IMPLEMENTING AN AUTOMATED VACUUM COLLECTION (AVAC) SYSTEM IN THE CITY OF MARKHAM

Development Services Committee

November 22, 2021

Agenda

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Video - How it Works

https://www.youtube.com/watch?v=HSTeVkXVpRU

1. Background

- AVAC is:
  - an innovative approach
  - especially appropriate for high density developments

- City staff has:
  - studied AVAC systems
  - held a SMART City workshop in Feb 2020
  - held a subsequent workshop in Feb 2021 focused on the AVAC system and Langstaff

(Waste truck collecting collection bin from terminal)

2. The Opportunity For Markham

- AVAC is increasingly utilized around the world
- Staff and Councillors have toured the La Cite Verte installation in Quebec City
- Following the workshop in Feb 2021, staff engaged a consultant to provide a financial feasibility analysis of implementing the AVAC system at the Langstaff Gateway Area

(AVAC inlets in public space)

(AVAC pipe from public space inlets)

2. The Opportunity For Markham - Contd

The City is well placed to consider implementing the system due to :

a. **Intensification** – City is facing significant growth through intensification. AVAC works best in intensification areas which potentially reduces the capital costs per capita and increases the revenue base due to higher number of units.

b. **Smart City** - The investment in AVAC technology is consistent with Markham's continued leadership in SMART City initiatives (eg. Markham District Energy, Digital Strategy, etc.)

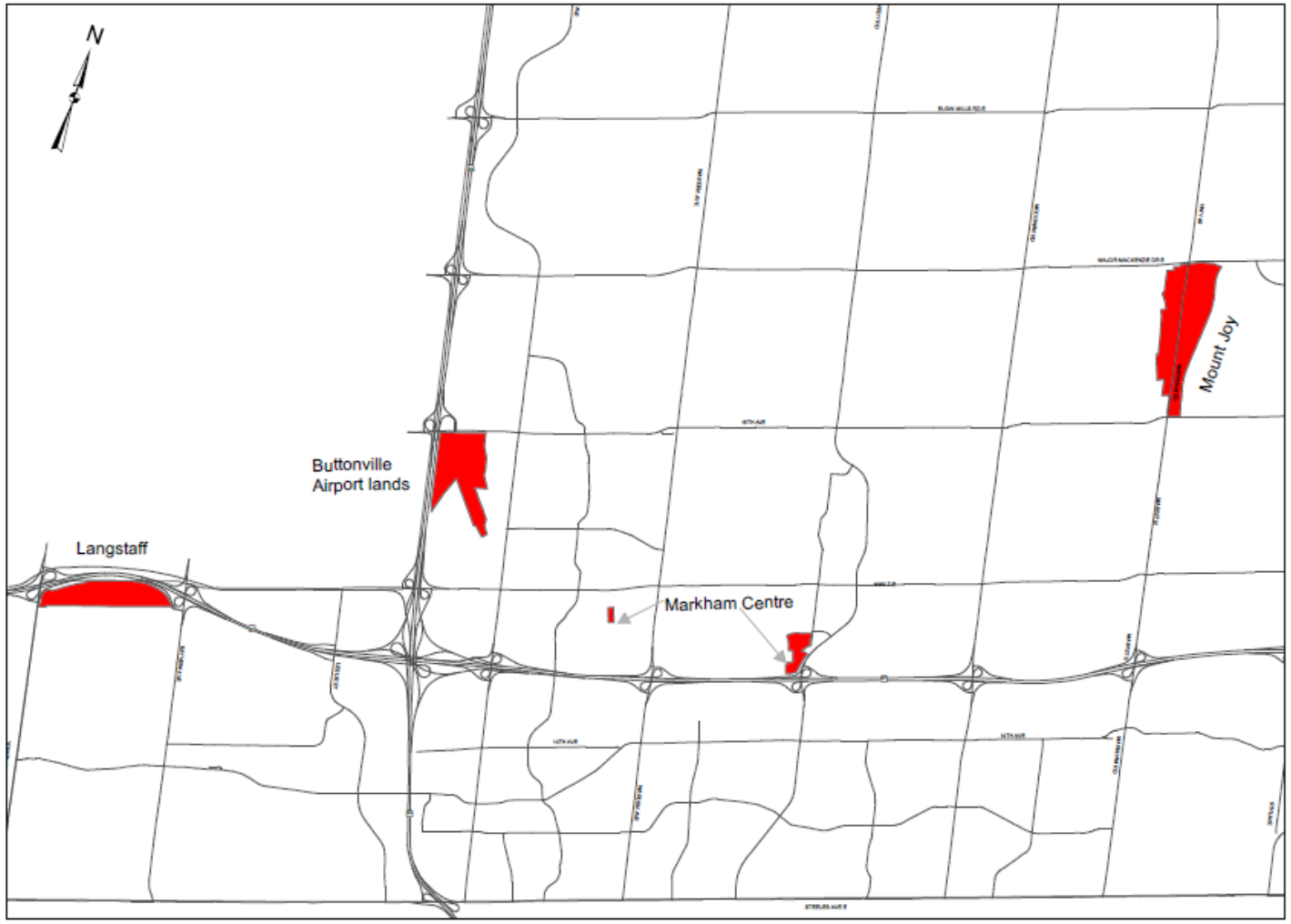
c. **Partnership with Developers** - Opportunity to discuss with willing partners in the development industry to implement this technology

d. **Community Esthetic –** The technology lends itself to improved esthetics (e.g. no waste bins, garbage on the streets etc.)

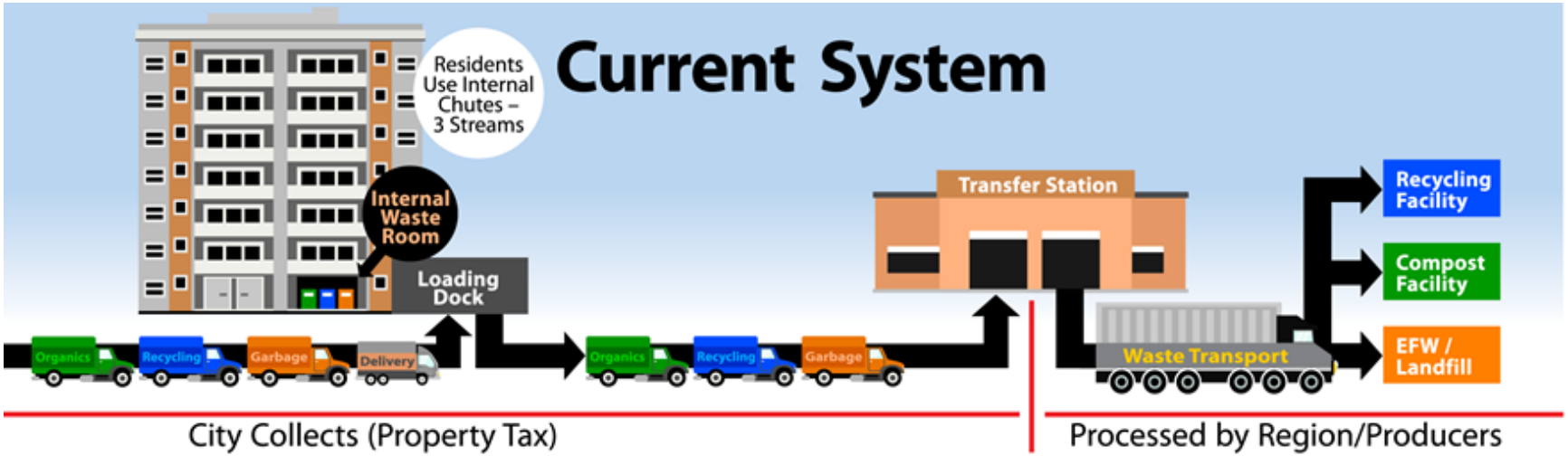
e. **Potential Areas** for Implementing AVAC

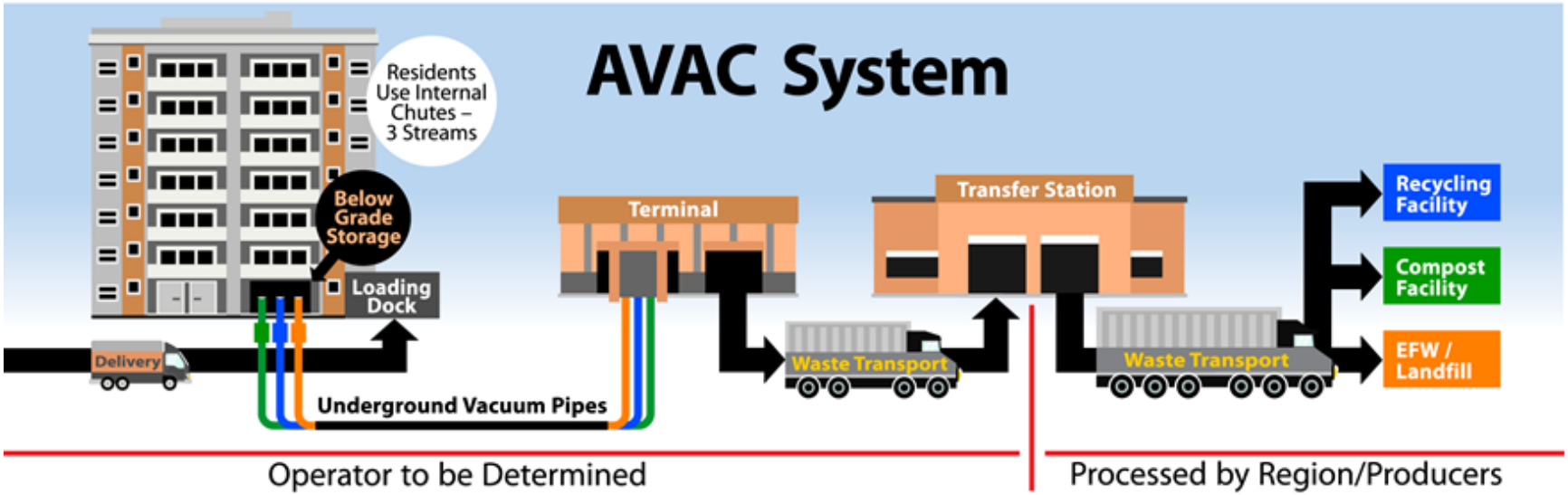
- Langstaff Gateway Area
- Markham Centre
- Buttonville, the MiX and other areas in the City

3. Map of Key Development Areas



4. Multi Residential Waste Collection Process





5. AVAC – Primary Components

Images as provided by the consultant

6. AVAC - BENEFITS

Spatial

- Reduced above-grade space requirements for 3-stream waste storage (bulky material/cardboard only) Bulky material/cardboard collection will require suitable ROW cross-section to allow for collection
- Release of surface space for community needs or development
- Improved public realm and citizen experience by reducing litter, rodents, and collection vehicles.

Technical

- Reduced roadway maintenance, noise, congestion and accidents
- System is available 24/7.
- Increased resilience to adverse events – weather

Environmental

- Reduced odours and carbon emissions
- Reduced truck traffic/congestion

Diversion

- Improved waste diversion, as system is never full
- 'Smart City" technology to increase diversion and participation (i.e. access controlled)
- Ability to collect separated 3-streams from residential and small commercial tenants
- Benefit to commercial users may increase ICI diversion rates

Built Environment

- Opportunity to reduce truck loading space and first floor heights currently designed to accommodate truck access.
- Makes shared loading spaces, transportation of waste throughout the building easier.
- Scalable system as development expands

7. AVAC – Limitations

- Significant capital/construction costs requiring front end investment
- Significant legal time will be required to consider decommissioning/ abandonment of system within ROW
- Increased design work required due to competing interest in the ROW (MDE, telecom, water, sewer etc.,)
- May require public consultation prior to implementation
- Affordability for developers and residents
- Financial Feasibility - Risks
  - Densities not being realized as planned
  - Participation by developers
  - Actual costs higher than what is projected in the business case

8. Langstaff Gateway - Assumptions

Consultant was hired to specifically do a financial analysis using the Langstaff area as case study.

Assumptions:

- AVAC system owned and operated by the City
- AVAC piping installed concurrently with other municipal infrastructure (sewers, water mains)
- Proposed roadways can accommodate the AVAC pipe infrastructure
- Two AVAC systems (East & West) will be installed due to rail corridor.
- Both waste terminals located primarily below grade on park lands conveyed to the City
- The system is designed to handle both residential and commercial waste

9. Langstaff Gateway - Financial Analysis

A business case was prepared by The Municipal Infrastructure Group using the following development and financial assumptions:

- Anticipated Langstaff development based on approved Secondary Plan concept, to be built out over 43 years (to 2065)

Res. Units	Retail & Commercial	Community Services	Office Space
15,000	746k sq.ft GFA	206k sq.ft GFA	2.4M sq.ft

- Capital and operating costs to be staged as community develops and AVAC system expands
- State of Good Repair costs sufficient to operate system on an ongoing basis
- No land cost for the terminals as they are expected to be incorporated under City parkland
- 20% contingency included on both capital and operating
- All figures in 2021 dollars

9. Financial Analysis - Contd

Expenditure Assumptions:

- The Business case details the costs to implement and operate an AVAC system.

- The total capital cost estimate is **$32.2M** (incl. pipes, building connections, parks infrastructure and central terminals). Approx. 72% of the costs will be incurred within 13 years of the development.

- The annual operating cost estimate is **$1.34M** at build out (2065), which includes items such as staffing, utilities, and $300k/year for state of good repair

- Total cost to 2065 (43 years) = $72.4M (in 2021 dollars)

9. Financial Analysis - Contd

Potential Revenues Assumptions:

- City of Markham, Langstaff developers, Condo Corporations, and businesses could have cost avoidance through implementation of AVAC.
  - **City:** would no longer have to collect waste from individual condo buildings or in Langstaff parks
  - **Developers**: would be able to reduce the size of the waste rooms in their buildings, freeing up space for other amenities or another unit
  - **Businesses**: would be able to reduce their waste collection costs
  - **Condo Corporations**: could benefit from reduced costs related to investment in bins and bin jockeying
- The goal was to establish amounts to be charged to these stakeholders that would accurately reflect their cost savings, so that each party would be cost neutral

9. Financial Analysis - Contd

Financial Summary:

	2023-2065	Notes
Capital and Operating Costs	($72.4M)	
City Contributions	$13.2M	Avoided residential and parks waste collection costs
Developer Contributions	$16.5M	A building connection fee of approx. $700/res.unit, $3.20/ commercial sq.ft and $1.48/office sq.ft - based on the estimated waste storage room space savings
Residential Customer contributions	$7.0M	A Condo Corp. fee of $22/unit/year – estimated savings related to bin jockeying and replacement
Non-res Customer contributions	$2.9M	A fee of $0.044 per sq ft/year – represents their cost avoidance
Funding Shortfall	**($32.8M)**	

- Setting the various stakeholder contributions at amounts equal to their cost savings results in a funding shortfall of $32.8M over 43 years.
- Note: If densities increase, the shortfall will be reduced. Conversely, if densities fail to materialize, the funding shortfall increases.

10. Funding Options

- Based on cash flow projections there remains a funding gap of $32.8M until buildout (2065)
- The funding options to recoup the investment over a 40+ year period are:
  1. Federal/Provincial Grants and Low Interest Financing - any grants obtained would help in reducing the $32.8M shortfall **RECOMMENDED**
  2. Increase in End User Fee charged to Condo Corps. Approximate increase from $22/Unit/year to $125/unit/year **NOT RECOMMENDED** (this would essentially be an additional $103/year tax/charge to the end user).
  3. City wide tax increase of $750k/year or 0.46% tax rate increase **NOT RECOMMENDED** (spreads the cost over the entire tax base, even though just Langstaff residents and businesses benefit from AVAC)

10. Funding Options - Contd

4. Increase in:
   a. residential Builder Connection Fees from $700/unit to $2,100/ unit ($700 estimated cost savings and $1,400 represents a premium payment to facilitate AVAC implementation)
   b. an increase in commercial builder connection fee from $3.2/ sq.ft to $9.60/sq.ft and
   c. an increase in office buildings connection fees from $1.48/sq.ft to $4.44/sq.ft. -

   RECOMMENDED (most feasible, especially if developers can use the presence of an AVAC system to help sell their units)

Staff recommend pursuing Options 1 (Grants/Low interest loans) to help reduce the shortfall and Option 4 (approaching Langstaff developers to contribute via a Builder Connection Fee)

Apart from the above recommended options from the consultant's report, staff are looking into possibilities of a Public Private Partnership (PPP) model to fund this initiative

10. Funding Options - Contd

Summary:

	Capital	Operating	Total (to 2065)
Costs	($32.2M)	($40.2M)	($72.4M)
Potential Funding:			
City (collection savings)		$13.2M	$13.2M
Residential Condo Corp Fees		$7.0M	$7.0M
Non-Residential Customer Fees		$2.9M	$2.9M
Developer Contributions (Base level - $700/unit)		$16.5M	$16.5M
Developer Contributions (Add'l - $1,400/unit)	32.2M	$0.6M	$32.8M
Total	0.0M	$0.0M	$0.0M

11. Recap

- AVAC is increasingly a proven technology
- Markham is well poised with several opportunities such as Markham Centre, Langstaff, Buttonville, the MiX
- Aligns with Markham's leadership in sustainable and other Smart City initiatives
- Financial analysis shows positive results especially with higher densities
- Funding options for shortfall, if required, can be pursued through grants, low interest financing and builder connection fees

12. Next Steps

- Discussion with developers on funding options
- Staff pursue opportunities for Federal/Provincial Grants and Low Interest Financing
- Staff pursue possibilities for a Public Private Partnership (PPP) funding model
- Staff update Committee with a report on the implementation strategy for the AVAC system including financial, governance, legal, technical and other operational matters