



ECOCOMPASS

CIF # 1089 – Next Gen Recycling Technologies

Neil Menezes, President

Steering Committee

RPWCO Members

- Erwin Pascual, Peel Region, RPWCO lead
- Cathy Copot-Nepszy, EWSWA
- Cameron Walsh, Guelph
- Jay Stanford, London
- Sumantra Datta Ray, Toronto
- Dennis Siu, York Region

CIF Staff Representatives

- Carrie Nash, CIF, Senior Program Manager

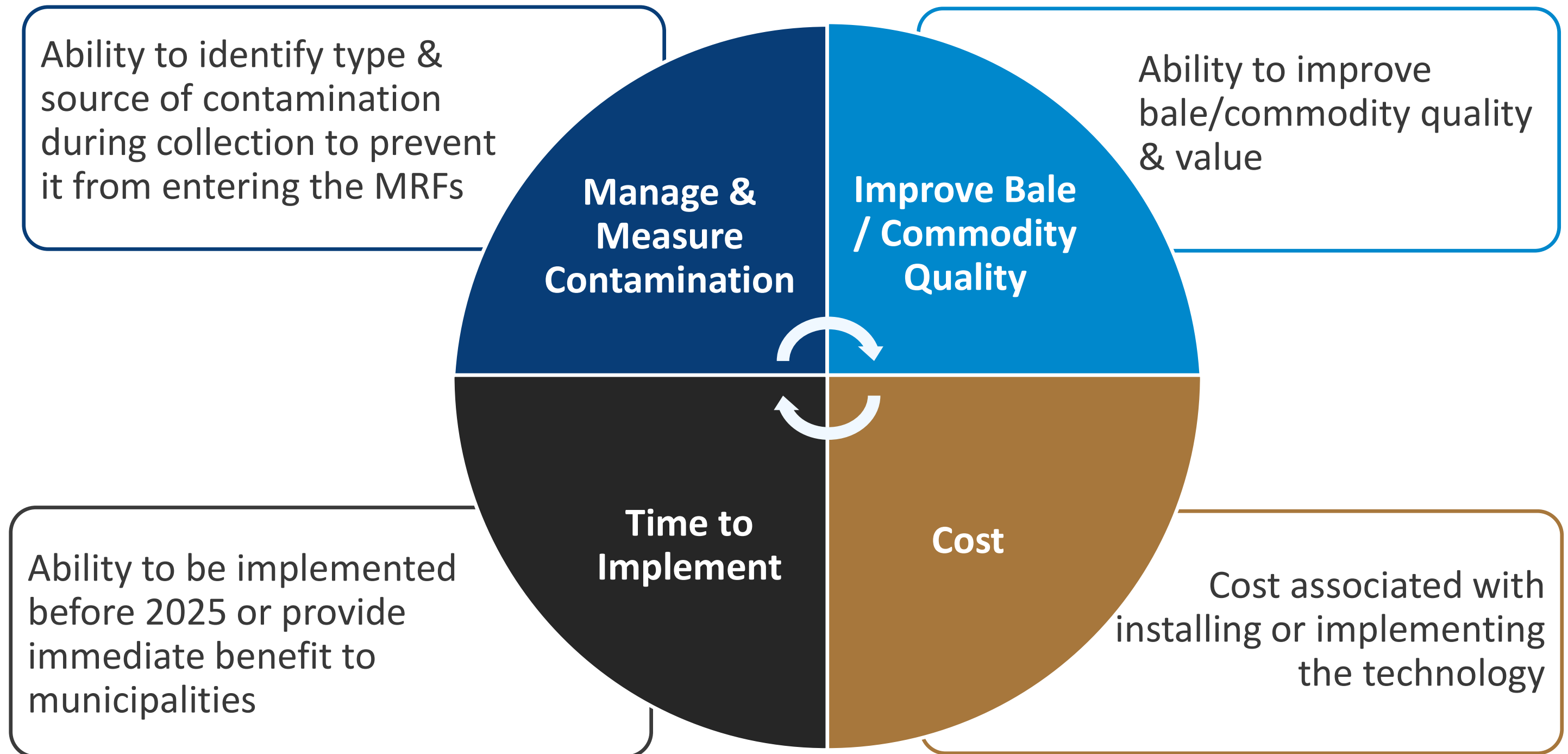
Why this Project?

- Transition to Individual Producer Responsibility (IPR) will occur between 2023–2025
- Meeting end market quality requirements has become challenging
- Collection & sorting costs continue to rise
- Look at how technology can help reduce costs & improve operation efficiencies
- Project Team: EcoCompass Inc. support by Holliday Recycling Technologies & Francis Veilleux (independent)

Long List of Technologies

Collection Bins & Systems	Collection Vehicles	MRF Equipment	Miscellaneous
<ul style="list-style-type: none"> • In-Bin Remote Sensors & Cameras • RFID Equipped Trucks & Bins • Bin Spring Closures • In-Ground Collection Bins • Underground Collection System 	<ul style="list-style-type: none"> • Front-Load Automated Collection Truck • Alternative Fuels • Electric Powered • Hybrid Solution • Fleet Management – Telematics • Self Sealing Tires • Tire Pressure Monitoring • Self Driving Collection Trucks • Self Driving Transport Trucks • AI Based Cart Recognition 	<ul style="list-style-type: none"> • Black Plastic Optical Sorter • Optimizing Existing Optical Sorters • Fully Automated MRF • Scalping Screen • Non-wrapping Screen • Artificial Intelligence & Robotics • Optibag Program • SCADA (Supervisory Control & Data Acquisition) • Auger Screen • UniSort 5.0 by Steinert • Michelin Tweel Airless Radial Tire • Automatic Switching Power Factor Correction • Levelling Devices • Ballistic Separator • Bag Breaker • Paper/Film Extractor • Optical Scale 	<ul style="list-style-type: none"> • Right Material Mix • Standardized Signage • Back-Office System • Solar-Compacting Smart Public Space Bins • Interactive Sorting Systems • AI – Waste & Recycling Sorting • AI – Waste Management – Saskatchewan • GIS & Big Data • Electronics Recycling – ATM

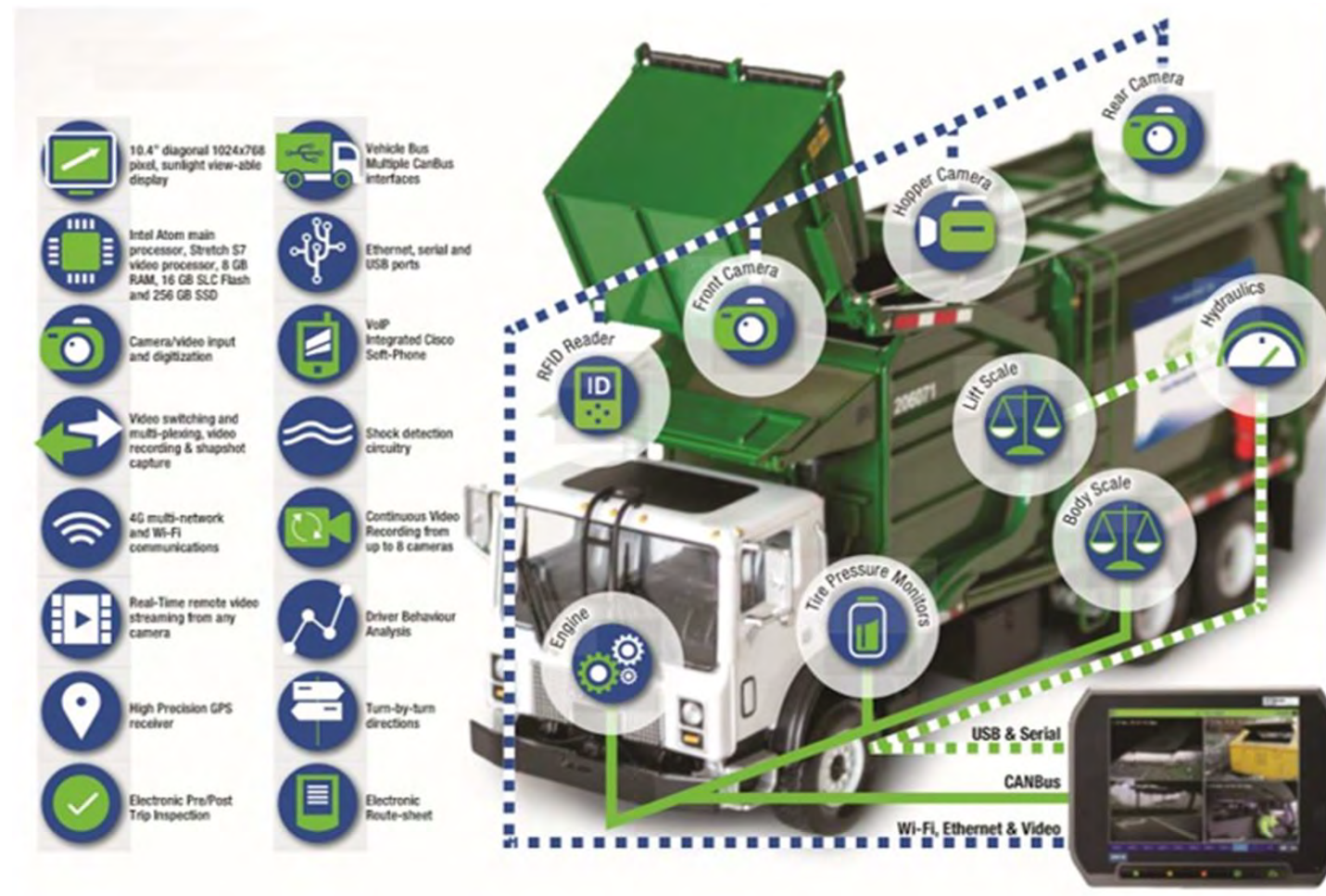
Prioritizing Technologies



Prioritized Short List (in-order)

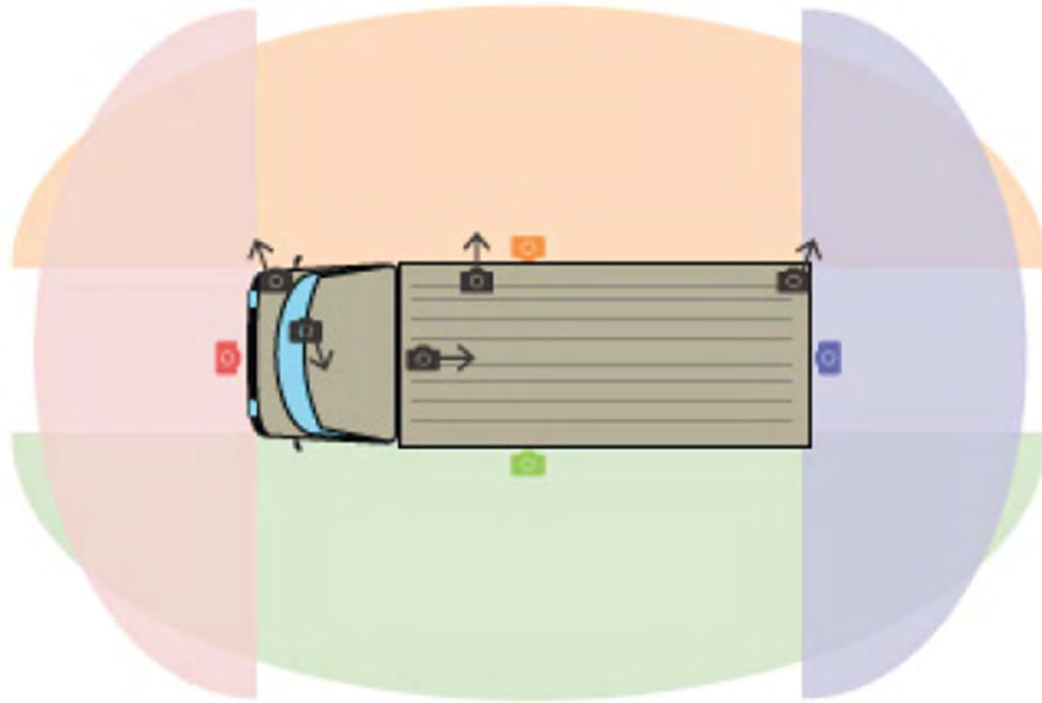
Equipment	Category
RFID Equipped Trucks & Bins	<i>Collection Bins & Systems</i>
Optimizing Existing Optical Sorters	<i>MRF Equipment</i>
Artificial Intelligence & Robotics	<i>MRF Equipment</i>
In-Bin Remote Sensors & Camera	<i>Collection Bins & Systems</i>
Black Plastic Optical Sorter (not by resin)	<i>MRF Equipment</i>
Front-Load Automated Collection Truck	<i>Collection Vehicles</i>
Scalping Screen	<i>MRF Equipment</i>
Non-wrapping Screen	<i>MRF Equipment</i>

RFID Equipped Bins and Trucks

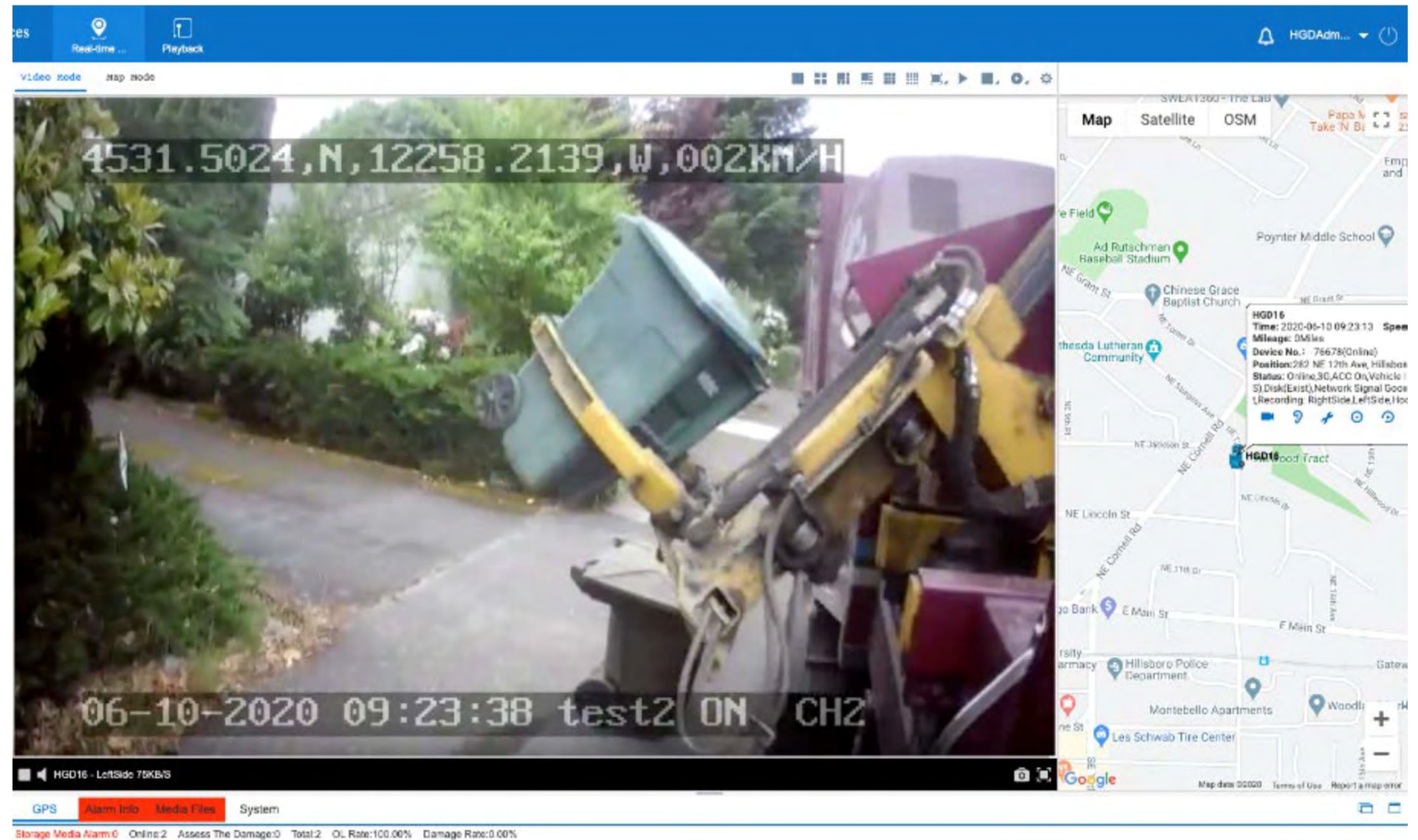


- RFID technology being added to bins & trucks
- Old technology, but combined with other technologies helps create a powerful system
 - scales
 - GPS
 - cameras
 - etc.
- Provides greater visibility at curb, increasing education & enforcement capabilities

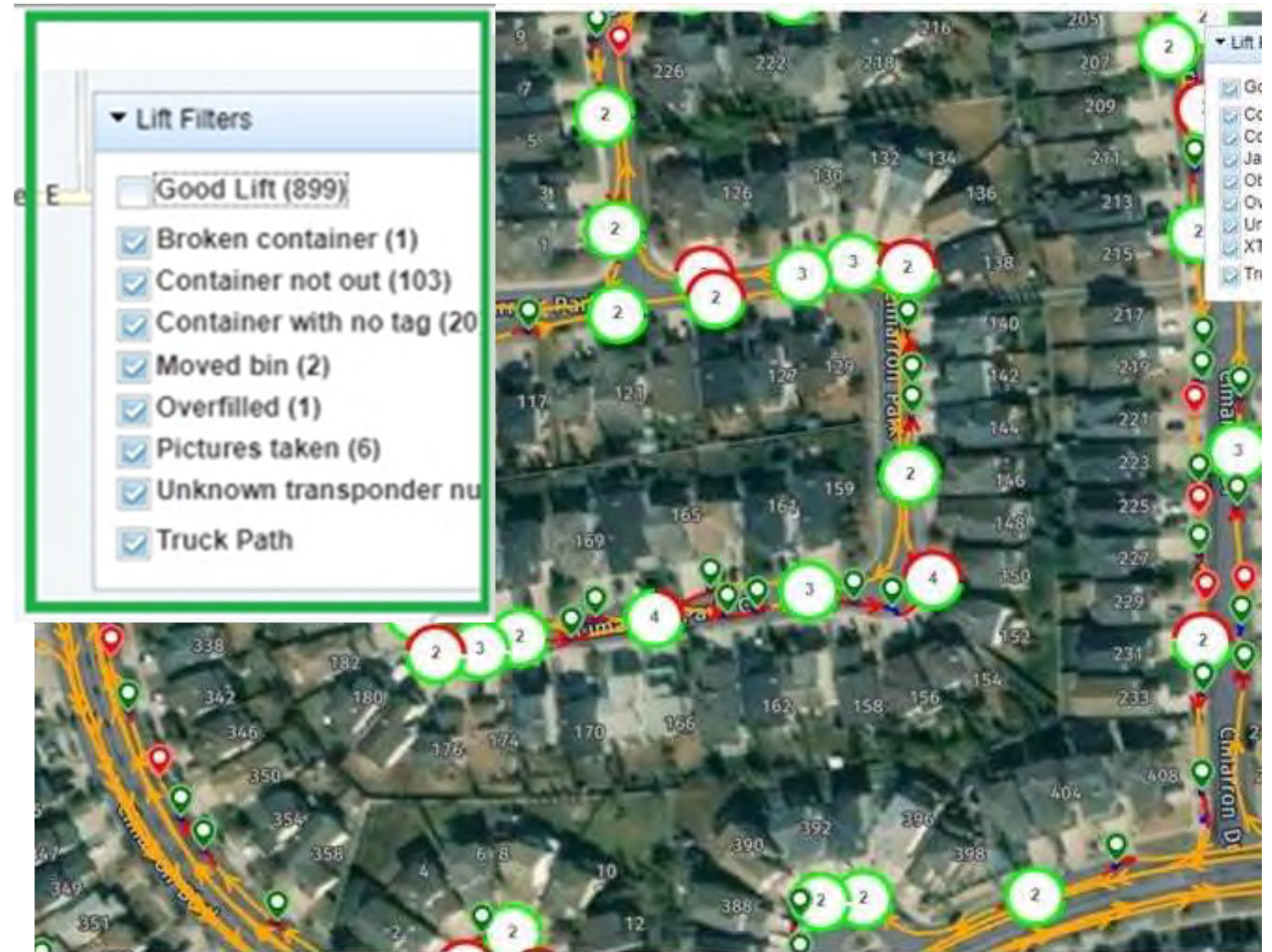
Increasing Visibility at the Curb



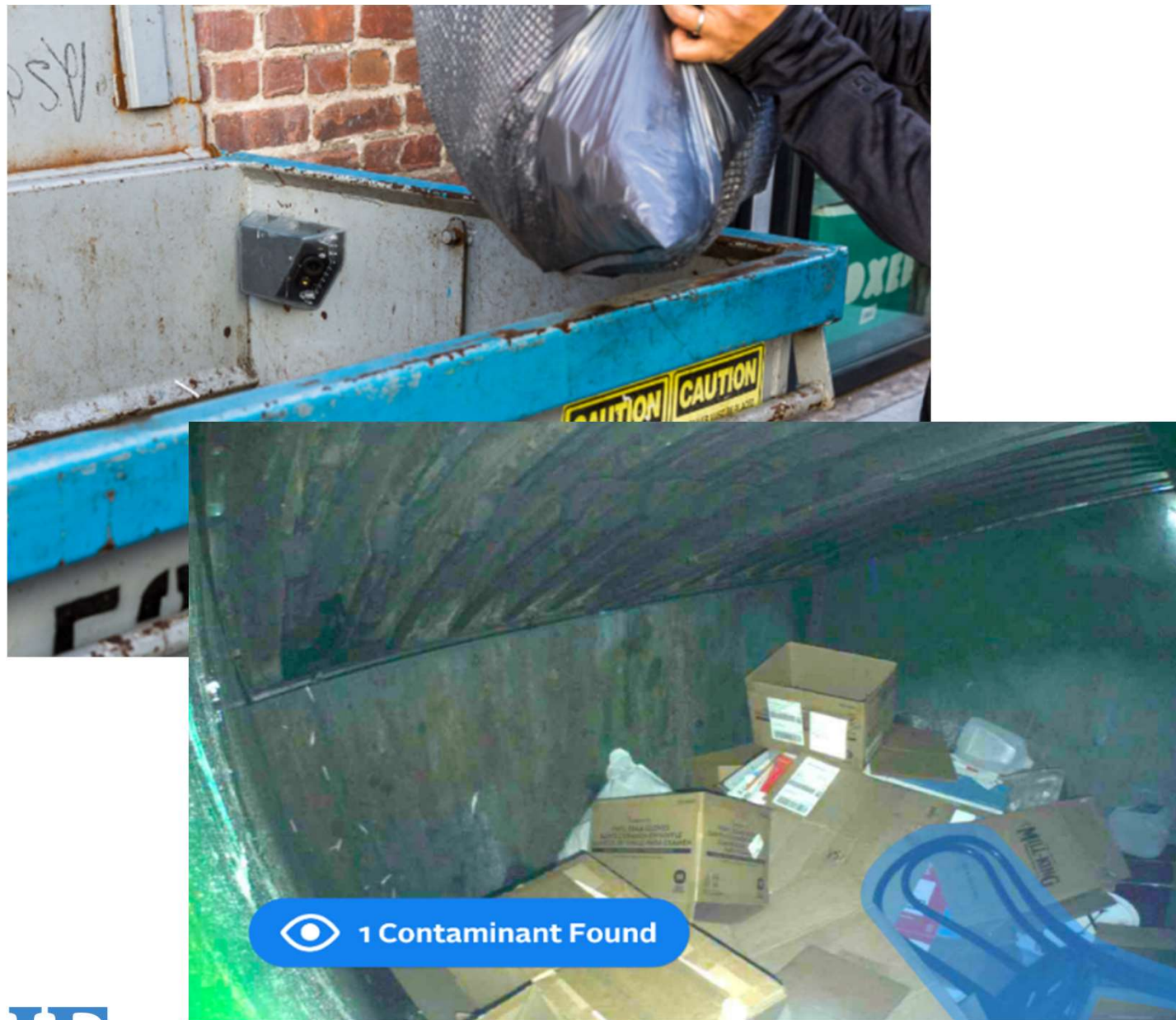
- Record if lift has occurred
- Provides time stamp, GPS location & RFID tag
- Can record driver interactions



Documenting Issues



In-Bin Cameras & Sensors



- Robust cameras allow to see “peek inside the bin”
- Battery operates & uses wireless networks to communicate
- Takes 3 to 5 pictures a day conveying fullness & contamination
- Useful in multi-family buildings & unstaffed drop-off depots

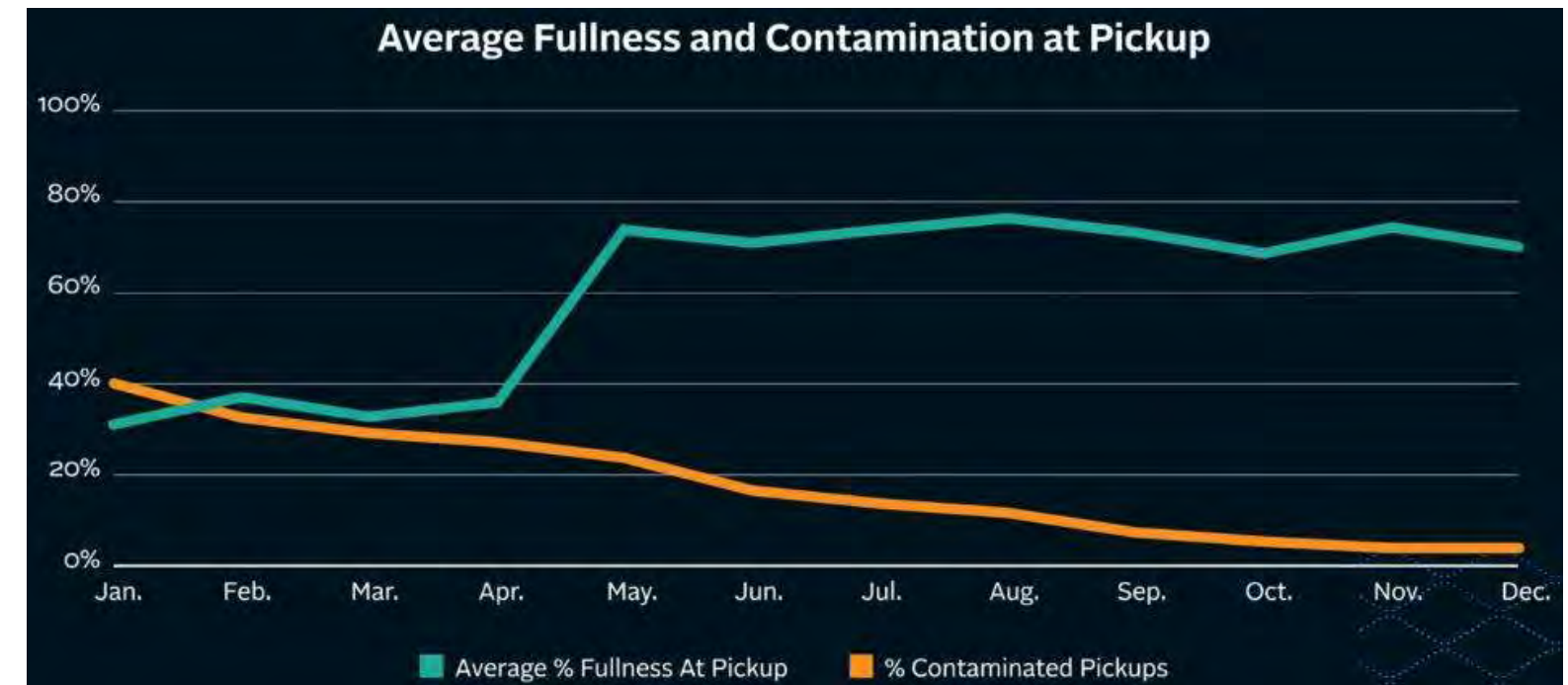
Tracking Contamination & Fullness

To All Optima Residents

GARBAGE AND RECYCLING

Garbage and recycling continue to be a serious issue at Optima. Superintendents and cleaners are spending hours flattening boxes and unblocking garbage chutes for improperly disposed recycling items and garbage. Incident reports are done by security on these items. **Residents will be charged a \$25 fee for first offence of any violations in regards to garbage and recycling disposal. Should the same resident violate the rules again a \$50 fee will be backcharged to your unit account.**

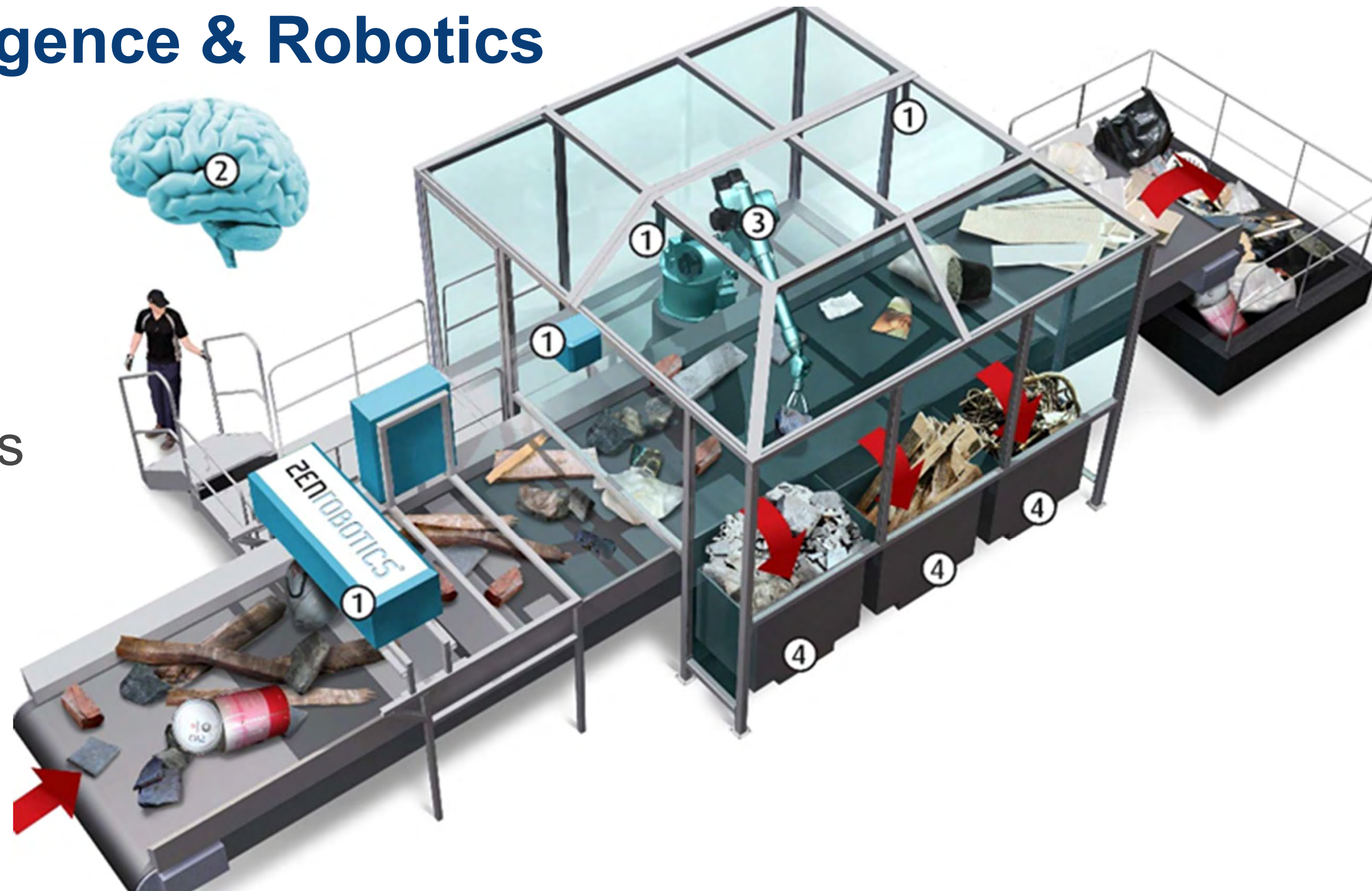
- A.I. can detect common problematic materials
- Allow municipalities to address issue potentially before tipping at MRF
- Optimizes collection route to send trucks only when bin full



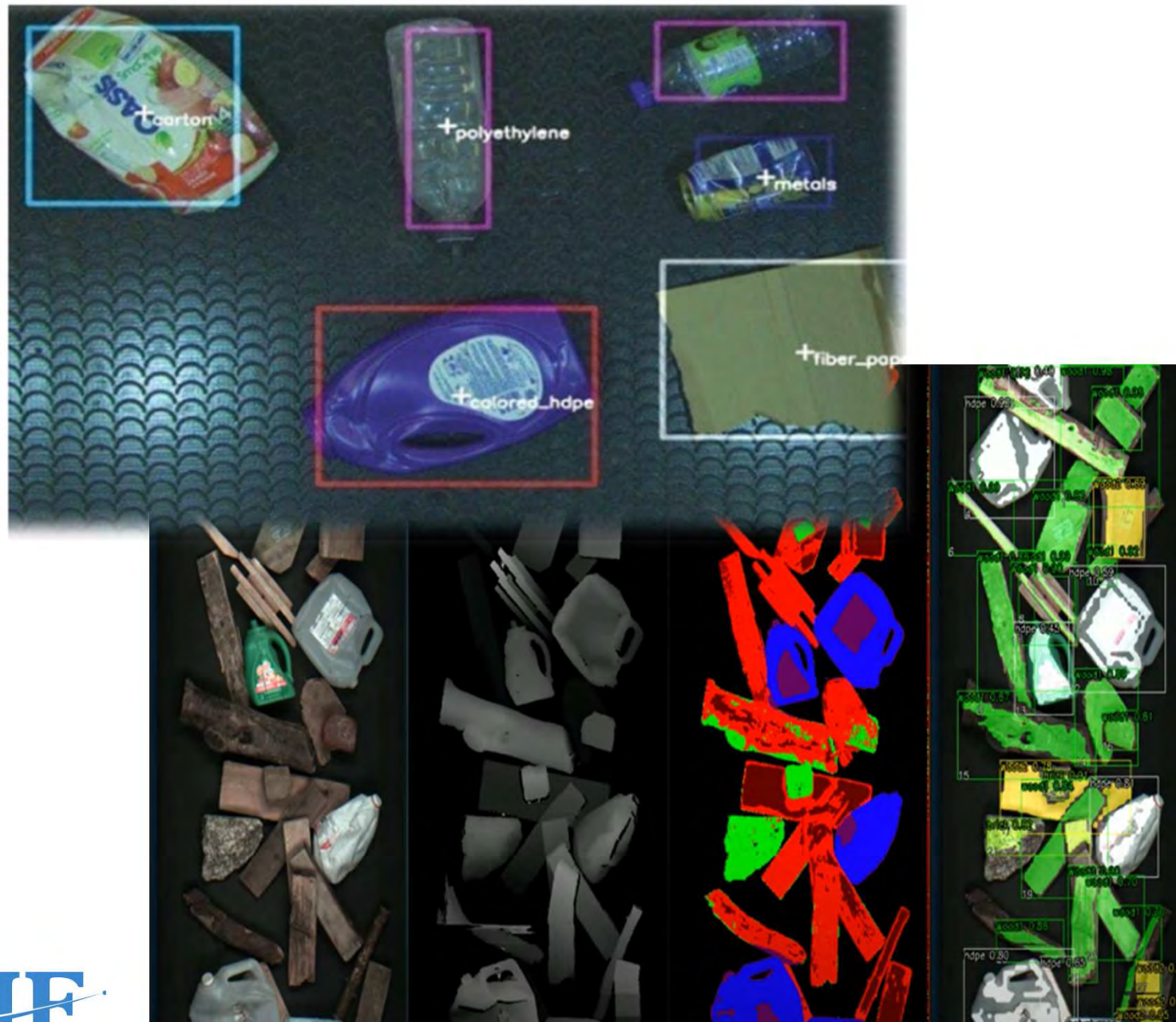
Total Contamination: All Shifts											
Building Location	Content Type	Bags	Uncollapsed Cardboard in Recycling	Cardboard in Refuse	Bulky Items	Tanglers	E-Waste	Styrofoam	Propane Tanks	Wood	Total
Building B1	Recycle	0	189	0	1	0	0	15	0	0	205
Building B1	Refuse	0	0	23	5	1	0	0	0	0	29
Building B2	Recycle	0	7	0	0	0	0	0	0	0	7
Building B2	Refuse	0	0	6	0	0	0	2	0	0	8
Building B3	Recycle	1	49	0	10	2	0	1	0	0	63
Building B3	Refuse	0	0	10	4	2	0	0	6	1	23
Building B4/TC	Recycle	275	159	0	14	4	0	18	0	6	476
Building B4/TC	Refuse	0	0	56	5	2	0	10	0	0	73
Building B5	Recycle	3	157	0	3	0	0	2	0	1	166
Building B5	Refuse	0	0	5	0	0	0	0	0	0	5
Conference Ctr	Recycle	1	77	0	7	2	0	1	0	0	88
Conference Ctr	Refuse	0	0	19	0	1	0	0	0	0	20
TOTAL		280	638	119	49	14	0	49	6	8	1163

Artificial Intelligence & Robotics

1. Vision System
2. Neural Network
3. Robotic Arm
4. Storage Bunkers



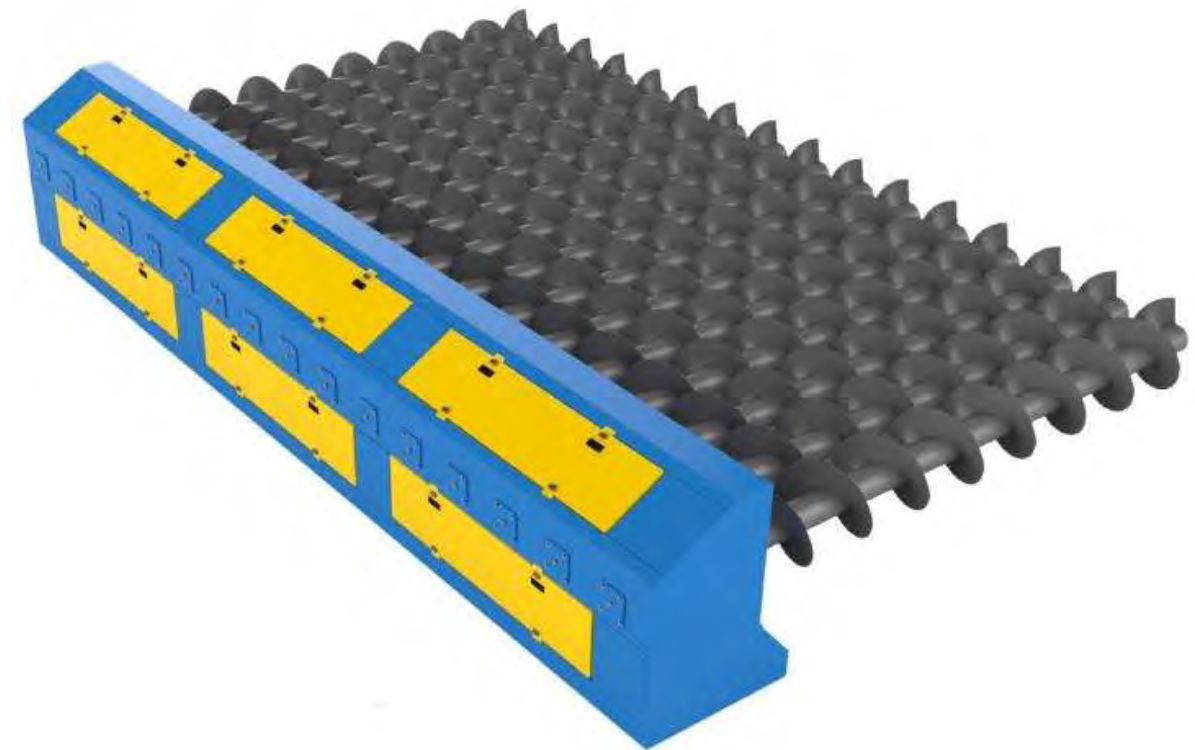
AI & Robotics Uses



- Ability to detect based on shape, colour, size & material
- When 1 machine “learns”, all machines learn
- Ideal for quality control
- Average 60 to 90 picks per minute
- Moves closer towards fully automated systems
- Lease options available

Auger Screens

- Combines multiple sorting equipment into 1
- Creates 3 fractions; “Overs”, “Unders” & “Sides”
- Eliminates need for pre-sort; reduces risk of injury to staff
- Anti-wrapping & low wear reduce maintenance costs



Materials Recovered

Overs Fraction



Unders Fraction



Sides Fraction



Trommels



- European markets seeing a resurgence in use of screening drums/Trommel screens
- Screen materials into multiple size fractions, plus bulky items that come out
- Can reduce staff required at pre-sort

What's Next?

- Final report will be published on the CIF website
- Will include technical specifications & some financials on all short-listed technologies



The screenshot displays the CIF Continuous Improvement Fund website. At the top is the CIF logo and a navigation menu with links: Home, Centre of Excellence, Funding & Projects, Training & Events, News & Views, and About. The main content area features three news items, each with a circular image icon and a 'Learn More' button:

- The CIF Ontario Recycler Workshop goes online!**
The ORW, originally scheduled to take place in May, has been reimagined as an online event on **October 6 and 8, 2020**. With release of the RRCEA Blue Box regulations on the horizon, ORW will incorporate engaging discussions around what is known and still unknown about transitioning to an Individual Producer Responsibility (IPR) framework.
- Draft Final CIF Windup Plan released for consultation**
On Friday, March 27, the CIF Committee approved release of a draft final windup plan for the CIF, for consideration as part of the upcoming consultation process for the windup of the Blue Box Program Plan.
- 2020 Request for Expressions of Interest**
The CIF is now accepting applications in response to the 2020 REOI. \$1,250,000 is available for new initiatives.

Below the news items is a section with three featured services, each with a representative image:

- Container Procurement**: Image of blue recycling bins and a 'recycle' bag.
- Online Training**: Image of two people working on a laptop.
- CIF Price Sheet**: Image of a printed price sheet.

The bottom section is titled **CENTRE OF EXCELLENCE** and contains five categories of services:

- Collection**: Compactors, Policies, Depots, Multi-Residential, Public Spaces.
- Operations**: CIF Price Sheet, Contingency Plans, Exporting.
- Promotion & Education**: Signage, Signage Gallery.
- Policy**: Blue Box Transition, Waste Composition Studies, Waste Recycling Planning.
- Procurement**: Ordering Containers, RFP & Contract Resources.

Questions?

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