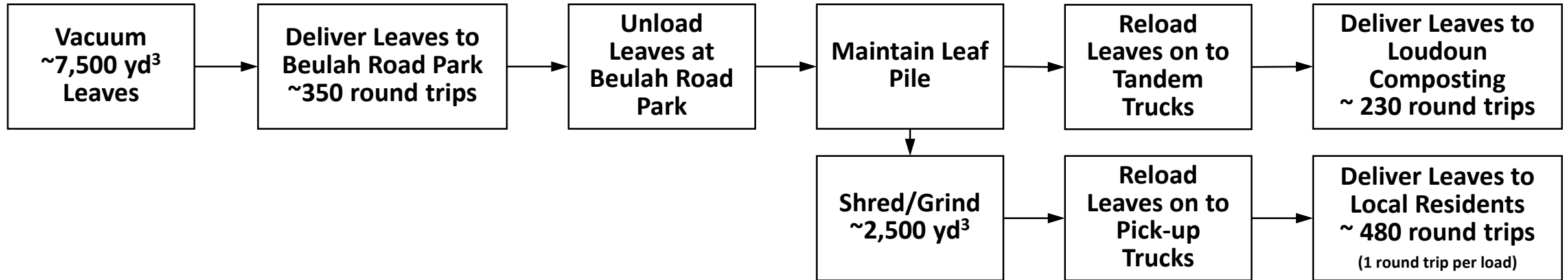

Leaf Collection Scenarios & Costs

February 1, 2022

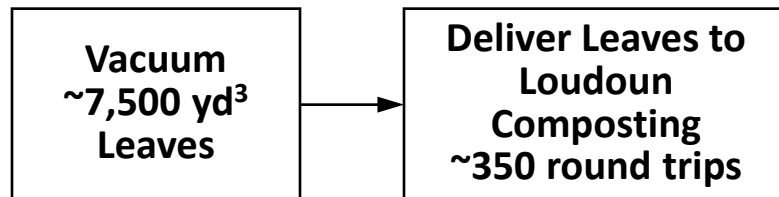
Leaf Collection Cost Calculations

- A cost comparison was conducted - using
 - Actual data from the 2020-2021 leaf collection season: Leaf volume, actual hours and equipmentCompared to:
 - A Direct Long Haul program where leaves are collected and hauled directly to Loudoun Composting

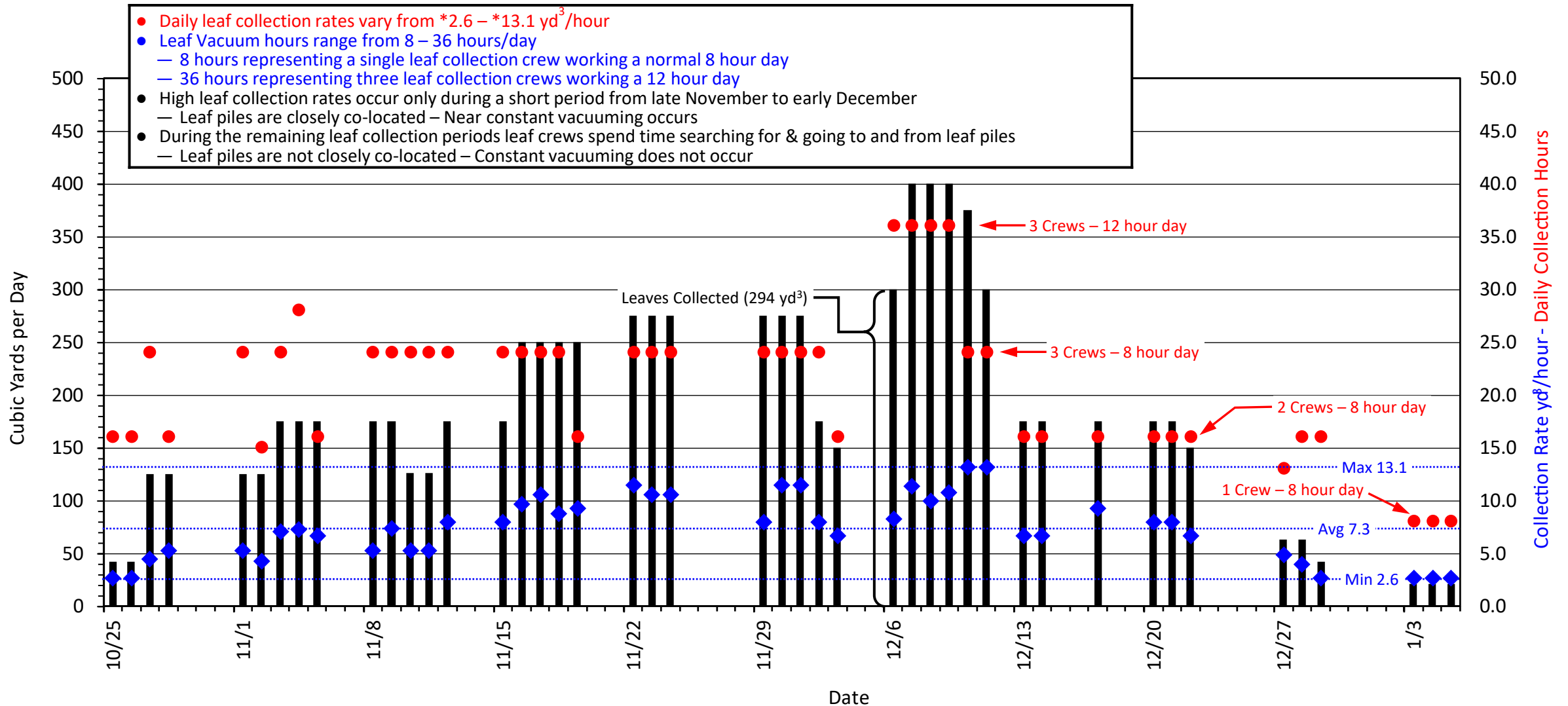
2020-2021 Leaf Collection



Direct Long Haul Leaf Collection



2020-21 Leaf Collection Volume, Crew Hours & Leaf Collection Rates



Cost for 2020-21 Leaf Collection Season - 7,427 yd³

Cost Item	Item	2020-21 Actuals	Source
Cost to Collect and Deliver Leaves to Beulah Road Park	Volume of leaves collected/vacuumed and delivered to Beulah Road Park	7,427 cubic yards	4/15/2021 NewGen Report Table 1-4
	Employee regular hours	3,814 hours	4/15/2021 NewGen Report Table 1-3
	<i>Employee regular hours cost @ \$55 per hour</i>	<i>\$209,770</i>	
	Employee overtime hours	416 hours	4/15/2021 NewGen Report Table 1-3
	<i>Employee overtime hours cost @ \$82.5 per hour</i>	<i>\$34,320</i>	
	Tandem truck hours while collecting leaves	988 hours	4/15/2021 NewGen Report Table 1-3
	Tandem truck hours delivering leaves to Beulah Road Park (7,427/21) x 0.5 hr per trip	177 hours	DPW Estimate based on Actual Data
	Supervisor pickup truck hours (45.7 shifts x 8 hours/shift x 50% utilization)	183 hours	DPW Estimate based on Actual Data
	Leaf vacuum hours	988 hours	4/15/2021 NewGen Report Table 1-3
	<i>Tandem truck maintenance costs @ \$6.49 per hour</i>	<i>\$7,560</i>	
	<i>Tandem truck fuel costs @ \$7.85 per hour</i>	<i>\$9,144</i>	
	<i>Pickup truck maintenance costs @ \$4.32 per hour</i>	<i>\$790</i>	
	<i>Pickup truck fuel costs @ \$3 per hour</i>	<i>\$548</i>	
	<i>Leaf vacuum maintenance costs @ \$17.48 per hour</i>	<i>\$17,270</i>	
	<i>Leaf vacuum fuel costs @ \$4.89 per hour</i>	<i>\$4,831</i>	
	<i>Total cost to collect and deliver leaves from vacuum site to Beulah Road Park</i>	<i>\$284,233</i>	
	Leaf Loading and Shredding Costs	Volume of leaves ground/shredded	2,500 cubic yards
<i>Cost for contractor to grind/shred leaves</i>		<i>\$10,000</i>	
Employee regular hours (supervisor + operator x 8 hr/day x 3 days)		48 hours	DPW Estimate
<i>Employee regular hours cost @ \$55 per hour</i>		<i>\$2,640</i>	
Equipment hours (8 hr/day x 3 days) assume same hourly costs as Tandem truck		24 hours	DPW Estimate
<i>Tandem truck maintenance costs @ \$6.49 per hour</i>		<i>\$156</i>	
<i>Tandem truck fuel costs @ \$7.85 per hour</i>		<i>\$188</i>	
<i>Cost to perform leaf shredding</i>		<i>\$12,984</i>	

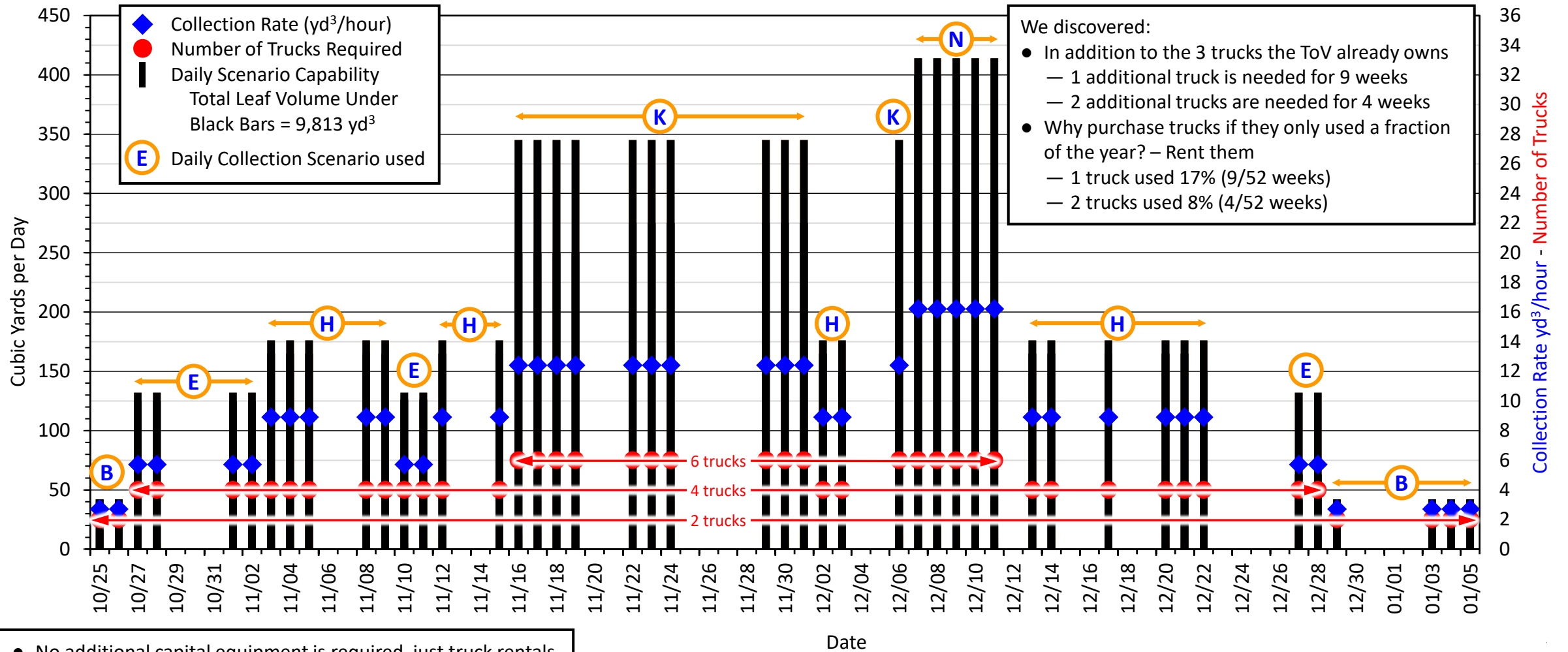
Cost Item	Item	2020-21 Actuals	Source	
Delivery Costs and Tipping Fees to Loudoun Composting	Cubic yards of leaves delivered to Loudoun Composting	4,900 cubic yards	4/15/2021 NewGen Report Table 2-1	
	Weight of unground leaves	350.0 lbs/cubic yard	4/15/2021 NewGen Report Table 1-1	
	Equivalent of 4900 cubic yards of leaves into tons	858 tons		
	Loudoun Composting fee for 1 ton of leaves	\$30.00/ton	01/2022 Cost Increase	
	<i>Loudoun Composting Fees</i>	<i>\$25,725</i>		
	Tandem truck capacity	21 cubic yards		
	Number of tandem truck loads required (Round trip deliveries)	233 round trips		
	Time to load tandem truck @ Beulah Road Park	0.25 hours		
	Round trip time from from Vienna to Loudoun Composting (includes unloading @ Loudoun)	2.0 hours		
	<i>Tandem truck maintenance costs @ \$6.49 per hour</i>	<i>\$3,402</i>		
	<i>Tandem truck fuel costs @ \$7.85 per hour</i>	<i>\$4,115</i>		
	Employee (truck driver) regular hours	524 hours		
	Employee (loader/supervisor) Regular Hours Assume 30 min per load	117 hours		
	<i>Employee regular hours cost @ \$55 per hour</i>	<i>\$35,241</i>		
	<i>Total cost to bring leaves from Beulah Road Park to Loudoun Composting</i>	<i>\$68,484</i>		
	Delivery Costs to Vienna Residents	Hours delivering mulch to residents	1,323 hours	DPW Actual Time for 2021 leaf deliveries
		<i>Pickup truck maintenance costs @ \$4.32 per hour</i>	<i>\$5,715</i>	
<i>Pickup truck fuel costs @ \$3 per hour</i>		<i>\$3,969</i>		
Employee (truck driver) regular hours		1,323 hours		
Employee (loader/supervisor) regular hours Assume 0.2 hour per load		265 hours		
<i>Employee regular hours cost @ \$55 per hour</i>		<i>\$87,318</i>		
<i>Total cost to deliver leaves to residents (excluding Shredding costs)</i>	<i>\$97,002</i>			

Total cost for 2020-21 Leaf Collection Program to collect 7427 cubic yards of leaves: \$462,704

Modeling the Direct Long Haul Leaf Collection Scenario

- We used the 2020-21 Leaf Collection data on the previous pages to model the Direct Long Haul Leaf Collection scenario
- We constructed 14 different daily leaf collection scenarios
 - See A through N in the back-up charts
- Each scenario varies the leaf collection rate and number of leaf collection crews
 - From this, we determine the number of trucks necessary to keep the leaf collection crews busy
 - Basically, the objective is for an empty truck to show up every time a leaf collection crew fills a truck
- Our modelling is conservative
 - For example, we allocated 30 minutes to drive to Loudoun Composting, 30 minutes to dump leaves, and 30 minutes to return to Vienna
 - We also added 30 minutes of margin on every trip to account for delays
- Our goal was to model a Direct Long Haul Leaf Collection scenario capable of ~10,000 yd³
 - We wanted to be sure to capture the maximum number of trucks needed
 - Recent year leaf collections have ranged from ~7,500 to ~9,500 yd³

Scenarios and Equipment Used for Direct Long Haul Leaf Collection



- No additional capital equipment is required, just truck rentals
- Use existing equipment
 - 3 Tandem trucks
 - 3 leaf vacuums and
 - 3 leaf boxes

Cost for Direct Long Haul Leaf Collection

Cost of Direct Long Haul Leaf Collection Program for 9,813 cubic yards				
Cost Item	Item	Value	Source	
Cost to Collect and Deliver Leaves to Beulah Road Park	Volume of leaves collected/vacuumed and delivered to Beulah Road Park	9,813 cubic yards	Scenario Leaf Collection Capability	
	ToV Leaf collection crew hours	3,720 hours	3 crewmembers per leaf vacuum (3x leaf vacuum hours)	
	ToV Tandem truck driver pulling leaf vacuum hours	1,240 hours	1 crewmember per leaf vacuum (1x leaf vacuum hours)	
	ToV Tandem truck driver delivering leaves to Loudoun Composting hours	531 hours	266 trips to Loudoun Composting x 2 hours/trip	
	ToV Supervisor hours	360 hours	1 supervisor per work day	
	Total hours	5,851 hours	Sum of the above hours	
	Total regular hours	5,266 hours	90% of total hours are regular hours	
	<i>Employee regular hours cost @ \$55 per hour</i>	<i>\$289,625</i>		
	Employee overtime hours	585 hours	10% of total hours are overtime hours	
	<i>Employee overtime hours cost @ \$82.5 per hour</i>	<i>\$48,271</i>		
	Tandem truck hours	891 hours	Equal to Tandem truck driver hours (1240 hrs + 531 hrs)	
	Pickup truck hours (for Supervisor)	360 hours	Equal to Supervisor hours	
	Leaf vacuum hours	1,240 hours	From Scenario calculation	
	<i>Tandem truck maintenance costs @ \$6.49 per hour</i>	<i>\$5,783</i>		
	<i>Tandem truck fuel costs @ \$7.85 per hour</i>	<i>\$6,994</i>		
	<i>Pickup truck maintenance costs @ \$4.32 per hour</i>	<i>\$1,555</i>		
	<i>Pickup truck fuel costs @ \$3 per hour</i>	<i>\$1,080</i>		
	<i>Leaf vacuum maintenance costs @ \$17.48 per hour</i>	<i>\$21,675</i>		
	<i>Leaf vacuum fuel costs @ \$17.48 per hour</i>	<i>\$6,064</i>		
	Number of weeks one-25 cubic foot Tandem truck is needed	9 weeks	From Scenario calculation	
	Hours per week (truck rents on a 9 hour/day shift basis)	45 hours		
	Total Hours for one-25 cubic foot Tandem truck	405 hours		
	<i>Total Cost for one-25 cubic foot Tandem truck for 9 weeks</i>	<i>\$42,930</i>		
	Number of weeks two-25 cubic foot Tandem trucks are needed	4 weeks	From Scenario calculation	
	Hours per week (truck rents on a 9 hour/day shift basis)	45 hours		
	Total Hours for two-25 cubic foot Tandem truck	360 hours		
	<i>Total Cost for two-25 cubic foot Tandem trucks for 4 weeks</i>	<i>\$38,160</i>		
	<i>Total cost to collect and deliver leaves from vacuum site directly to Loudoun Composting</i>	<i>\$462,136</i>		

Cost of Direct Long Haul Leaf Collection Program for 9,813 cubic yards			
Cost Item	Item	Value	Source
Leaf Loading and Shredding Costs			
	<i>Cost to perform leaf shredding</i>	<i>\$0</i>	
Delivery Costs and Tipping Fees to Loudoun Composting	Cubic yards of leaves delivered to Loudoun Composting	9,813 cubic yards	
	Weight of unground leaves	350.0 lbs/cubic yard	
	Equivalent of 4900 cubic yards of leaves into tons	1,717 tons	
	Loudoun Composting fee for 1 ton of leaves	\$30.00 /ton	01/2022 Cost Increase
	<i>Loudoun Composting Fees</i>	<i>\$51,518</i>	
	<i>Total cost to dispose of leaves at Loudoun Composting</i>	<i>\$51,518</i>	
Delivery Costs to Vienna Residents			
	<i>Total cost to deliver leaves to residents (excluding Shredding costs)</i>	<i>\$0</i>	
	<i>Total cost for Direct Long Haul Program to collect 9813 cubic yards of leaves</i>	<i>\$513,654</i>	

Total cost for Direct Long Haul Program to collect 9813 cubic yards of leaves: \$513,654

Comparing Apples to Apples

From a True Cost Account Perspective

Total cost for 2020-21 Leaf Collection Program to collect 7427 cubic yards of leaves	\$462,704
Total cost for Direct Long Haul Program to collect 9813 cubic yards of leaves	\$513,654
Scaling by the ratio of leaves collected (7427/9813 = 76 %)	
Total cost for Direct Long Haul Program to collect 7427 cubic yards of leaves	\$388,761
Direct Haul Yearly <u>Savings</u>	\$73,943

From a Budgeting Perspective (Payments to External Vendors)

Additional Costs to Rent Trucks <small>[\$42,930 + \$38,160) x 76%]</small>	\$61,628
Increase in Loudoun Composting Disposal Fees for the Leaves that were Previously Shredded in Beulah Road Park <small>[2,500 yd³ x 350.0 lbs/cubic yard / 2,000 lbs/ton x \$30.00 / ton)</small>	\$13,125
Elimination of Leaf Mulching/Shreding	-\$10,000
Direct Haul Yearly <u>Additional Cost</u>	\$64,753

Budget Changes Independent of Leaf Collection Method

Increase in Loudoun Composting Disposal Fees from \$9 to \$30/ton <small>[7,427-2,500 yd³ x 350.0 lbs/cubic yard / 2,000 lbs/ton x \$21.00 / ton)</small>	\$18,107
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Conclusions

- Direct Long Haul Leaf Collection and Disposal Program Benefits
 - Saves \$74 K per year (true cost accounting)
 - Ends leaf collection program earlier
 - Long Haul program ends leaf operations in early January, current program ends in late March
 - This frees up approximately 1,500 hours of DPW labor that can be used performing other tasks
 - Enables DPW to vacate Beulah Road Park
 - Eliminates acoustic fence barrier maintenance/replacement
 - Eliminates sound studies to comply with Conditional Use Permit
 - Eliminates leaf pile maintenance (leaf pile turnover and chemicals)
 - No additional need for any Capital Equipment
- Direct Long Haul Leaf Collection and Disposal Program Drawback
 - Results in \$65K budget increase to external vendors
 - Eliminates free local delivery of leaf mulch to ~ 200-300 residents
 - 2020-2021 cost of leaf shredding and local delivery was ~ \$110 K
 - Leaf Mulch is available at the I-66 transfer facility
 - DPW can investigate methods and costs if the free leaf mulch delivery service is continued

Back-up Charts

