

Illinois Risk Management Services

An Illinois Health and Hospital Association Company

CITY OF APPLETON
ACTUARIAL ANALYSIS
LOSS & EXPENSE RESERVES
AS OF DECEMBER 31, 2020

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INTRODUCTION

In the 1980's the City of Appleton insured its workers compensation, general liability and automobile liability exposures through retrospectively rated plans purchased in the commercial market. In January of 1990 the City began self-insuring a portion of these exposures though the amount the City retains has varied by year and coverage. IRMS Actuarial Services has been retained by the City of Appleton to perform an actuarial analysis to estimate the loss and expense reserves for the City's self-insured general liability, automobile liability and workers compensation exposures. This report provides a summary of our findings. A technical supplement that includes supporting data and work-papers is available upon request.

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This report is intended for the management of the City of Appleton. This report contains significant proprietary information. It is expected that it be held confidential and is not intended for public inspection. Any further distribution without our prior written permission is unauthorized.

EXECUTIVE SUMMARY

We project that the ultimate losses and defense and cost containment expenses (D&CC which are claim adjustment expenses directly attributable to specific claims) resulting from exposures incurred January 1, 1990 through December 31, 2020 will be \$15,470,338. As of December 31, 2020, \$12,565,617 has been paid, resulting in an unpaid claim liability of \$2,904,721. The following table provides a summary of our estimates of unpaid claim liabilities within the deductible by coverage:

City of Appleton Unpaid Loss & D&CC (Undiscounted) As of December 31, 2020			
Coverage	Case Reserve Outstanding	Incurred But Not Reported Reserves	Total Net Reserves for Unpaid Losses & D&CC
General Liability	488,278	318,379	806,657
Auto Liability	40,073	34,545	74,619
Workers Compensation	1,342,307	681,138	2,023,445
TOTAL	1,870,658	1,034,063	2,904,721

Next we developed indications for additional funding needed to cover loss and D&CC expenses for the upcoming year, January 1, 2021 through December 31, 2021. The following table summarizes our estimates of the additional liability that will arise during the next year:

City of Appleton 2021 Funding Indications Undiscounted	
Coverage	Central Estimate
General Liability	151,670
Automobile Liability	59,124
Workers Compensation	651,115
Total	861,910

We estimate that an additional \$861,910 in contributions will be necessary in 2021 to fund losses occurring within the City's retention during the year.

It is important to note that none of the estimates that appear in this report contemplate any costs, either previously paid or yet to be paid, on claims related to environmental clean-up expenses or liability costs. We understand that the city is involved with a clean-up effort of the Fox River. The expenses related to this event are outside the scope of this report.

DESCRIPTION OF HISTORICAL LIMITS & COVERAGES

Prior to January 1, 1990 the City purchased first dollar coverage (retrospectively rated) from the commercial market. It should be noted that we have assumed there to be no remaining liability prior to 1990. Beginning in 1990 the City retained the first \$250,000 per claim of workers

compensation coverage. This retention increased to \$350,000 in 2002 for police and fire employees and to \$300,000 for all other employees. Effective January 1, 2011, the workers compensation retention for all employees other than fire and police employees increased to \$325,000. Finally, the workers compensation retention was increased to \$500,000 effective January 1, 2013. These are the retentions that underlie our unpaid estimates as of December 31, 2020. The workers compensation funding estimate for 2021 assumes this \$500,000 will remain.

The City also began retaining a portion of its GL and AL exposures in 1990. Specifically, in 1990 the City began purchasing excess commercial insurance for its general liability and automobile liability coverage attaching at \$100,000 per occurrence with an aggregate limit of \$400,000. This retention increased to \$150,000 per occurrence with an aggregate limit of \$600,000 from 1991-1993 and increased to \$175,000 per occurrence with an aggregate limit of \$700,000 from 1994 to 2010. The retention limit increased to \$200,000 with an aggregate of \$800,000 for policy year January 1, 2011 through January 1, 2021 with a liability policy purchased from Cities and Villages Mutual Insurance Company.

In addition, beginning in January of 1999, the City purchased Employment Practice Liability Insurance (EPLI). The City's retention for this coverage consists of a \$25,000 self-insured deductible. There is a per occurrence limit of \$1,000,000 and an aggregate limit of \$1,000,000 per policy period for this coverage. This was previously uninsured exposure. We have incorporated the City's EPL liability with the GL.

SECTION ONE - ULTIMATE CLAIM COSTS

Appleton purchases an excess policy from Cities and Villages Mutual Insurance Company and thus is responsible for the first portion of each loss occurrence. The amount of each loss that Appleton retains varies by which year the loss event occurs as described in the previous section.

The job of the actuary is to estimate the ultimate costs that will arise from each year (i.e. estimate the bulk and IBNR reserves) taking into account the random fluctuations that occur in claim costs. The following table shows the paid as well as the incurred losses and D&CC, along with our estimates of the ultimate losses and D&CC as of December 31, 2020.

City of Appleton Estimated Ultimate Loss & D&CC Within Retention				
Accident Year	Auto Liability	General Liability	Workers Compensation	Total
1990	37,903	41,086	166,651	245,640
1991	20,590	63,570	95,093	179,253
1992	38,381	40,413	261,004	339,798
1993	9,681	35,421	299,488	344,590
1994	14,099	57,369	189,832	261,300
1995	21,955	48,331	175,170	245,456
1996	19,750	48,757	115,955	184,462
1997	66,662	94,325	128,619	289,606
1998	7,735	8,912	116,666	133,313
1999	91,493	7,378	182,520	281,391
2000	34,879	80,171	145,109	260,160
2001	18,626	3,729	289,023	311,378
2002	25,463	189,144	649,116	863,723
2003	25,743	24,897	155,089	205,729
2004	27,162	20,621	222,669	270,452
2005	14,634	21,606	695,317	731,557
2006	5,857	82,365	584,143	672,365
2007	5,761	63,051	259,013	327,826
2008	19,780	36,774	299,641	356,195
2009	32,255	105,147	963,740	1,101,142
2010	179,229	84,307	282,322	545,858
2011	81,315	40,837	518,141	640,293
2012	10,668	77,228	273,611	361,508
2013	10,640	181,430	213,049	405,119
2014	15,083	29,187	712,114	756,385
2015	46,810	4,781	896,828	948,419
2016	44,211	58,456	354,869	457,536
2017	49,483	275,180	828,672	1,153,335
2018	43,297	159,255	390,631	593,183
2019	32,659	103,506	996,793	1,132,958
2020	38,323	128,321	703,766	870,409
Total	1,090,129	2,215,556	12,164,653	15,470,338

As this table shows, we estimate that the total costs arising since the City began partially self-insuring in 1990 will be \$15,470,338. This table also shows the inherent volatility in these coverages with the ultimate costs on a nominal basis.

The following table compares our current estimates to those made in the City's prior analysis in 2018.

City of Appleton Estimated Ultimate Loss & D&CC On Loss occurring through December 31, 2018 Comparison to Previous Analysis			
Accident Year	As of 12/31/20	As of 12/31/18	Change
1990	245,640	245,640	0
1991	179,253	179,253	0
1992	339,798	339,798	0
1993	344,590	344,590	0
1994	261,300	261,300	0
1995	245,456	245,456	0
1996	184,462	184,462	0
1997	289,606	289,606	0
1998	133,313	133,313	0
1999	281,391	281,391	0
2000	260,160	260,160	0
2001	311,378	311,378	0
2002	863,723	675,154	188,569
2003	205,729	205,729	0
2004	270,452	270,452	0
2005	731,557	714,258	17,299
2006	672,365	672,365	0
2007	327,826	326,280	1,546
2008	356,195	357,882	-1,687
2009	1,101,142	860,892	240,251
2010	545,858	560,972	-15,114
2011	640,293	654,837	-14,544
2012	361,508	386,326	-24,818
2013	405,119	350,511	54,608
2014	756,385	787,673	-31,288
2015	948,419	727,122	221,297
2016	457,536	574,829	-117,293
2017	1,153,335	782,706	370,629
2018	593,183	676,915	-83,732
Total thru '18	13,466,971	12,661,249	805,722

As shown, our estimate of ultimate loss increased \$805,722 from the City's previous analysis in 2018. Most of this increase is coming from the workers compensation coverage which had significant deterioration in several older years since our last review. Interestingly, this is the opposite of our finding from two years ago in which the workers

compensation experience was favorable. This is indicative of how volatile the liability coverages are and how uncertain actual claim results can be. The poor workers compensation experience has led us to increase our prospective funding estimates as will be discussed later in section 3 of this report. Despite the volatility, overall we believe these changes are within a normal range of variability for these lines of business for a self-insured entity the size of Appleton.

SECTION TWO - RESERVE FOR UNPAID LOSSES AND D&CC

To derive estimates of net unpaid losses and D&CC as of December 31, 2020, we simply subtract payments net of recoveries from our estimate of net ultimate losses and D&CC. This results in an estimated reserve for net unpaid losses and D&CC as of December 31, 2020 as shown below:

Coverage	Estimated Net Ultimate Losses & D&CC	Net Paid Losses and D&CC as of December 31, 2020	Estimated Net Unpaid Losses & D&CC
General Liability	2,215,556	1,408,898	806,657
Auto Liability	1,090,129	1,015,510	74,619
Workers Compensation	12,164,653	10,141,208	2,023,445
Total	15,470,338	12,565,617	2,904,721

In summary, our Central estimate of the ultimate losses and D&CC resulting from all claims within the City's retention is \$15,470,338. As of December 31, 2020 \$12,565,617 has been paid resulting in a net reserve for unpaid losses and D&CC of \$2,904,721. Of this amount, \$1,870,658 is in the form of case reserves established by the claims adjusters for specific, known claims. The remaining \$1,034,063 is IBNR (Incurred But Not Reported) and provides a provision for further development of loss on known claims plus a provision for any claims that have occurred but which have not yet been reported.

SECTION THREE – NEW YEAR ESTIMATES

The last section presented our estimate of the unpaid liability associated with all exposures through December 31, 2020. In order to assist management in their financial planning for 2021

we project the anticipated loss and D&CC for the upcoming period. In order to do this we begin first with our estimates of ultimate loss for all the previous years for each coverage. We then trend the losses for claim cost inflation, benefit changes and wage increases (for workers compensation) in order to bring the historical losses to 2021 claim levels. The following table summarizes these trended historical years and projects loss & D&CC estimates for the upcoming year:

City of Appleton Estimated Loss & D&CC per \$100 of payroll at 2020 Cost Levels				
Accident Year	Auto Liability	General Liability	Workers Compensation	Total
1995	132	494	1,085	1,711
1996	114	469	690	1,273
1997	342	791	687	1,819
1998	38	70	595	703
1999	403	51	850	1,305
2000	149	529	676	1,354
2001	72	22	1,226	1,320
2002	96	1,060	2,507	3,664
2003	99	139	593	831
2004	106	115	852	1,072
2005	52	107	2,393	2,552
2006	20	378	1,903	2,301
2007	18	272	779	1,069
2008	61	149	868	1,078
2009	95	401	2,684	3,179
2010	515	309	768	1,592
2011	230	140	1,434	1,804
2012	30	260	758	1,049
2013	29	577	549	1,155
2014	36	80	1,626	1,742
2015	114	13	2,114	2,241
2016	107	156	822	1,084
2017	117	701	1,867	2,684
2018	98	383	864	1,346
2019	69	238	2,172	2,480
2020	80	283	1,502	1,865
Selected PP	125	320	1,374	1,819
% change	-4.1%	+1.1%	+15.8%	+11.3%
Proj 2021	59,124	151,670	651,115	861,910

In total we project \$861,910 as the cost of Appleton's self-insured portion of next year's (2021) exposure from these three coverages. This is a 11.3% increase from our previous funding estimate driven primarily by the poor loss development shown in the workers compensation and general liability coverages.

SECTION FOUR – DISCOUNTING & RISK MARGIN FOR ADVERSE DEVELOPMENT

Claim liabilities are subject to uncertainty. All of the above estimates we describe as our central estimates. They are our best or expected estimate of loss after consideration of several different actuarial methodologies that we applied to each line of business. Due to the random nature of claims, when all the unpaid claims occurring prior to December 31, 2020 are known, the true cost will be either higher or lower than our estimates. To measure the level of uncertainty in the reserves, we have developed computer models that simulate many potential claim occurrences.

The estimates presented in previous sections are also calculated on an undiscounted basis. That is, it will take years for all of the unpaid claims to be paid. Meanwhile, the assets supporting these liabilities will continue to earn investment income. For your consideration, we incorporate the concept of the time value of money and present the value of these unpaid liabilities on a discounted basis as well.

Actuarial Standards of Practice state that a discounted reserve estimate is not an actuarially sound estimate unless a risk margin is applied. Therefore, in practice, discounting and applying a risk margin are often done concurrently and this is the approach we will follow in this section. It should be pointed out that we are not advocating that Appleton discount its reserves or what an appropriate discount yield may be. These are decisions left to City management.

We start with our \$2,904,721 central estimate of total undiscounted, unpaid liability and simulate the potential variation around that estimate. By simulating several thousand possible outcomes, we establish a probability that the results will be below certain levels. We then apply discount factors assuming a certain investment yield. The following table shows the results of our simulations at various discount yield assumptions:

City of Appleton All Lines Combined As of December 31, 2020				
Probability	Simulated Unpaid Loss & D&CC			
	Undiscounted	2%	3%	4%
70%	3,133,016	2,917,446	2,823,671	2,737,619
75%	3,370,860	3,138,925	3,038,031	2,945,447
80%	3,660,920	3,409,027	3,299,451	3,198,900
90%	4,026,128	3,749,107	3,628,600	3,518,018
95%	4,578,844	4,263,793	4,126,742	4,000,979
Central	5,590,720	5,206,046	5,038,708	4,885,153

This table represents our estimate of the unpaid losses and D&CC under different probability levels and interest yield assumptions. For instance, at a 3% investment yield assumption, we estimate that there is an 80% probability that the total reserves will be adequate if they are set at \$3,299,451. Conversely, there is a 20% chance that amount will be inadequate. If the reserves do prove to be inadequate, Appleton would need to draw on funds from other sources to pay its claims. Choosing the appropriate probability level depends entirely on Appleton's attitude toward risk and its ability to cover adverse outcomes.

LIMITED DISTRIBUTION AND USE

This report is solely for the use of the City of Appleton and its auditors. While we realize that this report will become a public document, we ask that we be notified if any other parties request a copy of our report.

OTHER CONSIDERATIONS

It is important to note that estimates of future unpaid claim liabilities cannot be known with certainty. While our estimates were prepared with appropriate actuarial methodologies and judgments, the true cost of future claims could vary significantly in either direction from our estimates.

Wisconsin Statutes 893.80 and 345.05 provide governmental immunities including a cap on the amount of liability for any single claimant against a local governmental unit of \$50,000

(\$250,000 if the accident includes the use of a city-owned motor vehicle.) Note that this limitation limits the liability to each claimant not each occurrence. There may be multiple claimants from any single occurrence. To the extent that the impact of these statutes has affected Appleton data in the past, these limitations are incorporated into our projections. Claims brought in federal court are not affected by these state statutes. To the extent that federal claims are represented in Appleton data, these also are incorporated into our projections.

We have not included exposures stemming from environmental pollution or asbestos claims. The estimates in this report include no provision for any of these types of claims.

The data underlying our analysis is critical to the assumptions used to derive our estimates. We have assumed that all of the data underlying our analysis accurately reflects the experience of the City of Appleton.

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We appreciate this opportunity to be of service to the City of Appleton, and look forward to presenting our results. We also stand ready to answer any questions you may have.

Respectfully submitted,



Michael B. Delvaux, FCAS, FSA, MAAA
Consulting Actuary



Jessica A. Savoie
Actuarial Analyst

Appendix A – Un-pooled Results by LOB

Undiscounted

	auto	general Liab	work comp	sum total	pooled
55%	63,691	801,628	1,679,049	2,544,368	2,604,078
60%	68,587	846,766	1,876,585	2,791,939	2,762,448
65%	74,126	896,436	2,074,120	3,044,681	2,941,536
70%	80,664	951,269	2,271,655	3,303,588	3,133,016
75%	88,468	1,013,772	2,469,190	3,571,430	3,370,860
80%	98,447	1,083,110	2,765,493	3,947,051	3,660,920
85%	111,738	1,167,041	3,160,564	4,439,343	4,026,128
90%	132,952	1,276,775	3,654,401	5,064,128	4,578,844
95%	174,221	1,449,152	4,642,078	6,265,451	5,590,720
Central Estimate	74,619	806,657	2,023,445	2,904,721	2,904,721

Discounted at 2%

	auto	general Liab	work comp	sum total	pooled
55%	59,309	746,472	1,563,521	2,369,301	2,424,902
60%	63,868	788,504	1,747,465	2,599,837	2,572,376
65%	69,025	834,756	1,931,408	2,835,189	2,739,141
70%	75,114	885,816	2,115,352	3,076,282	2,917,446
75%	82,381	944,019	2,299,295	3,325,694	3,138,925
80%	91,674	1,008,586	2,575,211	3,675,470	3,409,027
85%	104,050	1,086,742	2,943,099	4,133,890	3,749,107
90%	123,804	1,188,926	3,402,957	4,715,686	4,263,793
95%	162,234	1,349,442	4,322,676	5,834,351	5,206,046
Central Estimate	69,484	751,155	1,884,220	2,704,859	2,704,859

Discounted at 3%

	auto	general Liab	work comp	sum total	pooled
55%	57,402	722,478	1,513,265	2,293,145	2,346,959
60%	61,815	763,159	1,691,296	2,516,271	2,489,692
65%	66,807	807,924	1,869,327	2,744,058	2,651,097
70%	72,700	857,343	2,047,358	2,977,401	2,823,671
75%	79,733	913,675	2,225,389	3,218,797	3,038,031
80%	88,727	976,167	2,492,436	3,557,330	3,299,451
85%	100,705	1,051,811	2,848,499	4,001,015	3,628,600
90%	119,824	1,150,710	3,293,576	4,564,111	4,126,742
95%	157,019	1,306,067	4,183,733	5,646,818	5,038,708
Central Estimate	67,251	727,010	1,823,656	2,617,917	2,617,917

Discounted at 4%

	auto	general Liab	work comp	sum total	pooled
55%	55,653	700,460	1,467,148	2,223,261	2,275,435
60%	59,931	739,902	1,639,754	2,439,587	2,413,818
65%	64,771	783,302	1,812,359	2,660,433	2,570,305
70%	70,484	831,215	1,984,965	2,886,664	2,737,619
75%	77,303	885,831	2,157,570	3,120,704	2,945,447
80%	86,023	946,418	2,416,479	3,448,920	3,198,900
85%	97,636	1,019,756	2,761,691	3,879,083	3,518,018
90%	116,173	1,115,642	3,193,204	4,425,019	4,000,979
95%	152,234	1,266,264	4,056,233	5,474,731	4,885,153
Central Estimate	65,201	704,855	1,768,080	2,538,136	2,538,136