

**Proposed HOA Snow Removal Allocations
FY 2020-21**

HOA'S	Account #	GPS 17-18 Minutes	GPS 17-18 with 90% Policy	17-18 % Allocation	17-18 % with 90% Policy Allocation	GPS 18-19 Minutes (Curated)	GPS 18-19 with 90% Policy	18-19 % Allocation	18-19 % with 90% Policy Allocation	GPS 19-20 Minutes (Curated)	GPS 19-20 with 90% Policy	19-20 % Allocation	19-20 % with 90% Policy Allocation	Average (Last 3 Years)	Average with 90% Policy (Last 3 Years)
JUNIPER RIDGE	20113	2,761	2,485	5.9%	5.6%	4,966	4,469	5.3%	4.9%	1,965	1,769	5.2%	4.9%	5.5%	5.1%
BASE CAMP	20126	1,594	1,594	3.4%	3.6%	3,029	3,029	3.2%	3.3%	1,348	1,348	3.6%	3.7%	3.4%	3.5%
CAPLES VIEW	20135	875	875	1.9%	2.0%	1,691	1,691	1.8%	1.9%	861	861	2.3%	2.4%	2.0%	2.1%
EAST MEADOWS	20148	13,491	13,491	28.9%	30.2%	33,538	33,538	35.5%	37.1%	10,702	10,702	28.4%	29.7%	30.9%	32.3%
EDELWEISS	20151	814	814	1.7%	1.8%	933	933	1.0%	1.0%	677	677	1.8%	1.9%	1.5%	1.6%
KIRKWOOD MEADOWS	20160	16,063	14,457	34.4%	32.4%	32,711	29,440	34.6%	32.6%	13,102	11,792	34.7%	32.7%	34.6%	32.6%
LOST CABIN	20173	977	977	2.1%	2.2%	1,336	1,336	1.4%	1.5%	935	935	2.5%	2.6%	2.0%	2.1%
MEADOWSTONE	20182	335	335	0.7%	0.8%	469	469	0.5%	0.5%	225	225	0.6%	0.6%	0.6%	0.6%
PALISADES	20202	2,400	2,160	5.1%	4.8%	2,953	2,658	3.1%	2.9%	1,698	1,528	4.5%	4.2%	4.2%	4.0%
SENTINELS	20215	998	998	2.1%	2.2%	1,956	1,956	2.1%	2.2%	1,157	1,157	3.1%	3.2%	2.4%	2.5%
SENTINELS WEST	20224	1,526	1,526	3.3%	3.4%	3,155	3,155	3.3%	3.5%	1,173	1,173	3.1%	3.3%	3.2%	3.4%
SNOWCREST	20237	115	115	0.2%	0.3%	118	118	0.1%	0.1%	113	113	0.3%	0.3%	0.2%	0.2%
SUN MEADOWS 1	20240	748	748	1.6%	1.7%	792	792	0.8%	0.9%	455	455	1.2%	1.3%	1.2%	1.3%
SUN MEADOWS 2	20259	128	128	0.3%	0.3%	242	242	0.3%	0.3%	435	435	1.2%	1.2%	0.6%	0.6%
SUN MEADOWS 3 & 4	20262	388	388	0.8%	0.9%	356	356	0.4%	0.4%	73	73	0.2%	0.2%	0.5%	0.5%
THE MEADOWS	20271	710	710	1.5%	1.6%	1,249	1,249	1.3%	1.4%	561	561	1.5%	1.6%	1.4%	1.5%
WHISKEY RUN	20284	836	836	1.8%	1.9%	1,380	1,380	1.5%	1.5%	443	443	1.2%	1.2%	1.5%	1.5%
THIMBLEWOOD	20293	322	322	0.7%	0.7%	638	638	0.7%	0.7%	391	391	1.0%	1.1%	0.8%	0.8%
TIMBER RIDGE	20304	530	530	1.1%	1.2%	694	694	0.7%	0.8%	545	545	1.4%	1.5%	1.1%	1.2%
TIMBER CREEK	20313	227	227	0.5%	0.5%	403	403	0.4%	0.4%	220	220	0.6%	0.6%	0.5%	0.5%
UNIT 3	20326	29	29	0.1%	0.1%	182	182	0.2%	0.2%	125	125	0.3%	0.3%	0.2%	0.2%
THE LODGE	20335	865	865	1.9%	1.9%	1,702	1,702	1.8%	1.9%	538	538	1.4%	1.5%	1.7%	1.8%
Subtotal HOAs		46,732	44,610			94,493	90,430			37,742	36,066				

**HOA Historic Contract Value Comparisons
FY 2020-21**

HOA'S	Account #	16-17 Contract Amount	17-18 Contract Amount	18-19 Contract Amount*	19-20 Contract Amount	20-21 Contract Amount (3 Year Avg.)	20-21 Contract Amount with 90% Policy (3 Year Avg.)
JUNIPER RIDGE	20113	\$ 15,766	\$ 15,766	\$ 20,496	\$ 35,117	\$ 30,900	\$ 28,650
BASE CAMP	20126	\$ 22,444	\$ 22,444	\$ 20,102	\$ 19,035	\$ 19,100	\$ 19,660
CAPLES VIEW	20135	\$ 9,450	\$ 9,450	\$ 9,144	\$ 10,133	\$ 11,240	\$ 11,800
EAST MEADOWS	20148	\$ 140,648	\$ 140,648	\$ 139,620	\$ 166,069	\$ 173,610	\$ 181,480
EDELWEISS	20151	\$ 9,776	\$ 9,776	\$ 9,039	\$ 8,195	\$ 8,430	\$ 8,990
KIRKWOOD MEADOWS	20160	\$ 87,098	\$ 87,098	\$ 113,227	\$ 175,454	\$ 194,400	\$ 183,160
LOST CABIN	20173	\$ 16,559	\$ 16,559	\$ 14,545	\$ 10,442	\$ 11,240	\$ 11,800
MEADOWSTONE	20182	\$ 5,985	\$ 5,985	\$ 3,950	\$ 3,195	\$ 3,370	\$ 3,370
PALISADES	20202	\$ 18,522	\$ 18,522	\$ 24,079	\$ 25,145	\$ 23,600	\$ 22,470
SENTINELS	20215	\$ 11,521	\$ 11,521	\$ 12,136	\$ 12,773	\$ 13,480	\$ 14,050
SENTINELS WEST	20224	\$ 15,461	\$ 19,461	\$ 17,652	\$ 17,773	\$ 17,980	\$ 19,100
SNOWCREST	20237	\$ 8,190	\$ 4,914	\$ 1,432	\$ 1,027	\$ 1,120	\$ 1,120
SUN MEADOWS 1	20240	\$ 5,843	\$ 5,843	\$ 7,596	\$ 6,926	\$ 6,740	\$ 7,300
SUN MEADOWS 2	20259	\$ 4,190	\$ 4,190	\$ 2,183	\$ 1,677	\$ 3,370	\$ 3,370
SUN MEADOWS 3 &4	20262	\$ 5,287	\$ 5,287	\$ 4,814	\$ 2,120	\$ 2,810	\$ 2,810
THE MEADOWS	20271	\$ 11,025	\$ 11,025	\$ 8,462	\$ 9,086	\$ 7,870	\$ 8,430
WHISKEY RUN	20284	\$ 17,325	\$ 12,127	\$ 13,203	\$ 11,500	\$ 8,430	\$ 8,430
THIMBLEWOOD	20293	\$ 4,738	\$ 4,738	\$ 3,984	\$ 4,144	\$ 4,490	\$ 4,490
TIMBER RIDGE	20304	\$ 13,766	\$ 13,766	\$ 9,919	\$ 5,890	\$ 6,180	\$ 6,740
TIMBER CREEK	20313	\$ 3,491	\$ 3,491	\$ 2,390	\$ 2,404	\$ 2,810	\$ 2,810
UNIT 3	20326	\$ 1,197	\$ 1,197	\$ 702	\$ 1,087	\$ 1,120	\$ 1,120
THE LODGE	20335	\$ 10,710	\$ 10,710	\$ 10,104	\$ 10,643	\$ 9,550	\$ 10,110
Subtotal HOAs		\$ 438,989	\$ 434,518	\$ 448,779	\$ 539,835	\$ 561,840	\$ 561,260
Subtotal Driveways					\$ 73,400	\$ 76,600	\$ 76,600
Subtotal KMPUD					\$ 67,808	\$ 61,034	\$ 61,034
					\$ 678,081	\$ 699,474	\$ 698,894

*Variation in Total Pricing is due to rounding % allocations to the nearest Tenth decimal place.

**Driveway Historic Contract Value Comparisons
FY 2020-21**

Account #	16-17 Contract Amount	17-18 Contract Amount	18-19 Contract Amount	19-20 Derived Average Pricing	20-21 Derived Average Pricing	\$ Difference 19-20 vs. 20-21
10195	\$ 930	\$ 1,025	\$ 1,146	\$ 1,600	\$ 1,800	\$ 200
10342	\$ 920	\$ 918	\$ 859	\$ 950	\$ 950	\$ -
10364	\$ 775	\$ 854	\$ 969	\$ 900	\$ 900	\$ -
10606	\$ -	\$ -	\$ 800	\$ 1,000	\$ 1,050	\$ 50
11038	\$ 875	\$ 873	\$ 559	\$ 1,600	\$ 1,800	\$ 200
11472	\$ 775	\$ 773	\$ 1,005	\$ 950	\$ 1,150	\$ 200
11530	\$ 775	\$ 773	\$ 804	\$ 1,250	\$ 1,350	\$ 100
11761	\$ 815	\$ 899	\$ 1,169	\$ 1,350	\$ 1,550	\$ 200
11774/16120	\$ 800	\$ 798	\$ 575	\$ 1,250	\$ 1,200	\$ (50)
11783	\$ 750	\$ 827	\$ 1,075	\$ 1,000	\$ 850	\$ (150)
11850/13492	\$ 800	\$ 882	\$ 1,147	\$ 1,400	\$ 1,150	\$ (250)
11872	\$ 775	\$ 773	\$ 515	\$ 850	\$ 900	\$ 50
12004	\$ 775	\$ 773	\$ 553	\$ 900	\$ 850	\$ (50)
12393/11238	\$ 1,550	\$ 1,567	\$ 1,426	\$ 1,700	\$ 1,750	\$ 50
12482	\$ 775	\$ 854	\$ 1,110	\$ 1,250	\$ 1,100	\$ (150)
12524	\$ 1,030	\$ 1,027	\$ 1,053	\$ 1,350	\$ 1,550	\$ 200
12613	\$ 775	\$ 854	\$ 1,089	\$ 1,000	\$ 900	\$ (100)
12682	\$ 775	\$ 814	\$ 952	\$ 1,000	\$ 950	\$ (50)
12895/11441	\$ 2,448	\$ 2,442	\$ 2,584	\$ 3,450	\$ 3,550	\$ 100
13245	\$ 775	\$ 773	\$ 774	\$ 1,150	\$ 950	\$ (200)

**Driveway Historic Contract Value Comparisons
FY 2020-21**

Account #	16-17 Contract Amount	17-18 Contract Amount	18-19 Contract Amount	19-20 Derived Average Pricing	20-21 Derived Average Pricing	\$ Difference 19-20 vs. 20-21
13303	\$ 1,030	\$ 1,027	\$ 918	\$ 1,450	\$ 1,300	\$ (150)
13534	\$ 875	\$ 965	\$ 1,255	\$ 950	\$ 950	\$ -
13661	\$ 775	\$ 854	\$ 1,110	\$ 1,150	\$ 1,050	\$ (100)
14113/10075	\$ 388	\$ 387	\$ 554	\$ 1,000	\$ 1,050	\$ 50
14471	\$ 775	\$ 773	\$ 561	\$ 800	\$ 950	\$ 150
14646	\$ 775	\$ 810	\$ 1,053	\$ 950	\$ 1,000	\$ 50
14880	\$ 715	\$ 788	\$ 942	\$ 1,150	\$ 1,200	\$ 50
14982	\$ 825	\$ 823	\$ 672	\$ 1,050	\$ 1,200	\$ 150
15009	\$ 775	\$ 773	\$ 409	\$ 800	\$ 750	\$ (50)
15212	\$ 775	\$ 854	\$ 1,110	\$ 1,550	\$ 1,400	\$ (150)
15281	\$ 855	\$ 853	\$ 818	\$ 1,000	\$ 1,100	\$ 100
15865	\$ 685	\$ 755	\$ 914	\$ 1,150	\$ 900	\$ (250)
15881	\$ 915	\$ 913	\$ 1,179	\$ 1,000	\$ 950	\$ (50)
15954	\$ 775	\$ 814	\$ 411	\$ 900	\$ 1,100	\$ 200
16000	\$ 825	\$ 823	\$ 563	\$ 900	\$ 900	\$ -
16180/13883	\$ 1,550	\$ 1,709	\$ 2,088	\$ 3,600	\$ 3,200	\$ (400)
16580	\$ 775	\$ 854	\$ 1,110	\$ 1,150	\$ 1,100	\$ (50)
16691	\$ 775	\$ 773	\$ 448	\$ 800	\$ 850	\$ 50
16711	\$ 900	\$ 992	\$ 1,290	\$ 1,600	\$ 1,650	\$ 50
17365	\$ 920	\$ 918	\$ 991	\$ 1,600	\$ 1,550	\$ (50)

**Driveway Historic Contract Value Comparisons
FY 2020-21**

Account #	16-17 Contract Amount	17-18 Contract Amount	18-19 Contract Amount	19-20 Derived Average Pricing	20-21 Derived Average Pricing	\$ Difference 19-20 vs. 20-21
17374	\$ 775	\$ 773	\$ 515	\$ 1,000	\$ 1,300	\$ 300
18695	\$ 775	\$ 854	\$ 1,110	\$ 1,100	\$ 1,150	\$ 50
18728/10773	\$ 1,240	\$ 1,237	\$ 1,334	\$ 1,550	\$ 2,200	\$ 650
18953	\$ 875	\$ 965	\$ 1,183	\$ 1,300	\$ 1,450	\$ 150
19138	\$ 685	\$ 683	\$ 687	\$ 950	\$ 900	\$ (50)
19163	\$ 400	\$ 399	\$ 519	\$ 750	\$ 800	\$ 50
19541	\$ 775	\$ 773	\$ 897	\$ 1,000	\$ 1,100	\$ 100
19785	\$ 875	\$ 965	\$ 1,022	\$ 1,150	\$ 1,300	\$ 150
20002	\$ 1,030	\$ 1,136	\$ 1,477	\$ 1,850	\$ 2,200	\$ 350
20348	\$ 775	\$ 855	\$ 905	\$ 1,150	\$ 1,300	\$ 150
20548	\$ 775	\$ 814	\$ 667	\$ 1,150	\$ 1,400	\$ 250
20602	\$ 775	\$ 773	\$ 494	\$ 700	\$ 1,000	\$ 300
20637	\$ 825	\$ 910	\$ 1,183	\$ 1,500	\$ 1,550	\$ 50
21183	\$ -	\$ -	\$ 975	\$ 1,250	\$ 1,300	\$ 50
21358	\$ 875	\$ 873	\$ 516	\$ 1,050	\$ 1,600	\$ 550
21425	\$ 920	\$ 918	\$ 788	\$ 1,200	\$ 1,350	\$ 150
21472	\$ 900	\$ 898	\$ 898	\$ 1,050	\$ 1,100	\$ 50
21847/14760 (13683)	\$ 1,630	\$ 1,798	\$ 2,336	\$ 2,700	\$ 3,200	\$ 500
Subtotal	\$ 49,481	\$ 51,581	\$ 56,066	\$ 72,850	\$ 76,600	

Recommendations for Changes for Snow Removal Contracts

This document represents the Snow Removal Team's and my personal recommendations for managing snow removal contracts for 2020-2021.

Summary of Recommendations:

1. Treat snow removal like other services with a well defined, documented procedure with a major review every three years.
2. Re-evaluate the allocating of costs to contracts every three years. The percentages based on the average from the last three years would be used through the 2022 - 2023 season. New contracts would be estimated and added in.
3. Limit operator note sheets to mechanical problems and other extraordinary events.
4. Establish defined expectations based on the expected snow conditions for a plow period. A plow period is one or more continuous operator shifts. For example, under "normal" conditions, we would expect every HOA and driveway under contract to be plowed at least once - unless there is some other pre-arrangement (i.e. East Meadows).
5. Develop a system of automated exception reporting that is reviewed after every plow period if an exception is reported. Exceptions should be minimal so this review should not require significant time. Exceptions (for example, a drive plow that exceeds the historical maximum by X percent) should be researched and manually curated if necessary. Another exception would be a missed contract under "normal" conditions.

Discussion

KMPUD has two methods for allocating costs and contract prices for 2020 - 2021 are based on these methods. For the 2020-2021 season these methods are based on the three year's worth of data from Oct 2017 - May 2020. For HOAs we take the time spend in an HOA divided by the total time we spend all HOAs. These times exclude times spent in the individual driveway contracts. For driveways we charge based on the "derived average" time to plow a driveway. This approximation reduces the variation that would occur from missed GPS entries if we tried to calculate driveways the same way we do HOAs. (see definition below for more details).

The purpose of curation should NOT be to attempt to verify every GPS calculation for the HOAs. Rather it should be to research anomalies (i.e. exceptions from the expected activity). We have enough data after three years to detect anomalies using computer algorithms and flag them for review after a plow period. Our goal should be to examine the data and customer feedback to improve our ability to identify exceptions and resolve them within a few days of the event. Anomalies can be based on:

1. The snow conditions. The proposed snow conditions are: Normal, Heavy - Emergency, Catch-up, Clean-up.
2. Plow periods. A plow period is one of more consecutive operator shifts that represent the completion of all plowing for that period. We define the activity level that starts a plow period and the in-activity level that marks its completion.
3. Within each plow period given the snow conditions, we use algorithms and staff or board review of data to detect anomalies that will require human investigation if the exception is material to the performance of the contract and is atypical. For example, certain driveways

are less likely to be reported by GPS. Missing one would not be significant but missing several in a row would be.

Approach for Allocation of Costs Among HOA Snow Removal Contracts

Introduction

The District's goal is to equitably allocate costs for snow removal services among HOA customers based on the time required to perform the service. Time is measured based on GPS events of when equipment enters a contract area and when it exits. The purpose of this document is to describe the approach the District uses to determine proportional time spent in HOAs and the annual contract price.

Since fiscal year 2016-17, the District determines the total time spent in an HOA via GPS units mounted on each piece of District equipment. When using GPS data, we call an "event" the time between entering an HOA's "polygon" and when we exit. The polygons have been adjusted over time based on observations and to increase the likelihood of capturing an event.

Proportional Pricing

The total snow removal budget is determined annually as part of the overall District budget, and those costs are split between the HOAs, Private Driveways, and the District.

HOAs with private driveway contracts have their GPS minutes spent in their HOA reduced by 10% to account for driveway travel time and reallocated among the remaining HOAs. % allocations are rounded to the nearest tenth decimal place. These adjusted allocations from the most recent three (3) years are then averaged, rounded to the nearest tenth decimal place, and this average percentage allocation is the bases for the cost allocation to each HOA contract, rounded to the nearest \$10.

Approach for Allocation of Costs Among Private Driveway Snow Removal Contracts

Introduction

As with Homeowner Associations, the District's goal is to equitably allocate costs for snow removal services among private driveway customers based on the time required to perform the service. Time is measured based on GPS events of when equipment enters a driveway and when it exits. Because of the small size of the driveways compared to the overall accuracy of GPS, we do not expect 100% accuracy. The purpose of this document is to describe the approach the District uses to determine proportional time spent in driveways and the annual contract price. The District determines the average time it takes to plow a driveway, assumes all driveways are plowed a similar number of times and allocates costs proportional to the average time. By using the average rather than the total time, the computation is not dependent on capturing every driveway plow.

When using GPS data, we call an "event" the time between entering a driveway's "polygon" and when we exit. The polygons are larger than the driveway and extend partially into the street. The polygons have been adjusted over time based on observations and to increase the likelihood of capturing an event. Sub-events are merged if they are within a short time of each other (currently we use 20 minutes). Thus, a trackless plow can go in and out of a driveway's polygon several times in the plowing process but it produces a single event whose elapsed time is the sum of the times of these sub-events.

Due to accuracy issues, we do not take the sum of events per driveway reported by GPS and proportionally allocate costs. The reasons for this include:

1. Sometime a driveway plowing is missed by GPS. Some locations are historically more likely to be missed than others. When it is missed, it is possible that extra time ends up within the HOA or a neighboring driveway.
2. The District cannot curate every driveway event as we do with HOAs due to the volume of data and small size of the driveways. By contrast, beginning in the 2018-2019 season the District curates all HOA plowing activity through a manual inspection of all data after every storm.

The District's approach for driveways is to use a reliable subset of available data to produce a "**derived average**" based on the data that is objectively the most reliable. By using a derived average per driveway rather than the sum of all driveway times, we are making an initial assumption that all driveways are plowed a similar number of times over the course of a season. If there is an intentional or known reduction or increase in plowing events among specific driveways, this is tracked and adjustments made. For example, sometimes a driveway is intentionally not plowed, e.g. when there are cars or other obstacles in the driveway.

Derived Average

The approach for a derived average is to remove the plowing events that are “too short” or “too long”. After completing statistical analysis on all of the 60 driveways plowed over the last three years, the District determined that an event under 45 seconds was highly likely to be equipment working on the street and not part of a driveway plow. In addition, under “average snow conditions” the larger, more complicated driveways can usually be plowed within 6 minutes.

The derived average is computed in two steps. The first is to determine the initial average driveway plowing time for driveways completed between 45 seconds and 6 minutes. We then multiple that average times by 3. That becomes the maximum time of the range. District experience has shown that very large event times are usually an indication of a problem or work unrelated to the normal plowing. By ignoring those extra long times, we avoid penalizing the driveway contracts for something out of the ordinary. After looking a variety of driveways, we found that 3 times the average tended to exclude outliers and include most common situations.

The second step is to compute the average plow time for events between 45 seconds and three times the average computed above. This is the derived average.

The advantage of derived averages is we can find examples for every driveway over the last three seasons that are reasonably likely to be accurate.

Proportional Pricing

Having produced a reliable derived average, the District takes the total budgeted driveway contract revenue and allocates it proportionally based on derived average as a percentage of the sum of all derived averages. The results are then rounded to the nearest \$50.

Driveways that were added during the 2018-2019 season have too few events to be meaningful. There were three driveways that fell into that category. For those driveways, District staff selected a driveway that is most similar in size and complexity and in the same or nearby neighborhood and uses that driveway’s derived average.

Some driveways are shared by two locations. For the purpose of computing costs and times, the driveway is treated as one unit. The cost is then split between the two locations.

If a location changes ownership during the season, the new owner takes over the contract and the previous years’ data associated with the driveway.

STAFF REPORT

Electric Power Supply Contract

Requested Action:

That the Committee recommend Board approval for a three-year extension on the Shell Energy North America power supply and schedule coordinator contracts.

Background:

For the years 2018-2020, the District has purchased power off the day-ahead market through contracts with Shell Energy North America (Shell). Under these contracts, the District pays a commodity adder of \$1.00/MWh and a schedule coordinator fee of \$5,000/month. The contracts will expire on December 31, 2020. District staff requested a proposal to extend the current contract under the same terms, and Shell has offered a three-year extension through an amendment to the current contract. This extension would run through December 31, 2023.

The District has received a proposed allocation from the Western Area Power Association that would provide an estimated 1,268 MWh of low-cost hydro power each year from federally owned dams starting in 2025. This would cover approximately 19% of KMPUD's annual retail sales. Shell has confirmed that once the WAPA power contract is executed they would be able to provide schedule coordinator services and a contract to provide the balance of the District's power supply needs.

Fiscal Impact:

None. The power supply costs would continue to reflect the day-ahead-market prices plus the existing commodity adder of \$1.00/MWh through December 31, 2023.

Prepared By:

Brandi Benson