



Informal Report to Council

(Revised 2/00 - Graphics Dept. Job #0949)

Submittal Date: 11/7/2017	Submitting Department: City Manager	Submitted By: Dale Fisseler P.E.	Reference #:
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Landfill Permit and Site Recommendation

Background

In August of 2016, the City Council authorized the development of a new landfill for Waco and the surrounding communities. Since that date, the City Council and staff have reviewed numerous landfill site alternatives, operational impacts and associated costs. Upon completion of these extensive reviews, the City's Engineers for this project, SCS Engineers and Walker Partners, have recommended that the City initiate the permitting process for a new landfill at the Old Lorena Road site.

The City's rate consultant for this project, NewGen Strategies and Solutions, has completed an evaluation of the costs associated with this work in order to provide you with a report and recommendation.

Several citizen groups and an Austin Political Action Committee have expressed several concerns about proceeding with the permitting process. Their concerns are addressed below.

Concerns about the lack of public meetings

Listed below are the meetings where the landfill was discussed or referenced:

8/16/2016, Legal bills for new landfill and professional services with SCS Engineers for new landfill permitting

3/2/2017, Neighborhood Meeting, Harris Creek Baptist Church

3/7/2017, Update on new landfill site planning and permitting (WS-2017-322)

3/21/2017, Legal bills for new landfill (permitting) (RES-2017-372)

3/21/2017, Amendment to professional services agreement with SCS Engineers new landfill permitting (RES-2017-371)

3/21/2017, Legal bills for litigation for new landfill (Citizens to Save Lake Waco) (RES- 2017-373)

5/10/2017, Meeting of the Sustainable Resource Practices Advisory Board

6/20/2017, Update on draft siting study for new landfill (WS-2017-563)

7/11/2017, Waco Business League Meeting

7/18/2017, Report of the City Manager (IR-Distance from transfer station to a new landfill) (WS-2017-616)

7/26/2017, Meeting of the Sustainable Resource Practices Advisory Board, agenda included presentation on landfill siting study

8/29/2017, Lunch & regional landfill discussion hosted by City of Hewitt

9/5/2017, Legal bills for litigation for new landfill (Citizens to Save Lake Waco) (RES-2017-796)

9/19/2017, Report of the City Manager (IR – Peer City Landfill Locations) (WS-2017-796)

9/19/2017, Update on Draft Siting Study for New Landfill (WS-2017-798)

10/2/2017, China Spring Neighborhood Association Meeting

10/5/2017, Meeting of the Sustainable Resource Practices Advisory Board; note that during the meeting a motion was passed to support and agree with the recommendation as developed by SCS Engineers and Walker Partners regarding a site for the new landfill with Wiley Stem abstaining from the vote.

10/10/2017, Public Meeting, Bledsoe Miller Community Center

In addition to the meetings listed above, it is important to note, citizens can attend any regular City Council meeting and address the City Council on this matter.

Finally, Council Members and staff received significant feedback through the Public Meeting the City Council sponsored on October 10, 2017. A review of the comment cards and the concerns expressed by attendees follows:

1. Proximity to homes and neighborhoods

Some residents had specific concerns related to noise, odor and birds that would have to be addressed in any permit application.

At the Council's request, the City researched our peer city landfills and found that the proposed Old Lorena Road site would be 0.66 miles from the nearest neighborhood (50 homes or more) and this is the second closest to neighborhoods of our peer cities. Additionally, the area between Old Lorena Road and Ritchie Road, immediately to the south of Highway 84, is an industrial area.

2. Impact on property values

Residents that live immediately across from the proposed Old Lorena Road site expressed concerns that a new landfill may impact property values. As part of the site development process, staff will review potential property value impacts and identify ways to minimize.

3. Concerns about the entrance location off of Old Lorena Road

Several individuals in the same area expressed concerns about an entrance to the site on Old Lorena Road and it was explained that entrance roads are part of the design process and will be addressed as part of the conceptual design and traffic impact study.

4. Concerns that development in the area will be negatively impacted

Current activity in the West Highway 84 corridor indicates continued strong development outlook. Most of the major housing developments were constructed after the current landfill was in operation.

5. Concerns about birds impacting neighborhoods.

The City will undertake a bird assessment as part of the permitting process to minimize any negative impacts of birds caused by a landfill at the Old Lorena Road site.

Staff believes it is important to meet with the residents along Old Lorena Road if the permit application process moves forward. This would allow us to address their concerns during site planning. The Texas Commission on Environmental Quality permitting process also encourages citizen comments..

The following are concerns expressed by members of the community:

Concerns about a 1992 agreement addressing landfill expansion

- Pursuant to a 1992 agreement, Waco agreed to, among other things, not expand the current permitted landfill 948A beyond its current boundaries.
- The City Council, when it approved the 1992 settlement agreement, clearly understood that a new landfill might be permitted in the area of the current landfill (permit 948A).
- The City will not seek a Texas Commission on Environmental Quality (TCEQ) permit for an expansion of the current landfill (permit 948A).
- The current landfill (permit 948A) will be closed.
- The City will be applying for a new permit for a new landfill and has no plans to operate two landfills at the same time.

Concerns about water quality in Lake Waco

- Any concerns about water quality will be addressed in the permitting process.
- Landfills are not included on the Environmental Protection Agency's (EPA) list as non-point source pollution.
- The City of Waco has extensive watershed monitoring protocols that not only protect the lake, but allow for water treatment processes to address any challenge associated with non-point pollution

source. These protocols, along with the redundant protections required in modern landfills, provide confidence in protecting water quality.

- The site includes ideal geology for the protection of ground and surface water.
- The design and construction would meet or exceed the Texas Commission on Environmental Quality (TCEQ) required stormwater regulations. Rainwater that comes into contact with garbage (leachate) will be captured and pumped to the wastewater treatment facility.
- The elevation of the Lake Waco flowage easement is below the bottom of any proposed disposal area to prevent backup of Lake Waco into the disposal area.
- The current landfill has operated for more than 35 years in the watershed of the South Bosque River, which is rated as High Aquatic use by the TCEQ.
- From rainfall data taken at the Waco Regional Airport, there have been three storms that were near 25-year rainfall events (2010, 2011 and 2012), and there was one storm that exceeded a 100-year event in 2015. The existing landfill sites' stormwater controls successfully performed during these events without runoff or water quality impact to Lake Waco.

Concerns about the floodplain or the flowage easement of Lake Waco

- The engineering design team will provide a landfill design that does not conflict with any flowage easements or floodplain as part of the permitting process.

Traffic concerns

- As part of the permitting process with TCEQ, a traffic impact study will be needed. City staff would anticipate roadway upgrades to improve traffic conditions for any potential site.
- The number of trucks is dependent on the volume of trash, not the location of the landfill.
- There is an overpass planned for the intersection of Speegleville/Old Lorena Road that would improve traffic on Highway 84.

Concerns about the Safety and FAA funding at the McGregor Executive Airport and Waco Regional Airport

- The Federal Aviation Administration will be involved in the permitting process and the safety and continued federal funding at both airports is a priority for both the City of Waco and the City of McGregor. As part of this process, a bird assessment will be initiated to minimize any negative impact of birds caused by a landfill at the Old Lorena Road site.

Concerns about Odor

- The TCEQ has conducted odor-complaint investigations at the landfill and has not found any violations of the nuisance odor rules.
- Staff has evaluated the odor complaints and recognizes the possibility of odor issues associated with landfill operations from time to time. We also recognize the proximity of rural septic systems and regional wastewater pumping facilities in the area.
- Staff is seeking the assistance from an environmental consulting firm to assess the odor issues and develop a plan to mitigate odors.

Other key operational and service considerations

Over the last decade, the City Council has asked staff to initiate programs to make our city cleaner. Many excellent services have been implemented because of the Council's direction, including illegal dumping enforcement, increased recycling and diversion, and convenient disposal of bulky waste at the Citizen Convenience Centers at the landfill and Cobbs Recycling Center. This extensive suite of services, at a very low cost, is absolutely tied to the easy access and close proximity of the landfill.

These many services include:

- once per week curbside garbage service;
- once every other week curbside recycling and yard waste;
- bulky waste pick up, upon request;

- Cobbs Convenience Center bulky and trash collection;
- twice annual Neighborhood Association cleanup events;
- routine city alley brush and trash cleanups;
- cleanup of city-owned lots;
- dead animal disposal;
- city streets and creek cleanups;
- street sweeper disposal;
- City Code Enforcement – trash disposal;
- Keep Waco Beautiful sponsored clean-up events;
- disposal of trash from illegal dump sites; and
- 2,000 lbs. of free disposal per month at the landfill (self-haul residents).

Highly impacted would be the 2,000 pounds of self-haul service that is available to all Waco residents included in their solid waste monthly base rate. This service is available both at the landfill and at the Cobbs Convenience Center. Brush, household trash that is not placed in the cart for pickup, and bulky items are included. The disposal service provided to the construction industry and to our non-profits would also be negatively impacted. The construction sector is a significant user of the current site.

Engineering Firm Recommendation

After a thorough and exhaustive review of potential sites, SCS Engineers and Walker Partners recommended the Old Lorena Road site as the best site. As mentioned previously, the firm evaluated 88 sites with the final 4 sites receiving a rigorous review through a matrix of 12 key categories.

Rate analysis

The engineering firm's costs associated with each site were provided to the City's rate consultant. The rate analysts completed a review of the rate impacts for each of the four sites. This analysis determined the incremental costs associated with hauling to these alternative landfill sites and the impact it would have on residential and commercial solid waste rate payers. The most cost-effective site is the Old Lorena Road site. A copy of analysis is attached.

Recommendation from the Sustainable Resource Practices Advisory Board

On October 5, 2017, following a presentation of the draft siting study from the City Council meeting of September 9, 2017, the Sustainable Resource Practices Advisory Board voted to recommend the Old Lorena Road site as recommended by SCS Engineers and Walker Partners.

Recommendation

The Old Lorena Road site has confirmed geology, is large enough to provide adequate capacity, is easily accessible, and is convenient for users. It is the least costly site to develop, operate and access. The Old Lorena Road site offers the least impact on our rate payers and it will allow the City to continue the services currently available. The other three final sites all present unknowns as well as significant operational challenges having to do with accessibility, travel time, land acquisition, new area neighborhood concerns, infrastructure (water, sewers, and roadway) needs, and permitting.

For these reasons and based on the recommendation of SCS Engineers, Walker Partners and rate analysis, it is my recommendation that the City Council authorize the staff to move forward with the permitting process for the Old Lorena Road site.



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Memorandum - Final

To: Mr. Chuck Dowdell, City of Waco
From: Mr. Dave Yanke, NewGen Strategies and Solutions, LLC
Date: November 2, 2017
Re: Cost of Hauling to Alternative Landfill Sites

Background

NewGen Strategies and Solutions, LLC (NewGen) was retained by the City of Waco (City) to assist in evaluating alternative landfill sites. The City is currently evaluating four possible locations to construct a new landfill. The purpose of this analysis is to determine the incremental costs associated with hauling to these alternative landfill sites, and the impact it would have on residential and commercial solid waste ratepayers. The following memorandum and the attached schedules present the methodology developed, and analysis performed by NewGen.

It should be emphasized that this financial analysis is based on operational data provided by the City's solid waste department, as well as landfill development costs (and infrastructure costs – roads, water, sewer, etc.) provided by the City's consulting engineers. We appreciate their timeliness in providing us with the necessary data to complete this analysis.

Collection Costs

Incremental Mileage – Existing Collection Routes

NewGen evaluated four existing solid waste collection services provided by the City: Residential Collection, Residential Brush, Commercial Roll-off and Commercial Front Load. Costs associated with existing routes include: fuel, repair and maintenance expenses (R&M), and capital related to the increased wear and tear of hauling trucks.¹ As mentioned above, one of the additional costs incurred is the fuel related to the incremental mileage associated with hauling to the alternative landfill sites. NewGen assumed all routes average 2.5 miles per gallon (MPG) and that the average cost of diesel fuel was \$2.50 per gallon.

For example, the City currently has 17 automated residential routes, operating four days per week and makes two trips per day to the landfill. The roundtrip distance to and from Site 21 is approximately 19.3

¹ Repair & Maintenance (R&M) is defined as all repair costs associated with maintaining the City's solid waste vehicles. This includes all costs such as brake replacements, new tires, oil changes, PM (preventative maintenance) inspections, etc.

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miles, which equals an additional annual fuel costs of \$136,490.² Incremental mileage calculations for existing routes are shown in greater detail in Schedule 1.

Incremental R&M Costs – Existing Collection Routes

NewGen estimated the additional repair and maintenance costs related to the incremental mileage associated with hauling to the alternative landfill sites. The additional R&M costs were based on the existing R&M costs, adjusted for an increase in the additional mileage associated with hauling to the alternative landfill sites. For instance, the current annual R&M costs for Residential Automated trucks average \$21,909 and the existing annual mileage is approximately 17,031 per route. Hauling to Site 21 would require an additional 8,029 miles annually per route, or a 47.14% increase in annual mileage, which equates to additional R&M costs of \$10,328.³ This analysis was performed for all four sites and all four collection vehicle service categories to determine the incremental R&M costs associated with hauling waste to the alternative sites. Incremental R&M costs calculations for existing routes are shown in greater detail in Schedule 1.

Incremental Capital Costs – Existing Collecting Routes

Incremental capital costs were included for Site 21 and Site 71 due to the larger increase in hauling distance to these further alternative landfill sites. To account for this increased mileage, NewGen decreased the average useful life from 5-years to 4-years for Residential Automated, Commercial Roll-off and Commercial Front Load trucks. For example, the City currently has 17 automated residential routes, with an approximate purchase price per truck of \$350,000, equaling a total fleet capital cost of \$5,950,000.⁴ Assuming the existing average useful life of 5-years, the annual amortization cost of the truck fleet would equate to \$1,190,000.⁵ Decreasing the average useful life of the truck to 4-years, the annual amortization cost of the truck fleet is \$1,487,500, which equals an annual increase in capital costs of \$297,500.⁶

Similar analysis was performed for Commercial Roll-off and Commercial Front Load trucks. The average useful life of Residential-Brush trucks was maintained at the existing 4-years. NewGen assumed no decrease in the average useful life of trucks for Site 57 (Old Lorena Rd.) and Site 81 due to the comparable hauling distances of those sites to the existing landfill. The incremental mileage to these sites did not warrant a decrease in the average useful life. Incremental capital costs calculations for existing routes are

² Annual Fuel Cost = 17 routes × 4 days per week × 2 trips per day to the landfill × 19.3 miles roundtrip to Site 21 × 52 weeks = 136,490 Annual Mileage ÷ 2.5 MPG × \$2.50 per gallon = \$136,490.

³ Additional R&M Cost per Route = 8,029 additional annual mileage hauling to Site 21 / 17,031 existing annual mileage per route for Residential – Automated = 47.14%. Existing R&M Costs per Route Residential – Automated = \$21,909 × 47.14% = \$10,328.

⁴ 17 existing Residential-Automated trucks × \$350,000 price per truck = \$5,950,000 total capital costs related to trucks for Residential-Automated.

⁵ Existing Annual Amortization of Residential-Automated Truck Fleet = \$5,950,000 total capital cost / 5-years useful life = \$1,190,000.

⁶ Projected Annual Amortization of Residential-Automated Truck Fleet = \$5,950,000 total capital cost / 4-years useful life = \$1,487,500. Annual Incremental Capital Costs = \$1,487,500 - \$1,190,000 = \$297,500.

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shown in greater detail in Schedule 1. Table 1 includes the annual incremental costs (fuel, R&M, and capital) related to the existing routes hauling to the four alternative landfill sites.

Table 1
Annual Incremental Costs Associated with Existing Routes Hauling to Alternative Landfill Sites

	Site 57 (Old Lorena Rd.)	Site 71	Site 81	Site 21
Residential Automated	\$ 53,359	\$ 519,023	\$ 79,231	\$ 609,572
Residential Brush	24,200	75,351	35,934	106,152
Commercial Roll-off	56,607	267,837	84,053	347,887
Commercial Front Load	26,410	193,643	39,215	238,460
Total Cost-Existing Routes	\$ 160,577	\$ 1,055,854	\$ 238,433	\$ 1,302,071

Any arithmetic error is due to rounding.

Additional Collection Routes

To account for longer hauling distances to the alternative landfill sites the City will need to add additional collection routes. Costs associated with additional routes include: capital costs related to the purchase of new trucks, repair and maintenance expenses, labor costs for additional drivers, and fuel. Annual costs associated with the additional collection routes are shown in Table 2 below. Collection costs for additional collection routes are shown in greater detail in Schedule 2.

Table 2
Annual Collection Costs Associated with Additional Routes Required to Haul to Alternative Landfill Sites

	Site 57 (Old Lorena Rd.)	Site 71	Site 81	Site 21
Residential Automated	\$ - ¹	\$ 410,942	\$ 179,601	\$ 421,594
Residential Brush	- ¹	359,035	173,740	374,435
Commercial Roll-off	- ¹	191,922	- ¹	205,264
Commercial Front Load	- ¹	181,113	- ¹	187,515
Total Cost-Additional Routes	\$ -	\$ 1,143,012	\$ 353,341	\$ 1,188,809

1) No additional route is needed.
Any arithmetic error is due to rounding.

Disposal Costs

NewGen was asked to perform a "high level" analysis of the potential increase in disposal costs associated with the alternative landfill sites. NewGen evaluated land costs and infrastructure costs for each alternative site to determine the effect it would have on disposal rates.⁷ Listed in Table 3 on the next page are the four alternative landfill sites. Additional detail concerning disposal costs is shown in Schedule 3.

⁷ This information was provided to NewGen by the City's engineering consultants.

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Table 3
Annual Cost Increase of Alternative Landfill Sites

Residential Costs	Status Quo	Site 57 (Old Lorena Rd.)	Site 71	Site 81	Site 21
Land Costs	-	\$ 1,850,000	\$ 999,000	\$ 5,200,000	\$ 1,700,000
Infrastructure Costs	-	1,207,500	6,675,000	2,106,300	7,211,300
Total Landfill Costs¹	-	\$ 3,057,500	\$ 7,674,000	\$ 7,306,300	\$ 8,911,300
Debt Issuance to Fund Landfill Costs					
Bond Issuance (Years)	-	20	20	20	20
Interest Rate	-	5%	5%	5%	5%
Principal Amount	-	\$ 3,100,000	\$ 7,700,000	\$ 7,300,000	\$ 9,000,000
Annual P&I Payment	-	248,752	617,868	585,771	722,183
Additional Leachate Sewer Costs	-	-	215,000	-	215,000
Total Annual Cost	-	\$ 248,752	\$ 832,868	\$ 585,771	\$ 937,183
2016 Tonnage ²	-	288,451	288,451	288,451	288,451
Incremental Price per Ton (\$)	\$ 0.00	\$ 0.86	\$ 2.89	\$ 2.03	\$ 3.25

1) Landfill costs provided to NewGen by the City's engineering consultants

2) 2016 tonnage provided by City staff.

Collection and Disposal Combined

Table 4 shows the combined annual additional collection and disposal costs that would be incurred to provide residential solid waste services at the same level of service, and the impact on the monthly residential solid waste bill, if any of the alternative landfill sites are considered.

Table 4
Summary - Total Residential Cost Increase of Alternative Landfill Sites
(Collection & Disposal Costs)

Residential Costs	Site 57 (Old Lorena Rd.)	Site 71	Site 81	Site 21
Existing Routes Automated (Table 1)	\$ 53,359	\$ 519,023	\$ 79,231	\$ 609,572
Existing Routes Brush (Table 1)	24,200	75,351	35,934	106,152
Additional Routes Automated (Table 2)	- ¹	410,942	179,601	421,594
Additional Routes Brush (Table 2)	- ¹	359,035	173,740	374,435
Disposal Cost (Schedule 3, line 20)	73,649	246,591	173,432	277,476
Total Incremental Cost	\$ 151,208	\$ 1,610,942	\$ 641,938	\$ 1,789,229
Number of Customers ²	41,591	41,591	41,591	41,591

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Residential Costs	Site 57 (Old Lorena Rd.)	Site 71	Site 81	Site 21
Months per Year	12	12	12	12
Increase in Monthly Bill (\$)	\$ 0.30	\$ 3.23	\$ 1.29	\$ 3.58
% Increase ³	2.1%	22.7%	9.1%	25.2%

- 1) No additional route is needed.
- 2) Number of customers as of October 1, 2017.
- 3) Based on current residential rate of \$14.20

Similar to what NewGen did to analyze the impact for residential ratepayers, Table 5 examines the potential annual cost impact for commercial roll-off and front load customers when evaluating the overall impact of additional collection and disposal costs incurred if the alternative landfill sites are used.

Table 5
Summary - Total Commercial Cost Increase of Alternative Landfill Sites
(Collection & Disposal Costs)

Commercial Costs	Site 57 (Old Lorena Rd.)	Site 71	Site 81	Site 21
Roll-off Costs				
Existing Routes (Table 1)	\$ 56,607	\$ 267,837	\$ 84,053	\$ 347,887
Additional Routes (Table 2)	-	191,922	-	205,264
Disposal Cost (Schedule 3, line 29)	9,486	31,761	22,338	35,739
Total Incremental Cost	\$ 66,093	\$ 491,520	\$ 106,391	\$ 588,890
Total Annual Pulls	9,360	9,360	9,360	9,360
Increase Cost per Pull (\$)	\$ 7.06	\$ 52.51	\$ 11.37	\$ 62.92
Front Load Costs				
Existing Routes (Table 1)	\$ 26,410	\$ 193,643	\$ 39,215	\$ 238,460
Additional Routes (Table 2)	-	181,113	-	187,515
Disposal Cost (Schedule 3, line 25)	28,536	95,543	67,197	107,510
Total Incremental Cost	\$ 54,946	\$ 470,299	\$ 106,412	\$ 533,485
Total Annual Lifts	145,808	145,808	145,808	145,808
Increase Cost per Lift (\$)	\$ 0.38	\$ 3.23	\$ 0.73	\$ 3.66

- 1) No additional route is needed.

Summary

Based on NewGen's analysis, some general statements can be made with regard to the costs that residential and commercial customers may incur if one of the alternative landfill sites discussed in this memo were to be selected as the future landfill site for the City of Waco. However, it is critical to

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emphasize that these numbers provide only an estimate and are based on a series of operational as well as engineering assumptions.

Residential Rates:

Residential Rates would need to increase approximately \$0.30 per month, per household, if Site 57 (Old Lorena Rd.) were selected, while the other alternative landfill sites would cost an additional \$1.29 to \$3.58 per month for the residential ratepayer (Table 4). This cost incorporates ALL collection and disposal costs that are projected to be incurred by the residential customer class to utilize these landfill sites.

Commercial Front Load Rates:

It is estimated that the "cost per lift" (i.e., the cost to empty a front load container) would on average increase approximately \$0.38 per lift, if Site 57 (Old Lorena Rd.) were used, but the cost would increase anywhere from \$0.73 to \$3.66 per lift if one of the alternative sites that are further away were to be utilized (Table 5).

Commercial Roll-off Rates:

Commercial roll-off rates would increase approximately \$7 "per pull" if the waste were hauled to Site 57 (Old Lorena Rd.), but potentially need to increase approximately \$11 to \$63 per pull if hauled to one of the other alternative landfill sites (Table 5). This significant increase is due to the fact that roll-off trucks make more frequent daily trips to the landfill versus residential refuse trucks and commercial front load trucks. The greater the distance required to travel to the landfill has an exponential increase on their operating cost structure.

Tipping Fee:

The tipping fee at Site 57 (Old Lorena Rd.) would need to increase approximately \$0.86 (or slightly less than \$1) per ton, while the other alternative sites would require an increase anywhere from \$2.03 to \$3.25 per ton (Table 3). This cost is ALREADY incorporated into the residential and commercial customers' projected rate increases as described above. The tipping fee rate increase discussed here would apply directly to those customers and private haulers that bring their waste directly to the landfill for disposal.

City of Waco
Incremental Costs Associated with
Existing Routes Hauling to Alternative Landfill Sites

		Alternative Landfill Sites				
		Site 57	Site 71	Site 81	Site 21'	NOTES
Residential - Automated		(Old Lorena Rd.)				
1	Incremental Roundtrip Mileage	3.3	13.7	4.9	19.3	A
2	Days per Week	4	4	4	4	
3	Trips per Day	2	2	2	2	
4	Weeks per Year	52	52	52	52	
5	Additional Annual Mileage per Route	1,373	5,699	2,038	8,029	B
6	Miles per Gallon	2.5	2.5	2.5	2.5	C
7	Price per Gallon	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	
8	Fuel Costs per Route	\$ 1,373	\$ 5,699	\$ 2,038	\$ 8,029	D
9	Number of Existing Routes	17	17	17	17	C
10	Additional Annual Fuel Cost	\$ 23,338	\$ 96,886	\$ 34,653	\$ 136,490	E
11	Existing R&M per Route	\$ 21,909	\$ 21,909	\$ 21,909	\$ 21,909	F
12	Additional R&M (% increase due to mileage)	8.06%	33.46%	11.97%	47.14%	G
13	Additional R&M Cost per Route	\$ 1,766	\$ 7,332	\$ 2,622	\$ 10,328	H
14	Additional Annual R&M Cost	\$ 30,022	\$ 124,636	\$ 44,578	\$ 175,582	I
15	Capital Cost of Truck per Route	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	C
16	Total Capital Cost	\$ 5,950,000	\$ 5,950,000	\$ 5,950,000	\$ 5,950,000	J
17	Existing Average Useful Life (Years)	5	5	5	5	
18	Existing Annual Amortization of Truck Cost	\$ 1,190,000	\$ 1,190,000	\$ 1,190,000	\$ 1,190,000	
19	Projected Average Useful Life (Years)	5	4	5	4	K
20	Projected Annual Amortization of Truck Cost	\$ 1,190,000	\$ 1,487,500	\$ 1,190,000	\$ 1,487,500	
21	Additional Annual Amortization Cost	\$ -	\$ 297,500	\$ -	\$ 297,500	L
22	Total Additional Cost - Residential Automated	\$ 53,359	\$ 519,023	\$ 79,231	\$ 609,572	
		Site 57	Site 71	Site 81	Site 21	
Residential - Brush		(Old Lorena Rd.)				
23	Incremental Roundtrip Mileage	3.3	13.7	4.9	19.3	A
24	Days per Week	5	5	5	5	
25	Trips per Day	4	3	4	3	M
26	Weeks per Year	52	52	52	52	
27	Additional Annual Mileage per Route	3,432	10,686	5,096	15,054	B
28	Miles per Gallon	2.5	2.5	2.5	2.5	C
29	Price per Gallon	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	
30	Fuel Costs per Route	\$ 3,432	\$ 10,686	\$ 5,096	\$ 15,054	D
31	Number of Existing Routes	4	4	4	4	C
32	Additional Annual Fuel Cost	\$ 13,728	\$ 42,744	\$ 20,384	\$ 60,216	E
33	Existing R&M per Route	\$ 12,444	\$ 12,444	\$ 12,444	\$ 12,444	F
34	Additional R&M (% increase due to mileage)	21.04%	65.51%	31.24%	92.29%	G
35	Additional R&M Cost per Route	\$ 2,618	\$ 8,152	\$ 3,888	\$ 11,484	H
36	Additional Annual R&M Cost	\$ 10,472	\$ 32,607	\$ 15,550	\$ 45,936	I
37	Capital Cost of Truck per Route	\$ 280,000	\$ 280,000	\$ 280,000	\$ 280,000	C
38	Total Capital Cost	\$ 1,120,000	\$ 1,120,000	\$ 1,120,000	\$ 1,120,000	J
39	Existing Average Useful Life (Years)	4	4	4	4	
40	Existing Annual Amortization of Truck Cost	\$ 280,000	\$ 280,000	\$ 280,000	\$ 280,000	
41	Projected Average Useful Life (Years)	4	4	4	4	K
42	Projected Annual Amortization of Truck Cost	\$ 280,000	\$ 280,000	\$ 280,000	\$ 280,000	
43	Additional Annual Amortization Cost	\$ -	\$ -	\$ -	\$ -	L
44	Total Additional Cost - Residential Brush	\$ 24,200	\$ 75,351	\$ 35,934	\$ 106,152	

City of Waco
Incremental Costs Associated with
Existing Routes Hauling to Alternative Landfill Sites

	Alternative Landfill Sites				NOTES
	Site 57 (Old Lorena Rd.)	Site 71	Site 81	Site 21	
Commercial - Roll-off					
45 Incremental Roundtrip Mileage	3.3	13.7	4.9	19.3	A
46 Days per Week	5	5	5	5	
47 Trips per Day	6	5	6	5	M
48 Weeks per Year	52	52	52	52	
49 Additional Annual Mileage per Route	5,148	17,810	7,644	25,090	B
50 Miles per Gallon	2.5	2.5	2.5	2.5	C
51 Price per Gallon	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	
52 Fuel Costs per Route	\$ 5,148	\$ 17,810	\$ 7,644	\$ 25,090	D
53 Number of Existing Routes	6	6	6	6	C
54 Additional Annual Fuel Cost	\$ 30,888	\$ 106,860	\$ 45,864	\$ 150,540	E
55 Existing R&M per Route	\$ 16,635	\$ 16,635	\$ 16,635	\$ 16,635	F
56 Additional R&M (% increase due to mileage)	25.77%	89.15%	38.26%	125.59%	G
57 Additional R&M Cost per Route	\$ 4,286	\$ 14,829	\$ 6,365	\$ 20,891	H
58 Additional Annual R&M Cost	\$ 25,719	\$ 88,977	\$ 38,189	\$ 125,347	I
59 Capital Cost of Truck per Route	\$ 240,000	\$ 240,000	\$ 240,000	\$ 240,000	C
60 Total Capital Cost	\$ 1,440,000	\$ 1,440,000	\$ 1,440,000	\$ 1,440,000	J
61 Existing Average Useful Life (Years)	5	5	5	5	
62 Existing Annual Amortization of Truck Cost	\$ 288,000	\$ 288,000	\$ 288,000	\$ 288,000	
63 Projected Average Useful Life (Years)	5	4	5	4	K
64 Projected Annual Amortization of Truck Cost	\$ 288,000	\$ 360,000	\$ 288,000	\$ 360,000	
65 Additional Annual Amortization Cost	\$ -	\$ 72,000	\$ -	\$ 72,000	L
66 Total Additional Cost - Commercial Roll-Off	\$ 56,607	\$ 267,837	\$ 84,053	\$ 347,887	
Commercial - Front Load					
67 Incremental Roundtrip Mileage	3.3	13.7	4.9	19.3	A
68 Days per Week	5	5	5	5	
69 Trips per Day	2	2	2	2	
70 Weeks per Year	52	52	52	52	
71 Additional Annual Mileage per Route	1,716	7,124	2,548	10,036	B
72 Miles per Gallon	2.5	2.5	2.5	2.5	C
73 Price per Gallon	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	
74 Fuel Costs per Route	\$ 1,716	\$ 7,124	\$ 2,548	\$ 10,036	D
75 Number of Existing Routes	7	7	7	7	C
76 Additional Annual Fuel Cost	\$ 12,012	\$ 49,868	\$ 17,836	\$ 70,252	E
77 Existing R&M per Route	\$ 21,507	\$ 21,507	\$ 21,507	\$ 21,507	F
78 Additional R&M (% increase due to mileage)	9.56%	39.70%	14.20%	55.93%	G
79 Additional R&M Cost per Route	\$ 2,057	\$ 8,539	\$ 3,054	\$ 12,030	H
80 Additional Annual R&M Cost	\$ 14,398	\$ 59,775	\$ 21,379	\$ 84,208	I
81 Capital Cost of Truck per Route	\$ 240,000	\$ 240,000	\$ 240,000	\$ 240,000	C
82 Total Capital Cost	\$ 1,680,000	\$ 1,680,000	\$ 1,680,000	\$ 1,680,000	J
83 Existing Average Useful Life (Years)	5	5	5	5	
84 Existing Annual Amortization of Truck Cost	\$ 336,000	\$ 336,000	\$ 336,000	\$ 336,000	
85 Projected Average Useful Life (Years)	5	4	5	4	K
86 Projected Annual Amortization of Truck Cost	\$ 336,000	\$ 420,000	\$ 336,000	\$ 420,000	
87 Additional Annual Amortization Cost	\$ -	\$ 84,000	\$ -	\$ 84,000	L
88 Total Additional Cost - Commercial Front Load	\$ 26,410	\$ 193,643	\$ 39,215	\$ 238,460	
89 Total Additional Annual Cost - All Trucks	\$ 160,577	\$ 1,055,854	\$ 238,433	\$ 1,302,071	N

NOTES:

- 1 The impact of the railroad crossing has not been factored into the operational collection efficiencies for Site 21
- A The Incremental Roundtrip Mileage is the difference between driving roundtrip from the intersection of Hwy 6 and Hwy 84 to the entrance of the existing landfill (Site 948A) and the additional roundtrip mileage required to drive to the Alternative Landfill Sites. Example: Roundtrip to Site 21 = 31.2 miles – Roundtrip to Site 948A = 11.9 miles = Incremental Roundtrip Mileage of 19.3 miles
- B Additional Annual Mileage per Route = Incremental Roundtrip Mileage × Days per Week × Trips per Day × Weeks per Year
- C Per City staff
- D Fuel Costs per Route = Additional Annual Mileage per Route ÷ 2.5 Miles per Gallon × \$2.50 per Gallon of Diesel Fuel
- E Additional Annual Fuel Cost = Fuel Costs per Route × Number of Existing Routes
- F Existing R&M per Route from "COW Truck Costs.xls" provided by City staff
- G Additional R&M (% increase due to mileage) = Additional Annual Mileage per Route ÷ Annual Mileage per Route. Example: Additional R&M Cost per Route Residential – Automated = 8,029 additional annual mileage hauling to Site 21 / 17,031 existing annual mileage per route for Residential – Automated = 47.14%. Existing R&M Costs per Route Residential – Automated = \$21,909 × 47.14% = \$10,328
- H Additional R&M Cost per Route = Existing R&M per Route × Additional R&M (% increase due to mileage)
- I Additional Annual R&M Cost = Additional R&M Cost per Route × Number of Existing Routes
- J Total Capital Cost = Capital Cost of Truck per Route × Number of Existing Routes
- K NewGen assumed a decrease in the Average Useful Life to account for the greater distance to Site 71 and Site 21
- L Additional Annual Amortization Cost = Projected Annual Amortization of Truck Cost - Existing Annual Amortization of Truck Cost
- M NewGen assumed a decrease in trips to account for the greater distance to Site 71 and Site 21
- N Total Additional Annual Cost = Line No. 22 Residential Automated Additional Cost + Line No. 44 Residential Brush Additional Cost + Line No. 66 Commercial Roll-Off Additional Cost + Line No. 88 Commercial Front Load Additional Cost

City of Waco
Collection Costs Associated with
Additional Routes Required to Haul to Alternative Landfill Sites

		Alternative Landfill Sites				
		Site 57	Site 71	Site 81	Site 21 ¹	NOTES
Residential - Automated		(Old Lorena Rd.)				
1	Capital Cost of Truck per Route	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	A
2	Average Useful Life (Years)	5	4	5	4	B
3	Annual Amortization of Truck Cost	\$ 70,000	\$ 87,500	\$ 70,000	\$ 87,500	C
4	Annual Labor (and Benefits) per Route	\$ 66,000	\$ 66,000	\$ 66,000	\$ 66,000	A
5	Annual R&M per Route	\$ 23,675	\$ 29,241	\$ 24,531	\$ 32,237	D
6	Mileage per Route	82	82	82	82	E
7	Days per Week	4	4	4	4	
8	Weeks per Year	52	52	52	52	
9	Annual Mileage per Route	17,031	17,031	17,031	17,031	F
10	Mileage to Alternative Site					
11	Incremental Roundtrip Mileage	3.3	13.7	4.9	19.3	G
12	Days per Week	4	4	4	4	
13	Trips per Day	2	2	2	2	
14	Weeks Per Year	52	52	52	52	
15	Additional Annual Distance to Alternative Site	1,373	5,699	2,038	8,029	H
16	Total Annual Mileage	18,404	22,730	19,069	25,060	I
17	Miles per Gallon	2.5	2.5	2.5	2.5	A
18	Price per Gallon	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	
19	Total Annual Fuel Costs (Route + Alt. Site Mileage)	\$ 18,404	\$ 22,730	\$ 19,069	\$ 25,060	J
20	Total Annual Costs per Route	\$ 178,079	\$ 205,471	\$ 179,601	\$ 210,797	K
21	Number of Additional of Routes	-	2	1	2	A
22	Total Annual Costs Residential - Automated	\$ -	\$ 410,942	\$ 179,601	\$ 421,594	L
Residential - Brush		(Old Lorena Rd.)				
23	Capital Cost of Truck per Route	\$ 280,000	\$ 280,000	\$ 280,000	\$ 280,000	A
24	Average Useful Life (Years)	4	4	4	4	B
25	Annual Amortization of Truck Cost	\$ 70,000	\$ 70,000	\$ 70,000	\$ 70,000	C
26	Annual Labor (and Benefits) per Route	\$ 66,000	\$ 66,000	\$ 66,000	\$ 66,000	A
27	Annual R&M per Route	\$ 15,062	\$ 20,596	\$ 16,332	\$ 23,928	D
28	Mileage per Route	63	47	63	47	E
29	Days per Week	5	5	5	5	
30	Weeks per Year	52	52	52	52	
31	Annual Mileage per Route	16,312	12,236	16,312	12,236	F
32	Mileage to Alternative Site					
33	Incremental Roundtrip Mileage	3.3	13.7	4.9	19.3	G
34	Days per Week	5	5	5	5	
35	Trips per Day	4	3	4	3	M
36	Weeks Per Year	52	52	52	52	
37	Additional Annual Distance to Alternative Site	3,432	10,686	5,096	15,054	H
38	Total Annual Mileage	19,744	22,922	21,408	27,290	I
39	Miles per Gallon	2.5	2.5	2.5	2.5	A
40	Price per Gallon	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	
41	Total Annual Fuel Costs (Route + Alt. Site Mileage)	\$ 19,744	\$ 22,922	\$ 21,408	\$ 27,290	J
42	Total Annual Costs per Route	\$ 170,807	\$ 179,517	\$ 173,740	\$ 187,218	K
43	Number of Additional of Routes	-	2	1	2	A
44	Total Annual Costs Residential - Brush	\$ -	\$ 359,035	\$ 173,740	\$ 374,435	L

City of Waco
Collection Costs Associated with
Additional Routes Required to Haul to Alternative Landfill Sites

		Alternative Landfill Sites				
		Site 57 (Old Lorena Rd.)	Site 71	Site 81	Site 21	NOTES
Commercial - Roll-off						
45	Capital Cost of Truck per Route	\$ 240,000	\$ 240,000	\$ 240,000	\$ 240,000	A
46	Average Useful Life (Years)	5	4	5	4	B
47	Annual Amortization of Truck Cost	\$ 48,000	\$ 60,000	\$ 48,000	\$ 60,000	C
48	Annual Labor (and Benefits) per Route	\$ 66,000	\$ 66,000	\$ 66,000	\$ 66,000	A
49	Annual R&M per Route	\$ 20,921	\$ 31,464	\$ 23,000	\$ 37,526	D
50	Mileage per Route	77	64	77	64	E
51	Days per Week	5	5	5	5	
52	Weeks per Year	52	52	52	52	
53	Annual Mileage per Route	19,978	16,648	19,978	16,648	F
54	Mileage to Alternative Site					
55	Incremental Roundtrip Mileage	3.3	13.7	4.9	19.3	G
56	Days per Week	5	5	5	5	
57	Trips per Day	6	5	6	5	M
58	Weeks Per Year	52	52	52	52	
59	Additional Annual Distance to Alternative Site	5,148	17,810	7,644	25,090	H
60	Total Annual Mileage	25,126	34,458	27,622	41,738	I
61	Miles per Gallon	2.5	2.5	2.5	2.5	A
62	Price per Gallon	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	
63	Total Annual Fuel Costs (Route + Alt. Site Mileage)	\$ 25,126	\$ 34,458	\$ 27,622	\$ 41,738	J
64	Total Annual Costs per Route	\$ 160,048	\$ 191,922	\$ 164,622	\$ 205,264	K
65	Number of Additional of Routes	-	1	-	1	A
66	Total Annual Costs Commercial - Roll-off	\$ -	\$ 191,922	\$ -	\$ 205,264	L
Commercial - Front Load						
		Site 57 (Old Lorena Rd.)	Site 71	Site 81	Site 21	
67	Capital Cost of Truck per Route	\$ 240,000	\$ 240,000	\$ 240,000	\$ 240,000	A
68	Average Useful Life (Years)	5	4	5	4	B
69	Annual Amortization of Truck Cost	\$ 48,000	\$ 60,000	\$ 48,000	\$ 60,000	C
70	Annual Labor (and Benefits) per Route	\$ 66,000	\$ 66,000	\$ 66,000	\$ 66,000	A
71	Annual R&M per Route	\$ 23,564	\$ 30,046	\$ 24,561	\$ 33,537	D
72	Mileage per Route	69	69	69	69	E
73	Days per Week	5	5	5	5	
74	Weeks per Year	52	52	52	52	
75	Annual Mileage per Route	17,943	17,943	17,943	17,943	F
76	Mileage to Alternative Site					
77	Incremental Roundtrip Mileage	3.3	13.7	4.9	19.3	G
78	Days per Week	5	5	5	5	
79	Trips per Day	2	2	2	2	
80	Weeks Per Year	52	52	52	52	
81	Additional Annual Distance to Alternative Site	1,716	7,124	2,548	10,036	H
82	Total Annual Mileage	19,659	25,067	20,491	27,979	I
83	Miles per Gallon	2.5	2.5	2.5	2.5	A
84	Price per Gallon	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	
85	Total Annual Fuel Costs (Route + Alt. Site Mileage)	\$ 19,659	\$ 25,067	\$ 20,491	\$ 27,979	J
86	Total Annual Costs per Route	\$ 157,222	\$ 181,113	\$ 159,052	\$ 187,515	K
87	Number of Additional of Routes	-	1	-	1	A
88	Total Annual Costs Commercial - Front Load	\$ -	\$ 181,113	\$ -	\$ 187,515	L
89	Total Incremental Collection Costs	\$ -	\$ 1,143,012	\$ 353,341	\$ 1,188,809	N

NOTES:

- 1 The impact of the railroad crossing has not been factored into the operational collection efficiencies for Site 21
- A Per City staff
- B NewGen assumed a decrease in the Average Useful Life to account for the greater distance to Site 71 and Site 21
- C Annual Amortization = (Cost of Truck + Average Useful Life)
- D Annual R&M per Route = Existing R&M per Route + Additional R&M Cost per Route from Schedule 1
- E Mileage per Route from "COW Truck Costs.xls" provided by City staff
- F Annual Mileage per Route = Mileage per Route × Days per Week × Weeks per Year
- G The Incremental Roundtrip Mileage is the difference between driving roundtrip from the intersection of Hwy 6 and Hwy 84 to the entrance of the existing landfill (Site 948A) and the additional roundtrip mileage required to drive to the Alternative Landfill Sites. Example: Roundtrip to Site 21 = 31.2 miles – Roundtrip to Site 948A = 11.9 miles = Incremental Roundtrip Mileage of 19.3 miles
- H Additional Annual Distance to Alternative Site = Incremental Roundtrip Mileage × Days per Week × Trips per Day × Weeks per Year
- I Total Annual Mileage = Annual Mileage Per Route (F) + Additional Annual Distance to Alternative Site (H)
- J Total Annual Fuel Costs = Total Annual Mileage ÷ 2.5 Miles per Gallon × \$2.50 per Gallon of Diesel Fuel
- K Total Annual Costs per Route = Annual Amortization of Truck Costs + Annual Labor (and Benefits) per Route + Annual R&M per Route + Total Annual Fuel Costs (Route + Alt. Site Mileage)
- L Total Annual Costs = Total Annual Costs per Route (K) × Number of Additional Routes
- M NewGen assumed a decrease in trips to account for the greater distance to Site 71 and Site 21
- N Total Incremental Collection Costs = Line No. 22 Total Annual Costs Residential Automated + Line No. 44 Total Annual Costs Residential Brush + Line No. 66 Total Annual Costs Commercial Roll-off + Line No. 88 Total Annual Costs Commercial Front Load

City of Waco
Incremental Operating Capital Costs Associated
with the Alternative Landfill Sites

Schedule 3

Itemized Costs	Status Quo	Alternative Landfill Sites				NOTES
		Site 57 (Old Lorena Rd.)	Site 71	Site 81	Site 21	
1 Land Costs	\$ -	\$ 1,850,000	\$ 999,000	\$ 5,200,000	\$ 1,700,000	A
2 Infrastructure Costs	-	\$ 1,207,500	\$ 6,675,000	\$ 2,106,300	\$ 7,211,300	B
3 Total Landfill Costs	\$ -	\$ 3,057,500	\$ 7,674,000	\$ 7,306,300	\$ 8,911,300	
4 Debt Issuance to Fund Landfill Costs						
5 Bond Issuance (Years)	-	20	20	20	20	
6 Interest Rate	-	5%	5%	5%	5%	
7 Principal Amount	-	\$ 3,100,000	\$ 7,700,000	\$ 7,300,000	\$ 9,000,000	
8 Annual P&I Payment	-	\$ 248,752	\$ 617,868	\$ 585,771	\$ 722,183	
9 Additional Leachate Sewer Costs		\$ -	\$ 215,000	\$ -	\$ 215,000	C
10 Total Annual Costs	\$ -	\$ 248,752	\$ 832,868	\$ 585,771	\$ 937,183	D
11 2016 Tonnage	288,451	288,451	288,451	288,451	288,451	A
12 Price per Ton (\$)	\$ -	\$ 0.86	\$ 2.89	\$ 2.03	\$ 3.25	E
13 Allocation of 2016 Tonnage						
14 Residential	85,403	30%	30%	30%	30%	
15 Commercial Front Load	33,090	11%	11%	11%	11%	
16 Commercial Roll-off	11,000	4%	4%	4%	4%	
17 Landfill Gate Tonnage	158,958	55%	55%	55%	55%	
18 Total 2016 Tonnage	288,451	100%	100%	100%	100%	
19 Residential						
20 Allocation of Annual Cost		\$ 73,649	\$ 246,591	\$ 173,432	\$ 277,476	F
21 Number of Customers		41,591	41,591	41,591	41,591	A
22 Months per Year		12	12	12	12	
23 Residential Rate Increase (month/customer)		\$ 0.15	\$ 0.49	\$ 0.35	\$ 0.56	G
24 Commercial Front Load						
25 Allocation of Annual Cost		\$ 28,536	\$ 95,543	\$ 67,197	\$ 107,510	F
26 Number of Annual Lifts		145,808	145,808	145,808	145,808	H
27 Rate Increase per Lift (\$)		\$ 0.20	\$ 0.66	\$ 0.46	\$ 0.74	I
28 Commercial Roll-off						
29 Allocation of Annual Cost		\$ 9,486	\$ 31,761	\$ 22,338	\$ 35,739	F
30 Number of Annual Pulls		9,360	9,360	9,360	9,360	J
31 Rate Increase per Pull (\$)		\$ 1.01	\$ 3.39	\$ 2.39	\$ 3.82	K

NOTES:

- A Per City staff
 B Includes roadway, water, wastewater, and R.O.W. acquisition costs provided by engineers
 C Provided by engineers
 D Total Annual Costs = Line No. 8 Annual P&I Payment + Line No. 9 Additional Leachate Sewer Costs
 E Price per Ton = Line No. 10 Total Annual Costs (C) ÷ Line No. 11 2016 Tonnage
 F Allocation of Annual Costs = Line No. 10 Total Annual Costs × % Allocation of 2016 Tonnage found on Line No. 14 through Line No. 18
 G Residential Rate Increase = Line No. 20 Allocation of Annual Cost ÷ Line No. 21 Number of Customers ÷ Line No. 22 Months per Year
 H Number of Annual Lifts = 2,804 weekly lifts × 52 weeks per year = 145,808
 I Rate Increase per Lift = Line No. 25 Allocation of Annual Cost ÷ Line No. 26 Number of Annual Lifts
 J Number of Annual Pulls = 180 weekly lifts × 52 weeks per year = 9,360
 K Rate Increase per Pull = Line No. 29 Allocation of Annual Cost ÷ Line No. 30 Number of Annual Pulls