



Regulatory Assessment of the LBin system

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Version Control

Date	Version	Notes
May 2024	Draft	For review and comment
July 2024	Final draft	Edits made after client review
August 2024	1.0	Final version

Executive Summary

JS Regulatory Services has undertaken a regulatory assessment of the LBin System at the request of EQ House Pty Ltd. The purpose of this assessment was to assess the LBin system against the two main waste transfer systems currently in use:

- **Direct-to-bin systems** – where customers directly deposit waste into a bin that is used for storage and/or transport for reprocessing or disposal and
- **Platform/pit Systems** - where customers deposit waste on a tipping floor or in a pit where machinery sorts and moves the waste to transfer bins or vehicles to transport to processing / disposal.

The assessment used a four point measurement scale (from likely to comply with minimal or no additional actions or interventions, through to, unlikely to comply even with significant additional actions or interventions). For this assessment, this measurement scale was also informed by the risk treatment process as detailed ISO 31000 along with the preferred hierarchy of managing risks.

A total of 31 requirements were assessed (10 related to work health and safety, 7 related to managing prohibited, problem and hazardous waste, 4 related to resource recovery, and 10 related to other common regulatory requirements). These requirements were obtained from various sources, including:

- Current NSW legislation,
- Various environment protection licences issued by the NSW Environment Protection Authority for transfer stations in New South Wales.
- NSW Government strategy documents relating to resource recovery and circular economy.

Other related subordinate documentation (e.g. Codes of Practice, Standards, guidelines, etc) were also considered as part of the assessment undertaken. Various assumptions were made in undertaking this assessment, which are documented in this report.

The main conclusion from the assessment undertaken is that the compliance effort required to meet the requirements related to work health and safety, the management of prohibited, problem, and hazardous wastes, and resource recovery requirements are substantially lower for the LBin system when compared to direct-to-bin and platform/pit systems. The areas of most distinct advantage of the LBin system from this assessment, when compared directly to bin and platform/pit systems, were:

1. The elimination of work health and safety regulatory risks associated with trips and falls for both facility staff and customers.
2. The ability to quickly identify prohibited, problematic, and hazardous wastes at the point of disposal.
3. The ability to quickly and safely remove / isolate prohibited, problematic, and hazardous wastes with minimal operational interruption.
4. Greater opportunities to segregate waste at the point of disposal to generate quality recovered resource feedstock with minimal to no contamination.

As an added benefit, the LBin system also reduces the compliance effort required to comply with other common regulatory requirements:

- significantly when compared to direct-to-bin systems, and
- considerably when compared to platform/pit systems.

1. Introduction

This report has been generated by JS Regulatory Services (JSRS) at the request of EQ House Pty Ltd. It details a regulatory assessment of the LBin system with respect to New South Wales work health and safety and environmental requirements.

Due to work health and safety and operational risks, as well as customer convenience, there has been a general trend away from direct tipping at a landfill site for customers in small vehicles. This is generally achieved by creating a waste transfer station or small vehicle receiving facility area. Historically, there have been two approaches to the design of these facilities: where customers deposit their waste directly in transport bins or where public customers deposit their waste into a pit / onto a floor where it is mechanically moved to transport bins.

The LBin system is an alternative approach to the existing options used for public customer-facing waste transfer stations. It is understood that this assessment may be referred to in order to further refine the design of the LBin system and/or for marketing purposes.

In NSW, there are numerous regulatory requirements that directly or indirectly impact on the operation of waste transfer facilities from a work health and safety and operational perspective. While many of these requirements are captured in legislation, some are contained in various codes of practice, guidelines, strategies, policies, and regulatory instruments.

The purpose of this document is to undertake an assessment of the LBin system against the existing customer waste transfer systems available to examine its capability to address the applicable regulatory requirements.

The following documents were consulted as part of undertaking this assessment:

- *The Protection of the Environment Operations Act 1997,*
- *The Waste Avoidance and Resource Recovery Act 2001,*
- *The Plastic Reduction and Circular Economy Act 2021,*
- *The Protection of the Environment Operations (General) Regulation 2022,*
- *The Protection of the Environment Operations (Waste) Regulation 2014,*
- *Waste Avoidance and Resource Recovery Act 2001,*
- *Work Health and Safety Act 2011,*
- *Work Health and Safety Regulation 2017,*
- *ISO 31000:2018 Risk Management Guidelines* (International Organization for Standardization, 2018),
- *AS 1657:2018 Fixed platforms, walkways, stairways and ladders - Design, construction and installation* (Standards Australia, 2018)
- *Code of Practice – Confined Spaces* (SafeWork NSW, 2022),
- *Code of Practice – Manual Hazardous Tasks* (SafeWork NSW, 2019),
- *Code of Practice – Managing the Risk of Falls at Workplaces* (SafeWork NSW, 2019),
- *Code of Practice – Managing the Risks of Plant in the Workplace* (SafeWork NSW, 2022),
- *Code of Practice – How to Manage and Control Asbestos in the Workplace* (SafeWork NSW, 2022),

- *Code of Practice – Managing Risks of Hazardous Chemicals in the Workplace* (SafeWork NSW, 2022),
- 2018 National Waste Policy: Less waste, more resources (Department of the Environment and Energy, 2018)
- *NSW Waste and Sustainable Materials Strategy 2041 Stage 1: 2021–2027* (NSW Department of Planning, Industry and Environment, 2021),
- *Waste Delivery Plan* (NSW Environment Protection Authority, 2021),
- *Handbook for Design and Operation of Rural and Regional Transfer Stations* (NSW Department of Environment and Conservation, 2006),
- *E-RAMP Risk Assessment Tool for Small Waste Facilities* (NSW Environment Protection Authority, Ver 4.0 2023),
- *Standards for Managing Construction Waste in NSW* (NSW Environment Protection Authority, 2019),
- *Fire Safety Guideline - Fire Safety in Waste Facilities* (NSW Fire + Rescue, 2020),
- *Environmental Guidelines: Solid Waste Landfills*, Second Edition (NSW EPA, 2016),
- *Waste Classification Guidelines Part 1: Classifying waste* (NSW EPA, 2014), and
- Various environment protection licences issued by the NSW Environment Protection Authority.

2. Background

The transport of waste from the point of generation to final processing or landfill has evolved significantly over the last century. The transfer processes are generally well resolved and have not changed appreciably for many decades. Waste management regulations, waste diversion requirements and WHS standards have become stricter in recent years and existing facilities designed for transport/transfer efficiency are struggling to meet these standards.

This report is focused specifically on facilities accommodating the public delivering vehicle loads of waste. These facilities are commonly referred to for the purpose of this report as Public Waste Transfer Stations (PWTS). The report will look specifically at how traditional and new methodologies and technologies in PWTS perform in a modern regulatory and WHS environment.

The infrastructure to create a PWTS typically involves at least some civil engineering works. Many waste transfer sites are located on former landfills, which makes creating a stable footing for structures a complex and expensive exercise. Even “green field” waste transfer sites can encounter engineering issues like shallow rock, shallow groundwater, on-site soils unsuitable for load bearing, and so on. The civil engineering works typically creates facilities that physically endure for more than 50 years, locking in design shortcomings that struggle to adapt to changes in regulations and waste strategies.

2.1 WHS

In New South Wales, customers of PWTS have sustained serious injuries or died from falls sustained at these facilities. Efforts to reduce the severity of accidents for the public often increase the frequency of less severe accidents while prolonging the waste deposition process. Public injuries (or near misses) are not typically recorded as WHS incidents as they are not staff/workers at the facilities. Improvements in site safety are often a response to a reportable incident that only typically captures the most serious of injuries.

The number of injuries to workers at PWTS is only known to their direct employers but are likely to be significant when compared to other industries. The traditional design of most PWTS facilities provides limited opportunity to do much more than administrative and some minor engineering improvements.

2.2 Problem and hazardous waste

Coupled with managing WHS risks, facilities are being scrutinised more closely by regulators as to how they identify, isolate, and manage contaminated, hazardous and/or problem waste. Small quantities of contamination by wastes like asbestos-containing materials, have the potential to cause significant issues if not identified and intercepted at the customer-facing waste transfer facility.

This is highlighted by recent issues such as the recent asbestos contamination in mulch identified in NSW, Victoria and Queensland that caused closures of schools, public and other facilities across the country. In addition, the lithium batteries making their way into waste facilities are estimated to be triggering over 30 fires a day across Australia, that create hazards that frustrate fire services, compromise the facility's operations, and cause air pollution.

2.3 Resource recovery and recycling

There is a significant legislative and policy push to recover as many viable resources as possible from waste. Reducing waste to landfill, greenhouse gas emissions and returning valuable resources to the economy are core features of most waste strategies. This is requiring waste transfer stations to change their procedures around inspection, sorting, and storing waste, which was not contemplated in the original PWTS design.

2.4 Typical Public Waste Transfer Station systems

Currently, PWTS fall exclusively into two groups:

1. **Direct to bin** – where the customer deposits their waste directly into a bin that, once full, is transported away for processing/disposal. Often these are arranged in a sawtooth pattern for ease of truck access.
2. **Platform/pit** – where the customer deposits their waste on a tipping floor or in a pit where machinery compacts and pushes the waste to transfer bins or vehicles where to be transported away for processing/disposal.

Both of these systems will be described in more detail below:

2.4.1 Direct to bin

After an inbound gatehouse inspection of the customers load, the customer deposits their waste directly to the bin that will be used to haul the waste to its destination. This system is frequently seen at PWTS co-located at landfill sites where there is an area for small vehicles to deliver waste separated from the active tipping face. It is also common to see this system at smaller transfer stations.

There are two subtypes of the direct-to-bin system that relate to the height of the bin relative to the customer. They are:

1. **Below ground** – separate levels are created using earthworks and/or structures to enable the bin to be placed so that the top of the bin is at or slightly above the ground level of the customer. This enables the customer to offload waste into larger volume bins to reduce transport frequency/cost. This sub-type typically uses hook lift bins and depending on the size of the bins in use, the height difference between the levels can be between 1.0 to 3.0 metres. Below-ground bins are typically arranged in a sawtooth or stepped configuration to enable easy access for waste transfer vehicles to collect full bins and place empty bins.
2. **Ground level** – while no level separation is required the top of the bin is above ground-level of the customer, meaning that the customer has to offload waste against gravity. This system typically (but not exclusively) uses front lift bins. Customers have to clear between 0.9 to 1.5 metres to deposit their waste. The site physical arrangement of ground-level bins is more flexible than below ground bins as they often only require front-on access. The downside is that the capacity of the bins is reduced, substantially requiring more transport servicing operations..

These sub-types are not mutually exclusive, and both are often in operation at waste transfer sites (Figure 3). To maximise the ease for the customer, ground-level bins are typically used for lighter materials (e.g. cardboard, paper, and other dry recyclables) with below-ground bins used for more bulky waste (large items, scrap steel, concrete, garden waste, etc).

Figure 1 - Example of a below-ground direct-to-bin system



Source: City of San Antonio, Texas

Figure 2 - Example of a ground level direct to bin system



Source: Municipality of Gordon/Barrie Island, Ontario

Figure 3 - A hybrid below-ground / ground-level direct-to-bin transfer station



Source: Charlotte County, Florida

2.4.2 Platform / Pit

This system differs from the direct-to-bin system in that waste is deposited directly on a covered concrete floor or pit and is physically / mechanically sorted, with the resulting wastes transferred to appropriate bins or transfer vehicles for off-site transport. This system is typically seen at dedicated transfer stations handling larger quantities of waste and can also allow tipping by smaller commercial vehicles and trucks.

While the mode of operation is similar, the construction of transfer stations using a platform differs from that using a pit.

1. **Platform** – all waste activities occur on a single level. Customers deposit their waste on the facility's concrete floor (the tipping floor – Figure 4). This enables the customer to offload waste with the assistance of gravity. The waste is then physically / mechanically sorted and then placed into separate bins, typically by machinery, for later transport off-site for reprocessing or disposal.
2. **Pit** – separate levels are created using earthworks and/or structures to enable the creation of a pit (the push pit – Figure 5). Customers deposit their waste directly into the pit at the facility, which can be done with the assistance of gravity. The deposited waste is then pushed down the pit to compact the waste and load waste transfer vehicles for disposal.

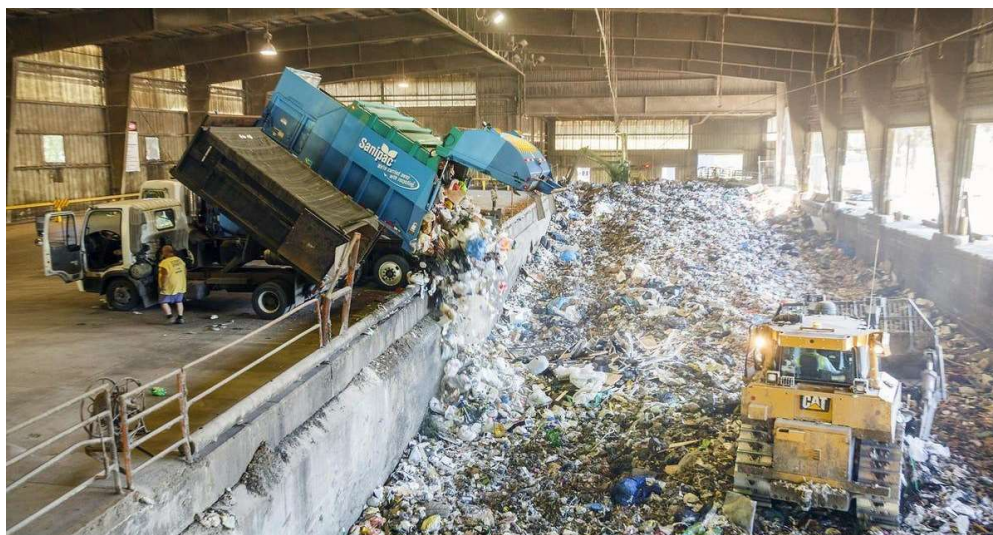
Platform and pits are typically mutually exclusive: if a waste transfer site is using one, there is unlikely to be the need for the other.

Figure 4 - Example of a tipping floor



Source: King County, Washington

Figure 5 – Example of a pushpit



Source: Lane County, Oregon

3. The LBin system

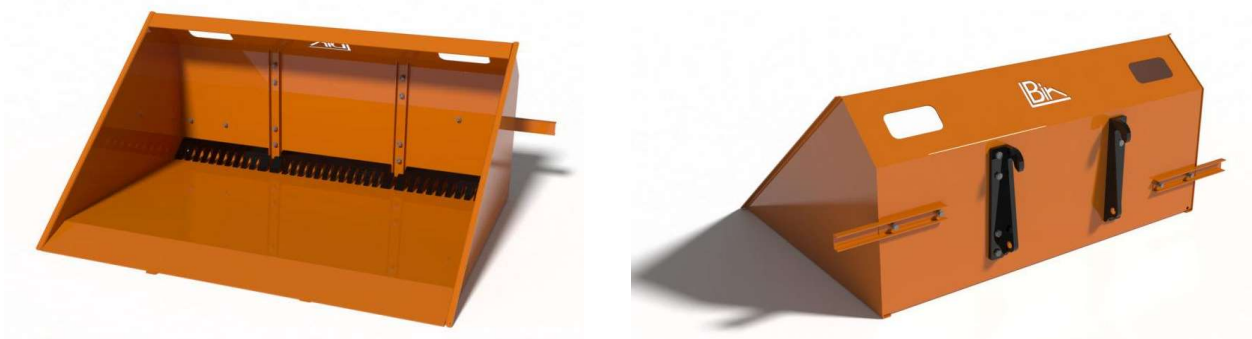
As the LBin system is new alternative to the previously described systems, a fuller description of the system is provided for the information of the reader.

The LBin system is a waste management solution designed to optimise waste containment and collection processes at waste transfer locations. It employs a modular design for waste containment and collection. It is intended to act as an interface at waste transfer facilities between members of the public dropping off their waste and the operations of waste sorting, processing, transfer, or disposal.

The design of the LBin system has two parts:

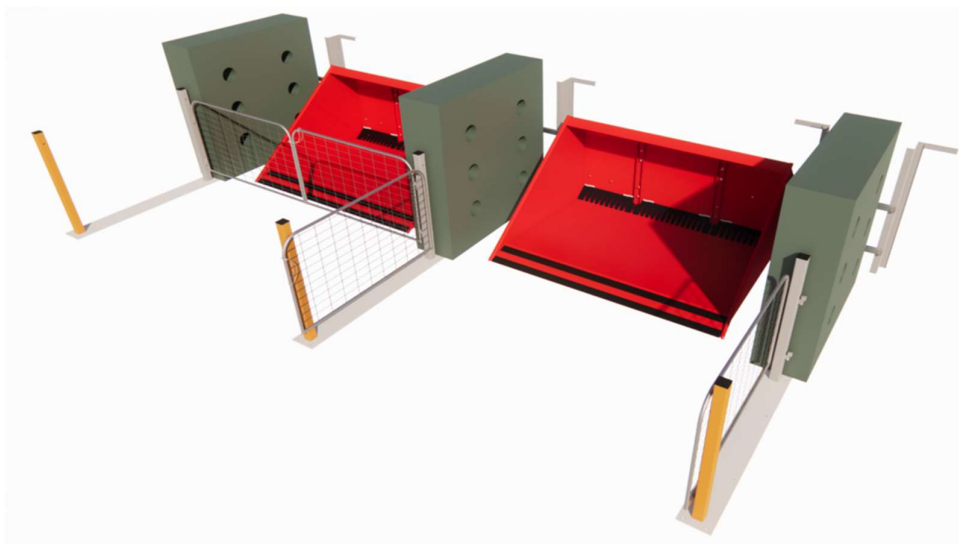
1. The LBin, is shown in Figure 6.
2. The bay barrier to provide safe segregation, as shown in Figure 7

Figure 6 - The LBin (front and back)



Source: Contained Waste Solutions

Figure 7 - The barrier bay (example configuration)



Source: Contained Waste Solutions

The LBin itself is a durable welded steel construction that is designed to withstand the typically harsh environment of a waste facility, including those created by weather conditions, vandalism, and operational use. The construction of the LBin allows for the inspection of the waste as it is being delivered by operators of the waste facility as well as easy access to retrieve any small items of incompatible materials delivered.

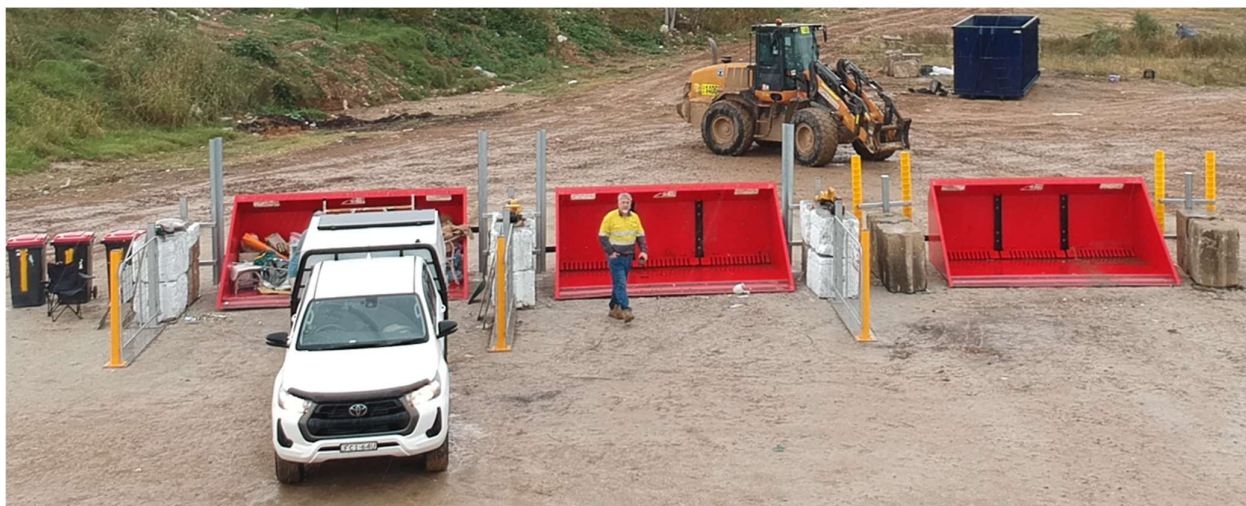
The LBin does not require significant civil engineering or earthworks to be placed to receive waste, with a simple, well-compacted flat area being sufficient. The LBin can be moved with various machines with a quick hitch attachment at the rear. Once an LBin is full, a machine such as a front-end loader can pick it up and transfer its contents to an appropriate stockpile or larger bulk waste transfer bin. The ability to quickly pick up and move an LBin is also beneficial for dealing with any contaminated, hazardous, or problem waste.

A number of LBin can be used to achieve the required operational capacity of any waste transfer site. Further flexibility is provided by the LBin being available in three sizes: 4.4 cubic metres (2.4 metres wide), 5.4 cubic metres (3.0 metres wide) and 6.2 cubic metres (3.6 metres wide).

The LBin system is also designed to operate at ground level. This eliminates any need to construct retaining walls to accommodate some direct-to-bin systems or for customers and staff to lift loads into conventional ground-level bins. There is also no need for durable concrete working surfaces as required in pit/platform-type systems. This feature also eliminates the trip and fall hazards for customers and staff typically present at waste transfer facilities.

An example configuration of a small LBin waste transfer site is shown in Figure 8.

Figure 8 - The LBin system (example configuration)



Source: Contained Waste Solutions

The LBin system can be configured to segregate customers from plant and equipment and other waste management activities without the need for significant civil engineering or earthworks using a range of barriers that can be bolted to a slab or pinned by weights. The bins themselves provide a 1.5m high solid steel barrier between the public and the machinery. Customer vehicles can be confined to an area that only accommodates small vehicles. All other operations, including the movement of waste transfer vehicles, and the storage / processing of wastes happens outside of this “green” area. An operating example of this principle is shown in Figure 9.

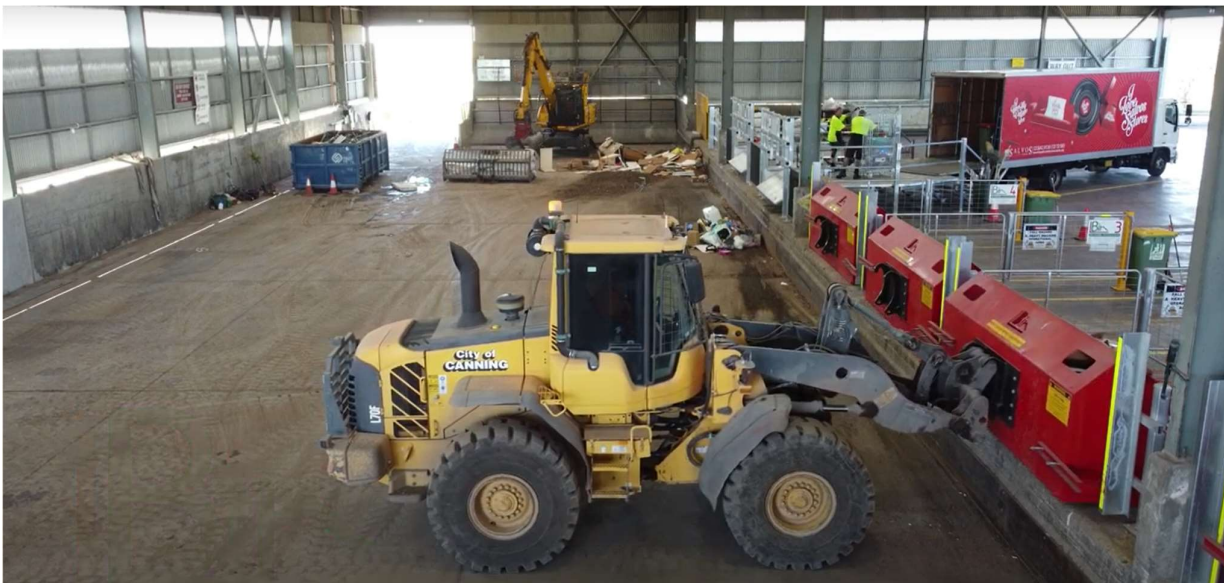
Figure 9 - Operational LBin system – Byrom Myocum



Source: Contained Waste Solutions

The LBin system can also be retrofitted to an existing waste transfer station designed to use either direct-to-bin or platform/pit systems. Figure 10 shows an example of this.

Figure 10 - The LBin system retrofitted to a pushpit transfer station



Source: Contained Waste Solutions

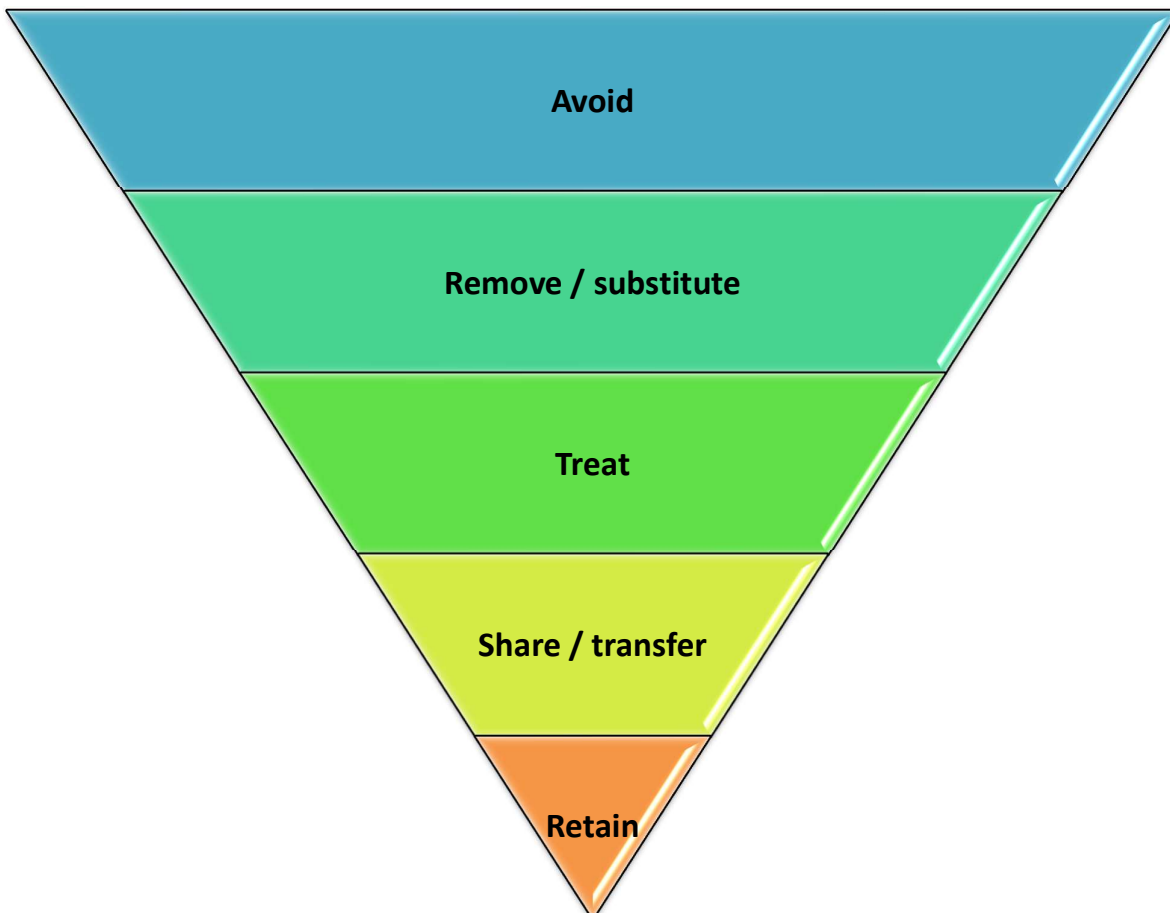
4. Assessment criteria

4.1 Measures

To undertake this regulatory assessment, specific measures were created to describe the level of compliance effort required to meet the specific requirements. A four-point scale was created for this assessment to enable the objective assessment of the systems examined. The assessment and scale are described in Appendix A.

The measures are also informed by the risk treatment process in ISO 31000, along with the preferred hierarchy of managing risks. With reference to Figure 11 below, each requirement was considered in terms of the hierarchy from top to bottom. For example, could compliance be achieved through avoidance of the risk, if not, could be achieved by removal, substitution, and so on. If a particular treatment type could achieve compliance, the level of compliance effort (implementation and maintenance) was considered.

Figure 11 - Hierarchy of risk treatment



Based on ISO 31000 approach to Risk Treatment

4.2 Work health and safety

From the documents examined, the key requirements applicable to waste transfer stations were identified and consolidated. These are presented in the tables below.

Table 1 - Requirements under the *Work Health and Safety Act 2011*

Reference	Requirement
Section 19 (1)	A person conducting a business or undertaking must ensure, so far as is reasonably practicable, the health and safety of— (a) workers engaged, or caused to be engaged by the person, and (b) workers whose activities in carrying out work are influenced or directed by the person, while the workers are at work in the business or undertaking.
Section 19(2)	A person conducting a business or undertaking must ensure, so far as is reasonably practicable, that the health and safety of other persons is not put at risk from work carried out as part of the conduct of the business or undertaking.
Section 29	A person at a workplace (whether or not the person has another duty under this Part) must— (a) take reasonable care for his or her own health and safety, and (b) take reasonable care that his or her acts or omissions do not adversely affect the health and safety of other persons, and (c) comply, so far as the person is reasonably able, with any reasonable instruction that is given by the person conducting the business or undertaking to allow the person conducting the business or undertaking to comply with this Act.

Table 2 - Requirements under the *Work Health and Regulation 2017*

Reference	Requirement
Clause 35	A duty holder, in managing risks to health and safety, must— (a) eliminate risks to health and safety so far as is reasonably practicable, and (b) if it is not reasonably practicable to eliminate risks to health and safety—minimise those risks so far as is reasonably practicable.
Clause 60(1)	A person conducting a business or undertaking must manage risks to health and safety relating to a musculoskeletal disorder associated with a hazardous manual task, in accordance with Part 3.1.
Clause 65	A person conducting a business or undertaking must ensure, so far as is reasonably practicable, that a worker does not enter a confined space before this Division has been complied with in relation to that space.
Clause 78(1)	A person conducting a business or undertaking at a workplace must manage, in accordance with Part 3.1, risks to health and safety associated with a fall by a person from one level to another that is reasonably likely to cause injury to the person or any other person.

Reference	Requirement
Clause 214	The person with management or control of powered mobile plant at a workplace must in accordance with Part 3.1, manage risks to health and safety associated with the following: (d) the plant colliding with any person or thing,
Clause 351(1)	A person conducting a business or undertaking must manage, in accordance with Part 3.1, risks to health and safety associated with using, handling, generating or storing a hazardous chemical at a workplace.
Clause 422 (1)	A person with management or control of a workplace must ensure, so far as is reasonably practicable, that all asbestos or ACM at the workplace is identified by a competent person.

4.3 Intercepting prohibited, problem and hazardous waste

From the documents examined, the key requirements applicable to the interception of prohibited, problem and hazardous wastes were identified and consolidated. These requirements originate from:

1. Standard and common environment protection licence conditions,
2. The *Protection of the Environment Operations Act 1997*, and
3. *Waste Delivery Plan*

For EPA licensed waste facilities, there are conditions in the licence that specify what wastes can be received at the facility. The specified wastes vary licence to licence and can be as broad as a classification of waste (e.g. general solid waste), or as narrow as a specific waste item (e.g. smoke detectors). Regardless of the contents of the list of permitted waste, there is a universal obligation on the licensee to ensure that only permitted wastes are received. This necessitates that screening and controls are put in place to ensure compliance with this requirement.

These requirements are presented in the tables below.

Table 3 - Requirements under the *Protection of the Environment Operations Act 1997*

Reference	Requirement
s.144AAB	A person must not cause or permit asbestos waste in any form to be reused or recycled.

Table 4 - Standard and common environment protection licence conditions

Reference	Requirement
Limit 1 (Standard)	The licensee must not cause, permit or allow any waste to be received at the premises, except the waste expressly referred to...
Limit 2 (Common)	The licensee must have in place and implement procedures to identify and prevent the acceptance of any waste not permitted at the premises.
Limit 3 (Common)	Any waste received at the premises must be assessed and classified in accordance with the EPA Waste Classification Guidelines as in force from time to time.
Limit 4 (Common)	Any non-conforming waste not permitted to be received at the premises must be placed in a designated quarantine area and removed from the premises as soon as practicable to a place that can lawfully receive that waste.

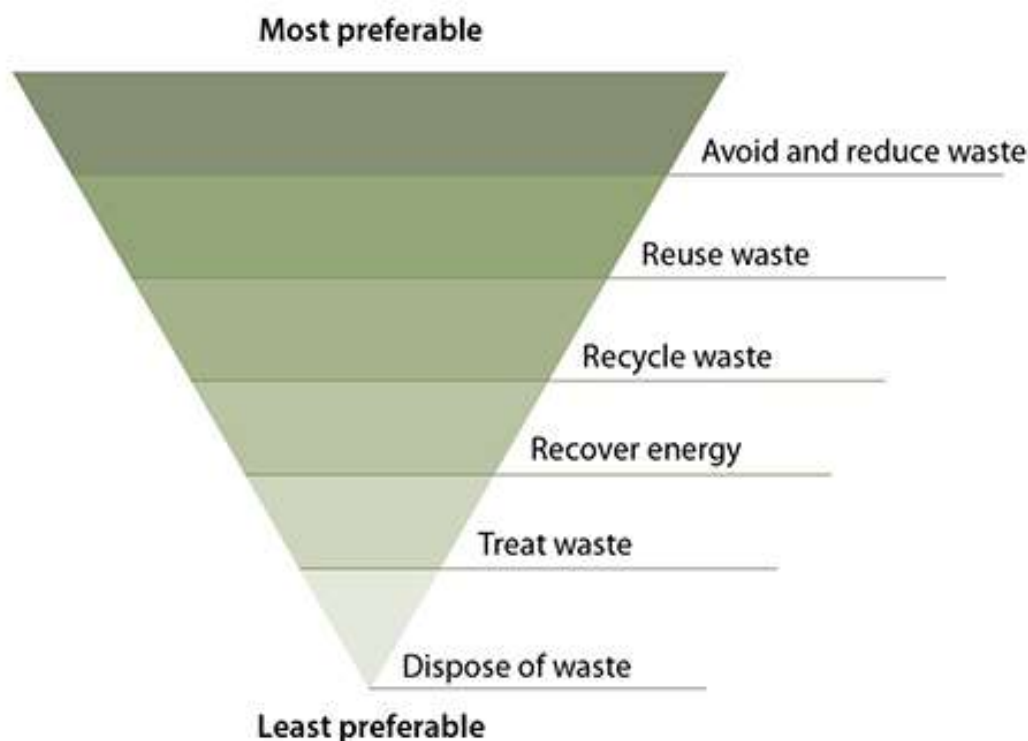
Table 5 - NSW Waste and Sustainable Materials Strategy 2041 objectives

Reference	Requirement
Objective 1	Managing hazardous waste
Objective 2	Helping the community deal with problematic and hazardous waste.

4.4 Resource Recovery

A range of policies and targets are applicable to waste management broadly in NSW. The primary considerations are drawn from Section 3(b) of the *Waste Avoidance and Resource Recovery Act 2001*. This section of this act provides the legislative initiative for the waste hierarchy. This hierarchy is shown in Figure 12 below.

In addition to this are specific targets set by the NSW Waste and Sustainable Materials Strategy which align with the national targets set in the National Waste Policy. In addition, recent legislative changes in NSW have seen the requirements to comply with a resource recovery order brought directly into the *Protection of the Environment Operations Act 1997*. These orders often restrict the types of waste that can be used as inputs to waste derived resources. Similar to the requirements of EPA licenced facilities, this then necessitates that screening and controls are put in place to ensure only approved materials are used in waste derived resources. These are presented in the tables below.

Figure 12 - Waste management hierarchy

Source: NSW Environment Protection Authority

Table 6 – NSW Waste and Sustainable Materials Strategy 2041 targets

Reference	Requirement
Target 1	80% average recovery rate from all waste streams by 2030
Target 2	Triple the plastics recycling rate by 2030
Target 3	Halve the amount of organic waste sent to landfill by 2030

Table 7 - Requirements under the *Protection of the Environment Operations Act 1997*

Reference	Requirement
s.286A(2)	A person to whom an order under subsection (1) applies must comply with the requirements imposed by the order...

4.5 Other common regulatory requirements

In addition to the above requirements, there are a number of other regulatory requirements that govern the operation of waste transfer stations in NSW. These include requirements made:

- Under the *Protection of the Environment Operations Act 1997*,
- Under the *Protection of the Environment (Waste) Regulation 2014*, and
- For licensed transfer stations, conditions of their environment protection licence.

The relevant requirements that the LBin system can have an impact on have been consolidated and appear in the following tables.

Table 8 - Requirements under the *Protection of the Environment Operations Act 1997*

Reference	Requirement
s.120	A person who pollutes any waters is guilty of an offence.
s.126	The occupier of any premises who deals with materials in or on those premises in such a manner as to cause air pollution from those premises is guilty of an offence if the air pollution so caused, or any part of the air pollution so caused, is caused by the occupier's failure to deal with those materials in a proper and efficient manner.
s.142A	A person who pollutes land is guilty of an offence.

Table 9 - Requirements under the *Protection of the Environment (Waste) Regulation 2014*

Reference	Requirement
cl.27(a)	The occupier of a scheduled waste facility must record the following information in relation to each delivery of waste or other material received at the facility— (a) the amount of any waste delivered, its waste type and (except where the waste is trackable liquid waste) its waste stream,

Reference	Requirement
cl.28	The occupier of a scheduled waste facility must record the following information in relation to each load of waste or other material transported from the facility for use, recovery, recycling, processing or disposal at another place— (a) the amount of any waste contained in the load, its waste type and (except where the waste is trackable liquid waste) its waste stream, (b) the amount of any other material contained in the load and a description of the nature of that other material,
cl.111(1)(c)	The defence provided for in section 142E of the Act (relating to the introduction of a substance into or onto land that is an unlicensed landfill site) is only available to the occupier of an unlicensed landfill site if, when the substance was introduced— ... (c) the landfill site was being operated in accordance with the operating requirements*, and

* The applicable specified operating requirements are as follows:

- (a) all reasonable steps are to be taken to minimise the emission of any offensive odour or offensive noise beyond the boundaries of a landfill site,
- (b) all reasonable steps are to be taken to avoid discharges from the landfill site causing water pollution,
- (c) all reasonable steps are to be taken to ensure that any plant at the landfill site that is used for the purposes of disposing of, or moving or covering, waste is properly maintained so as to avoid land pollution,
- (d) all reasonable steps are to be taken to ensure that any plant at the landfill site that is designed to control or prevent land pollution at the site (including any gas collection system and any leachate collection system) is maintained in an efficient condition,
- (e) all reasonable steps are to be taken to secure the site against uncontrolled public access (for example, by the provision of fencing and other security measures),
- (f) all reasonable steps are to be taken to minimise the emission of dust beyond the boundaries of the landfill site,
- (g) all reasonable steps are to be taken to minimise the tracking of dust or mud from the site on to any public road providing access to the site,
- (h) all reasonable steps are to be taken to minimise the risk of fire at the landfill site,
- (i) if the substance is asbestos waste—the requirements of clause 80 relating to covering that waste are to be complied with,
- (j) if the substance is clinical or related waste—the requirements of clause 113 relating to the disposal of that waste at a landfill site are to be complied with.

Table 10 - Standard and common environment protection licence conditions

Reference	Requirement
Operating 1 (Standard)	Licensed activities must be carried out in a competent manner. This includes: (a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and (b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.
Operating 2 (Standard)	All plant and equipment installed at the premises or used in connection with the licensed activity: (a) must be maintained in a proper and efficient condition; and (b) must be operated in a proper and efficient manner.
Operating 3 (Common)	Activities must be carried out in a manner that minimises the generation of dust.
Operating 4 (Common)	The Licensee must ensure that all operations and activities at the Premises are carried out in a manner that will prevent and minimise the risk of fire at the Premises.

4.6 Assumptions

This assessment has been based on the following assumptions:

1. The facilities (regardless of type) are publicly accessible waste transfer locations for the disposal of mixed general solid waste (as defined in the NSW EPA *Waste Classification Guidelines Part 1: Classifying waste*).
2. The facilities have an inbound material inspection process to ensure received materials comply with the sites licence and material segregation requirements.
3. Heavy mobile plants are in operation at all three facility types.
4. All staff at the facilities are appropriately trained and experienced in waste type identification and facility operations.
5. All three systems are operated in a “typical” manner, being:
 - (a) For direct-to-bin systems, customers park their vehicle near the receiving bin, and deposit the waste directly in the bin. The bin is then transported for reprocessing/disposal once full.
 - (b) For platform/pit systems, customers park their vehicles on the tipping floor / near the pit edge and deposit the waste directly onto the floor / into the pit. The waste is then mechanically sorted and pushed to waste transfer vehicles.
 - (c) For the LBin System, customers park their vehicles at the receiving LBin and deposit the waste directly in the LBin. Staff inspect the deposited material before the contents of the LBin are deposited into the appropriate waste transfer bin or storage area.

5. Assessment

5.1 Work Health and Safety

The detailed assessment undertaken, along with comments and observations, is contained in Appendix B.

5.1.1 *Direct to bin*

Direct-to-bin systems have some significant regulatory challenges:

- The protection of other people (i.e. customers) at the waste transfer station,
- Managing the risks of trips and falls,
- Managing risks from hazardous chemicals and
- Identifying asbestos-containing materials.

A typical waste bin also has the potential to become a confined space: a consideration that is often overlooked by operators of waste facilities. Entering confined spaces requires considerable additional regulatory safeguards.

As this type of PWTS typically was typically designed as a “one stop” disposal systems, the inclusion of material segregation and recycling / reuse has created complex traffic movement patterns between different areas and bins at the facility. In addition, heavy vehicles and plan are often working in the customer access areas to service the bins or load recovered materials. The increased frequency and complexity of traffic movements (both vehicle and pedestrian) creates significant additional risks of collisions between vehicles and people.

5.1.2 *Platform / Pit*

Platform/pit systems have similar significant regulatory challenges to direct to bin systems as described above:

In addition, platform/pit type systems require significant additional safeguards to fulfil the regulatory obligations in relation to powered mobile plant, which would be equivalent to those required for a system where small vehicles tip waste directly on a landfill tipping face.

5.1.3 *LBin system*

The LBin system requires substantially less compliance effort to meet the identified requirements than the other two systems. The main areas of advantage are in the prevention of trips and falls and the protection of the waste transfer station's customers. The system does require machine operations at a greater frequency although these operations are physically separated from customer areas and staff pedestrian access / egress routes.

5.2 Intercepting prohibited, problem, and hazardous waste

The detailed assessment undertaken, along with comments and observations, is contained in Appendix C.

5.2.1 *Direct to bin*

The primary limitation in direct to bin systems is the inspection of waste before being disposed. The screening that occurs at the gatehouse of these facilities are typically, at best, superficial. As the entire

waste load cannot be thoroughly inspected during this screening, it is substantially reliant upon customer declaration, which can be influenced by a variety of motivations (including minimising cost) and knowledge of waste materials. While the customer can be provided a discretionary opportunity to deposit problem and/or hazardous items before proceeding to the deposition point, it is ultimately the customer that is making the decision as to what waste the facility will receive, not the facility operator.

If these items are detected by a facility operator suitably trained in recognising these items, retrieving them is a high risk activity from a WHS perspective and results in significant operational disruption.

Even if prohibited, problem and/or hazardous waste can be safely retrieved, there is a significant risk that the entire contents of the bin have been contaminated. This requires the contents of the contaminated bin to be managed in the same manner as the waste that contaminated it. This could lead to closure of several receival bays of a or even the entire facility until remediation is completed.

When a fire caused by prohibited, problem, and/or hazardous waste occurs in a direct to bin system from, the bin involved can potentially be isolated. However, the contents of the bin are likely to burn to completion, losing any potential resources, causing significant operational disruption and air pollution.

5.2.2 Platform / Pit

Platform/pit systems have the exact same limitation as direct to bin system when it comes to inspection of incoming wastes. It is ultimately the customer that is making the decision as to what waste the facility will receive, not the facility operator. The contamination implications are more significant for platform / pit systems as larger quantities of waste are typically involved. Entire transfer truck loads and/or entire pit / floor contents have the potential to be contaminated.

The inspection / retrieval of prohibited, problem and/or hazardous waste is a higher risk activity when compared to bin systems. All plant operating is required to be shut down and the traversing / manual handling of large amounts of waste materials poses significant WHS risk.

Potential contamination and fire risks are also heightened in a platform/pit system, again, due to the larger quantities of waste involved. Fires in platform/pit systems if not identified and extinguished shortly after identification have the potential to be catastrophic, significantly damaging plant, equipment, and infrastructure causing prolonged operational disruption.

5.2.3 LBin system

The LBin System permits a thorough inspection of each load as it is laid out and displayed to the operator. This has clear advantages with respect to identifying, removing, and segregating any prohibited, problem and/or hazardous waste, including specifically targeted:

- Asbestos
- Lithium batteries
- Chemicals
- Tyres
- Containers such as gas bottles.

The LBin's containment of each load also contains the hazard to the load, allowing the contaminated load to be safely removed by machine to an isolated area for treatment or extraction of problem items. This approach also greatly reduces fire risks where potential ignition sourced can be quickly identified and, if a fire does start, the bin can be quickly isolated and only involves a relatively small amount of waste material.

5.3 Resource recovery

The detailed assessment undertaken, along with comments and observations, is contained in Appendix D.

5.3.1 Direct to bin

Direct to bin systems are designed to be highly efficient in facilitating transitions from the PWTS to the disposal locations. Unless specific bins are provided for the capture of recoverable resources (and these resources do not get contaminated), all material that goes into a bin is effectively en-route to landfill.

This is a particularly problematic issue in relation to garden organics. The disposal fees for garden organic waste are typically substantially less than that of general waste. This can create an incentive for customers to conceal (and subsequently disposal) of other wastes with garden organics. Combining this with intermittent supervision of garden organics disposal areas substantially increases the risk of contamination of this resource.

Direct-to-bin systems, especially those using larger bins, can disincentivise resource recovery. Even though an adequate number of bins for specific waste types may be provided, if accessing these bins requires multiple vehicle movements, it becomes more likely that the customer may deposit all their waste into the “mixed” waste bin. Direct-to-bin systems also have a distinct disadvantage in that bins used for specific waste types (e.g. garden waste) can be contaminated and condemned for disposal by a small load of contaminated waste. Any contamination can be difficult and dangerous to remove once in the bin.

As identified in the previous section, the customer is making the decision about what goes into the bin. The customer’s knowledge may be lacking or incomplete with respect to waste types and/or what waste can be recovered / recycled, either resulting in contamination of bin contents or the loss of potentially valuable resources to landfill.

5.3.2 Platform / Pit

Platform / pit systems have all the same challenges as direct to bin systems as detailed above: The main challenge being that the customer is making the decision about what goes into the pit and that all material that goes into a platform / pit is effectively en-route to landfill.

Some recoverable and recyclable can be recovered from a platform / pit system by introducing additional plant such as waste handlers to pick through the loads for larger items like metal and timber. Recoverable items can also be recovered by hand, but requires staff to enter the machine area, shutting down all machine operations. Reuse materials are also often damaged from being deposited and/or the operation of the machinery.

5.3.3 LBin system

The LBin System allows for easy inspection by recovery staff of a customers deposited waste, identifying items that potentially can be reused, items that can be recycled, any potential contaminants.

Items recovered for reuse will have less damage and greater value as they are not thrown over an edge or contacted by a machine as is the case in the other systems. Recovery staff can address reuse, recycling, and potential contaminant items in two ways:

1. Have an LBin with valuable recovery items removed from the public area and set down in a safe staff recovery area, where the valuable items are inspected and extracted with the balance of the load directed to waste transfer.

2. Educate the public and have them return the material to their vehicle for deposition in a post deposition area drop off area with dedicated bins. A recovery drop-off area using LBin's allows the staff to inspect and remove contaminants from recoverable / recyclable materials.

With the LBin system green waste can be received at the same location at general waste. The operator inspects the waste for contaminants to determine the waste path (Green, General or Contaminated). Fees can be levied based on this inspection. Customers can be asked to remove contaminants to benefit from lower fees and the resultant recovered resource will be superior when considering ease of processing and potential contamination.

Green waste is cleaner and more attractive for processors to collect. Additional staff and machinery are not needed to manage a green pile.

5.4 Other common regulatory requirements

The detailed assessment undertaken, along with comments and observations, is contained in Appendix E.

5.4.1 Direct to bin

The bins used in a direct to bin system typically experience significant wear and tear. Regular inspection and maintenance would be required to ensure they are fit for purpose.

The risk of fire is a significant concern in direct to bin systems, with a potential fire source only likely to be discovered when a fire starts. A bin involved in fire can be moved to a safe area, limiting the risk of spread.

5.4.2 Platform / Pit

Platform / pit systems typically involve high frequency and high intensity of plant to handle and move waste. These movements can generate dust, which often requires the operation of a dust suppression system and air exhaust controls. Any excess water collected from dust suppression has to be treated as leachate. This increases the complexity of overall operations and increases the risk of failures and/or non-compliance with regulatory requirements.

The concrete base of the platform or pit also experiences significant wear and tear, even if constructed with high strength concrete and using rubber tyred plant. To ensure the platform, pit is maintained in compliance with regulatory requirements, regular resealing or refurbishment work is required.

The risk of fire is a significant concern in platform / pit systems, with a potential fire source only likely to be discovered when a fire starts. In the absence of quick and decisive extinguishment of a fire, it is likely to involve the entire waste mass present..

5.4.3 LBin system

The benefits offered by the LBin system in allowing for easy inspection of deposited waste also provide a compliance benefit as well. Incoming waste is thoroughly screened, can be accurately categorised and any prohibited waste, flammable liquids, ignition sources, etc can be quickly identified and isolated.

Planning and design controls are essential for any waste transfer facility type. Similarly, when operational, controls and procedures are required at any waste transfer facility to ensure conditions of consent / licence are complied with. The main advantage the LBin system has here over its alternatives is that it is modular, flexible, and does not require extensive infrastructure for its use.

This is a significant benefit, especially where transfer stations may be co-located on landfill sites and the final landform may change. The relative ease that a LBin system can be relocated enables compliance with requirements like preventing water pollution, preventing land pollution and minimising the emission of dust and other air pollutants without extensive and expensive infrastructure works.

6. Conclusions

From the assessment undertaken, the following conclusions can be drawn:

6.1 Work health and safety

1. The compliance effort required to meet work health and safety regulatory requirements is substantially lower for the LBin system when compared to direct-to-bin and platform/pit systems.
2. Below ground, direct-to-bin systems and push-pit systems create significant work health and safety regulatory risks in relation to trips and falls to both facility staff and customers, which require extensive safeguards and controls.

6.2 Intercepting prohibited, problem, and hazardous waste

3. The LBin system is far superior to its alternatives in intercepting prohibited, problem, and hazardous wastes as:
 - It provides the opportunity for a far more thorough assessment of waste being deposited than can ever be achieved through gatehouse screening, and
 - Any identified prohibited, problem, and hazardous wastes can be quickly isolated and removed with minimal disruption of operations.
4. Direct-to-bin and platform/pit systems have inherent limitations at the disposal point to identify and isolate prohibited, problematic, and hazardous wastes, especially when considering small items (e.g. lithium batteries) and/or items being intentionally concealed.

6.3 Resource recovery

5. The LBin system offers the greatest opportunity to segregate waste at the point of disposal, including removing and isolating any potential contaminants in recovered resources when compared to direct-to-bin and platform/pit systems.
6. All transfer station systems would require additional efforts in education and awareness of the community and supervision/assistance at the time of disposal to increase resources recovered from wastes delivered to a transfer station.

6.4 Other common regulatory requirements

7. The compliance effort required to meet operation and maintenance requirements is significantly lower for the LBin system when compared to direct-to-bin systems and considerably lower when compared to platform/pit systems.

Appendix A

Assessment scales

The following detailed assessment uses the following colour coding and abbreviations:

	Green: Compliant with the relevant requirement with no / minimal additional actions or interventions.
	Yellow: Substantially compliant with the relevant requirement. Minor actions or controls will satisfy requirements.
	Orange: Unlikely to comply with the relevant requirement unless significant additional actions or controls are implemented.
	Red: Unlikely to comply with relevant requirement, even with the implementation of significant additional actions or controls.

WHS Issues Codes & Descriptions:

- **Interception:** This relates to the process of removing contaminants, hazards or recyclables when identified. This is a task required for site licensing conditions.
- **Exposure to working Machinery:** Where a person is located or works in an area where machine would normally operate or where there is no barrier between the person and the machine.
- **Deposition:** The act of depositing waste material at the waste transfer point.
- **W@H:** Working at Heights. Where there is an apparent risk in the facility of a fall >300mm that is not protected by an AS1657 compliant edge protection.
- **TH:** Exposure to a Tripping hazard that can lead to fall injuries on the same work level. Not working at heights.
- **Other:** Other risks associated with the clause.
- **MS:** Muscular Skeletal injuries, strains fractured and broken bones.
- **CL:** Cuts & Lacerations.
- **CR:** Crush
- **EX:** Exposure to toxic & Harmful Chemicals & Materials.
- **RPL:** Risk profile low, unlikely and/or minor injury.
- **PRM:** Risk Profile Medium. likelihood High and/or serious non-life-threatening injury consequence.
- **RPH:** Risk Profile High. High probability and/or serious & life-threatening injury consequence.

Appendix B

Detailed assessment

Work Health and Safety

Reference	Requirement	Direct to bin	Platform/pit	LBin
Section 19 (1)	A person conducting a business or undertaking must ensure, so far as is reasonably practicable, the health and safety of— (a) workers engaged, or caused to be engaged by the person, and (b) workers whose activities in carrying out work are influenced or directed by the person, while the workers are at work in the business or undertaking.	Interception of prohibited/problem/ hazardous waste would require staff to climb down into a transfer bin via ladder. RPH, W@H, EX, CL, MS. W@H and TH: Tyre stops are required to keep customer vehicle away from the edge per AS1657. Located on public side work areas. Stops not seen while carrying Material. RPM, EX, CL, MS. Falls from deposition into bin have been known to cause casualties. RPH, W@H, EX, CL, MS. Exposure to working Machinery: Lack of barriers and separation distance to heavy vehicles servicing bins. RPH, CR, EX, CL, MS.	Interception of prohibited/problem/ hazardous waste would require staff to work in the pit or on the floor where machine and or the public are working. RPH, W@H, EX, CL, MS. W@H and TH: Pit tyre stops are required to keep customer vehicle away from the edge per AS1657. Stops not seen while carrying Material. RPM, EX, CL, MS. Falls from deposition level into pit have been known to cause casualties & serious injury. RPH, W@H, EX, CL, MS. For flat floor material on the floor represents RPM, TH, EX, CL, MS. Exposure to working Machinery: Lack of barriers and separation distance common in flat to floor. Pit known for having machine operations eject material into pedestrian areas. RPH, CR, EX, CL, MS.	Interception of prohibited/problem/ hazardous waste can be done in safe area away from the public and machinery by relocating the LBin with the targeted material. Risk Eliminated W@H and TH: Working at heights and tyre stops not required. Risk Eliminated Exposure to working machinery: Separation if heavy plant activities from public drop off area. Risk eliminated Attention would still be required for the management of and disposed hazardous wastes and/or asbestos-containing materials.

Reference	Requirement	Direct to bin	Platform/pit	LBin
Section 19(2)	A person conducting a business or undertaking must ensure, so far as is reasonably practicable, that the health and safety of other persons is not put at risk from work carried out as part of the conduct of the business or undertaking.	Deposition: Material needs to be carried, lifted or thrown into the WT bin. RPM, CL, MS. W@H and TH: Fall into bins resulting in serious injury and fatality have happened. Tyre stops are required to keep customer vehicle away from the edge per AS1657. Stops not seen while carrying Material. RPM, EX, CL, MS. RPH, W@H, EX, CL, MS. Exposure to working machinery: Forklifts, trucks and other machines commonly traverse public areas to collect recovered materials or bins used for pre-sorting. RPM, CL, CR, MS	Deposition: Pit: Material needs to be carried, lifted or thrown into the WT bin. RPM, CL, MS. Flat: Customers exposed to waste of others and contaminates on floor. RPM, EX, CL, MS. W@H and TH: Pits: Fall into pits resulting in serious injury and fatality have happened. Pits: tyre stops are required to keep customer vehicle away from the edge per AS1657. Stops not seen while carrying Material. RPH, W@H, EX, CL, MS. Platform: material on the floor represents a hazards RPM, TH, EX, CL, MS. Exposure to working machinery: Lack of barriers and separation distance common in flat to floor. Pit known for having machine operations eject material into customer areas. RPH, CR, EX, CL, MS	Deposition: Loads backed up over edge of Lbin, carrying and twisting substantially eliminated. RPM, EX, CL, MS W@H and TH: Working at heights and tyre stops not required. Risk Eliminated Exposure to working machinery: Machine areas are fully separated from customers with solid barriers, Distance and gates. Risk Eliminated

Reference	Requirement	Direct to bin	Platform/pit	LBin
Section 29	A person at a workplace (whether or not the person has another duty under this Part) must— (a) take reasonable care for his or her own health and safety, and (b) take reasonable care that his or her acts or omissions do not adversely affect the health and safety of other persons and (c) comply, so far as the person is reasonably able, with any reasonable instruction that is given by the person conducting the business or undertaking to allow the person conducting the business or undertaking to comply with this Act.	W@H and TH: The facility operator should not permit a vehicle to be pulled up close to an edge where the vehicle tray could be used as a platform for a customer to fall over the site edge. AS1657 would require a trailer or Ute or truck bed be no closer to an edge than 2.2m. A lack of control historically has led to the public falling over edge protection, fatalities have resulted. RPH, W@H, EX, CL, MS.	W@H and TH: Pit: The same issues as the direct to bin systems. Exposure to Hazards: Flat Floor: Customers are exposed to Material of previous depositions and are not skilled in recognising the risks. The operator needs to ensure that all hazards are identified and contained before allowing a customer into an area. RPM, EX. Exposure to working machinery: Floor: Lack of barriers and separation distance common in flat to floor, need to be maintained by the operator. Un-inducted customers cannot be expected to be aware of the risks. RPH, W@H, EX, CL, CR, MS.	W@H and TH: Working at heights risks eliminated. Exposure to Hazards: Each load is inspected, hazards can be identified by experience staff. Only exposure is to customer own hazardous material. All operator obligations met and hazards eliminated. Exposure to working machinery: Customer not able to expose themselves to working machinery without deliberate intent. Operators obligations met Hazard eliminated.
Clause 35	A duty holder, in managing risks to health and safety, must— (a) eliminate risks to health and safety so far as is reasonably practicable, and (b) if it is not reasonably practicable to eliminate risks to health and safety—minimise those risks so far as is reasonably practicable.	Risks are engineered in to this system and cannot be eliminated. Significant action and controls are required to minimise these risks.	Risks are engineered into this system and cannot be eliminated. Significant action and controls are required to minimise these risks.	The LBin system creates a new benchmark for eliminating WHS risks as far as reasonably practicable by eliminating the risks in the direct to bin and platform / pit systems.

Reference	Requirement	Direct to bin	Platform/pit	LBin
Clause 60(1)	A person conducting a business or undertaking must manage risks to health and safety relating to a musculoskeletal disorder associated with a hazardous manual task, in accordance with Part 3.1.	There are significant manual handling risks involved in moving materials into and from the bin particularly when AS1657 compliant barriers are installed	Disposing waste and recovering resources poses a significant manual handling risk. For pits where barriers are installed to AS 1657 there are carrying and lifting activities.	LBin systems allow the customer to back up over the edge of the bin to slide materials off their vehicle and minimise carrying and twisting. Injuries should not occur as a result of the system design..
Clause 65	A person conducting a business or undertaking must ensure, so far as is reasonably practicable, that a worker does not enter a confined space before this Division has been complied with in relation to that space.	The bins can be considered a confined space with potential for accidental falls, engulfment, and exposure to hazardous atmosphere	Platform/pit spaces are not as confined but accidental falls can cause confinement due to no easily accessible exit points	Unlike typical waste bins, the LBin is open at the front eliminating any issues in relation to confined spaces
Clause 78(1)	A person conducting a business or undertaking at a workplace must manage, in accordance with Part 3.1, risks to health and safety associated with a fall by a person from one level to another that is reasonably likely to cause injury to the person or any other person.	Below ground direct-to-bin systems have a substantial drop into the bin, increasing the likelihood of injury or death if a fall occurs. Significant controls must be employed to mitigate this risk	Despite typically having lower drop heights, it still poses a very high likelihood of injury if a fall occurs, which is compounded by the waste and machinery present. Significant controls must be employed to mitigate this risk	The LBin System has no falls to create this risk.
Clause 214	The person with management or control of powered mobile plant at a workplace must in accordance with Part 3.1, manage risks to health and safety associated with the following ... (b) the plant colliding with any person or thing,	Vehicles that load / unload bins typically use the same access points and roadways as customers. Bins arranged in the customer area to provide deposition of Problem, hazardous, reuse and recyclable materials typically require machine servicing in the public area.	Heavy plant typically operate in close proximity to customers. There are risks of direct collision between customers. Mobile plant can also impact and project material into the public area.	LBin System establishes physically separated areas for customers and plant. Eliminating an associated risk of machine/person interaction.

Reference	Requirement	Direct to bin	Platform/pit	LBin
Clause 351(1)	A person conducting a business or undertaking must manage, in accordance with Part 3.1, risks to health and safety associated with using, handling, generating or storing a hazardous chemical at a workplace.	Allows for hazardous chemicals to be mixed into waste unseparated from larger loads. No fully effective mechanisms to prevent this from occurring.	Allows for hazardous materials to be mixed into a larger general load mix affecting all waste in the area. No fully effective mechanisms to prevent this from occurring.	LBin System contains hazardous waste introduced by any one customer within an individual bin that can be covered removed and isolated. A new bin can be placed in the vacant bay and operations may continue.
Clause 422 (1)	A person with management or control of a workplace must ensure, so far as is reasonably practicable, that all asbestos or ACM at the workplace is identified by a competent person.	No fully effective mechanisms to prevent ACM being “smuggled” into the facility and disposed.	No fully effective mechanisms to prevent ACM being “smuggled” into the facility and disposed.	LBin System contains hazardous waste introduced by any one customer within an individual bin that can be verified by a competent person before adding to the waste stream.

Appendix C

Detailed assessment

Intercepting prohibited, problem, and hazardous waste

Reference	Requirement	Direct to bin	Platform/pit	LBin
Waste hierarchy	Managing waste in accordance with the hierarchy detailed in Figure 12.	This system is not designed to facilitate safe resource recovery. Reuse and Recycling recovery on Direct to bin sites is reliant upon Customers voluntarily dropping off materials in designated drop of areas before going to the deposition point.	This system is not designed to facilitate safe resource recovery. Resource recovery on these sites is reliant upon Customers voluntarily dropping off materials in designated drop of areas before going to the deposition point. Some bulky items like steel and timber can be extracted post deposition by adding additional machinery such as a waste handler to pick out such items.	The LBin System allows for Reuse and recyclable items to be easily identified with little damage. Operators can direct the public to extract and drop off reuse and recyclable items of an LBin can be relocated to a safe place for staff to extract reuse and recyclable items before the rest of the load is committed to the bulk waste.
s.144AAB	A person must not cause or permit asbestos waste in any form to be reused or recycled.	At gate screening procedures rely on customer honesty and expertise to declare the presence of Asbestos. The system without 100% supervision of every customer unloading has no other points for the identification of interception of Asbestos before its added to any of the site waste bins. Green waste is often handled in remote unsupervised stockpiles. Asbestos contamination of these stockpiles is commonplace. Processed green waste can end up in mulch and compost.	At gate screening procedures rely on customer honesty and expertise to declare the presence of Asbestos. The system without 100% supervision of every customer unloading has no other points for the identification of interception of Asbestos before its added to any of the sites waste stream. Green waste is often handled in remote unsupervised stockpiles. Asbestos contamination of these stockpiles is commonplace. Processed green waste can end up in mulch and compost.	The LBin System has a step where the operator inspects each load laid out and displayed in the LBin before it is contributed to any waste stream. Including green waste.

Reference	Requirement	Direct to bin	Platform/pit	LBin
Limit 1 (Standard)	The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to...	At gate screening procedures rely on customer honesty and expertise to declare the contents of the waste they are delivering. The system without 100% supervision of every customer unloading has no other points for the identification of interception of Asbestos before its added to any of the site waste bins.	Screening procedures at the gatehouse, especially for large mixed loads, have limited effectiveness	The LBin System offers the best opportunity to identify prohibited waste being delivered to a facility.
Limit 2 (Common)	The licensee must have in place and implement procedures to identify and prevent the acceptance of any waste not permitted at the premises.	Screening procedures at the gatehouse, especially for large mixed loads, have limited effectiveness	Screening procedures at the gatehouse, especially for large mixed loads, have limited effectiveness	Screening at the disposal point offers the most comprehensive screening. The LBin System offers the best opportunity for this.
Limit 3 (Common)	Any waste received at the premises must be assessed and classified in accordance with the EPA Waste Classification Guidelines as in force from time to time.	Screening procedures at the gatehouse, especially for large mixed loads, have limited effectiveness	Screening procedures at the gatehouse, especially for large mixed loads, have limited effectiveness	Screening at the disposal point offers the most comprehensive screening. The LBin system offers the best opportunity for this
Limit 4 (Common)	Any non-conforming waste not permitted to be received at the premises must be placed in a designated quarantine area and removed from the premises as soon as practicable to a place that can lawfully receive that waste.	Once deposited into a bin, extraction and quarantine of prohibited waste is at best dangerous and difficult	Once deposited into a platform or pit, extraction and quarantine of prohibited waste is at best dangerous and difficult.	The LBin system provides easy access to small items and the ability to isolate the entire bin quickly if necessary.
Objective 1	Managing hazardous waste	Hazardous waste is typically not identified until after disposed to bin. Once hazardous wastes are introduced to the bin, the entire contents of the bin potentially end up as contaminated waste.	Hazardous waste is typically not identified until after disposed to bin. Once hazardous wastes are introduced to the pit / platform, the entire waste mass present potentially ends up as contaminated waste.	Of the three systems examined, the LBin system is the only one that enables easy identification and removal / segregation of any hazardous waste and minimising the amounts of other potentially contaminated wastes.

Reference	Requirement	Direct to bin	Platform/pit	LBin
Objective 2	Helping the community deal with problematic and hazardous waste.	Problem and hazardous waste is typically not identified until after disposed to bin. Once hazardous wastes are introduced to the bin, the entire contents of the bin potentially end up as contaminated waste.	Problem and hazardous waste is typically not identified until after disposed to bin. Once hazardous wastes are introduced to the pit / platform, the entire waste mass present potentially ends up as contaminated waste.	As above, particularly where an LBin system is operated in conjunction with a Community Recycling Centre

Appendix D
Detailed assessment
Resource recovery

Reference	Requirement	Direct to bin	Platform/pit	LBin
Target 1	80% average recovery rate from all waste streams by 2030	Once waste is deposited in a bin there is very little opportunity for further resource recovery. Bins used for specific waste types (e.g. garden waste) can be contaminated and condemned for disposal by a single small load of contaminated waste.	Once waste is deposited in a pit or on a platform, there is very little opportunity for further resource recovery. Larger quantities of otherwise recoverable waste can be contaminated and condemned for disposal by a single small load of contaminated waste.	The LBin system offers the opportunity for customers and facility staff to work together to segregate waste and produce uncontaminated recovered resources.
Target 2	Triple the plastics recycling rate by 2030	Unless the customer self-segregates any plastic waste (if receptacles are provided), it is deposited in the general waste bin / tipping area and subsequently disposed of.	Unless the customer self-segregates any plastic waste (if receptacles are provided), it is deposited in the general waste bin / tipping area and subsequently disposed of.	The LBin system offers the opportunity for customers and facility staff to work together to segregate waste and produce uncontaminated recovered resources.
Target 3	Halve the amount of organic waste sent to landfill by 2030	Dedicated organic waste bins can be provided but are subject to contamination risk from the disposal of other waste, contaminating the segregated organic materials.	Organic waste, once disposed to a pit or platform, rapidly becomes unrecoverable due to contamination by other wastes.	The LBin system offers the opportunity to conduct a more thorough inspection of any delivered organic waste, and easy removal of any potential contamination before being aggregated. The end result is a readily processed uncontaminated feedstock.

Reference	Requirement	Direct to bin	Platform/pit	LBin
s.286A(2)	A person to whom an order under subsection (1) applies must comply with the requirements imposed by the order...	Other recoverable wastes that can be used as recovered resources, once disposed to a bin are subject contamination risk from the disposal of other waste, contaminating the segregated materials.	Other recoverable wastes than can be used as recovered resources, once disposed to a pit or platform, rapidly become unrecoverable due to contamination by other wastes.	The LBin system offers the best opportunity to identify and remove any potential contamination from recovered resources.

Appendix E
Detailed assessment
Other common regulatory requirements

Reference	Requirement	Direct to bin	Platform/pit	LBin
s.120	A person who pollutes any waters is guilty of an offence.	Significant infrastructure work is often required to manage stormwater and leachate. Current bins have limited to no capability to drain leachate / pollutants	Platform/pit systems utilise dust suppression washdown systems, increasing the amount of leachate requiring management.	LBin systems are sealed, have finger gates to operate solid waste from liquids and a drain hole for targeted release of leachate/chemicals.
s.126	The occupier of any premises who deals with materials in or on those premises in such a manner as to cause air pollution from those premises is guilty of an offence if the air pollution so caused, or any part of the air pollution so caused, is caused by the occupier's failure to deal with those materials in a proper and efficient manner.	Direct-to-bin systems can generate odours when left unemptied for long periods.	Dust control systems and exhaust air treatment are often required to minimise impacts on neighbouring premises	The inspection at point of disposal and frequent emptying of the LBin system allows for the quick identification and removal of any materials causing air pollution or odours.
s.129	The occupier of any premises at which scheduled activities are carried on under the authority conferred by a licence must not cause or permit the emission of any offensive odour from the premises to which the licence applies.	Direct-to-bin systems can generate odours when left unemptied for long periods.	Direct-to-bin systems can generate odours when left unemptied for long periods.	The inspection at point of disposal and frequent emptying of the LBin System allows for the quick identification and removal of any materials causing air pollution or odours.
s.142A	A person who pollutes land is guilty of an offence.	Requires design and management controls to ensure land pollution does not occur.	Platforms/pits require extensive engineering that as an additional benefit, offer protection from land contamination.	Requires design and management controls to ensure land pollution does not occur.

Reference	Requirement	Direct to bin	Platform/pit	LBin
cl.27(a)	The occupier of a scheduled waste facility must record the following information in relation to each delivery of waste or other material received at the facility— (a) the amount of any waste delivered, its waste type and (except where the waste is trackable liquid waste) its waste stream,	The assessment and categorisation of incoming waste on the basis of a gatehouse screening, especially for large loads of mixed waste, typically lacks accuracy.	The assessment and categorisation of incoming waste on the basis of a gatehouse screening, especially for large loads of mixed waste, typically lacks accuracy. Once the waste is deposited to the platform / pit, there is little opportunity to segregate and measure.	The LBin System enables a supplementary assessment of waste being delivered to take place. The load is assessed by a trained person and is not reliant upon the customer.
cl. 28	The occupier of a scheduled waste facility must record the following information in relation to each load of waste or other material transported from the facility for use, recovery, recycling, processing or disposal at another place— (a) the amount of any waste contained in the load, its waste type and (except where the waste is trackable liquid waste) its waste stream, (b) the amount of any other material contained in the load and a description of the nature of that other material,	Outgoing waste and recovered resources from a facility are typically more accurately categorised and measured than incoming wastes. This system has a much higher probability of the general waste including types of waste that would otherwise recorded in another waste types.	Outgoing waste and recovered resources from a facility are typically more accurately categorised and measured than incoming wastes. This system has a much higher probability of the general waste including types of waste that would otherwise recorded in another waste types.	Outgoing waste and recovered resources from a facility are typically more accurately categorised and measured than incoming waste for all systems.

Reference	Requirement	Direct to bin	Platform/pit	LBin
cl.111(1)(c)	The defence provided for in section 142E of the Act (relating to the introduction of a substance into or onto land that is an unlicensed landfill site) is only available to the occupier of an unlicensed landfill site if, when the substance was introduced— ... (c) the landfill site was being operated in accordance with the operating requirements*, and	A direct-to-bin system operating on an unlicensed landfill site would likely require significant design modification and operational controls to meet the operating requirements.	It is likely that meeting these requirements would be cost-prohibitive for platform/pit type transfer stations operating on unlicensed landfill sites.	The operating requirements at unlicensed landfill sites mirror many of the requirements listed above.
Operating 1 (Standard)	Licensed activities must be carried out in a competent manner. This includes: (a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and (b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.	Direct-to-bin systems offer a relative ease of handling / moving waste, albeit of a moderate intensity.	Platform / pit systems typically require high intensity handling and movement of waste. There are also increased leachate volumes required to be managed due to the required dust suppression system.	While the LBin system may require more movement numbers, these movements are usually over short distances and are of low intensity (i.e. not pushing / hauling large weights).
Operating 2 (Standard)	All plant and equipment installed at the premises or use in connection with the licensed activity: (a) must be maintained in a proper and efficient condition; and (b) must be operated in a proper and efficient manner.	Bins often require frequent repairs and maintenance. Fall prevention infrastructure requires constant monitoring and maintenance	The concrete platform / pit requires resealing at regular intervals due to wear. Rapid wear can also occur to plant used at the platform / pit. Dust suppression and air exhaust control systems require constant monitoring and maintenance.	Damaged LBin can be quickly and easily replaced or substituted for maintenance. Wear on operational machinery is also significantly lower.

Reference	Requirement	Direct to bin	Platform/pit	LBin
Operating 3 (Common)	Activities must be carried out in a manner that minimise the generation of dust /	Tip heights are usually the highest in direct-to-bin systems	Dust suppression and air exhaust control systems are typically required and require constant monitoring and maintenance.	The LBin system offers the opportunity to identify dust generating materials before being tipped. Tip heights are significantly less than other systems.
Operating 4 (Common)	The Licensee must ensure that all operations and activities at the Premises are carried out in a manner that will prevent and minimise the risk of fire at the Premises	Potential ignition sources unlikely to be identified before depositing in the bin. Discovery is most likely to occur when a fire starts. Direct-to-bin systems can assist in containing a fire.	Potential ignition sources unlikely to be identified before depositing to platform / pit. Discovery is most likely to occur when a fire starts. A fire that starts in a platform / pit system can rapidly spread.	Operators are able to inspect, identify and remove combustibles from LBin. A fire in LBin can be contained by the bin that can be easily removed from the facility.