside the proposed federal scheme. -batteries of any chemistry weighing more than 5kg -batteries that are not covered by another arrangement such as the television, computer and mobile phone schemes	Processors of electronic and EWastes have capability to include these items for recovery.
Pharmaceutical Wastes	The World Health Organisation report (2011) notes that "inappropriate disposal practices such as flushing unwanted or excess drugs down toilets or sinks and discharging them into household waste are common and may be the main contributor to pharmaceuticals in the environment such as surface water and landfill leachate". Risk to human health, leachate, contaminated run-off into surface waters, contamination of ground water and soil, uncontrolled gas formation and migration of gas off-site. Risk to human health, tracking of infectious materials by vectors, leachate, contaminated run-off into surface waters, contamination of ground water and soil. Risk to human health, leachate, contaminated run-off into surface waters, contamination of ground water and soil. Contamination of ground water and soil, loss of resources.	Preventative measures (regulation and policy) governing disposal practices at point source are necessary and are supported by WRINT. A state-based Product Stewardship or take-back scheme for discarded (non-ingested) pharmaceuticals would also need to be implemented in conjunctions with a landfill ban.
Agricultural Trickle Tape (16, 22, 28 & 35 mm), D Tape, Fluming, Banana Bags, plastic grower bags	Risks to receiving environment when managed incorrectly consuming valuable air space, fire management issues, air-borne hazards when burnt on private property and potential to cause greater impacts	Can leverage existing AG Australia programs and target farm consumers already captured and contributing to similar plastic recovery schemes. NT Industry operators have the capacity to manage and process all recovered and diverted plastics

3 WRINT Plan 3 — Appendix 1

Possible Product Assessment Method

The following table provides a method for assessment for prioritising products or classes of products being considered for the product list (for example batteries). The method has been derived by GlobalPSC following discussion at the first meeting of the Product Stewardship Advisory Group on 12 December 2012 where it was agreed that products or classes of products may be added to the list at any time for future consideration for Product Stewardship.

In proposing products for the list there needs to be a clear reason – a problem to be solved or benefit to be gained.

Products (priority products) proposed for Product Stewardship need to show that the benefits of taking action on a product will have the potential to outweigh the costs of action and can be backed up by a persuasive rationale and evidence.

Batteries

Criteria		Comments – in relation to the objectives of the Waste Management Strategy for the Northern Territory 2015-2022 and relevant NT regulation
1	There is potential to significantly reduce the impact that the products have on the environment, or that substances in the products have on the environment, or on the health or safety of human beings.	
2	There is potential to significantly increase the conservation or materials used in the products, or the recovery of resources (including materials and energy) from waste from the products. NB: the Working Group (WG) also considered economic factors in this criterion.	
3	Action will contribute to Australia meeting its international obligations concerning the impacts referred to in 1.	
4	Action will contribute to reducing the amount of greenhouse gases emitted, energy used and water consumed in connection with products and waste from products.	
5	The products in the class are in a national market.	
6	The products contain hazardous substances.	
7	Urgent action is needed for the proposed product (advice to be provided about when action should be taken for inclusion on the list - Year 1, 2, 3, or later)	

Criteria		Comments – in relation to the objectives of the Waste Management Strategy for the Northern Territory 2015-2022 and relevant NT regulation
8	There is community concern and strong commitment for action by the community. NB: The WG agreed that this criterion was difficult to demonstrate across the products examined at this point in time.	
9	Amenable to a product stewardship approach. NB: the WG modified this criterion from the original suggestion – "Preferred action is a product stewardship approach."	
10	Action is a priority for state and territory jurisdictions (i.e. the product is high on a priority list).	
11	Lessons from any previous attempts to regulate or better manage the product in Australia.	
12	Lessons from any product stewardship experience overseas in relation to the product.	
13	There is a high level of commitment from industry and the market and/or industry is ready for action (i.e. there is sufficient domestic recycling capacity to deal with the product to be collected).	
14	The consumer is willing to pay for action that reduces the impact that the products have on the environment, or that substances contained in the products have on the environment, or on the health or safety of human beings.	
15	Reusing, recycling, recovering, treating or disposing of the products involves a significant cost to the Commonwealth, or State, Territory or local governments.	
16	Action to reduce impacts will offer business opportunities that would make a contribution to the economy.	

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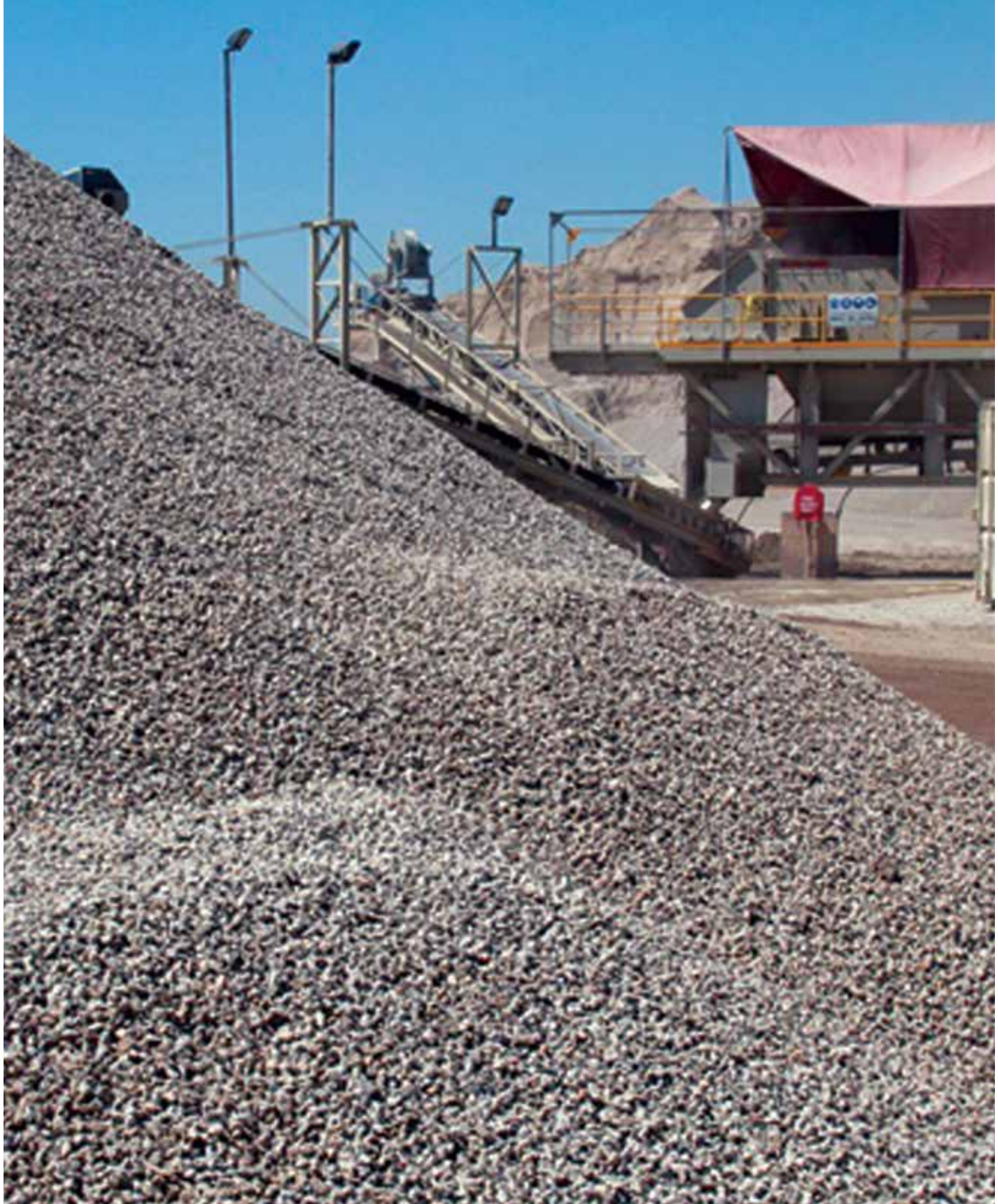


This Plan provides an overview of the following items for consideration and discussion:

- Landfill product restrictions
  - Priority materials
    - Category 1 – Opportunistic materials
    - Category 2 – Materials with detrimental impacts
- Construction and Demolition Waste Plans
  - Scope

Action Item

WRINT advocates a feasibility study of introducing landfill bans and landfill material restrictions specifically for the Northern Territory. Given the work of other states, WRINT suggests utilising these existing studies where appropriate to minimise the associated resourcing requirements and workload.

WRINT Plan 4 — Resource Recovery

Landfill Material Restrictions

This Plan details outcomes, policies and actions for the implementation of landfill restrictions including potential landfill bans where alternate markets exist. For the purposes of this Plan the following definitions apply:

- A Landfill Material Restriction – whereby any form of 'sorting' of the priority materials/material streams would be considered sufficient for those types of materials to be restricted from landfill; and with the waste generators, processors and transporters to be required to testify that the sorting has achieved predetermined quality specifications to the landfill operator/owner. Quality protocols for sorted secondary-resources would be required;
- A Landfill Ban – a complete ban of unsorted wastes or particular priority materials proposed by WRINT in this Plan (regardless of origin), whereby those materials are totally diverted from landfill. This measure would be supported by defined 'requirement to sort' protocols setting out minimum requirements to apply irrespective of the destination of residual waste.

A landfill ban cannot be simply implemented at the landfill gate, it requires input from the waste generators and the waste and recycling industry; and bans must be supported by complementary interventions to change behaviours and stimulate market signals. Waste generators are critical to the success of landfill bans as the way that waste is produced, handled, stored and contained at the point of generation may significantly impact the ease of reprocessing or separation later. Whilst NT's waste and recycling industry has a range of technologies to separate mixed waste loads, their effectiveness and economy is influenced by waste type, specific characteristics and volume. Source separation at the point of waste generation has productivity advantages and may be a requirement of an effective landfill ban depending on product/material stream. WRINT supports the application of the waste hierarchy by all waste generators as it is critical to move wastes up the hierarchy and ensure that the most environmentally friendly disposal option is selected as part of normal business function. It is also important to collect accurate data about the volume and characteristics of the wastes being generated.

WRINT notes that NT does not have viable and truly inclusive landfill models to determine the full externalities associated with sending particular materials or products to landfill. Whilst other jurisdictions have undertaken detailed feasibility studies regarding the impacts of introducing landfill bans and landfill restrictions and their cost/benefits, this evidence-base is unavailable in NT.

WRINT believes that the following objectives are critical in any decision making (including risk-assessment) process:

- Protection of human health and the environment, including the reduction of climate change impacts associated with the landfill of wastes;
- Contribution to increasing productivity and resource efficiency across all industries including the waste and recycling sector;
- Increased employment (including regional and ageing population employment opportunities) and financial growth within the waste and recycling sector;
- Promotion of remanufacture and use of secondary resources;
- Increased market certainty and business confidence to invest in new collection, processing and treatment infrastructure;
- Driving increased self-sufficiency and securing future supplies of secondary-resources to sustain the infrastructure;
- Increasing the outputs of existing industry infrastructure; and
- Providing a cost-benefit to the community by fully costing the externalities associated with landfill and implementing a more transparent user-pays approach which reflects consumption.

The application of landfill bans and landfill material restrictions, if implemented with other policy measures, is an effective measure to increasing resource recovery rates of various material/product streams and is in line with aspirations outlined in the 'Waste Management Strategy for the Northern Territory 2015-2022'.

WRINT supports the application of the waste hierarchy by all waste generators as it is critical to move wastes up the hierarchy and ensure that the most environmentally friendly disposal option is selected as part of normal business function.

4 WRINT Plan 4 continued

Evidence Based research supporting the feasibility of Landfill Bans

A Hyder Report[1] determined that "with excellent and suitable complementary instruments, landfill bans could offer Australia good hazard control/reduction, as they already do in a number of states, and deliver good diversion outcomes in a cost-effective manner" ….and "international and national examples show that the planning for and implementation of bans need to include:

- Analysis of environmental and financial outcomes and technologies;
- Local involvement and implementation;
- Clear responsibilities and cooperation between government levels;
- Judicial and financial instruments;
- Transparency and clear communication to the public; and
- Clarity in establishing timelines for compliance".

[1] Hyder. (2010). Landfill Ban Investigation: Final Report. Report prepared for the Department of Sustainability, Environment, Water, Population and Communities. November 2010.

Secondary impacts on the environment and human health through incidents, such as illegal dumping should materials no longer be accepted at landfill, must also be taken into consideration.

Action Item

WRINT advocates that landfill bans and landfill material restrictions are not effective on their own and may lead to unintended consequences when they are implemented in isolation. Rather, WRINT believes that landfill bans and material restrictions should be complementary to other policy instruments such as Government green procurement commitments, Product Stewardship Schemes (Federal or State specific) or green energy tariffs, as well as the utilisation of existing and new regulations, controls and effective enforcement.

Action Item

Outside regional areas, landfill bans and the consolidation of landfill facilities to transfer stations may be unfeasible at this present time. Options for remote and very remote communities may include bulking materials for sorting and recovery at central locations or adopting a 'mono-cell approach' where planned ground storage for a range of single stream materials may be a viable option (metals, plastics and glass) until viable markets and infrastructure to handle these exist. This permits economic opportunities for landfill mining into the future if economic, market and technology opportunities permit.

With regards to landfill bans and landfill material restrictions, WRINT advocates that they are based on clear science-based policy and requests that the State Government make a 'Call for Opportunity' for each of the priority material streams proposed by WRINT as part of this Plan. This broader consultation will assist government and industry in the identification of any unintended consequences as well as provide the opportunity to individual businesses within the waste and recovery sector to provide confidential business plans and costs to government so that a complete impact statement can be developed.

Scope

Additionally, landfill bans must recognise available (built and planned) facilities. For example, a total ban on liquids and organic streams to landfill would be at the detriment of existing industry assets, but should be a serious consideration where disposal facilities are under designed particularly at all open pit or trench facilities.

All new facilities built using appropriate treatment technologies would be considered in time and the current lead-times associated with planning and financing could be used for the development of case studies and business plans to support policy amendments.

WRINT would also like to highlight the issues associated with determining the effectiveness of landfill bans, particularly in an environment where base-line data and historic and current materials flows are largely unknown and un reported. The lack of understanding of legacy wastes (for example Ewastes) has a proven impact on policies, such as Product Stewardship as well as landfill bans, and might create 'stress points' which could lead to negative unintended consequences (such as illegal dumping or over-subscription of services).

WRINT recognises that effective enforcement by regulators is critical to the success of landfill bans and material restrictions. Secondary impacts on the environment and human health through incidents, such as illegal dumping should materials no longer be accepted at landfill, must also be taken into consideration. Resources to collect and monitor compliance and other data must be immediately available upon commencement of any ban or restriction, to avoid incidents associated with illegal dumping or illegal exports.

Lead-in times for commencement of any bans and/or restrictions must also be appropriate to the development of markets, collection infrastructure, and reprocessing facilities. As must the recognition between urbanised and remote areas. For the purposes of the Plan, WRINT acknowledges the five major regional centres as identified in the Waste Strategy as:

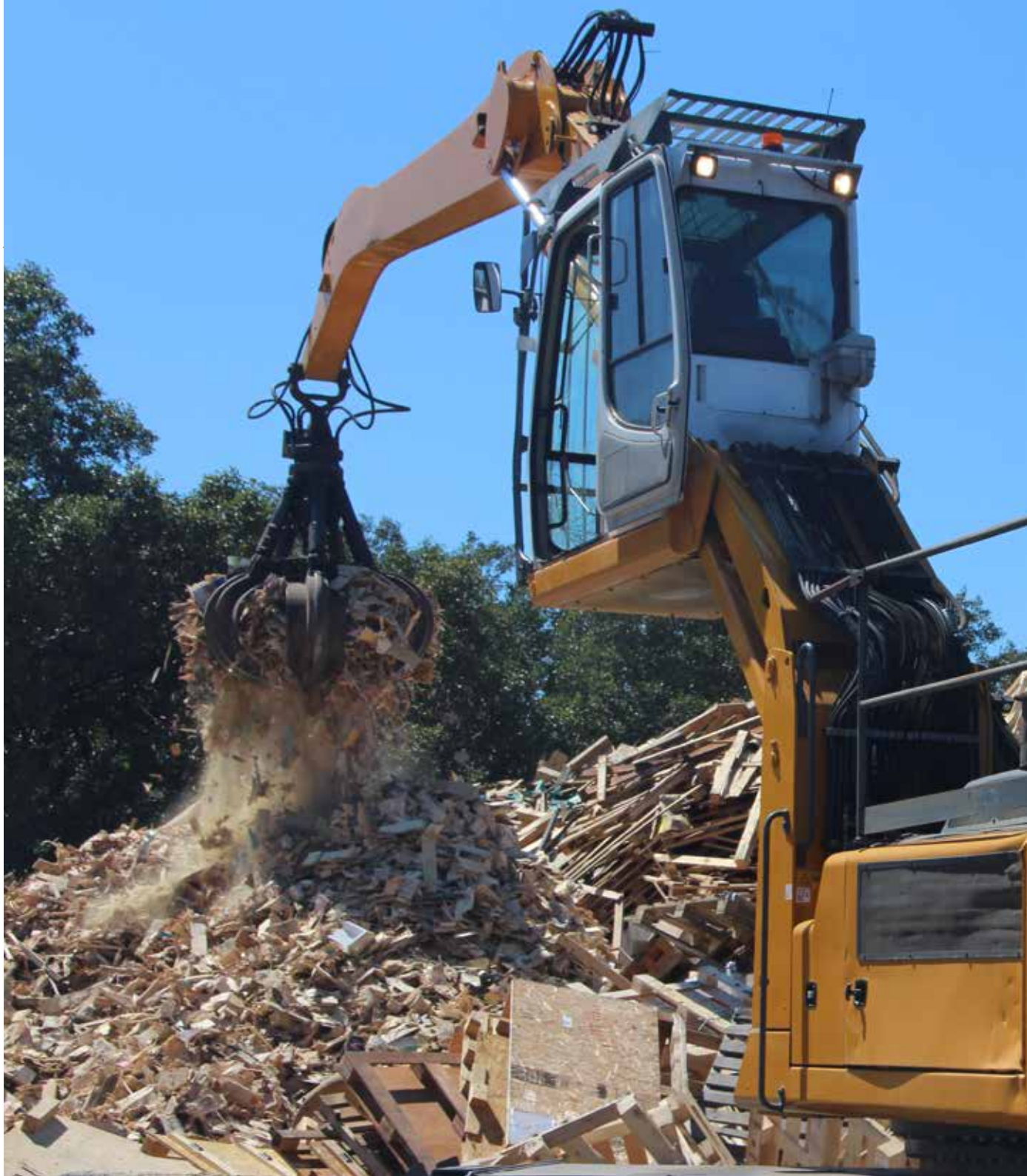
- Top End Region (including Darwin, Palmerston, Lichfield and surrounds)
- Central Region (Alice Springs)
- Katherine Region
- Barkley Region (Tennant Creek)
- East Arnhem Region (Nhulunbuy)

Bans may only initially be practical in the top end region and this is the recommended priority. Lessons learnt and outcomes achieved could then be considered for adoption in the remaining regions.

4 WRIQ Action Plan 4 continued

Offered Landfill Ban Priority Materials

The following priority materials have been identified by WRINT members as suitable for landfill restrictions and /or bans. WRINT has classified the materials into two categories – Category 1, where opportunity exists to move the materials up the waste hierarchy and Category 2, where current poor practice may negatively impact human health and the environment.



Category 1

Material Ban	Action - Sources	Current Markets
Wood (untreated and low grade/treated)	Construction and demolition wastes; pallets for packaging; joinery and furniture manufacture; landscape industry; forestry industry; saw mills	Domestic - Panel board manufacture; animal bedding; equine surfaces; mulches; compost production; fuel for power generation Export – Panel board; fuel;
Whole Loads of Plasterboard	Construction and demolition wastes, building refurbishment and fit outs	Domestic and Agricultural – Soil supplement products
Whole Loads of Concrete, Asphalt and Masonry Materials	Construction and demolition wastes, building refurbishments and fit outs	Domestic – Recovered secondary-resources including recycled aggregate. Substitute for domestically and internationally sourced virgin resources. Selected product standards already exist - HB 155: 2002
Selected Concrete	Landfill ban of concrete greater than >200mm in size Responsibility for all generators to comply	Domestic – Recovered secondary-resources including recycled aggregate. Substitute for domestically and internationally sourced virgin resources. Selected product standards already exist - HB 155: 2002
Metals from landfill where appropriate	Car bodies, domestic appliances and other metal types Appropriate landfills in NT to implement metal recovery diversion plans.	Domestic capacity exists for local gas recovery for fridges – (as it is illegal to release the gas) prior to them entering the scrap metal or landfill diversion system Export - metals
Mattresses	Volumes significantly increase under disaster management situations and mining camp relocation and temporary facility termination at the end of construction projects	Currently sent to landfill in NT although metals, foams and textiles are suitable for recovery and both domestic and export markets exist. Mattress recycling growing in VIC and SA through the third sector as well as investment into new technologies. Whilst this technology is not currently viable in NT, reverse logistic opportunities and export prospects are available. Saleable reuse of mattresses is unfeasible.
E-Wastes these also fall into Category 2 as their mismanagement may have negative risks to human and environmental health	Household, commercial and industrial, electronic and electrical wastes. Growing >5% per annum in Australia. To include all electronic and small electrical goods (all sources), and domestic appliances. Recovery facilities to be established at all WTS and product reprocessed at licenced NT facilities	Domestic – Substantial existing infrastructure for the active disassembly of e-wastes across NT (including some regional areas). Domestic reuse of plastics and glass. Domestic capacity exists for gas recovery for fridges. Opportunities for social enterprise. Export – Rare Earths, Plastics, Glass
Polystyrene	Retail establishments, public building fit outs and major construction projects generate significant volumes of these streams. When landfilled it provides significant operational as well environmental impacts. Trials of Styrene diversion be implemented at Transfer Stations in the Darwin area 2016 Trials to follow in 2017 at the remaining four regional centres Total Ban Styrene products 2019 for the five major regional areas.	NT recyclers have the capability to handle these streams and conversion locally is possible if the supply chain is secure. This would result in industry investment, economic returns to the state and new employment
PolyVinylChloride (PVC) including from medical wastes	Trial to commence of recycling PVC healthcare products in Darwin.	Established product stewardship/return scheme for PVC health care products.
Oils and Greases (hydrocarbon)	Mainly from industrial and commercial sources. Use growing proportionally to industry growth, particularly in the mining and resource sectors, and also the meat processing sector.	Domestic – direct reuse (through high-grade, closed-loop recycling), recovery as a fuel oil Export – fuel oils
Batteries (also Category 2)	All Batteries – handheld through to motor-vehicle Recycling facilities to be established at all Waste Transfer Stations (WTS) – storage timeframes to be negotiated and licenced and proportionally based on local population density to take into account economies of scale in the more remote areas.	Federal Government Stewardship scheme

Category 2

Material Ban	Action - Sources	Current Markets
Pharmaceutical Wastes	The World Health Organisation report (2011) notes that "inappropriate disposal practices such as flushing unwanted or excess drugs down toilets or sinks and discharging them into household waste are common and may be the main contributor to pharmaceuticals in the environmental media such as surface water and landfill leachate".	Preventative measures (regulation and policy) governing disposal practices at point source are necessary and are supported by WRINT. A State-based Product Stewardship or Take-back scheme for discarded (non-ingested) pharmaceuticals would also need to be implemented in conjunctions with a landfill ban.
Organics and other liquids from trench landfills, open pits and unlined landfills Closure and rationalisation of all NT 's open pit, unlined, trench and under engineered public asset landfills by 2019	Risk to human health, leachate, contaminated run-off into surface waters, contamination of ground water and local waterways contamination of soil, uncontrolled gas formation and migration of gas off-site. Risk to human health, tracking of infectious materials by vectors, Leachate, contaminated run-off into surface waters, contamination of ground water, contamination of soil WRINT advocates the closure of 70% of the Territory's public sector operating landfills in the five regional centres with a priority focus for closure on all unlined / open trench or open pit facilities which fail to meet current minimum landfill standards and design guidelines to be devised with industry and other stakeholders. Aligned with the closure of these out dated facilities, a state wide audit and future infrastructure plan should be completed on the required needs to manage the state's expected waste and recycling outputs for the next 30 years. This work should align with the agreed objectives detailed in the NT Plan (see Section 8 – Summary of NT EPA Management Actions). Closed facilities, where necessary, should be replaced with upgraded waste and recycling transfer operations for the affected communities. Upgraded community assets should include sorting / storing infrastructure to manage viable recycling streams where this is practical. All facilities, as a minimum, should have used oil recovery, used tyre recovery and metals recovery capability, and where product bans are initiated these streams should also be managed appropriately	Treated correctly Organics and Liquid streams can be processed either at Compost operations and used in remanufacturing soils and other valued added resources and where this is not feasible or possible these wastes should be processed in state of the art treatment operations. Closing unlined , open trench and pit facilities or inappropriately designed under engineered landfills provides the public sector opportunities to look at more regional and other public-private sector partnerships. Planning for future infrastructure will ensure the effective use of public funds expended in this area, provide industry with confidence that assets invested will be required and ensures the community have a full understanding and expectation of the assets required. It will enable for State and Local Government plans to identify and allow for effective buffer and the allocation of land in the areas where the infrastructure is needed, as well as for greater utilisation of existing industry infrastructure where new assets are deemed not required. The action would result in removal of environmental harm and public health concerns from air borne and other vectors as well as contamination to the environment water tables, and would result in an improved state wide resource recovery performance, greater accountability to the use of public assets and ratepayer funds and create new opportunities to leverage existing waste management public assets and design / planning for new investments and technologies that will support the state's population growth
Untreated Medical and Clinical Wastes from unlined landfills	Risk to human health, tracking of infectious materials by vectors, Leachate, contaminated run-off into surface waters, contamination of ground water, contamination of soil	All medical wastes should only be disposed of at fully approved medical specialist treatment facilities. Where it is practical, metals and other recyclable items can be recovered post treatment and recycled. Distance and remoteness should not be a factor given the risks to human health.
Agriculture – **Ban of on-site burial of chemicals (including oils), and plastics**	Risk to human health, leachate, contaminated run-off into surface waters, contamination of ground water, contamination of soil Regional trails for diversion of all Agricultural tape and plastic drums, and plastic banana bags for example, as a minimum 2017 followed by a ban in the five regional centres implemented by 2019 State wide ban of burning of any agricultural plastics from 2016	Agricultural tape and drums disposed into landfill consumes valuable airspace and has an economic value and recycling benefit
Resources sector operations including Mining Sites **Ban of all on-site burial of whole tyres, oils and greases, hydrocarbon liquid streams**	Contamination of ground water, contamination of soil, loss of resources Muds and liquids to be transported by approved transporters and processed at approved composting operations All Used Oils and Greases to be recycled or re-used at approved EPA licenced facilities Mining activities conducting landfill operations are required to design and operate all on site landfills in accordance with best practice criteria. Any facility failing to operate or build a landfill outside of these guidelines is restricted to disposing a maximum of 50 tonnes of general waste in any calendar year. All liquids containing hydrocarbons banned from onsite landfill disposal and to be treated off site at a licenced treatment and recycling operations. Whole tyres banned from being buried on site • Up to 25 inch rim size July 1 2016 • 26 inch and greater 1 July 2017	Secondary Resources generated by the Primary Resources and Mining industry have significant economic value to the NT Secondary Resources Sector. Australian industry has made significant investments in world class recycling and reprocessing operations that employ Territorians. This investment should be utilised by the NT resources sector. Specific streams identified by the industry can be reprocessed at NT based operations providing sound environmental recycling processes, local employment and economic value to the Economy. Solid waste being heterogeneous in nature contains many potential and known contaminants Rubber crumb can be reused into asphalt and to displace other virgin product applications in NT

CASE STUDY

Examples of Landfill Bans

	Bans/ Restrictions
Austria	Restrictions on organic waste (TOC<5%) to Landfill (1996)
Germany	Ban on separately collected waste materials, unsorted municipal waste – the part of municipal wastes that can be recovered and untreated waste with TOC<3% (1993 with a 12 year lead in period)
Sweden	Bans on the landfilling of sorted combustible waste (2002) and organic waste (TOC<10%) (2005)
The Netherlands	Ban on the landfilling of combustible and biologically decomposable wastes, as well as separated construction and demolition wastes (1995)
Flanders, Belgium	Landfill ban on both unsorted waste and on separately collected waste materials (1998) Landfill ban on combustible residual wastes (2000)
Massachusetts, U.S.	Bans on the landfilling and combustion of a range of materials including: Asphalt pavement, brick and concrete; Glass and metal containers; leaves and yard wastes; metal; recyclable paper; single polymer plastics; white goods; tyres (banned from landfill only); and wood (banned from landfill only).
South Australia	Landfill bans include oil and whole tyres from landfills (1 September 2010); computer monitors and TVs from (metro-only) landfills (1 September 2012); and all electronic and electrical goods state-wide from landfills (1 September 2013).
ACT	Landfill ban of e-wastes

4 WRINT Plan 4 continued

Construction and Demolition Resource Recovery Plan

The construction (including reconstruction) and demolition sector is vital to NT's economy. It is a significant agent for change and has a highly influential role in changing behaviours and the promotion of sustainable development practices across a range of activities and related sectors.

This Plan outlines a number of proposals for action for the management and treatment of construction and demolition waste to achieve more sustainable and affordable outcomes

At the front End the construction industry must promote a change culture of minimising the amount of waste produced and increase the proportion of materials recovered for reuse and recycling. It is recognised that a significant challenge within the sector is the large numbers of small builders which have limited management options and also the contractual issues associated with the high proportion of sub-contractor arrangements which often do not clearly articulate responsibilities or dilute responsibilities for sustainable waste management practices.

In particular Government has a major role in changing this culture and should take a central role to ensuring all Government expenditure on new or existing capital projects 'walks the talk' not merely talks sustainability principles, and that solid robust waste management plans and reuse of recyclables are accepted as business as usual.

Many construction and demolition wastes are easy to recycle using proven technology and existing infrastructure (including mobile and temporary plant). For example, masonry material is relatively easy to reprocess when it is separated at source. In such cases the quality of the end secondary resource exceeds that of the virgin resources and has a reduced carbon footprint. Whilst NT's Construction and Demolition waste is typically dominated by soils and aggregates (including masonry) by weight, 75% of the ecological footprint of these wastes are attributable to five materials, wood, plastic, insulation and gypsum products, hazardous wastes and metals.

WRINT's Plan details outcomes, policies and actions for organisations and individuals involved in the construction and demolition sector across NT.

Case Study

The UK's Site Waste Management Plan Regulations 2008 formerly applied to all construction projects with a value of GB£250,000 or more, (with additional updating requirements for projects with a value of GB£500,000 or more). The client had to produce the plan before the construction project commenced. The aim of the plan was to reduce waste crime and reduce the environmental impact of construction waste during the project.

Moreover, the C&D sector in England successfully achieved halving the waste it sent to landfill by 2012. The commitment was successfully implemented by over 800 companies through accurate measurement and reporting, increased waste prevention, more recycling and increased use of recycled and recovered materials.

The construction industry must promote a change culture of minimising the amount of waste produced and increase the proportion of materials recovered for reuse and recycling.

A Plan would cover organisations and individuals (including sole traders and all contractors) operating within NT 's construction and demolition sector, setting particular responsibilities for all those working on projects with a value of $500,000 or more

Action Item

WRINT advocates that the Northern Territory Government investigate appropriate regulation to mandate Construction and Demolition (C&D) Plans. A Plan would cover organisations and individuals (including sole traders and all contractors) operating within NT 's construction and demolition sector, setting particular responsibilities for all those working on projects with a value of $500,000 or more (including GST).

The Plan would capture all wastes which are directly generated through a construction and/or demolition project and throughout each phase within a project (for example, demolition, site clearance, sub-structure/foundation, super-structure, fitting); and also to all renovation and maintenance projects associated with existing structures/buildings.

Whilst WRINT supports the provision of targets, they can only work where there is credible baseline data in association with mandatory reporting, and that targets are mandated with clear responsibilities and punitive provisions for non-achievement or false claims. However, over time, these Plans could facilitate the accurate mandatory reporting of such data.

A number of NT-specific opportunities are advocated, including:

- A five year rolling infrastructure program, that prioritises infrastructure in key C&D generation areas, should be developed. On the basis of the quantities generated, and potential for recovery, planning should give consideration to fixed or mobile facilities to service material volumes as appropriate.
- Where obvious gaps exist in the geographic spread of existing facilities in relation to the generation of C&D waste, NT's EPA could work with local governments to support the incorporation of C&D waste recovery infrastructure and programs in all waste management strategy reviews.
- One of the key approaches of NT's Strategy, is the development of partnerships. In the public realm, peak agencies, including Local Government Associations, will help to facilitate planning and resource sharing, and the development of local market outlets for materials. Additionally, government agencies should be considered priority partners.
- Private partnerships and social enterprises should also be supported. Beyond obvious partnerships with the waste management industry and reprocessors, opportunities exist within the civil sector and quarrying industry; and the renewable energy sector. These relate particularly to the most immediate opportunities in material recovery and market development in regards to recycled masonry materials.
- Planning and operational measures also need to be managed. NT's EPA has the opportunity to work proactively, and in partnership with industry, to support the development of guidance. Priority should be given to:
- The siting and operational requirements of both fixed and mobile equipment, to manage expectations as the industry goes through a growth phase
- Guidance on the management of asbestos in the C&D waste reprocessing sector.

WRINT advocates South Australia's requirements to pre-sort C&D wastes prior to disposal, recognising its potential in providing long-term, sustainable solutions to the recovery of C&D wastes and long term industry behaviours. WRINT also advocates this approach as a successful solution to eradicating unlicenced operators from the waste industry and reducing illegal dumping of C&D wastes. This measure provides increased business confidence and the associated investment in the new infrastructure.

The ease of entry to the NT waste industry is also of concern, as this leads to a lowering of overall business practices and standards which may directly impact human health and negatively impact environmental values where waste is poorly managed.

WRINT advocates the licensing of all waste facilities and transporters including holding a public register of operating business locations.

5

This Plan provides an overview of the following items for consideration:

- Requirement and criteria for an NT Emergency Waste Management Plan
- Recycled Organic Waste – Disaster Relief Planning Framework
- Biosecurity and development of a Code

WRINT Plan 5 — Emergency Waste Preparedness

WRINT is supportive of the Territory's commitment to develop a best-practice 'NT Emergency Waste Management Plan' as outlined in the Waste Management Strategy for the Northern Territory 2015-2025.

As a critical stakeholder, WRINT recognises the importance of reducing the impact of waste on human health and the environment through improved waste management practices. It is WRINT's position that any such work adopted must include a macro understanding of the term "Disaster" and not place a system boundary on this from natural events only. WRINT notes that the Strategy refers to "natural or environmental disasters", implying an omission of man-made disasters although these are eluded to later in the strategy by way of "new waste streams from emerging industries which may be of high risk and require emergency plans".

Action Item

The NT Emergency Waste Management Plan (NTEWMP) must include, manmade disasters, (oil spills), natural events (earth quakes, cyclones and fire) as well as bio security incidents (foot and mouth outbreaks). WRINT acknowledges that emergences not only have the capacity to generate large volumes of waste within a short timescale but that many of these wastes are problems wastes, whether in concentrated or diluted form. In the longer-term, the management of problem wastes is also a concern, for example, those generated from the demolition of impacted infrastructure and longer-term clean-up plans.

It is WRINT's considered opinion that NT Emergency Waste Management Plan is a priority which needs to be initiated with immediate effect and that a whole of Government and Industry Taskforce be formed to develop the Plan.

The Territories demographics, coupled with a lack of any adequately engineered landfill operations for managing major incidents wastes, its unique flora and fauna environment and sensitive environments, in terms of World Heritage listed sites (such as Kakadu, Litchfield and Uluru Kata Tjuta National Parks), demand that such a scope of work be undertaken. The NT Community is currently exposed from the potential health aspects associated with managing complex emergency wastes, and also exposed to the economic and environmental impacts should a major man-made or natural disaster occur.

The Territories demographics, coupled with a lack of any adequately engineered landfill operations for managing major incidents wastes, its unique flora and fauna environment and sensitive environments, in terms of World Heritage listed sites, demand that such a scope of work be undertaken.

5 WRINT Plan 5 continued

Background

WRINT advocates that the collection, transport and disposal of all solid, liquid and hazardous waste materials must be recognized as an essential community service. The industry understand the impacts that extreme weather events have on their operations, and it is for this reason all have emergency operational management plans in situ, to ensure that when major weather events do occur, the collection and removal of waste in the community, can be undertaken in the most practical manner.

Local councils have traditionally had the responsibility for cleaning up and removing wastes following major weather events. Typically an impacted local authority engages private sector contractors to assist or undertake the work. Usually this work is contracted out to its landfill or preferred council contractor but no structural or system boundary is observed across jurisdictions for engaging of this work.

It is industry's observations, based on historical evidence that have occurred (both manmade and natural weather events), that typically clean-up logistics, contractors and appropriate asset needs are only considered as an afterthought rather than known by all involved leading up to the event .

As part of the NTEWMP, all local government authorities have existing local disaster cleanup management plans in place, but their focus historically is on its ratepayers ie households, street debris, parks, green waste or local creek debris.

WRINT advocates that a broader NTEWMP must provide focus at the cleanup at the macro level, including a detailed, critical approach or analysis for the handling, removing, managing or disposal of the very significant quantities of commercial and industrial wastes, including contaminated muds and liquids (which often include problem wastes) that are generated when these events occur.

As part of the NTEWMP, all local government authorities have existing local disaster cleanup management plans in place, but their focus historically is on its ratepayers ie households, street debris, parks, green waste or local creek debris.

WRINT advocates that the NTEWMP should:

- Identify when and how the sector is engaged, and the contract framework for payment of the services required prior to every 'storm season'.
- Often landfill and waste transfer operations following these events need to operate outside normal operating hours and outside of planning and environment approvals to take weather event related clean up wastes. Licenses for all operators need to reflect the ability to take these streams and manage them on site safely, where facilities are currently precluded from doing so, without fear of post event prosecution by regulators for accepting these streams.
- The lack of planning for temporary storage, locating and bulk out of flood clean-up wastes results in parks, car parks, streets and road reserves being used to deposit household and street waste. This results in significant operational, land contamination, leachate run off and, at times, safety issues. It also impacts communities whose personal items are left exposed to all to see. Specialist locations need to be identified in all local authority jurisdictions for the temporary storage of affected material.
- A central register is held by all councils and relevant state government agencies, that lists and identifies critical business and industry facilities that could become potential environmental or bio hazard sites in the event of a natural disaster, i.e. poultry farms, food processing operations, abattoirs, meat and freezer stores, cold rooms, organic material stores, paint, and hazardous waste storage locations. These need to be registered for each region, to reduce post event hazards.
- A central register of all licensed waste (liquid and solid) transporters, waste management, reprocessing and recycling facilities is held by all councils and relevant state government agencies with emergency contacts for those facilities. This assists with reducing notification and assistance times.
- The NTEWMP must make provision to ensure that all registers are maintained every 6-12 months to ensure the currency of the data held.
- Hazardous waste removal and management is a critical issue that needs consideration from both an event management point of view and post event management
- Recycling and recovery of 'value' materials, such as organics and metals, could have significantly reduced costs of disposal if more planning and thought was taken to temporally locate, store and then sort the waste rather than just send it all to landfill for disposal.
- The management of business wastes from commercial and industrial sectors, food processing operations, abattoirs, and hazardous and liquid wastes must be factored into the NTEWMP. The plan, after it is adopted, should be reviewed and discussed with all stakeholders, at least annually to ensure that it remains current and remains aligned to the state's growth and business activity.
- Mitigation of some impacts associated with problem wastes generated from households if local councils conduct a household hazardous waste cleanup event and households are encouraged to remove these wastes before storm season. Such a service could be expanded to small businesses where applicable.
- In the event of Earthquakes and fatalities occurring in buildings and other infrastructure the management plans for demolishing these assets must escribe a protocol respect to the requirements of how coroner's investigations and removal of bodies and body parts are managed. (example Christchurch NZ Earthquake post event clean up plans)

5 WRINT Plan 5 continued

Recycled Organic Waste Disaster Relief Planning Framework

There currently exists any real planning for the safe and lawful processing of green waste in the aftermath of a natural disaster. Historically, these types of disasters have generated significant amounts of green waste and generally occur in the summer when green waste receival is at its highest levels. Local Governments are risk adverse and protocols provide that it simply passes responsibility for the processing and storing of green waste onto the incumbent green waste processor, demanding in-situ and 'business as usual 'maintenance of contract terms. Little consideration is provided to existing industry operators or the incumbent council contractors for the 'peak' in processing and transport requirements or stewardship of the materials generated from major disaster events.

Consideration must be made to understand how an un-forecast excessive amount of finished product, can be distributed and disposed of without leaving the private contractor liable. If a contractor has to factor in the provision for disaster management of green waste, as occurs, this only increases the gate fee thus reducing a service cost which is not considered in the tender process.

WRINT advocates

- That Government commit to the greater Darwin region an effective and sustainable solution for diverting and managing green wastes from landfill. Compost operations provide an alternate disposal solution for handling liquid wastes and this option must be urgently investigated to meet the rapidly expanding liquid and other waste mud streams that are rising due to the increase in industrial and mining facilities and their processors.
- Green waste processing and management is considered as part of the disaster management program with a planned and effective response.
- Where there is a peak of green waste materials, the incumbent processor should be given the first option to process as much as they can handle (within the budgetary and license constraints) at that point in time. Surplus material could be offered to the industry in a fair and equitable manner without jeopardising the existing processing contract.
- Local Government, as the representative of the community, demonstrates stewardship by committing to use the finished products derived from recycled green and organic wastes. This would protect the organic processing industry by providing an incentive for supply feedstock that was as free from contamination as possible and producing a quality product.
- Local Government (or the lead agency) to recognise that professional, legal processing of waste materials is a responsibility which has a cost if it is to be performed properly. There is an inherent biosecurity risk in green waste and other organic materials, including sewerage and MSW. 'Short cutting' the process has environmental risk and sending materials to landfill is a cheap, lazy and irresponsible way of 'managing' the situation.

Hazardous and regulated waste removal pose significant community health as well environmental risks and its future management must be factored into the design of the states disaster waste management master plan.

Biosecurity Considerations

Animal losses occur due to a number of factors impacting from single events/operations such as fires and road traffic accidents; through to wide-spread or regional events such as disease outbreaks, permitted culls and extreme weather events such as cyclones and floods. When catastrophic losses occur, quick action is needed to minimise biosecurity risks and prevent air, water and land pol¬lution. During such events, it cannot be assumed that existing, local waste management infrastructure (from transport to landfill disposal) can deal with the amount or nature of the animal wastes, particularly during disease outbreaks and other emergency conditions. In many cases, facilities are not appropriately licenced or lack the infrastructure or capacity to safely accept and manage these wastes.

The report 'A review of Australia's preparedness for the threat of foot-and-mouth disease' commissioned in 2011 by the Australian Department of Agriculture, Fisheries and Forestry for Mr Ken Matthews' (AO), former Secretary of the Department, to provide a qualitative assessment of Australia's readiness to respond to the threat of foot and mouth disease. The report acknowledges the strength in Australia's biosecurity system. It highlights eleven areas where improvements would further strengthen Australia's approach to managing the threat of this disease and recommended that all states prepare a plan for dealing with large outbreaks of animal disease.

NT's agricultural sector, provides significant economic opportunity to the state. The Top End region can be divided into the following districts based on river catchments: Adelaide River, Darwin and Rural, Douglas-Daly and Mary River. There are currently 25 producers managing 20 ,680 km2 of the 'Top End' region alone, predominantly as beef cattle enterprises[1]. The proximity of these activities coupled with transport to market and export facilities does increase risks and also the impact of any potential disease outbreak within the cattle.

It is critical for emergency response agencies, such as the Northern Territory Emergency Services and Department of Primary Industry and Fisheries (DPIF), to have clear identification of resources and capabilities including those of the private sector. Developing and maintaining a resource list prior to any incident is paramount to a successful response. The Code must also outline current legislative requirements and operational processes representing best practice for the safe management of animal wastes (including dead animals); and provide the basis for further education and training opportunities for waste contractors and recyclers regarding the safe handling of zoonotic diseases and management of the associated human health risks. Typically, only under exceptional circumstances will contaminated animal carcasses and animal materials be removed from infected premises (i.e. a farm) for final disposal or treatment elsewhere. Nevertheless, the waste management industry handles dead animals and animal by-products as part of their ongoing service and contractual obligations and, as such, has a range of appropriate resources (trucks, plant, personnel).

Animal waste businesses should develop risk management systems to ensure that the waste is handled, transported and disposed of in a manner that eliminates or minimises human health risks. This should be supported by policies, procedures and protocols and worker instruction, training and supervision.

There are numerous mortality management methods for disposing of dead animals and animal wastes on-site or off-site, including:

- Deep burial;
- Composting;
- Incineration and other thermal treatments;
- Rendering;
- Landfill;
- Natural decomposition (where the animal or waste remains in-situ).

The scope of the Code must seek to mitigate risks to human health from animals and must consider a range of animal and human pathogens including:

- Endemic diseases such as anthrax and Hendra virus and more common pathogens such as E.coli.
- Emergency animal diseases such as avian influenza, Nipah virus and rabies.

It is also recommended that the Code includes:

- A list of resources.
- A list of contacts for the relevant State government departments and industry.
- Basic procedures for containing an infectious, large animal carcass which should include photographic or video resources.
- A summary list of zoonoses and risk management strategies including the identification of a range of general risk principles that are applicable to all diseases and categorically highlights some issues associated with specific diseases.
- An 'Operations Matrix' to easily identify minimum operational standards and procedures (including decontamination procedures), vaccines, spill management, personal protective equipment (PPE) requirements, licence and specific operational requirements for transport, treatment and/or disposal.
- Requirements for 'record management' including relevant templates (such as the reporting form for notifiable diseases in cattle in the NT – see http://www.nt.gov.au/d/Primary_Industry/Content/File/biosecurity/Rpt_Form_NotifiableDiseasesV6_May2014.pdf) and notification requirements.

Action Item

WRINT advocates the Territory government formulate a 'Code of Practice for Management Animal Wastes' which can be utilized by industry and the relevant government agencies. This Code would outline the critical issues and processes for the responsible handling (including transport) and treatment of dead animals and their by-products (including animal wastes).

[1] Northern Territory Government and Meat and Livestock Association. (2011). Cattle and Land Management Best Practices in the Top End Region.

WRINT

Essential for community Essential for environment

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