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Values Implementing RFID in Waste Management.

Resident activity bin not out for a while.

Implementing RFID in waste provides greater visibility, assisting with cost reduction and improving services.

RFID is an easy way to keep track of bins in a council, whether it be residential bins, council litter bins in parks, shopping strips, or office block commercial bins. The values for Council, Bin Manufacture and Waste Contactor may differ, providing benefits to each entity. Implementing RFID requires input from different companies having different responsibilities.

Bin Manufactures	- Inserting the RFID tag and associating it with a bin.
Bin delivery	- Associating the bin /tag with an address.
Waste Collection	- Reading the bin with associated hardware and software solution.

This document assists each party, helping them understand the values of RFID in waste, and their responsibility in the implementation process.

Footnotes include.

- Tagging new bins with RFID and managing existing old bins that do not have RFID.
- Industrial and Commercial waste
- Bin level monitoring

Council Values

Bins are a high valued council asset and reside in an uncontrolled environment at residents' properties, parks, halls shopping centres. RFID Values for councils can include.

- | | | |
|---|-------|--------------------------|
| - Age of all bins | _____ | <input type="checkbox"/> |
| - Bins and their condition | _____ | <input type="checkbox"/> |
| - Location of foreign bins on the curb, that are not of council origin. | _____ | <input type="checkbox"/> |
| - Lifetime of bins, times each bin is emptied | _____ | <input type="checkbox"/> |
| - Logging lost or stolen bins and locating them. | _____ | <input type="checkbox"/> |
| - Monitoring and control of bins in parks, shopping centres | _____ | <input type="checkbox"/> |
| - Ability to charge for collection on specific bins. | _____ | <input type="checkbox"/> |
| - If rates not paid, warn not to collect bin. | _____ | <input type="checkbox"/> |
| - Recycling habits, presentation rates by month, area, and waste stream | _____ | <input type="checkbox"/> |
| - Increase recycling, Governments towards zero waste initiative. | _____ | <input type="checkbox"/> |
| - Reduce contamination in landfill. | _____ | <input type="checkbox"/> |
| - Increase ratepayer value in collection services. | _____ | <input type="checkbox"/> |
| - Process improvements for council and waste contractor | _____ | <input type="checkbox"/> |
| - Information sharing | _____ | <input type="checkbox"/> |
| - Reward rate payers for recycling habits and bin placement. | _____ | <input type="checkbox"/> |



Bin Manufacture Values

- Providing a bin with added intelligence and security _____ ☐
- Bin serial number in RFID TAG id, providing RFID and visible id _____ ☐
- Evidence of bin supply. _____ ☐
- Track of bin from manufacture to delivery _____ ☐
- Stock taking _____ ☐
- Finding missing bins in a facility _____ ☐
- Asset Inventory Tracking _____ ☐

Bin rollout Values

- Proof of bin delivery to a household location GPS/GNSS with RFID _____ ☐
- Quick audit at completion of a bin deliveries _____ ☐
- As last bin is delivered job completed, no costly months spent auditing the bins delivered to properties with council. _____ ☐
- When resident says they did not receive a bin evidence it was delivered. _____ ☐

Waste Contractor.

Bin Management

- Simplistic way logging damaged bins for repair and report of repair. _____ ☐
- Note to remove bin from curb when collecting a specified bin. _____ ☐
- Report and find lost or stolen bins as they are collected. _____ ☐

Waste Management

- Visibility and Evidence of waste collection _____ ☐
- Knowledge that a bin was collected when resident calls for missed bins. _____ ☐
- Improving services and reduce collection costs. _____ ☐
- Summary of collection per day month year by area and waste stream. _____ ☐
- Presentation rates per day month year by area and waste stream. _____ ☐
- Automated recording of double dipping by residents _____ ☐
- Log overweight or overflowing bins. _____ ☐
- Warning of contamination coming up, due to historic contamination logs. _____ ☐
- First and Last bin collection. _____ ☐
- Messages to rate payer on better bin placements _____ ☐
- Logging of contaminated bins _____ ☐
- Event warning, special bin collection in a location. _____ ☐
- Hard rubbish logging with estimated size. _____ ☐



- Log of bin collection obstruction _____ ☐
- Drivers can communicate, with householders on contaminated bins. _____ ☐
- Letters to rate payers, poorly positioned bins, or too close to another object. _____ ☐

Driver and Vehicle Management

- Truck detail per day starts, stops breaks and collections. _____ ☐
- Ease in lodgement of collection cases _____ ☐
- Hot spot Management, hidden obstacles _____ ☐
- Hazard warning when entering zones. _____ ☐
- Hazard warnings specified times 40ks school zones. _____ ☐
- Vehicle tracking _____ ☐
- Navigation system _____ ☐
- Direct messaging to vehicles on screen tablets with acknowledgment _____ ☐
- Messaging to the fleet or a specific truck _____ ☐
- Automated daily start and finish vehicle check and OHS procedures _____ ☐

Curb Assist location logging

Waste Vehicles travel every street, every week, every year and have visibility into many issues in the council. Drivers have a lot of tacit knowledge about their routes due to weekly travels over many weeks and months. Touch screens provide an easy way to dynamically log curb side issues, providing valuable information to all sectors of council.

The curb side information whilst not traditionally part of a waste collections responsibility, it can be harvested during a trucks daily run, presented, and charged to council. Otherwise obtaining this information with other methods can be difficult or costly for council.

- Logging of fallen trees. _____ ☐
- Floodway's _____ ☐
- Fire hazards _____ ☐
- Graffiti _____ ☐
- Potholes _____ ☐
- Illegally Dumped rubbish, such as cars, fridges etc _____ ☐
- Hard rubbish collections Locations _____ ☐
- Neighbourhood watch _____ ☐

Curb side programs can be run monthly such as fire hazards after autumn, or ad hoc due to damage after floods or high winds.

RFID Tag number

When implementing RFID, bin deliveries to residents need to be more specific, recording a specific bin to a property along with the visible bin serial number and RFID number.

To simplify the database creation, it's recommended the RFID EPC bank be programmed with a mask at the start example "AD17" which has been typically used in Australia and New Zealand. This data set at the start of the tag helps when collecting a bin. The AD17 number identifies the RFID as a Residential bin, not a generic tag in the waste, coming from other industries.

The Visible bin serial number should also be written the tag, so when looking for a specific bin by RFID it can be viewed when looking at a bin.

UHF RFID tags are typically 28 hexadecimal, 24 hexadecimal 0-9, A-F is often used in waste bins to reduce the number length.

Example

Bin Serial number

644589

RFID

AD17 0000 0000 0000 0064 4589



Conducting a bin roll out with RFID.

When conducting a bin roll outs it's recommended bin manufactures program bin bins as per this document. This quickens and simplifies the process, not needing to keep track of bin serial numbers to random RFID numbers. RFID equipment may then not be required during the bin delivery, since the bin serial number represents the RFID number.

The database creation using handheld devices should be dynamically updating a portal as bins are delivered, not relying on syncing of PDAs periodically, which can result in lost information, which is difficult to recreate due to bins residing in resident's property.

Litter bins

Litter bins are bin other than residential bins typically in beaches, parks, council facilities, shopping centres or street side shopping locations. These bins can be tracked for other purpose. They are bins not secured at a resident property and are open for uncontrolled public use.

- Chargeable bins _____ ☐
- Evidence of times bins are emptied, park bin emptied, 15 min later it's full again by residents dumping illegally, or an event such as a fair produces extra waste. _____ ☐

Some of these bins can utilise bin level monitoring. Sending direct messages as bins are getting full.

Dealing with existing bins that have NO RFID tags

When applying RFID tags to all new bins being delivered to households, consideration on the existing bins in the field that do not have an RFID tag. A waste system can still work effectively using both RFID and GPS/GNSS technologies.

RFID will provide accurate identity of the owner and resident of a bin no matter where it is located.

GPS can provide estimated location of a non RFID bin lift (not a specific bin) This information can still be of benefit within a waste solution.

As bins are lifted with no tag read, the GPS/GNSS can be recorded, reverse google lookups can provide the address indicating the location of a bin collection. This can be used in a waste solution; the exception can be reported providing staff locations of these bins with no tags, so they can easily apply RFID retrofit tags.

Commercial Waste

RFID in Commercial waste can have different values to Residential waste. These bins are typically charged on collection either ad hoc or on a regular basis, therefore RFID values can differ to curb side bins.

These bins are of high value and assets of a contractor rather than council, keeping track of these bins and their contents, can save waste collectors significant dollars.

Unauthorised collections, RFID records unauthorised waste collection. If a bin is lifted together with a GPS/GNSS location and no tag is read it can indicate an unauthorized collection and location. Geo fencing these high value bins can reduce theft.

RFID provides evidence of bin collection for the purpose of billing, together with RFID, data can be logged using a touch screen, indicating volumes of waste for collection companies helping them with efficiencies.

Bin level monitoring

Bin level monitoring can be of value in park bins and commercial waste bins. Sending periodic bin levels throughout the day.

Further information can be made available by contacting Adilam.



Waste-Xi

Documentation and videos for bin manufacture tag fitment, bin roll out application software, ongoing management of bins and the vehicle Waste Xi solutions are available at.

<https://www.wastexi.com/>

<https://www.wastexi.com/node/14>

Bin tag programming

<https://www.wastexi.com/auditingapp>

Bin audit app

https://www.wastexi.com/portal_info

Waste-Xi

<https://www.wastexi.com/hotspots1>

Hot spot management

<https://www.wastexi.com/hotspots2>

Waste-Xi a product of Adilam Technologies.

www.adilam.com

Adilam assists companies integrate RFID into the business processes. In Waste management we provide solutions across the complete RFID implementation process. Whether you need a complete solution, just hardware, or advise on implementation, Adilam can help.

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