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January 31, 2023

Timothy Allen
Retirement System Director and Chief Investment Officer
Tacoma Employees' Retirement System
3628 South 35th Street
Tacoma, WA 98409

Re: July 2023 Cost-of-Living Adjustments

Dear Tim:

We have calculated the COLAs to be applied to member benefits in July 2023. The COLAs are summarized as follows.

Date of Retirement	COLA	Percent of Original Purchasing Power*
On or before July 1, 1978	8.810%	50.0%
July 2, 1978 through July 1, 1979	5.198%	50.0%
July 2, 1979, through July 1, 2022	2.125%	52.8% - 100.0%
After July 1, 2022	No COLA	100.0%

* Loss of purchasing power is not measured until a full year has passed since retirement.

Summary of CPI increases

The Seattle-Tacoma-Bremerton CPI-W experienced a 8.810% increase from 865.195 in 2021 to 941.416 in 2022. Therefore, all members who retired on or before July 1, 2022 are eligible for the full 2.125% COLA, based on TMC Section 1.30.665. Per Section 1.30.665A the CPI-W increase is rounded to the nearest 0.05 of one percent but not more than 2.125%. Two exhibits detailing the development of the COLA factors are enclosed with this letter.

Members with retirement dates from July 2, 1978 through July 1, 1979 will be included in the 50% restoration for 2023 and will have their benefits increased by 5.198%. Their resulting purchasing power will be 50% of their original purchasing power after the increase in July 2023.

Members with retirement dates on or before July 1, 1978 were included in the 50% restorations for 2009 and 2022 and will have their benefits increased by 8.810%. Their resulting purchasing power will be 50% of their original purchasing power after the increase in July 2023.

Calculations

The calculations were performed consistently with the interpretation of TMC Section 1.30.665 used in prior years. This letter provides the COLAs and describes their calculation. The letter is sent early to give the Board time to review the COLAs. In June or July, the System will calculate the increase in each member's retirement benefit using the appropriate COLA factor based on the date of the original member's retirement. We will be available to review those calculations and to answer any questions the System may have at that time.

The COLAs are based on the Seattle-Tacoma-Bremerton Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W), as specified in the law. This letter covers a great amount of detail. Most of this detail is a restatement of explanations provided in past years. The description provides a thorough documentation of the COLA process.

Examples

Example 1: members retired in June 2003. These members will be receiving their twentieth COLAs. The CPI increases have been 1.42%, 1.57%, 3.02%, 3.73%, 3.79%, 4.48%, 0.44%, 0.78%, 3.17%, 2.54%, 1.22%, 1.93%, 0.91%, 2.28%, 3.32%, 3.36%, 2.14%, 1.90%, 4.75%, and 8.81% respectively. These members have received COLAs of 1.400% in 2004, 1.600% in 2005 and 2.125% for each year from 2006 through 2022. These members will receive a 2.125% COLA in 2023.

Total COLA and CPI increases including 2023:

$$\begin{aligned} \text{CPI increases} &= 1.0142 \times 1.0157 \times 1.0302 \times 1.0373 \times 1.0379 \times 1.0448 \times 1.0044 \times 1.0078 \\ &\quad \times 1.0317 \times 1.0254 \times 1.0122 \times 1.0193 \times 1.0091 \times 1.0228 \times 1.0332 \times 1.0336 \\ &\quad \times 1.0214 \times 1.0190 \times 1.0475 \times 1.0881 = 1.72468 \text{ (Column 5 of Exhibit 1)} \\ &= 941.416/545.850 \end{aligned}$$

$$\text{COLA increases} = 1.01400 \times 1.01600 \times 1.02125^{18} = 1.5042$$

Since the cumulative COLA increases including the 2.125% COLA in 2023 are less than the cumulative CPI increases, these members get the entire 2.125% COLA.

Example 2: members retired in June 2022. These members will be receiving their COLAs. The CPI increase was 8.81%. Since the code states the COLA is the minimum of 2.125% and the CPI rounded to the nearest 0.05%, these members will receive a 2.125% COLA.

Example 3: members retired in June 2019.

$$\text{CPI increases} = 1.0214 \times 1.0190 \times 1.0475 \times 1.0881 = 1.18633 \text{ (Column 5 of Exhibit 1)}$$

$$\begin{aligned} \text{COLA increases} &= 1.02125 \times 1.0190 \times 1.02125 = 1.06277 \text{ prior to 2023 adjustment} \\ &\quad \text{(Column 8 of Exhibit 1). Including a 2.125\% increase for 2023 would} \\ &\quad \text{result in a total of } 1.08535 = 1.06277 \times 1.02125. \end{aligned}$$

Since the cumulative COLA increases including the 2.125% COLA in 2023 (1.08535) are less than the cumulative CPI increases (1.18633), these members will receive the entire 2.125% COLA.

Overview of COLAs

Annual COLAs for TERS are granted in July to all members who retired on or before July 1 of the preceding year. The COLAs are based on the Seattle-Tacoma-Bellevue Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) for the two years preceding the year in which the COLA is granted. Therefore, a member retiring in June of 2022 will receive the first COLA in July of 2023, and it will be based on the increase in CPI-W from 2021 to 2022. A member retiring in August of 2022 will receive the first COLA in July of 2024, and it will be based on the increase in CPI-W from 2022 to 2023.

The generalizations are:

- All COLAs are based on increases in the CPI for the period ending in the year preceding the COLA.
- The first COLA for members who retired on or before July 1 is based on increases in the CPI from the calendar year prior to retirement to the calendar year of retirement.
- The first COLA for members who retired after July 1 is based on increases in the CPI from the calendar year of retirement to the calendar year after retirement.

Calculation of Factors

The enclosed Exhibit 1 “Factors Applied in Calculating the 2023 COLA Increases” uses 17 columns to calculate the COLA factors. Consistent with the previous discussion, the factors will be different for members who retired in the first or second half of the calendar year. A complete description of the columns follows:

1. The first three columns show the Seattle-Tacoma-Bellevue CPI-W. The average value given in Column 3 is the beginning point for the calculation.
2. Column 4 documents the annual increase in the CPI.
3. Columns 5 and 6 document the cumulative increase in the CPI to be used in calculating the 50% restoration benefits and maximum accumulated COLA. As an example, if a member retired in March of 1980, the member’s 2023 restoration COLA and maximum accumulated COLA would be based on increases in the CPI from 1979 (214.600) to 2022 (941.416). The corresponding factor is $941.416 / 214.600 = 4.38684$. This number is shown in Column 5.
4. Column 7 documents the general TERS COLA given in each year. Some retirees have received less than this amount, as benefits are limited to 100% of original purchasing power.
5. Columns 8 and 9 document the cumulative annual COLAs granted prior to the 2023 COLA. They ignore the effect of any restorations of purchasing power. As an example, members retiring in March of 1980 received the first COLA in July of 1981, and as of June 2023 have

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received sixteen 1.75% COLAs (1981 – 1996), four 2.00% COLAs (1997-2000), and twenty-two 2.125% COLAs (2001-2022) for a cumulative increase of $1.0175^{16} \times 1.02^4 \times 1.02125^{22} = 2.26912$. This number is shown in Column 8. In 2003 to 2005, in 2010 to 2011, in 2014 to 2016, and in 2021, some recent retirees were not eligible for the full 2.125% COLA due to inflation less than 2.125%. Exhibit 2 documents how these COLAs less than 2.125% combined to provide the cumulative COLAs shown in Columns 8 and 9.

6. Columns 10 and 11 document the maximum accumulated COLA which represents the magnitude of accumulated CPI-W increases over the cumulative TERS COLA increases. The maximum accumulated COLA would restore the member to 100% of original purchasing power. Note that these are rounded to the nearest 0.05%. This is used to determine whether or not the full 2.125% increase can be granted under Section 1.30.665C.
7. Columns 12 and 13 document the percent of original purchasing power which members have before the July 1, 2023 COLA based on the CPI measures used to calculate the 2023 COLA. As an example, if a member retired in March of 1980, the cumulative increase in the CPI (Column 5) has been 4.38684 while the member's cumulative COLA increases (Column 8) have been 2.26912. The combined effect is that the member's benefit now provides $2.26912 / 4.38684 = 51.726\%$ of its original purchasing power. This number is shown in Column 12.

Prior restorations are included in these calculations. Members who were included in the prior 50% restoration are currently receiving 45.952% of their original purchasing power as seen in the bottom of Columns 12 and 13.

8. Columns 14 and 15 show the COLA factor to be applied to the portion of the current retirement benefit that is subject to escalation. Due to the CPI increasing by 8.81% this year, all members who retired on or before July 1, 2022 will receive the greater of (a) the 2.125% increase and (b) the COLA to restore them to 50% of their purchasing power.
9. Columns 16 and 17 show the Percent of Original Purchasing Power after the July 2023 COLA increases. All members have at least 50% of their original purchasing power. Members retiring on or before July 1, 1979 will have 50.000% of their original purchasing power. A restoration of purchasing power increase will be required this year. In some years, some members may be slightly above or below the 100% mark since the COLAs are rounded to the nearest 0.05%.

Caveats and Certification

Milliman's work product was prepared exclusively for the use or benefit of the Tacoma Employees' Retirement System for a specific and limited purpose. It is not for the use or benefit of any third party for any purpose. Any third party recipient of Milliman's work product who desires professional guidance should not rely upon Milliman's work product, but should engage qualified professionals for advice appropriate to its own specific needs. Any distribution of this letter must be in its entirety, unless prior written consent from Milliman is obtained.

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The consultants who worked on this assignment are retirement actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

The signing actuary is independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, I hereby certify that, to the best of my knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. I am a member of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

If you have any questions, feel free to contact me.

Sincerely,



Daniel R. Wade, FSA, EA, MAAA
Consulting Actuary

DRW/va

Attachments

cc: Cathy Marx (w/ Attachments)
Julie Smith (w/ Attachments)

Tacoma Employees' Retirement System Factors Applied in Calculating the 2023 COLA Increases

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
	AVERAGE CPI-W URBAN WAGE, CLERICAL SEATTLE (All Items 1967 = 100)			Annual CPI Increase	(Cumulative Increase in CPI at 2023 based on year w/ prior 6/30) CPI(2022)/CPI(T)		Tacoma COLA given on 7/1 of Year *	Cumulative Tacoma COLA @ 6/30/2023 *		Maximum Accumulated COLA **		Percent of Original Purchasing Power @ 6/30/2023 **		Total COLA Factor at 7/2023 with 50% Minimum ROPP		Percent of Original Purchasing Power @ 7/1/2023 **	
Ret Year	1st Half	2nd Half	Avg		DOR	DOR		DOR	DOR	DOR	DOR	DOR	DOR	DOR	DOR	DOR	DOR
					<= 7/1	>=7/2		<= 7/1	>=7/2	<= 7/1	>=7/2	<= 7/1	>=7/2	<= 7/1	>=7/2	<= 7/1	>=7/2
2023					1.00000	N/A	2.125%	1.00000	N/A	1.0000	N/A	100.000%	N/A	1.00000	N/A	100.000%	N/A
2022			941.416	8.81%	1.08810	1.00000	2.125%	1.00000	1.00000	1.0880	1.0000	91.904%	100.000%	1.02125	1.00000	93.857%	100.000%
2021			865.195	4.75%	1.13978	1.08810	2.125%	1.02125	1.00000	1.1160	1.0880	89.600%	91.904%	1.02125	1.02125	91.504%	93.857%
2020			825.961	1.90%	1.16149	1.13978	2.125%	1.04065	1.02125	1.1160	1.1160	89.597%	89.600%	1.02125	1.02125	91.501%	91.504%
2019			810.526	2.14%	1.18633	1.16149	2.125%	1.06277	1.04065	1.1165	1.1160	89.585%	89.597%	1.02125	1.02125	91.488%	91.501%
2018			793.554	3.36%	1.22622	1.18633	2.125%	1.08775	1.06277	1.1275	1.1165	88.708%	89.585%	1.02125	1.02125	90.593%	91.488%
2017			767.741	3.32%	1.26696	1.22622	2.125%	1.11086	1.08775	1.1405	1.1275	87.679%	88.708%	1.02125	1.02125	89.543%	90.593%
2016			743.051	2.28%	1.29588	1.26696	2.125%	1.13447	1.11086	1.1425	1.1405	87.544%	87.679%	1.02125	1.02125	89.405%	89.543%
2015			726.470	0.91%	1.30763	1.29588	2.125%	1.14468	1.13447	1.1425	1.1425	87.539%	87.544%	1.02125	1.02125	89.399%	89.405%
2014			719.942	1.93%	1.33290	1.30763	2.125%	1.16700	1.14468	1.1420	1.1425	87.553%	87.539%	1.02125	1.02125	89.414%	89.399%
2013			706.291	1.22%	1.34915	1.33290	2.125%	1.18100	1.16700	1.1425	1.1420	87.537%	87.553%	1.02125	1.02125	89.397%	89.414%
2012			697.784	2.54%	1.38341	1.34915	2.125%	1.21087	1.18100	1.1425	1.1425	87.528%	87.537%	1.02125	1.02125	89.388%	89.397%
2011			680.504	3.17%	1.42728	1.38341	2.125%	1.24944	1.21087	1.1425	1.1425	87.540%	87.528%	1.02125	1.02125	89.400%	89.388%
2010			659.589	0.78%	1.43844	1.42728	2.125%	1.25944	1.24944	1.1420	1.1425	87.556%	87.540%	1.02125	1.02125	89.417%	89.400%
2009			654.472	0.44%	1.44476	1.43844	2.125%	1.26510	1.25944	1.1420	1.1420	87.565%	87.556%	1.02125	1.02125	89.426%	89.417%
2008			651.608	4.48%	1.50953	1.44476	2.125%	1.32135	1.26510	1.1425	1.1420	87.534%	87.565%	1.02125	1.02125	89.394%	89.426%
2007			623.650	3.79%	1.56668	1.50953	2.125%	1.37082	1.32135	1.1430	1.1425	87.499%	87.534%	1.02125	1.02125	89.358%	89.394%
2006			600.900	3.73%	1.62509	1.56668	2.125%	1.39995	1.37082	1.1610	1.1430	86.146%	87.499%	1.02125	1.02125	87.977%	89.358%
2005			579.300	3.02%	1.67422	1.62509	2.125%	1.42970	1.39995	1.1710	1.1610	85.395%	86.146%	1.02125	1.02125	87.209%	87.977%
2004			562.300	1.57%	1.70053	1.67422	2.125%	1.45186	1.42970	1.1715	1.1710	85.377%	85.395%	1.02125	1.02125	87.191%	87.209%
2003			553.600	1.42%	1.72468	1.70053	2.125%	1.47291	1.45186	1.1710	1.1715	85.402%	85.377%	1.02125	1.02125	87.217%	87.191%
2002	543.2	548.5	545.850	1.80%	1.75572	1.72468	2.125%	1.49942	1.47291	1.1710	1.1710	85.402%	85.402%	1.02125	1.02125	87.217%	87.217%
2001	532.8	539.6	536.200	3.54%	1.81793	1.75572	2.13%	1.55249	1.49942	1.1710	1.1710	85.399%	85.402%	1.02125	1.02125	87.213%	87.217%
2000	512.4	523.3	517.850	3.77%	1.88642	1.81793	2.00%	1.58820	1.55249	1.1880	1.1710	84.191%	85.399%	1.02125	1.02125	85.981%	87.213%
1999	495.3	502.8	499.050	3.10%	1.94487	1.88642	2.00%	1.61997	1.58820	1.2005	1.1880	83.294%	84.191%	1.02125	1.02125	85.064%	85.981%
1998	480.7	487.4	484.050	2.61%	1.99558	1.94487	2.00%	1.65236	1.61997	1.2075	1.2005	82.801%	83.294%	1.02125	1.02125	84.561%	85.064%
1997	469.1	474.4	471.750	3.10%	2.05752	1.99558	2.00%	1.68541	1.65236	1.2210	1.2075	81.915%	82.801%	1.02125	1.02125	83.656%	84.561%
1996	452.7	462.4	457.550	3.31%	2.12557	2.05752	1.75%	1.71912	1.68541	1.2365	1.2210	80.878%	81.915%	1.02125	1.02125	82.597%	83.656%
1995	439.8	446.0	442.900	2.90%	2.18730	2.12557	1.75%	1.74920	1.71912	1.2505	1.2365	79.971%	80.878%	1.02125	1.02125	81.670%	82.597%
1994	426.2	434.6	430.400	3.65%	2.26711	2.18730	1.75%	1.77982	1.74920	1.2740	1.2505	78.506%	79.971%	1.02125	1.02125	80.174%	81.670%
1993	411.9	418.6	415.250	2.99%	2.33486	2.26711	1.75%	1.81096	1.77982	1.2895	1.2740	77.562%	78.506%	1.02125	1.02125	79.210%	80.174%
1992	399.6	406.8	403.200	3.53%	2.41730	2.33486	1.75%	1.84265	1.81096	1.3120	1.2895	76.228%	77.562%	1.02125	1.02125	77.848%	79.210%
1991	386.1	392.8	389.450	5.54%	2.55126	2.41730	1.75%	1.87490	1.84265	1.3605	1.3120	73.489%	76.228%	1.02125	1.02125	75.051%	77.848%
1990	361.8	376.2	369.000	7.13%	2.73310	2.55126	1.75%	1.90771	1.87490	1.4325	1.3605	69.800%	73.489%	1.02125	1.02125	71.284%	75.051%
1989	340.3	348.6	344.450	4.66%	2.86058	2.73310	1.75%	1.94110	1.90771	1.4735	1.4325	67.857%	69.800%	1.02125	1.02125	69.299%	71.284%
1988	326.1	332.1	329.100	3.30%	2.95485	2.86058	1.75%	1.97507	1.94110	1.4960	1.4735	66.841%	67.857%	1.02125	1.02125	68.262%	69.299%
1987	315.6	321.6	318.600	2.35%	3.02414	2.95485	1.75%	2.00963	1.97507	1.5050	1.4960	66.453%	66.841%	1.02125	1.02125	67.865%	68.262%
1986			311.300	0.71%	3.04567	3.02414	1.75%	2.04480	2.00963	1.4895	1.5050	67.138%	66.453%	1.02125	1.02125	68.565%	67.865%
1985			309.100	2.08%	3.10904	3.04567	1.75%	2.08058	2.04480	1.4945	1.4895	66.920%	67.138%	1.02125	1.02125	68.343%	68.565%
1984			302.800	3.27%	3.21083	3.10904	1.75%	2.11699	2.08058	1.5165	1.4945	65.933%	66.920%	1.02125	1.02125	67.334%	68.343%
1983			293.200	-0.27%	3.20210	3.21083	1.75%	2.15404	2.11699	1.4865	1.5165	67.270%	65.933%	1.02125	1.02125	68.699%	67.334%

* See Exhibit 2 for detail. Amount shown is the maximum for the year, ignoring restoration of purchasing power COLAs, which are not included. Some retirees received less based on 100% of purchasing power maximum.

** All members retiring on or before July 1, 1978 have had their benefits increased to at least 50% of original purchasing power. These increases are included.



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**Exhibit 1
(continued)**

**Tacoma Employees' Retirement System
Factors Applied in Calculating the 2023 COLA Increases**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
	AVERAGE CPI-W URBAN WAGE, CLERICAL SEATTLE (All Items 1967 = 100)			Annual CPI Increase	(Cumulative Increase in CPI at 2023 based on year w/ prior 6/30) CPI(2022)/CPI(T)		Tacoma COLA given on 7/1 of Year *	Cumulative Tacoma COLA @ 6/30/2023 *		Maximum Accumulated COLA **		Percent of Original Purchasing Power @ 6/30/2023 **		Total COLA Factor at 7/2023 with 50% Minimum ROPP		Percent of Original Purchasing Power @ 7/1/2023 **	
Ret Year	1st Half	2nd Half	Avg		DOR <= 7/1	DOR >=7/2		DOR <= 7/1	DOR >=7/2	DOR <= 7/1	DOR >=7/2	DOR <= 7/1	DOR >=7/2	DOR <= 7/1	DOR >=7/2	DOR <= 7/1	DOR >=7/2
1982			294.000	6.48%	3.40969	3.20210	1.75%	2.19174	2.15404	1.5555	1.4865	64.280%	67.270%	1.02125	1.02125	65.646%	68.699%
1981			276.100	10.84%	3.77927	3.40969	1.75%	2.23009	2.19174	1.6945	1.5555	59.009%	64.280%	1.02125	1.02125	60.262%	65.646%
1980			249.100	16.08%	4.38684	3.77927	1.75%	2.26912	2.23009	1.9335	1.6945	51.726%	59.009%	1.02125	1.02125	52.825%	60.262%
1979			214.600	10.73%	4.85767	4.38684	1.75%	2.30883	2.26912	2.1040	1.9335	47.530%	51.726%	1.05198	1.02125	50.000%	52.825%
1978			193.800	9.12%	5.30077	4.85767	1.75%	2.34923	2.30883	2.1762	2.1040	45.952%	47.530%	1.08810	1.05198	50.000%	50.000%
1977			177.600	7.96%	5.72289	5.30077	1.75%	2.39034	2.34923	2.1762	2.1762	45.952%	45.952%	1.08810	1.08810	50.000%	50.000%
1976			164.500	5.58%	6.04246	5.72289	1.75%	2.43217	2.39034	2.1762	2.1762	45.952%	45.952%	1.08810	1.08810	50.000%	50.000%
1975			155.800	10.11%	6.65312	6.04246	1.75%	2.47474	2.43217	2.1762	2.1762	45.952%	45.952%	1.08810	1.08810	50.000%	50.000%
1974			141.500	10.98%	7.38365	6.65312	1.75%	2.51804	2.47474	2.1762	2.1762	45.952%	45.952%	1.08810	1.08810	50.000%	50.000%
1973			127.500	6.52%	7.86480	7.38365	6.00%	2.56211	2.51804	2.1762	2.1762	45.952%	45.952%	1.08810	1.08810	50.000%	50.000%
1972			119.700	2.84%	8.08777	7.86480	1.50%	2.71584	2.56211	2.1762	2.1762	45.952%	45.952%	1.08810	1.08810	50.000%	50.000%
1971			116.400	2.11%	8.25804	8.08777	7.50%	2.75657	2.71584	2.1762	2.1762	45.952%	45.952%	1.08810	1.08810	50.000%	50.000%
1970			114.000	4.40%	8.62103	8.25804	1.50%	2.96332	2.75657	2.1762	2.1762	45.952%	45.952%	1.08810	1.08810	50.000%	50.000%
1969			109.200	4.90%	9.04338	8.62103	9.50%	3.00777	2.96332	2.1762	2.1762	45.952%	45.952%	1.08810	1.08810	50.000%	50.000%

* See Exhibit 2 for detail. Amount shown is the maximum for the year, ignoring restoration of purchasing power COLAs, which are not included. Some retirees received less based on 100% of purchasing power maximum.

** All members retiring on or before July 1, 1978 have had their benefits increased to at least 50% of original purchasing power. These increases are included.

Documentation of Cumulative COLAs for Retirement Dates on or before 7/1 of Given Year

Ret Year	Tacoma COLA given on 7/1 of Year *	Cumulative COLA at 7/2013	7/2014 COLA	Cumulative COLA at 7/2014	7/2015 COLA	Cumulative COLA at 7/2015	7/2016 COLA	Cumulative COLA at 7/2016	7/2017 COLA	Cumulative COLA at 7/2017	7/2018 COLA	Cumulative COLA at 7/2018	7/2019 COLA	Cumulative COLA at 7/2019	7/2020 COLA	Cumulative COLA at 7/2020	7/2021 COLA	Cumulative COLA at 7/2021	7/2022 COLA	Cumulative COLA at 7/2022	
2023	2.1250%																				
2022	2.1250%																				
2021	2.1250%																				
2020	2.1250%																	2.1250%	1.02125		
2019	2.1250%																1.9000%	1.01900	2.1250%	1.04065	
2018	2.1250%													2.1250%	1.02125	2.1250%	1.04295	2.1250%	1.06511	2.1250%	1.08775
2017	2.1250%										2.1250%	1.02125	2.1250%	1.04295	2.1250%	1.06511	2.1250%	1.08775	2.1250%	1.11086	
2016	2.1250%								2.1250%	1.02125	2.1250%	1.04295	2.1250%	1.06511	2.1250%	1.08775	2.1250%	1.11086	2.1250%	1.13447	
2015	2.1250%							0.9000%	1.00900	2.1250%	1.03044	2.1250%	1.05234	2.1250%	1.07470	2.1250%	1.09754	2.1250%	1.12086	2.1250%	1.14468
2014	2.1250%					1.9500%	1.01950	0.9000%	1.02868	2.1250%	1.05053	2.1250%	1.07286	2.1250%	1.09566	2.1250%	1.11894	2.1250%	1.14272	2.1250%	1.16700
2013	2.1250%		1.2000%	1.01200	1.9500%	1.03173	0.9000%	1.04102	2.1250%	1.06314	2.1250%	1.08573	2.1250%	1.10880	2.1250%	1.13237	2.1250%	1.15643	2.1250%	1.18100	
2012	2.1250%	1.02125	1.6500%	1.03810	1.9000%	1.05782	0.9000%	1.06734	2.1250%	1.09003	2.1250%	1.11319	2.1250%	1.13684	2.1250%	1.16100	2.1250%	1.18567	2.1250%	1.21087	
2011	2.1250%	1.04295	2.1250%	1.06511	2.1250%	1.08775	1.2500%	1.10134	2.1250%	1.12475	2.1250%	1.14865	2.1250%	1.17306	2.1250%	1.19799	2.1250%	1.22344	2.1250%	1.24944	
2010	2.1250%	1.05130	2.1250%	1.07364	2.1250%	1.09645	1.2500%	1.11016	2.1250%	1.13375	2.1250%	1.15784	2.1250%	1.18244	2.1250%	1.20757	2.1250%	1.23323	2.1250%	1.25944	
2009	2.1250%	1.05550	2.1250%	1.07793	2.1250%	1.10084	1.3000%	1.11515	2.1250%	1.13885	2.1250%	1.16305	2.1250%	1.18776	2.1250%	1.21300	2.1250%	1.23878	2.1250%	1.26510	
2008	2.1250%	1.10298	2.1250%	1.12641	2.1250%	1.15035	1.2500%	1.16473	2.1250%	1.18948	2.1250%	1.21476	2.1250%	1.24057	2.1250%	1.26693	2.1250%	1.29386	2.1250%	1.32135	
2007	2.1250%	1.13447	2.1250%	1.15858	2.1250%	1.18320	2.1250%	1.20834	2.1250%	1.23402	2.1250%	1.26024	2.1250%	1.28702	2.1250%	1.31437	2.1250%	1.34230	2.1250%	1.37082	
2006	2.1250%	1.15858	2.1250%	1.18320	2.1250%	1.20834	2.1250%	1.23402	2.1250%	1.26024	2.1250%	1.28702	2.1250%	1.31437	2.1250%	1.34230	2.1250%	1.37082	2.1250%	1.39995	
2005	2.1250%	1.18320	2.1250%	1.20834	2.1250%	1.23402	2.1250%	1.26024	2.1250%	1.28702	2.1250%	1.31437	2.1250%	1.34230	2.1250%	1.37082	2.1250%	1.39995	2.1250%	1.42970	
2004	2.1250%	1.20154	2.1250%	1.22707	2.1250%	1.25314	2.1250%	1.27977	2.1250%	1.30697	2.1250%	1.33474	2.1250%	1.36310	2.1250%	1.39207	2.1250%	1.42165	2.1250%	1.45186	
2003	2.1250%	1.21896	2.1250%	1.24486	2.1250%	1.27131	2.1250%	1.29833	2.1250%	1.32592	2.1250%	1.35409	2.1250%	1.38287	2.1250%	1.41225	2.1250%	1.44226	2.1250%	1.47291	
2002	2.1250%	1.24090	2.1250%	1.26727	2.1250%	1.29420	2.1250%	1.32170	2.1250%	1.34978	2.1250%	1.37847	2.1250%	1.40776	2.1250%	1.43767	2.1250%	1.46822	2.1250%	1.49942	
2001	2.1250%	1.28481	2.1250%	1.31212	2.1250%	1.34000	2.1250%	1.36847	2.1250%	1.39755	2.1250%	1.42725	2.1250%	1.45758	2.1250%	1.48855	2.1250%	1.52019	2.1250%	1.55249	
2000	2.0000%	1.31437	2.1250%	1.34230	2.1250%	1.37082	2.1250%	1.39995	2.1250%	1.42970	2.1250%	1.46008	2.1250%	1.49111	2.1250%	1.52279	2.1250%	1.55515	2.1250%	1.58820	
1999	2.0000%	1.34066	2.1250%	1.36914	2.1250%	1.39824	2.1250%	1.42795	2.1250%	1.45829	2.1250%	1.48928	2.1250%	1.52093	2.1250%	1.55325	2.1250%	1.58626	2.1250%	1.61997	
1998	2.0000%	1.36747	2.1250%	1.39653	2.1250%	1.42620	2.1250%	1.45651	2.1250%	1.48746	2.1250%	1.51907	2.1250%	1.55135	2.1250%	1.58432	2.1250%	1.61798	2.1250%	1.65236	
1997	2.0000%	1.39482	2.1250%	1.42446	2.1250%	1.45473	2.1250%	1.48564	2.1250%	1.51721	2.1250%	1.54945	2.1250%	1.58238	2.1250%	1.61600	2.1250%	1.65034	2.1250%	1.68541	
1996	1.7500%	1.42271	2.1250%	1.45295	2.1250%	1.48382	2.1250%	1.51535	2.1250%	1.54755	2.1250%	1.58044	2.1250%	1.61402	2.1250%	1.64832	2.1250%	1.68335	2.1250%	1.71912	
1995	1.7500%	1.44761	2.1250%	1.47837	2.1250%	1.50979	2.1250%	1.54187	2.1250%	1.57464	2.1250%	1.60810	2.1250%	1.64227	2.1250%	1.67717	2.1250%	1.71281	2.1250%	1.74920	
1994	1.7500%	1.47294	2.1250%	1.50424	2.1250%	1.53621	2.1250%	1.56885	2.1250%	1.60219	2.1250%	1.63624	2.1250%	1.67101	2.1250%	1.70652	2.1250%	1.74278	2.1250%	1.77982	
1993	1.7500%	1.49872	2.1250%	1.53057	2.1250%	1.56309	2.1250%	1.59631	2.1250%	1.63023	2.1250%	1.66487	2.1250%	1.70025	2.1250%	1.73638	2.1250%	1.77328	2.1250%	1.81096	
1992	1.7500%	1.52495	2.1250%	1.55735	2.1250%	1.59045	2.1250%	1.62424	2.1250%	1.65876	2.1250%	1.69401	2.1250%	1.73001	2.1250%	1.76677	2.1250%	1.80431	2.1250%	1.84265	
1991	1.7500%	1.55164	2.1250%	1.58461	2.1250%	1.61828	2.1250%	1.65267	2.1250%	1.68779	2.1250%	1.72365	2.1250%	1.76028	2.1250%	1.79769	2.1250%	1.83589	2.1250%	1.87490	
1990	1.7500%	1.57879	2.1250%	1.61234	2.1250%	1.64660	2.1250%	1.68159	2.1250%	1.71732	2.1250%	1.75382	2.1250%	1.79109	2.1250%	1.82915	2.1250%	1.86802	2.1250%	1.90771	
1989	1.7500%	1.60642	2.1250%	1.64055	2.1250%	1.67542	2.1250%	1.71102	2.1250%	1.74738	2.1250%	1.78451	2.1250%	1.82243	2.1250%	1.86116	2.1250%	1.90071	2.1250%	1.94110	
1988	1.7500%	1.63453	2.1250%	1.66926	2.1250%	1.70474	2.1250%	1.74096	2.1250%	1.77796	2.1250%	1.81574	2.1250%	1.85432	2.1250%	1.89373	2.1250%	1.93397	2.1250%	1.97507	
1987	1.7500%	1.66313	2.1250%	1.69848	2.1250%	1.73457	2.1250%	1.77143	2.1250%	1.80907	2.1250%	1.84751	2.1250%	1.88677	2.1250%	1.92687	2.1250%	1.96781	2.1250%	2.00963	
1986	1.7500%	1.69224	2.1250%	1.72820	2.1250%	1.76492	2.1250%	1.80243	2.1250%	1.84073	2.1250%	1.87985	2.1250%	1.91979	2.1250%	1.96059	2.1250%	2.00225	2.1250%	2.04480	
1985	1.7500%	1.72185	2.1250%	1.75844	2.1250%	1.79581	2.1250%	1.83397	2.1250%	1.87294	2.1250%	1.91274	2.1250%	1.95339	2.1250%	1.99490	2.1250%	2.03729	2.1250%	2.08058	
1984	1.7500%	1.75199	2.1250%	1.78922	2.1250%	1.82724	2.1250%	1.86607	2.1250%	1.90572	2.1250%	1.94622	2.1250%	1.98757	2.1250%	2.02981	2.1250%	2.07294	2.1250%	2.11699	
1983	1.7500%	1.78265	2.1250%	1.82053	2.1250%	1.85921	2.1250%	1.89872	2.1250%	1.93907	2.1250%	1.98027	2.1250%	2.02236	2.1250%	2.06533	2.1250%	2.10922	2.1250%	2.15404	
1982	1.7500%	1.81384	2.1250%	1.85239	2.1250%	1.89175	2.1250%	1.93195	2.1250%	1.97300	2.1250%	2.01493	2.1250%	2.05775	2.1250%	2.10147	2.1250%	2.14613	2.1250%	2.19174	
1981	1.7500%	1.84558	2.1250%	1.88480	2.1250%	1.92485	2.1250%	1.96576	2.1250%	2.00753	2.1250%	2.05019	2.1250%	2.09376	2.1250%	2.13825	2.1250%	2.18369	2.1250%	2.23009	
1980	1.7500%	1.87788	2.1250%	1.91779	2.1250%	1.95854	2.1250%	2.00016	2.1250%	2.04266	2.1250%	2.08607	2.1250%	2.13040	2.1250%	2.17567	2.1250%	2.22190	2.1250%	2.26912	
1979	1.7500%	1.91074	2.1250%	1.95135	2.1250%	1.99281	2.1250%	2.03516	2.1250%	2.07841	2.1250%	2.12257	2.1250%	2.16768	2.1250%	2.21374	2.1250%	2.26078	2.1250%	2.30883	
1978	1.7500%	1.94418	2.1250%	1.98550	2.1250%	2.02769	2.1250%	2.07078	2.1250%	2.11478	2.1250%	2.15972	2.1250%	2.20561	2.1250%	2.25248	2.1250%	2.30035	2.1250%	2.34923	
1977	1.7500%	1.97821	2.1250%	2.02024	2.1250%	2.06317	2.1250%	2.10702	2.1250%	2.15179	2.1250%	2.19752	2.1250%	2.24421	2.1250%	2.29190	2.1250%	2.34060	2.1250%	2.39034	
1976	1.7500%	2.01282	2.1250%	2.05560	2.1250%	2.09928	2.1250%	2.14389	2.1250%	2.18945	2.1250%	2.23597	2.1250%	2.28349	2.1250%	2.33201	2.1250%	2.38157	2.1250%	2.43217	
1975	1.7500%	2.04805	2.1250%	2.09157	2.1250%	2.13602	2.1250%	2.18141	2.1250%	2.22776	2.1250%	2.27510	2.1250%	2.32345	2.1250%	2.37282	2.1250%	2.42324	2.1250%	2.47474	
1974	1.7500%	2.08389	2.1250%	2.12817	2.1250%	2.17340	2.1250%	2.21958	2.1250%	2.26675	2.1250%	2.31492	2.1250%	2.36411	2.1250%	2.41434	2.1250%	2.46565	2.1250%	2.51804	
1973	6.0000%	2.12036	2.1250%	2.16542	2.1250%	2.21143	2.1250%	2.25842	2.1250%	2.30642	2.1250%	2.35543	2.1250%	2.40548	2.1250%	2.45660	2.1250%	2.50880	2.1250%	2.56211	
1972	1.5000%	2.24758	2.1250%	2.29534	2.1250%	2.34412	2.1250%	2.39393	2.1250%	2.44480	2.1250%	2.49675	2.1250%	2.54981	2.1250%	2.60399	2.1250%	2.65933	2.1250%	2.71584	
1971	7.5000%	2.28129	2.1250%	2.32977	2.1250%	2.37928	2.1250%	2.42984	2.1250%	2.48147	2.1250%										