Exhibit I

Actuarial Assumptions and Methods Used for Projections

Investment Returns

- <u>Deterministic Projections</u>
 - For certification of critical and declining status in checklist item #5:

Time Period	Assumed Rate of Return
5/1/2019 - 4/30/2028	6.40%
5/1/2028+	7.50%

• For all other projections

Time Period	Assumed Rate of Return
5/1/2019 - 4/30/2029	6.50% ¹
5/1/2029 - 4/30/2043	7.50%
5/1/2043 - 4/30/2048	7.30%
5/1/2048 - 4/30/2053	7.20%
5/1/2053+	7.50%

• <u>Stochastic Projections</u>

Stochastic projections were performed using 2,000 trials. For each year in each trial, correlated sample rates of return were produced by asset class and then blended according to the assumed investment percentages applicable to the particular year.

The underlying asset class distributions were assumed to be <u>log-normal</u> with characteristics following the composite capital market assumptions shown in Exhibit 15 of *Survey of Capital Market Assumptions: 2019 Edition*, published by Horizon Actuarial Services, LLC.

Assets during the "initial period" ending April 30, 2020 were not assumed to vary stochastically. Thereafter, short-term capital market assumptions were assumed to apply through April 30, 2029 and long-term to apply thereafter.

The arithmetic and geometric means, standard deviations, and correlations of expected asset class returns are shown below (for the asset classes in which plan assets are invested):

¹ For the first 2 months of the 5/1/2019-4/30/2020 plan year, actual investment income was used. For the remaining 10 months of such plan year (the "initial period"), a return equal to 10/12ths of 6.50% was assumed.

PYE 2021-2028		PYE 2	029+	Standard
Arith	Geom	Arith	Geom	Deviation
7.26%	6.03%	8.34%	7.05%	16.17%
8.45%	6.55%	9.52%	7.54%	20.15%
8.40%	6.83%	9.30%	7.70%	18.23%
10.62%	7.77%	11.67%	8.67%	24.73%
3.74%	3.58%	4.46%	4.30%	5.47%
5.60%	5.10%	6.38%	5.82%	10.06%
2.80%	2.56%	3.81%	3.43%	7.61%
6.19%	5.57%	6.76%	6.06%	11.31%
6.95%	5.79%	7.94%	6.82%	15.03%
5.63%	5.27%	6.61%	6.18%	8.38%
11.34%	8.97%	12.82%	10.10%	22.05%
	PYE 202: Arith 7.26% 8.45% 8.40% 10.62% 3.74% 5.60% 2.80% 6.19% 6.19% 6.95% 5.63% 11.34%	PYE 202:-2028 Arith Geom 7.26% 6.03% 8.45% 6.55% 8.40% 6.83% 10.62% 7.77% 3.74% 3.58% 5.60% 5.10% 6.19% 5.57% 6.19% 5.79% 5.63% 5.27% 11.34% 8.97%	PYE 2021-2028 PYE 2 Arith Geom Arith 7.26% 6.03% 8.34% 8.45% 6.55% 9.52% 8.40% 6.83% 9.30% 10.62% 7.77% 11.67% 3.74% 3.58% 4.46% 5.60% 5.10% 6.38% 6.19% 5.57% 6.76% 6.95% 5.79% 7.94% 5.63% 5.27% 6.61% 11.34% 8.97% 12.82%	PYE 2021-2028 PYE 2029+ Arith Geom Arith Geom 7.26% 6.03% 8.34% 7.05% 8.45% 6.55% 9.52% 7.54% 8.40% 6.83% 9.30% 7.70% 10.62% 7.77% 11.67% 8.67% 3.74% 3.58% 4.46% 4.30% 5.60% 5.10% 6.38% 5.82% 2.80% 2.56% 3.81% 3.43% 6.19% 5.57% 6.76% 6.06% 6.95% 5.79% 7.94% 6.82% 5.63% 5.27% 6.61% 6.18% 11.34% 8.97% 12.82% 10.10%

						Corre	elation M	atrix				
	Asset Class	1	2	3	4	5	6	7	8	9	10	11
1	US Large Cap	1.00										
2	US Small/Mid Cap	0.86	1.00									
3	Non-US Developed	0.83	0.74	1.00								
4	Non-US Emerging	0.72	0.67	0.78	1.00							
5	US Fixed - Core	0.15	0.07	0.17	0.17	1.00						
6	US Fixed - High Yield	0.60	0.58	0.61	0.61	0.41	1.00					
7	Non-US Fixed - Developed	0.20	0.12	0.32	0.29	0.53	0.23	1.00				
8	Non-US Fixed - Emerging	0.51	0.47	0.54	0.64	0.45	0.59	0.42	1.00			
9	Real Estate	0.48	0.49	0.46	0.41	0.16	0.42	0.15	0.33	1.00		
10	Hedge Funds	0.64	0.62	0.64	0.62	0.18	0.53	0.19	0.42	0.36	1.00	
11	Private Equity	0.75	0.70	0.70	0.63	0.05	0.50	0.11	0.39	0.43	0.58	1.00

Expected Returns

Assumed future investment percentages, as provided by Graystone Consulting, are shown below:

	Assum	ied Investi	ment Alloo	ation
	PYE	PYE	PYE	
	2020-	2044-	2049-	PYE
Asset Class	2043	2048	2053	2054+
US Large Cap	18%	18%	18%	18%
US Small/Mid Cap	7%	7%	7%	7%
Non-US Developed	11%	11%	11%	11%
Non-US Emerging	3%	3%	3%	3%
US Fixed - Core	13%	13%	13%	13%
US Fixed - High Yield	2%	5%	5%	2%
Non-US Fixed - Developed	2%	2%	2%	2%
Non-US Fixed - Emerging	2%	4%	4%	2%
Real Estate	20%	15%	12%	20%
Hedge Funds	6%	10%	15%	6%
Private Equity	16%	12%	10%	16%

Mortality

Mortality was assumed to follow the RP-2006 blue collar mortality tables projected generationally using the MP-2018 projection scale. Sex-distinct mortality rates were used for males and females. The employee tables were used for all participants not in pay status while the healthy annuitant tables were used for all participants in pay status.

No adjustments (such as set-forwards or rate multipliers) were applied.

Other Demographic Assumptions

• <u>Withdrawal</u>

Ultimate rates of withdrawal are assumed to follow table T-7 (less GAM-51 mortality) from *The Actuary's Pension Handbook*. The complete table is shown below:

	Withdrawal		Withdrawal]		Withdrawal
Age	Rate	Age	Rate		Age	Rate
20	0.099384	35	0.087062]	50	0.042247
21	0.098898	36	0.085466		51	0.036823
22	0.098398	37	0.083717		52	0.031228
23	0.097877	38	0.081815		53	0.025661
24	0.097331	39	0.079756		54	0.020347
25	0.096742	40	0.077543		55	0.015488
26	0.096114	41	0.075151		56	0.011247
27	0.095438	42	0.072556		57	0.007718
28	0.094704	43	0.069760		58	0.004939
29	0.093906	44	0.066758		59	0.002879
30	0.093031	45	0.063540		60	0.001465
31	0.092065	46	0.060053		61	0.000594
32	0.091000	47	0.056227]	62	0.000152
33	0.089820	48	0.052000		63+	-
34	0.088511	49	0.047337			

Additionally, special select rates are applied during the first 4 years that a participant is reported:

	Select
Year	Withdrawal
Reported	Rate
First	.500000
Second	.300000
Third	.150000
Fourth	.150000

• <u>Disability</u>

Rates of disability are assumed to follow 30% of the 1964 OASDI male table. The complete table is shown below:

	Disability		Disability			Disability
Age	Rate	Age	Rate		Age	Rate
20	0.000602	35	0.001474		50	0.006059
21	0.000656	36	0.001583		51	0.006723
22	0.000708	37	0.001707		52	0.007453
23	0.000758	38	0.001850		53	0.008254
24	0.000807	39	0.002014		54	0.009131
25	0.000854	40	0.002201		55	0.010089
26	0.000901	41	0.002415		56	0.011133
27	0.000948	42	0.002658		57	0.012267
28	0.000996	43	0.002933		58	0.013498
29	0.001046	44	0.003244		59	0.014830
30	0.001100	45	0.003595		60	0.016269
31	0.001159	46	0.003987		61	0.017820
32	0.001224	47	0.004426		62	0.019490
33	0.001297	48	0.004915		63	0.021285
34	0.001380	49	0.005458		64	0.023210
				-	65+	-

• <u>Retirement</u>

For active participants, the following rates of retirement are assumed to apply:

	Retirement Rate:				
	Without Index	With Index			
	80 or 85	80 or 85			
Age	Requirements	Requirements			
55	0.10	0.25			
56	0.10	0.25			
57	0.10	0.25			
58	0.10	0.25			
59	0.15	0.25			
60	0.15	0.25			
61	0.30	0.25			
62	0.30	0.40			
63	0.30	0.40			
64	0.05	0.40			
65+	1.00	1.00			

Assumptions Regarding Form and Commencement Age of Benefits

- <u>"Take Up" Rate of Benefit Form Election</u>
 - For purposes of the certification of critical and declining status in checklist item #5 and the calculation of the present value of the reduction in benefits in checklist item #12, future retirees were assumed to elect benefit forms according to the following table:

Benefit Form	Married Participants (65% Assumed)	Single Participants (35% Assumed)
Life annuity	15%	85%
Life-ten year certain	5%	15%
Joint & 50% survivor	20%	n/a
Joint & 75% survivor	15%	n/a
Joint & 100% survivor	45%	n/a

The effect of the various elections was <u>approximated</u> by using a hybrid form of benefit consisting of:

- Joint and 66.25% survivor for married actives
- 2-year certain for unmarried actives, and
- Joint and 43% survivor with 1 year certain for inactive vesteds.

The benefit amount was calculated using a blended conversion factor at each age that was the appropriately-weighted average of the actual conversion factors at that age.

- For purposes other than the certification of critical and declining status in checklist item #5 and the calculation of the present value of the reduction in benefits in checklist item #12, elections were assumed to follow the table provided in the previous bullet point, but the elections were <u>explicitly</u> valued. This was done by performing multiple runs and taking an appropriately-weighted average of the projected benefit payments and other values.
- Benefit Commencement Age for Withdrawal Benefits
 - For purposes of the certification of critical and declining status in checklist item #5, current inactive vested participants are assumed to retire at age 59 if they have at least 10 years of service, or age 62 if less than 10 years of service. Future inactive vested participants are assumed to retire at age 59.

• For all purposes other than the certification of critical and declining status in checklist item #5, current inactive vested participants are assumed to retire according to the following decrement table:

	Inactive Retirement Rate				
	<10 Years of	10+ Years			
Age	Service	of Service			
55	-	0.15			
56	-	0.07			
57	-	0.07			
58	-	0.07			
59	-	0.07			
60	-	0.07			
61	-	0.07			
62	0.03	0.25			
63	0.03	0.15			
64	0.15	0.15			
65	0.35	0.40			
66	0.10	0.30			
67	0.10	0.20			
68	-	0.15			
69	-	0.10			
70+	1.00	1.00			

Future inactive vested participants (i.e., withdrawal benefit for participants who are currently active) are assumed to commence at age 59.

• Benefit Commencement Age for Disability Benefits

Current and future disabled participants are assumed to convert to retirement benefits at age 62.

Assumptions Regarding Missing or Incomplete Data

• <u>Assumption Regarding Terminated Vested Participants Beyond Normal Retirement Age</u> All known inactive vested participants were assumed to be alive. The fund office recently undertook a data clean-up project that resulted in the acquisition of hundreds of addresses for such people who were previously "missing."

It was assumed that inactive vested participants who are past their IRC section 401(a)(9) required beginning date ("RBD") on May 1, 2019 will be put into pay status retroactive to such date. As such, we assumed that the active/retiree reduction (16%) would apply to them in lieu of the inactive reduction (26%).

• Assumptions to Fill In Other Missing Data

The age of participants with unrecorded dates of birth was estimated based on the average entry age of participants with recorded dates of birth and the same vesting status and reported service.

New Entrant Profile

• Distribution of assumed future new entrants by age and sex are as follows:

Age	Sex	Distribution
20	М	30.07%
25	М	24.80%
30	М	17.47%
35	М	12.63%
40	М	6.72%
45	М	3.93%
50	М	2.36%
55	М	2.02%

• Future new entrants were assumed to work 1,210 hours per year.

Contribution Rates

- A \$15 per hour average contribution rate was assumed for projecting contributions to the plan.
- Individual assumed future contribution rates were set equal to the individual participant's average hourly rate received during the 2017-2018 plan year and then pro-rated so that the total group average was \$15 per hour. It was assumed that 39% of this rate would be credited (i.e., benefit bearing).

Contribution Base Units

• The following future hours worked were assumed for purposes of projecting contributions to the plan:

Plan Year	
Ending 4/30:	Hours
2020	8.2 million
2021	8.0 million
2022	7.8 million
2023+	7.0 million

• Individual active participants were assumed to work 1,600 hours per year if they were vested and 600 hours per year otherwise. However, these numbers were pro-rated in order to conform the total hours worked by the entire population to the table above.

Withdrawal Liability Payments

• For purposes of the certification of critical and declining status in checklist item #5, no future withdrawal liability payments were assumed.

Plan	Assumed EWL Payments From:				
Year(s) Ending	Prior	Future			
4/30:	Withdrawals	Withdrawals	Total		
2020	\$ 1,333,196	\$ -	\$ 1,333,196		
2021-2023	36,159	963,841	1,000,000		
2024	36,159	763,841	800,000		
2025-2033	36,159	613,841	650,000		
2034	12,056	637,944	650,000		
2035-2037	7,236	642,764	650,000		
2038	3,618	646,382	650,000		
2039+	-	650,000	650,000		

• For all other purposes, the following future withdrawal liability payments were assumed:

The assumed payment for the plan year ending April 30, 2020 includes a large assessment that is currently being litigated. It was assumed that the fund would receive a lump sum payment equal to the assessed liability with a one-third probability.

Administrative Expenses

- For purposes of the certification of critical and declining status in checklist item #5, noninvestment expenses were assumed to be \$4,000,000 for each future year.
- For all other purposes, non-investment expenses were assumed to be \$6,101,734 for the plan year ending April 30, 2020. Expenses for the plan year ending April 30, 2021 were assumed to be \$4,090,000 and were assumed to increase at the rate of 2.25% per year thereafter.

Projection Methodology

- The DBVal valuation system was used to perform all actuarial calculations.
- As discussed above, for purposes of the certification of critical and declining status in checklist item #5 and the calculation of the present value of the reduction in benefits in checklist item #12, the effect of the "take-up" rate of optional benefit form elections was <u>approximated</u> by using a hybrid form and amount of benefit.
- No data grouping techniques were used.
- The following changes to the cash flow projections were incorporated:
 - Inactive vested participants were processed in separate runs in order to properly value the desired retirement decrements. No pre-retirement withdrawal or disability rates were assumed for these runs.
 - For each plan design scenario, 5 active-only runs (one for each form of benefit), 5 inactive vested-only runs (one for each form of benefit), and one pay status run were done. The projected benefit payments from these 11 runs were blended, along with projected benefits from assumed new entrants, to produce the final stream of benefit payments.
 - Benefit payments from the valuation system output are given as of the beginning of each plan year. These were multiplied by a one-half year interest adjustment factor to produce cash flows.
 - New entrant benefit payments from the valuation system were adjusted for contribution rate and total hours.
 - For purposes of the certification of critical and declining status in checklist item #5, active participant cash flows from the valuation system were adjusted for contribution rate and total hours. For all other purposes, these adjustments were handled within the system.

Exhibit II

Supporting Documentation for Selection of Certain Assumptions

Investment Returns

• Components of the target portfolio used in the projections expressed in terms of the asset classes used for setting the plan's investment policy.

Asset Class	Target
	Anocation
Domestic Large Cap	11%
Domestic Small/Mid Cap	7%
International Equity	4%
Emerging Market Equities	3%
Global Equity	8%
Core/Diversified Fixed Income	11%
Bank Loans	2%
Emerging Market Debt	2%
Real Estate	20%
Hedge Funds	6%
Global Asset Allocation/Risk Parity	10%
Private Equity/Debt	16%

• Components of the target portfolio allocated among the asset classes from *Survey of Capital Market Assumptions: 2019 Edition*, published by Horizon Actuarial Services, LLC.

Asset Class	Target Allocation
US Large Cap	18%
US Small/Mid Cap	7%
Non-US Developed	11%
Non-US Emerging	3%
US Fixed – Core	13%
US Fixed – High Yield	2%
Non-US Fixed – Developed	2%
Non-US Fixed – Emerging	2%
Real Estate	20%
Hedge Funds	6%
Private Equity	16%

The following asset classes were not included in the Horizon study and have been allocated among other included classes:

• Global Equity (8%)

- Bank Loans (2%)
- Global Asset Allocation/Risk Parity (10%)

<u>Differences Between Target Portfolio and Current Mix of Assets</u>

Presently, the largest variations within the existing portfolio relative to the target allocation are the overweight to domestic fixed income and the underweight to private equity. The overweight is largely the result of the recent sale of private debt by the pension fund for more than \$40 million dollars. The proceeds from the sale of the asset were placed in a short- to intermediate-duration fixed income strategy, while new alternative investments could be selected and funded.

Since the sale of the asset mentioned above, the fund has made commitments totaling \$52 million in new private investments, approximately \$5 million of which has been called. Capital calls for these investments have and will continue to be funded from the short- to intermediate-duration fixed income investment, which, over time, will reduce the fund's overweight to fixed income assets and increase the fund's allocation to private equity, bringing these asset classes closer to their intended targets.

• Expectation That Mix of Assets Will Vary Over Time

In the coming years, as the projected assets of the fund are expected to fall, the allocation to long-term illiquid investments is reduced. While this may slightly reduce the return characteristics of the fund, it is necessary to ensure that the fund maintains liquidity necessary to pay benefits to its participants. If the percentage of assets within illiquid investments is too high as the fund balance falls, this could lead to a liquidity crisis during a market correction, that is, not having sufficient liquid investments over time as the fund balance declines will provide access to liquid investments that would allow the fund to meet its obligations. Over time, as the fund balance and funded status improve, an increased allocation to private investments will be considered as a means of improving the risk and return characteristics of the fund.

It is expected that the mix of assets will vary as follows:

	PYE	PYE	PYE	
	2019-	2044-	2049-	PYE
Asset Class	2043	2048	2053	2054+
US Large Cap	18%	18%	18%	18%
US Small/Mid Cap	7%	7%	7%	7%
Non-US Developed	11%	11%	11%	11%
Non-US Emerging	3%	3%	3%	3%
US Fixed - Core	13%	13%	13%	13%
US Fixed - High Yield	2%	5%	5%	2%
Non-US Fixed - Developed	2%	2%	2%	2%
Non-US Fixed - Emerging	2%	4%	4%	2%
Real Estate	20%	15%	12%	20%
Hedge Funds	6%	10%	15%	6%
Private Equity	16%	12%	10%	16%

Assumed Investment Allocation

- Net investment return assumptions used for deterministic projections
 - \circ $\,$ The net investment return assumptions used for deterministic projections were based on:
 - The expected net returns, standard deviations, and correlations from the Survey of Capital Market Assumptions: 2019 Edition as detailed in Document 25.1. Short-term assumptions from the survey were assumed to apply to plan years ending prior to May 1, 2029 and the long-term assumptions were used thereafter.
 - The assumed investment allocations over time as described in the preceding section.

 Stochastic modeling of portfolio returns was performed assuming a 10-year holding period for returns prior to May 1, 2029 and a 20-year holding period for subsequent years. The 75th, 50th, and 25th percentile returns for each period are shown below. 10,000 trials were used.

	PYE	PYE	ΡΥΕ	PYE	
	2020-	2030-	2044-	2049-	PYE
Percentile	2029	2043	2048	2053	2054+
75 th	9.28%	9.60%	9.26%	9.08%	9.60%
50 th	6.74%	7.82%	7.58%	7.45%	7.82%
25 th	4.20%	6.00%	5.85%	5,77%	6.00%

 We also looked at statistics obtained by weighting the expected geometric average return furnished by a single manager per asset class responding to the Horizon survey. For each asset class, the 25th, 50th and 75th percentile manager was used in this weighting. The results are as follows:

	Weig	Weighted Geometric Average Return					
	PYE	PYE	PYE	PYE			
Manager	2020-	2030-	2044-	2049-	PYE		
Percentile	2029	2043	2048	2053	2054+		
75 th	6.77%	7.78%	7.49%	7.38%	7.78%		
50 th	6.17%	6.92%	6.65%	6.56%	6.92%		
25 th	5.63%	6.34%	6.10%	6.03%	6.34%		

 We selected the following interest rates by starting from the 50th percentiles from our stochastic modeling and then adjusting downward so that they were not too close to the edges of the 25th-75th percentile corridor established by the "weighted manager" method.

	ΡΥΕ	PYE	PYE	PYE	
	2020-	2030-	2044-	2049-	PYE
	2029	2043	2048	2053	2054+
Assumed Interest Rate	6.50%	7.50%	7.30%	7.30%	7.50%

• Since the capital market returns provided in response to the Horizon survey included the effects of inflation and were net of investment-related expenses, we did not employ an explicit inflation or investment expense assumption.

Demographic Experience

<u>Experience Studies</u>

UAS does not typically perform formal experience studies for our clients. We typically assess the appropriateness of assumptions by looking at 5-year histories of demographic experience (expected versus actual exits by cause) and aggregate liability gain or loss relative to the size of accrued liability. If an assumption looks questionable, we perform an internal demographic experience study.

	Expected and Actual Exits From Active Status Due To:						
PYE	Retire	ment	Disabl	ement	(Net) Wit	thdrawal	
4/30:	Expected	Actual	Expected	Actual	Expected	Actual	
2018	96.9	97	6.8	6	792.8	403	
2017	78.1	80	22.1	5	824.3	653	
2016	73.5	96	21.6	8	702.9	506	
2015	77.4	46	30.2	5	646.4	500	
2014	78.8	53	30.5	12	368.4	669	
2013	102.7	57	32.1	48	407.0	684	
2012	104.0	117	31.5	47	373.8	272	
2011	77.7	123	30.7	41	372.8	220	
2010	141.0	173	37.9	61	488.6	1,466	
2009	126.4	163	41.5	44	609.2	1,100	

A 10-year history of demographic experience is provided below:

	Expected and Actual Deaths by Status					
PYE	Acti	tives Inactive Vesteds Retirees		rees		
4/30:	Expected	Actual	Expected	Actual	Expected	Actual
2018	8.9	12	40.1	30	269.1	298
2017	9.8	15	32.9	36	301.3	289
2016	9.3	13	30.6	26	298.3	304
2015	9.2	7	23.6	50	324.1	287
2014	9.5	6	22.2	25	318.1	280
2013	10.2	13	21.3	26	314.1	295
2012	10.6	8	21.6	22	264.2	295
2011	10.4	12	23.5	55	256.2	258
2010	12.9	16	20.4	53	250.6	292
2009	14.3	13	20.0	46	240.2	257

• Liability Gain/Loss Analysis

Liability gains/losses for the last 10 years, both as a dollar amount and as a percentage of accrued liability, are shown below:

	Liability (Gain)/Loss				
PYE		As % of			
4/30:	As \$ Amount	Liability			
2018	\$ 12,008,517	0.54%			
2017	17,488,095	0.81%			
2016	14,607,648	0.69%			
2015	(2,276,720)	-0.11%			
2014	16,203,453	0.78%			
2013	11,546,638	0.55%			
2012	16,834,372	0.81%			
2011	41,566,901	2.07%			
2010	(23,845,603)	-1.17%			
2009	16,249,855	0.80%			

• Percentage of Plan Population That Is Married

For the 5 plan years ending April 30, 2014-2018, 1,086 people commenced retirement benefits. Of these, 729, or <u>67.1%</u>, were married and, on average, the male spouse was 2.1 years older than the female spouse. There were no same sex married couples reported.

• Distribution of Optional Form Elections

The distribution of optional form elections at retirement for the plan years ending April 30, 2014-2018 is shown below:

Bonofit Form	Married Participants	Single Participants
Benefit Form	Electing	Electing
Life annuity	17.3%	81.5%
Life-ten year certain	3.2%	15.7%
Joint & 50% survivor	21.4%	1.1%*
Joint & 75% survivor	44.6%	1.1%*
Joint & 100% survivor	13.6%	0.6%*

* The plan does <u>not</u> allow single participants to elect a joint and survivor form of benefit. The apparent instances of this in the table above are due to divorced retirees who elect a joint and survivor annuity pursuant to the terms of a qualified domestic relations order (QDRO). For projections, these percentages were assumed to be zero.

• Rates of Retirement by Age

	Witho	out Index 80 or	85	Wit	h Index 80 or 8	85
Age	Exposure	Retirements	Rate	Exposure	Retirements	Rate
55	489	49	10.0%	106	32	30.2%
56	380	32	8.4%	41	15	36.6%
57	303	21	6.9%	25	7	28.0%
58	252	25	9.9%	29	9	31.0%
59	191	20	10.5%	27	9	33.3%
60	133	15	11.3%	25	5	20.0%
61	93	23	24.7%	18	4	22.2%
62	90	33	36.7%	9	3	33.3%
63	50	12	24.0%	6	2	33.3%
64	30	5	16.7%	5	2	40.0%
65	22	3	13.6%	6	3	50.0%
66	19	3	15.8%	2	0	0.0%
67	7	2	28.6%	4	2	50.0%
68	5	0	0.0%	2	2	100.0%
69	3	0	0.0%	0	0	0.0%
70	2	0	0.0%	1	0	0.0%
>70	4	0	0.0%	0	0	0.0%

Retirement experience by for <u>actives</u> based on the plan years ending April 30, 2014-2018 is summarized below:

	10+	Years of Servio	ce	3-9	Years of Servic	е
Age	Exposure	Retirements	Rate	Exposure	Retirements	Rate
55	427	65	15.2%	-	-	-
56	361	28	7.8%	-	-	-
57	304	12	3.9%	-	-	-
58	291	14	4.8%	-	-	-
59	264	19	7.2%	-	-	-
60	235	17	7.2%	-	-	-
61	206	21	10.2%	-	-	-
62	188	48	25.5%	492	15	3.0%
63	130	19	14.6%	428	9	2.1%
64	104	16	15.4%	344	49	14.2%
65	82	33	40.2%	237	80	33.8%
66	39	12	30.8%	142	12	8.5%
67	27	6	22.2%	96	7	7.3%
68	22	3	13.6%	70	1	1.4%
69	13	1	7.7%	50	1	2.0%
70	8	2	25.0%	19	4	21.1%
>70	2	2	100.0%	12	2	16.7%

Retirement experience by for <u>inactive vested</u> participants based on the plan years ending April 30, 2014-2018 is summarized below:

Mortality Assumptions

• Experience Study Underlying Mortality Rates

The vast majority of participants in the plan are employed in the construction industry as a carpenter or in a related trade (e.g., millwright). As such, they would classified as blue collar workers. Therefore, we selected the blue collar tables of the *RP-2014 Mortality Tables Report* issued by the Society of Actuaries as the basis for the mortality assumption. We believe this table is representative of the expected mortality experience under the plan.

• Process Used to Construct Tables

As we have selected the blue collar tables of the *RP-2014 Mortality Tables Report* issued by the Society of Actuaries as the basis for the mortality assumptions, we refer the reader to the text of this study for a detailed description of how the tables were constructed. The report can be found here:

https://www.soa.org/globalassets/assets/files/research/exp-study/research-2014-rpreport.pdf

• Mortality Adjustments

No adjustments were applied to the blue collar tables found in the RP-2014 study.

• Mortality Improvement

We used the Society of Actuaries' MP-2018 improvement scales to project mortality rates generationally.

New Entrant Profile

• The distribution of ages of new entrants over the past 5 years appears below:

Age	Percer	ntage of N	ew Entrar	nts for PYE	4/30:
Range	2018	2017	2016	2015	2014
<20	7.79%	6.91%	8.62%	6.38%	7.89%
20-24	19.52%	19.75%	20.94%	19.30%	17.55%
25-29	18.17%	18.62%	16.26%	19.14%	14.00%
30-34	16.65%	19.75%	17.86%	22.01%	20.51%
35-39	14.50%	11.57%	13.30%	9.25%	8.09%
40-44	8.68%	9.59%	8.87%	7.34%	8.09%
45-49	5.46%	7.19%	5.91%	6.06%	9.86%
50-54	5.28%	3.81%	4.31%	5.26%	7.69%
55-59	2.69%	1.83%	3.08%	4.47%	4.34%
60+	1.25%	0.99%	0.86%	0.80%	1.97%

- New entrants essentially never enter the plan with vesting or benefit service. This is because:
 - Reciprocity agreements are typically of the "money-follows-man" type, so participants generally cannot come in with vesting service earned in another plan that carries over to the Carpenters Pension Trust Fund under a "pro-rata" reciprocity agreement.
 - If the plan is designated as a home fund under a money-follows-man agreement, the employee must first become a participant in the plan, so he/she would not be a new employee when contributions are transferred in.
 - Furthermore, contiguous non-covered service is extremely rare as the plan does not allow a termination to occur between the non-covered and covered service.

Contribution Base Units and Employer Withdrawals

• Employers That Contributed Over 5%

Information on the employers that made more than 5% of total plan year contributions during the last 10 plan years (plan years ending April 30, 2009-2018) appears below. Note that, during 5 of the last 10 plan years, no single employer accounted for more than 5% of the total contributions. Therefore, there is no entry for these plan years (plan years ending April 30, 2018, 2017, 2016, 2010, and 2009).

				Average	
PYE	Employer	Percent		Contribution	Total
4/30:	Name	of Total	Hours	Rate	Contribution
2015	Employer A	8.10%	520,846	\$ 16.30	\$ 8,488,041
2014	Employer B	6.17%	315 <i>,</i> 567	19.10	6,028,496
2014	Employer A	5.56%	330,062	16.44	5,427,692
2014	Employer C	5.43%	313 <i>,</i> 658	16.90	5,301,144
2013	Employer B	7.94%	564 <i>,</i> 592	12.60	7,112,439
2013	Employer C	6.51%	319,310	18.26	5,830,619
2012	Employer B	9.14%	657,240	11.99	7,882,031
2012	Employer C	5.78%	388,064	12.84	4,983,881
2011	Employer C	7.86%	649,819	8.20	5,328,570
2011	Employer B	6.14%	342,167	12.18	4,167,883

• <u>Historical Trends – Contribution Base Units (Hours)</u>

As recently as the early 2000's, the plan had annual contribution hours in excess of 14 million. However, by 2010, hours had hit a low point of 5.8 million. The decline was largely driven by a struggling Detroit economy.

The auto industry touches the lives of most of Detroit's residents in one way or another. Consequently, when the auto industry goes through a tough time, so does Detroit. By the late 2000's, flagging car sales had forced both Chrysler and GM to file for bankruptcy. The decline of these great American companies, on top of the "great recession" being felt across the country, had a chilling effect on union construction projects, resulting in the sharp decline in hours.

Work hours have rebounded to some extent since 2011 and are now hovering around the 8 million mark. However, changes in state labor laws, a decline in union market share, a dramatically scaled back Auto Show, and other project-specific issues, will likely force a decline in hours over the next few years.

• <u>Historical Trends – Contribution Rates</u>

Beginning in 2006, the bargaining parties began making consistent contribution rate increases in an attempt to improve the plan's funding situation. These increases were typically non-credited/non-benefit bearing. During the period 2006-2014, the average hourly contribution rate increased from about \$4 to over \$15, and the percentage credited dropped from 100% to about 39%. Please see Document 26.1.

On August 1, 2013, the Trustees voted to adopt the "all reasonable measures" option under the Pension Protection Act. Since that time there have been no negotiated increases (though the average does fluctuate based on the changing distribution of work among the various collective bargaining agreements).

The Trustees and bargaining parties feel that the high contribution rate coupled with low accrual rate make it difficult to attract and retain the best workers. Furthermore, the high contribution rates make it difficult for contractors to compete in the bidding process. Therefore, the sponsors are of the opinion that future contribution rate increases would be detrimental to the plan.

• Rationale for Hours Assumption

The hours assumptions we have used in this filing were presented to us as the Trustees' best estimates of future industry activity. Due to the extensive knowledge of the local construction industry, both from the labor and management side, possessed by the Board of Trustees, we believe this estimate to be well-informed and very credible. However, as the plan's actuaries, we must independently verify its reasonableness and appropriateness.

The assumption predicts hours that go up from last year's 8 million to 8.2 million in plan year ending April 30, 2020, then gently decline to 8.0 million and 7.8 million. Beginning in 2023 hours drop to 7.0 million, where they remain.

The first 3 years of projections are fairly consistent with the hours experience in plan years ending in 2018 and 2019. We do not think that hours will ever return to levels seen in the early 2000's. This is primarily due to market share lost by union contractors following the "great recession" and continuing population decline. Rather, a short-term stabilization seems more likely.

We also think that the decline in 2023 is reasonable. There are a number of one-time projects that are currently underway or scheduled to start soon that will wrap up by 2023 or shortly thereafter with no new work on the horizon to replace them. Some examples are:

- \$4.4 billion Gordie Howe Bridge is projected to be complete in 2024.
- \$1 billion Blue Water Energy Center has a projected completion date in 2021.

- Monroe Block historic district scheduled to start work early 2020, construction cost is estimated to be \$800 million.
- FCA Mack Engine Plant employs 400+ millwrights and finishes at the end of 2020.
- FCA Warren Truck Assembly employs 300-400 millwrights and finishes in the first quarter of 2021.

Other factors are likely to contribute to an impending decline in hours. These include new "right to work" legislation in Michigan, the elimination of "project labor agreements" on state construction projections, and a dramatic down-sizing of the Detroit Auto Show.

We think that the ultimate hours level of 7 million is reasonable based on 2 factors:

- 1. The 10-year historic average of work hours is 6.9 million.
- 2. In his 20-year hours forecast prepared for the pension plan, economist Malcom S. Cohen predicts that hours will fall sharply in 2022 and then cycle up and down over time, with an average level of around 7.2 million.

We have assumed that as hours decline, the plan will see an uptick in assessable withdrawals, and that such withdrawals will stabilize shortly after hours stabilize. However, as most of the contributing employers qualify for the construction industry exemption from withdrawal liability, assessments are much less than one would expect for a fund of this size.

• <u>Rationale for Contribution Rate Assumption</u>

The bargaining parties and Trustees are of the opinion that, historically, pension contribution rates increased too much and too quickly. They understand that the high contributions and low accrual rate will make it difficult to man jobs and retain qualified craftsmen. Furthermore, the high contribution rates make it difficult for signatory contractors to compete in the market place.

Therefore, any further increase in contribution rates will likely result in a reduction in work hours, giving rise to a net loss in contribution income. Given this situation, it is very unlikely that the bargaining parties will want to increase pension contribution rates anytime soon.

Contribution rates have been essentially unchanged since 2014. We selected a future assumed rate of \$15 per hour based on the 5-year average of \$15.02 and the belief that rates will not increase going forward.

• <u>Experience with Withdrawals</u> The plan's 10-year experience with withdrawal liability collections has been as follows:

	Withdrawal Liability
PYE 4/30:	Collected
2010	\$ 357,188
2011	55,520
2012	1,355,000
2013	540,000
2014	-
2015	1,180,886
2016	-
2017	-
2018	7,236
2019	3,061,736

Due to the small number of withdrawals that are actually assessable due to the construction industry exemption, there is quite a bit of volatility in the collection numbers.

Two employers are currently making quarterly payments, and a case against a third employer is being litigated. Based on the known payment schedules and assuming a one-third probability that the case in litigation will result in payment of the allocated liability, we estimated collections for the current plan year at \$1,333,196.

We felt that, as hours are projected to decline, there would be a greater chance of withdrawal liability assessments. Therefore, we left assumed collections at the \$1 million level for 2021 through 2023. After that we assumed \$800,000 for 2024 as a transition down the 10-year average of about \$650,000, which we assumed for all plan years thereafter.

Our 2018 withdrawal liability report shows 13 contractors who paid some withdrawal liability. Of those, 5 were paid in full and 8 were settled or written off. The "discount" on the settlements fell in the range of 15%-40%. The write-offs allowed the plan to collect only pennies on the dollar.

Take-up Rate With Respect to Selection of Benefit/Contribution Schedules

The initial rehabilitation plan adopted in 2008 had only 2 schedules: the "preferred" and the "default." Following the adoption of this plan, every bargaining unit adopted the preferred schedule.

In the 2012 update to the rehabilitation plan, the preferred schedule called for contribution rate increases every year through 2016 on the Commercial, Display, Floorlayer, Millwright, and Roadbuilder contracts. However, when the "all reasonable measures" plan was adopted the following year, rates were essentially frozen at the 2013 level and have not been increased since.

Projection Methodology

• Approximation Techniques

As previously discussed, for purposes of the certification of critical and declining status in checklist item #5 and the calculation of the present value of the reduction in benefits in checklist item #12, the effect of the "take-up" rate of optional benefit form elections was <u>approximated</u> by using a hybrid form and amount of benefit.

It was decided to use the hybrid form of benefit technique to approximate the present value of the reduction in benefits for checklist item #12 because results were needed on a person-by-person basis and, due to system limitations, it was not practical to assign each participant record a present value using the same technique we used to generate expected benefit payments.

The approximation turned out to produce an error in aggregate annual benefit payments that varied from -0.67% to about 1.00% based on implementation of the proposed suspension.

- Changes to Cash Flow Projections
 - Inactive vested participants were processed in separate runs in order to properly value the desired retirement decrements. This was done because our valuation system does not fully support inactive decrements.
 - For each plan design scenario, 5 active-only runs (one for each form of benefit), 5 inactive vested-only runs (one for each form of benefit), and one pay status run were done. The projected benefit payments from these 11 runs were blended, along with projected benefits from assumed new entrants, to produce the final stream of benefit payments. This was done because our valuation system does not allow the user to assume multiple forms of benefit payment in a single run.
 - Benefit payments from the valuation system output are given as of the beginning of each plan year. These were multiplied by a one-half year interest adjustment factor to produce cash flows. We think it is more intuitive to work with cash flows rather than interest-adjusted cash flows. Additionally, all benefit payments

produced by the valuation system are discounted at the valuation interest rate, whereas, when projecting assets, various rates of interest are applied.

- New entrant benefit payments from the valuation system were adjusted for contribution rate and total hours. This was done outside of the valuation system to prevent having to re-do these runs following an assumption change.
- For purposes of the certification of critical and declining status in checklist item #5, active participant cash flows from the valuation system were adjusted for contribution rate and total hours. The certification of critical and declining status was done before work on this filing had commenced and we had not yet developed code to handle this adjustment internally.

Exhibit III

Additional Disclosures Relating to the Use of Different Assumptions

• Deterministic Projections

Explanation of differences between assumptions used under sections 4.02(1) and 3.01 of Revenue Procedure 2017-43.

- The short-term interest rate used under section 3.01 is 6.4% versus 6.5% used under section 4.02(1). The average short-term returns are generally higher in the 2019 Horizon survey as compared to the 2018 survey. When the certification of critical and declining status was completed, the 2019 survey was not yet published. Additional analysis using the new survey caused us to raise this rate.
- The long-term interest rate used under section 3.01 is a flat 7.5%, whereas, the projections under section 4.02(1) include 5-year periods of 7.3% and 7.2% that coincide with assumed changes in asset mix. The average long-term returns are generally lower in the 2019 Horizon survey as compared to the 2018 survey. When the certification of critical and declining status was completed, the 2019 survey was not yet published. Additional analysis using the new survey revealed that there was not enough conservatism built into the 7.5% assumption to absorb the assumed asset mix changes occurring in the plan years ending in 2044 and 2049. Therefore, we lowered the assumed returns during these periods.
- The "take-up" rate for benefit form election was approximated with a hybrid form of benefit under section 3.01, whereas, the assumption is explicitly valued under section 4.01(1). When the certification of critical and declining status was completed, it was based on the 2018 actuarial valuation report, which used the hybrid form approach. We felt that it was not necessary to incorporate the explicit approach because the approximation is at its worst when the guarantee-based limitation comes into play. As the certification did not value any type of benefit reduction, the guarantee-based limitation was not an issue.
- For purposes of section 3.01, current inactive vested participants are assumed to retire at age 59 if they have at least 10 years of service, or age 62 if less than 10 years of service. Under the section 4.01(1) calculations, retirement rates are used to value inactive vested participants. The critical and declining certification was prepared prior this filing and, at that point in time, we had not developed the coding needed to explicitly value multiple retirement ages for inactives.
- For the projections under section 3.01, no future withdrawal liability payments were assumed. At the time the critical and declining certification was prepared, we had not collected or analyzed information on prior withdrawal liability collections and did not think it would be material to the results of the certification.

 For the projections under section 3.01, we did not take into account any increased expenses due to the MPRA filing or future inflation in expenses. At the time the critical and declining certification was prepared, we did not realize the magnitude of plan expenses due to the filing. When preparing this filing we decided it would be more appropriate to increase the 2019-2020 expense level to reflect these additional costs. We also followed our standard valuation practice of assuming flat expenses going forward when completing the certification. When completing this filing, we decided it would be more accurate to include a future inflation adjustment in our expense assumption.

• <u>Stochastic Projections</u>

Other than differences inherent in deterministic versus stochastic modeling, we do not believe there are any discrepancies between the assumptions used for the deterministic projection under section 4.02(1) of Revenue Procedure 2017-43, and the stochastic projections under section 4.02(2).

Carpenters Pension Trust Fund – Detroit and Vicinity

20-year Forecast

August 26, 2019

Prepared by

Malcolm S. Cohen, PhD President, Employment Research Corporation

Prepared for

Michigan Regional Council of Carpenters, Carpenters Pension Trust Fund – Detroit & Vicinity c/o Benesys, Inc. Attn: Joan Janks, Plan Manager 700 Tower Drive, Ste. 300 Troy, MI 48098

Carpenters Pension Trust Fund – Detroit and Vicinity – 20-year Forecast

I was asked to make a 20-year projection of hours worked for unionized carpenters in the state of Michigan. This report summarizes my findings.

Qualifications- Malcolm S. Cohen, PhD

I am the president of Employment Research Corporation, a firm located in Ann Arbor, Michigan, that specializes in employment and wage and hour research. I obtained my Ph.D. in Economics from MIT, with specializations in Econometrics and Labor Economics. After graduating from MIT, I worked for the U.S. Bureau of Labor Statistics in Washington, D.C. I have taught at the University of Maryland, the University of Michigan, and the University of Minnesota. The classes I have taught include Statistics, Economics, Labor Market Information, Human Resource Management, Human Resource Information Systems, and Econometrics. I served as Director of the Institute of Labor and Industrial Relations at the University of Michigan from 1980 to 1993. At the University of Michigan, I also served varied terms as the Chairman of the Program for Human Resource Development, a graduate certificate program, between 1975 and 1978. I have conducted extensive research on labor market issues, new hires, labor shortages and labor market information. I have written over 50 articles and books on related topics. I have testified or been a consultant in over 1,000 audits or cases and have testified over 300 times. I have also served as an expert to the EEOC and U.S. Department of Labor.

Under contract to the Wage and Hour Division of the U.S. Department of Labor, I prepared detailed estimates of the number and characteristics of the exempt and non-exempt employees for congressionally mandated minimum wage studies published in June 1998 and January 2001. Additionally, under contract to the Wage and Hour Division, I prepared a report describing major changes in the U.S. economy and estimating how those changes would impact the viability of 29 CFR § 541 regulatory requirements (namely, The "New Economy" and Its Impact on Executive, Administrative and Professional Exemptions to the Fair Labor Standards Act (FLSA)). The DOL submitted each of these reports to the U.S. Congress for its information and use in considering proposed regulations and legislation. My Curriculum Vitae is attached as Appendix A.

Related Publications

While I was at the Institute of Labor and Industrial Relations at the University of Michigan from 1972-1993, I authored or coauthored a number of related publications, including:

"The Economic Outlook for the Metropolitan Areas of Michigan" with George A. Fulton and Donald R. Grimes. *The Economic Outlook for 1987, proceedings of the Thirty-fourth Annual Conference on the Economic Outlook*. Ann Arbor: Research Seminar in Quantitative Economics, University of Michigan

Occupational Employment Forecasts for the Flint SMSA, with Arthur R. Schwartz and Donald R. Grimes.

Civilian Labor Force, Employment and Unemployment Forecasts, Michigan, East and Central Major Areas, with Harold T. Shapiro, Arthur R. Schwartz, and Alan Kett.

Civilian Labor Force, Employment and Unemployment Forecasts, Southeast Michigan, with Harold T. Shapiro, George A. Fulton, and Arthur R. Schwartz.

Civilian Labor Force, Employment and Unemployment Forecasts, Michigan, Western Major Areas, with Harold T. Shapiro, Arthur R. Schwartz, and Alan Kett.

Civilian Labor Force, Employment and Unemployment Forecasts, State of Michigan, with Harold T. Shapiro and George A. Fulton.

Civilian Labor Force, Employment and Unemployment Forecasts: Multi-County Balance of State Areas, with Harold T. Shapiro, Arthur R. Schwartz, Alan Kett, and Philip Mirowski.

Wage and Salary Forecast, Michigan, with Arthur R. Schwartz.

Civilian Labor Force, Employment and Unemployment Forecasts for the Flint SMSA.

An Econometric Model of a Local Urban Labor Market: The Flint SMSA.

An Econometric Model of a Local Urban Labor Market: The Denver, Colorado SMSA.

Data and documents reviewed

In preparing this report I have reviewed the following data and publications:

- 1. Michigan Regional Council of Carpenters Pension Trust Fund Detroit and Vicinity Summary Plan Description, January 1, 2017.
- 2. First-seventh and thirteenth Amendments to the Pension Plan of the Carpenters' Pension Trust Fund Detroit and Vicinity (As Restated on October 7, 2014).
- 3. Carpenters Pension Trust Fund All Reasonable Measures Plan 2013.
- 4. 10-Year Active Membership Statistics, UBC Midwestern District 2009-2019.
- 5. Annual Carpenters Pension Trust Fund Actuarial Valuation Reports May 1, 2011 May 1, 2018.
- 6. Wage rates for various union locals for time periods from 2016 to 2018 for different areas in Michigan.
- 7. Various collective bargaining agreements for the Michigan Regional Council of Carpenters.
- 8. Financial Statements for the Carpenters' Pension Trust Fund 2012-2017.
- 9. Form 990 and Form 5500 for tax years ending 4/30/2013-4/30/2017.
- 10. An email from Paul Newcomer dated April 26, 2019 providing background for the report.
- 11. Data from the U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Survey on the Employment of Carpenters, 2003-2018.
- 12. U.S. Bureau of Labor Statistics, Occupational Outlook Handbook, 5/22/2019.
- 13. University of Michigan RSQE press release Job Growth Michigan Forecast 2017-2020.
- 14. National employment projections, U.S. Department of Labor Bureau of Labor Statistics, Employment Projections, 2016-2026, and descriptions of their methodology.
- 15. Michigan Occupational Employment Projections, Michigan Bureau of Labor Market Information and Strategic Initiatives, 2016-2026.

- 16. Labor Force Statistics Derived from the CPS, September 1982, BLS Bulletin 2096.
- 17. Bureau of Labor Statistics, Employment and Earnings, January 1983.
- 18. Current Population Survey, Employed Persons by detailed Occupation, 1983-2002.
- 19. Current Population Survey, Employed Persons by detailed Occupation and Sex, annual averages, 2000-2010.
- 20. Current Population Survey, Employed Persons by detailed Occupation and Sex, annual averages, 2011-2018.
- 21. Trends in carpenter employment (number of jobs reported by establishment) in Detroit, Michigan and the United States, 1997 -2018.
- 22. https://finance.yahoo.com/news/jeffrey-gundlach-increases-us-recession-odds-75-percent-193520909.html.
- 23. National Bureau of Economic Research, US Business Cycle Expansions and Contractions.
- 24. <u>https://www.cnbc.com/2019/08/22/manufacturing-sector-contracts-for-the-first-time-in-nearly-a-decade-according-to-ihs-markit.html</u>

Analysis

I was asked to make a projection of demand for unionized construction-industry carpenters in Michigan. I was provided with historical data on hours worked by members of the Carpenters Pension Trust Fund – Detroit and Vicinity ("the Fund"). Employer contributions to the Fund are related to each employee's hourly rate. There are different kinds of projections. Economists look at past trends and current leading indicators and make projections based on these trends. These forecasts are intended to assist analysts in understanding broad trends and risks and are not intended to determine actual contribution rates that should be made to keep a pension plan solvent. These determinations are typically made by actuaries that have more experience with fund flows and understand risks to the solvency of the fund. They also have a better understanding of the specifics of the fund contributors as well as specific risks. The Fund's Annual Actuarial Valuation reports hours worked each year. Figure 1 shows hours worked for the Fund between 2003 and 2018.¹



Figure 1

From 2003 to 2010, hours worked by Carpenters in the Fund declined. From 2010 to 2018, hours worked increased from just under 6 million hours per year to nearly 8 million hours per year, or 4.2% per year. This high rate of growth was related to the recovery from the 2008-2010 recession and is unlikely to continue.

In order to project expected hours worked for future years, I compared the data on hours with measures related to industry activity such as Carpenters' employment in the United States, Michigan and the Detroit Metropolitan Statistical Area. Figure 2 shows Carpenter employment in Michigan and in the Detroit Metropolitan Statistical Area from 2003 to 2018.²

Figure 2

Source: Annual Carpenters Pension Trust Fund Actuarial Valuation Reports May 1, 2011 – May 1, 2018

¹ I was provided with actuarial valuations for 2011-2018. The 2012 valuation included a chart I used to estimate hours worked back to 2003.

² Occupational Employment Statistics Data for Michigan and the Detroit Metropolitan Statistical area for Carpenters (47-2031), 2003-2018, U.S. Bureau of Labor Statistics.



Source: Bureau of Labor Statistics, Occupational Employment Survey, 2003-2018.

Both Michigan employment and the Detroit Metropolitan Area employment exhibit a similar historical pattern as hours worked by members of the Carpenters Pension Trust Fund. Figure 3 shows both Carpenter employment in Michigan and hours worked in the Carpenters Pension Trust Fund.





Source: Bureau of Labor Statistics, Occupational Employment Survey, 2003-2018 and Carpenters' Pension Trust Fund Actuarial Valuation documents, 2011-2018.

Although they are on different scales, the trend in Carpenter employment in Michigan has been reflected in the hours worked by members of the fund over the past 15 years.

The demand for Carpenters can fluctuate based on economic conditions. During an economic recession, it is not unusual to see a decrease in demand for many types of labor. The National Bureau of Economic Research (NBER) defines a recession as a "significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales."³ Figure 4 shows the real Gross Domestic Product (GDP) in billions from 1978 to 2018, with NBER-defined recessions shown in the shaded areas.



Figure 4

Source: Real GDP in billions of chained 2012 dollars, Quarterly, seasonally adjusted annual rate and recession data from Federal Reserve Economic Data (https://fred.stlouisfed.org).

Although there are quantitative methods for predicting the likelihood of future recessions, there is not a reliable way to predict precisely when a recession will begin or end, or how many will occur in a 20-year period. However, we can make projections which show likely future economic activity, adjusting for the possible impact of recessionary periods which can lead to declines in Carpenter employment. Since the NBER began measuring recessions in 1857 there has not been a 10-year period without a recession except the current cycle, June 2009 to present. Therefore, it seems probable that there will be at least one recession, and probably two, in the next 20 years.

³ NBER website, <u>http://www.nber.org/cycles/cyclesmain.html</u>

Figure 5 shows the employment of Carpenters in the U.S. over the last 40 years. The shaded areas indicate, from peak to trough, declines in Carpenter employment in the United States. Historical data is based on the Current Population Survey (CPS) conducted by the United States Bureau of the Census.⁴



Figure 5

In the last 40 years there have been three major declines in Carpenter employment, occurring from 1979-1982, 1988-1992, and 2006-2010. From 2006 to 2010, Carpenter employment dropped by 33%. Over the same time period, hours worked by carpenters in Michigan declined by 47%, from 11,200,000 to 5,900,000.

To estimate the impact of future declines, I have included a projection that assumes there will be two declines over the next 20 years that and that each will average 30%. I assume that employment will decline 15% during the first year, and bottom at 30% in the second year, then return to the 4.2% growth rate experienced by Carpenter hours from 2010 to 2018.

In this projection, shown in Figure 6, Carpenter hours will reach 7.7 million by 2038, but there is a 30% reduction in hours occurring over two years in 2021 and 2032.

Source: United States Current Population Survey, Bureau of Labor Statistics.

⁴ The count of Carpenters in the CPS differs from OES data because it includes persons self-reporting their occupation as a carpenter to the census bureau, where OES data is based on reporting by employers.





Table 1 provides the projection in manhours by year from 2019 to 2038.

Year	Projected
	Hours Worked
2010	0 5 20 250
2019	8,528,350
2020	8,886,541
2021	7,553,560
2022	6,220,579
2023	6,481,843
2024	6,754,080
2025	7,037,752
2026	7,333,337
2027	7,641,337
2028	7,962,274
2029	8,296,689
2030	8,645,150
2031	7,348,377
2032	6,051,605
2033	6,305,772
2034	6,570,615
2035	6,846,581
2036	7,134,137
2037	7,433,771
2038	7,745,989

Table 1: Projected Hours for Carpenters' Pension Fund – Detroit and Vicinity

Conclusion

Based on my analysis of the various economic forecasts and projections I reviewed, it is my opinion that there is a strong possibility of one or more recessions occurring in the 20-year period of the projection, resulting in a decline in Michigan Carpenter hours from 2019 to 2038.



JUNE 1ST, 2019

TO: ALL INDEPENDENT COMMERCIAL CONTRACTORS (SECTION F2)

The 2019-2023 labor contract with the Michigan Regional Council of Carpenters provides for a June 1, 2019 Gross Wage increase for Southeast Michigan of \$1.70/hr. effective June 1, 2019. The increase has been allocated as follows: Base Wage \$0.70, Annuity Fund \$0.70, and Apprenticeship \$0.30.

EFFECTIVE THE FIRST FULL PAYROLL PERIOD COMMENCING ON OR AFTER JUNE 1, 2019 THROUGH MAY 31, 2020

CARPENTER JOURNEYMAN RATES

	Day Shift	2nd Shift	3rd Shift
	Per Hour	Per Hour	Per Hour
*Base Wage	\$ 32.70	\$ 34.88	\$ 37.37
*Special Assessment Fund (taxed)	0.20	0.20	0.20
*Special Assessment Building Fund (taxed)	0.20	0.20	0.20
*U.B.C. Per Cap (taxed)	0.05	0.05	0.05
U.B.C. Training (funded)	0.10	0.10	0.10
Health & Welfare Insurance (funded)	7.05	7.05	7.05
Health & Welfare Supplemental (funded)	0.91	0.91	0.91
Pension - 48.65% of base wage (funded)	15.91	16.97	18.18
Annuity Fund - 11.77% of base wage (funded)	3.85	4.11	4.40
GROSS WAGE	\$ 60.97	\$ 64.47	\$ 68.46
Apprenticeship (funded)	1.00	1.00	1.00
Apprenticeship Reimbursement Fund (funded)	0.12	0.12	0.12
Guaranty Fund (funded)	0.10	0.10	0.10
Labor Management Partnership Team (funded)	0.07	0.07	0.07
Industry Advancement Fund (funded)	0.15	0.15	0.15
TOTAL	\$ 62.41	\$ 65.91	\$ 69.90

Geographic jurisdiction of Macomb, Monroe, Oakland, Sanilac, St. Clair, Washtenaw and Wayne Counties. Also including in Livingston County the townships of Brighton, Deerfield, Genoa, Green Oak, Hamburg, Hartland, Oceola, Putnam, Tyrone and Unadilla

Calculation of Pension & Annuity Contributions are on regular-time (hours worked) pay ONLY.

Dues Deduction - Per the Michigan Regional Council By-Laws, dues shall be deducted from the employee's Total Base Wage. The amount of the dues is included in the Base Wage as stated above (currently 4.00%) and deducted on all premium and overtime pay.

*Taxable

400 Renaissance Center, Ste. 1010 Detroit, MI 48243 Phone: (313) 285-5000 Fax: (313) 832-1578 23401 Mound Road, Ste. 101 Warren, MI 48091 Phone: (313) 832-3887 Facilitation (313) 832-3887 888-HAMMER-9 www.hammer9.com

CARPENTER FOREMAN RATES

	Day Shift	2nd Shift	3rd Shift
	Per Hour	Per Hour	Per Hour
*Base Wage	\$ 34.09	\$ 36.36	\$ 38.96
*Special Assessment Fund (taxed)	0.20	0.20	0.20
*Special Assessment Building Fund (taxed)	0.20	0.20	0.20
*U.B.C. Per Cap (taxed)	0.05	0.05	0.05
U.B.C. Training (funded)	0.10	0.10	0.10
Health & Welfare Insurance (funded)	7.05	7.05	7.05
Health & Welfare Supplemental (funded)	0.91	0.91	0.91
Pension - 48.65% of base wage (funded)	16.58	17.69	18.95
Annuity Fund - 11.77% of base wage (funded)	4.01	4.28	4.59
GROSS WAGE	\$ 63.19	\$ 66.84	\$ 71.01
Apprenticeship (funded)	1.00	1.00	1.00
Apprenticeship Reimbursement Fund (funded)	0.12	0.12	0.12
Guaranty Fund (funded)	0.10	0.10	0.10
Labor Management Partnership Team (funded)	0.07	0.07	0.07
Industry Advancement Fund (funded)	0.15	0.15	0.15
TOTAL	\$ 64.63	\$ 68.28	\$ 72.45

CARPENTER LAYOUT MAN RATES

	Day Shift	2nd Shift	3rd Shift
	Per Hour	Per Hour	Per Hour
*Base Wage	\$ 33.81	\$ 3 6.06	\$ 38.64
*Special Assessment Fund (taxed)	0.20	0.20	0.20
*Special Assessment Building Fund (taxed)	0.20	0.20	0.20
*U.B.C. Per Cap (taxed)	0.05	0.05	0.05
U.B.C. Training (funded)	0.10	0.10	0.10
Health & Welfare Insurance (funded)	7.05	7.05	7.05
Health & Welfare Supplemental (funded)	0.91	0.91	0.91
Pension - 48.65% of base wage (funded)	16,45	17.54	18.80
Annuity Fund - 11.77% of base wage (funded)	3.98	4.24	4.55
GROSS WAGE	\$ 62.75	\$ 66.35	\$ 70.50
Apprenticeship (funded)	1.00	1.00	1.00
Apprenticeship Reimbursement Fund (funded)	0.12	0.12	0.12
Guaranty Fund (funded)	0.10	0.10	0.10
Labor Management Partnership Team (funded)	0.07	0.07	0.07
Industry Advancement Fund (funded)	0.15	0.15	0.15
TOTAL	\$ 64.19	\$ 67.79	\$ 71.94

Calculation of Pension & Annuity Contributions are on regular-time (hours worked) pay ONLY.

Dues Deduction - Per the Michigan Regional Council By-Laws, dues shall be deducted from the employee's Total Base Wage. The amount of the dues is included in the Base Wage as stated above (currently 4.00%) and deducted on all premium and overtime pay.

*Taxable

INDEPENDENT CONTRACT (SECTION F2)

CARPENTER APPRENTICESHIP WAGE SCALE

<u>EFFECTIVE THE FIRST FULL PAYROLL PERIOD</u> <u>COMMENCING ON OR AFTER JUNE 1, 2019 THROUGH MAY 31, 2020</u>

CARPENTER APPRENTICE RATES

<u>First Shift</u>		*Spec	*UBC	UBC		48.65%	11.77%						Guar.	
	*Base	Assmt.	Per Cap	Train	Ins.	Pension	Annuity	Gross	Appr.	Reimb	LMPT	IAF	Fund	Total
1st 6 mo (55%)	\$17.99	\$0.40	\$0.05	\$0.10	\$7.96	\$8.75	\$2.12	\$37.37	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$38.81
2nd 6 mo (55%)	\$17.99	\$0.40	\$0.05	\$0.10	\$7.96	\$8.75	\$2.12	\$37.37	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$38.81
3rd 6 mo (60%)	\$19.62	\$0.40	\$0.05	\$0.10	\$7.96	\$9.55	\$2.31	\$39.99	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$41.43
4th 6 mo (65%)	\$21.26	\$0.40	\$0.05	\$0.10	\$7.96	\$10.34	\$2.50	\$42.61	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$44.05
5th 6 mo (70%)	\$22.89	\$0.40	\$0.05	\$0.10	\$7.96	\$11.14	\$2.69	\$45.23	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$46.67
6th 6 mo (75%)	\$24.53	\$0.40	\$0.05	\$0.10	\$7.96	\$11.93	\$2.89	\$47.86	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$49.30
7th 6 mo (80%)	\$26.16	\$0.40	\$0.05	\$0.10	\$7.96	\$12.73	\$3.08	\$50.48	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$51.92
8th 6 mo (85%)	\$27.80	\$0.40	\$0.05	\$0.10	\$7.96	\$13.52	\$3.27	\$53.10	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$54.54

<u>Second Shift</u>		*Spec	*UBC	UBC		48.65%	11.77%						Guar.	
	*Base	Assmt.	Per Cap	Train	Ins.	Pension	Annuity	Gross	Appr.	Reimb	LMPT	IAF	Fund	Total
1st 6 mo (55%)	\$19.18	\$0.40	\$0.05	\$0.10	\$7.96	\$9.33	\$2.26	\$39.28	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$40.72
2nd 6 mo (55%)	\$19.18	\$0.40	\$0.05	\$0.10	\$7.96	\$9.33	\$2.26	\$39.28	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$40.72
3rd 6 mo (60%)	\$20.93	\$0.40	\$0.05	\$0.10	\$7.96	\$10.18	\$2.46	\$42.08	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$43.52
4th 6 mo (65%)	\$22.67	\$0.40	\$0.05	\$0.10	\$7.96	\$11.03	\$2.67	\$44.88	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$46.32
5th 6 mo (70%)	\$24.42	\$0.40	\$0.05	\$0.10	\$7.96	\$11.88	\$2.87	\$47.68	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$49.12
6th 6 mo (75%)	\$26.16	\$0.40	\$0.05	\$0.10	\$7.96	\$12.73	\$3.08	\$50.48	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$51.92
7th 6 mo (80%)	\$27.90	\$0.40	\$0.05	\$0.10	\$7.96	\$13.57	\$3.28	\$53.26	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$54.70
8th 6 mo (85%)	\$29.65	\$0.40	\$0.05	\$0.10	\$7.96	\$14.42	\$3.49	\$56.07	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$57.51

Third Shift		*Spec	*UBC	UBC		48.65%	11.77%						Guar.	
	*Base	Assmt.	Per Cap	Train	Ins.	Pension	Annuity	Gross	Appr.	Reimb	LMPT	IAF	Fund	Total
1st 6 mo (55%)	\$20.55	\$0.40	\$0.05	\$0.10	\$7.96	\$10.00	\$2.42	\$41.48	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$42.92
2nd 6 mo (55%)	\$20.55	\$0.40	\$0.05	\$0.10	\$7.96	\$10.00	\$2.42	\$41.48	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$42.92
3rd 6 mo (60%)	\$22.42	\$0.40	\$0.05	\$0.10	\$7.96	\$10.91	\$2.64	\$44.48	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$45.92
4th 6 mo (65%)	\$24.29	\$0.40	\$0.05	\$0.10	\$7.96	\$11.82	\$2.86	\$47.48	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$48.92
5th 6 mo (70%)	\$26.16	\$0.40	\$0.05	\$0.10	\$7.96	\$12.73	\$3.08	\$50.48	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$51.92
6th 6 mo (75%)	\$28.03	\$0.40	\$0.05	\$0.10	\$7.96	\$13.64	\$3.30	\$53.48	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$54.92
7th 6 mo (80%)	\$29.90	\$0.40	\$0.05	\$0.10	\$7.96	\$14.55	\$3.52	\$56.48	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$57.92
8th 6 mo (85%)	\$31.76	\$0.40	\$0.05	\$0.10	\$7.96	\$15.45	\$3.74	\$59.46	\$1.00	\$0.12	\$0.07	\$0.15	\$0.10	\$60.90

*Taxable

Geographic jurisdiction of Macomb, Monroe, Oakland, Sanilac, St. Clair, Washtenaw and Wayne Counties. Also including in Livingston County the townships of Brighton, Deerfield, Genoa, Green Oak, Hamburg, Hartland, Oceola, Putnam, Tyrone and Unadilla

Insurance amount of \$7.96 is \$7.05 for Health & Welfare Insurance and \$.91 for the Health & Welfare Supplemental Fund. Special Assessment of \$0.40 includes \$0.20 for the Building Fund.

Calculation of Pension & Annuity Contributions are on regular-time pay ONLY.

Dues Deduction - Per the Michigan Regional Council By-Laws, dues shall be deducted from the employee's Total Base Wage. The amount of the dues is included in the Base Wage as stated above (currently 4.00%) and deducted on all premium and overtime pay.

CPTF-DV000220

	Sou	utheastern	Apprentice	e Rates 6-0	1-19 thru 5-3	31-20		
	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95
Journeyman Rate . Hrs	17.70	19.18	20.65	22.13	23.60	25.08	26.55	28.03
V & H x Hrs Paid	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75
Pension Gross Wage	20.70	22.43	24.15	25.88	27.60	29.33	31.05	32.78
U.B.C. Per Capita x Hrs Paid	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Spec Assess x Hrs Paid	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Total Taxable Wage	20.95	22.68	24.40	26.13	27.85	29.58	31.30	33.03
H & W Ins x Hrs Paid	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05
H & W MRA x Hrs Paid	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Pen. x Hrs Paid	9.46	10.24	11.03	11.82	12.61	13.39	14.18	14.97
Supp Pen x Hrs Paid	6.14	6.48	6.82	7.16	7.49	7.83	8.17	8.50
App Trn x Hrs Paid	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UBC H & S x Hrs Paid	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
UBC MLMP Fund x Hrs Paid	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Total Package	45.25	48.10	50.95	53.81	56.65	59.50	62.35	65.20

	Sou	utheastern	Apprentice	Rates 6-01-2	19 thru 5-31-2	20		
*These rates apply to \$2.00/r	nr. shift pren	nium						
*For other shift premiums, pl	ease contact	the Fringe I	Benefit office	for rates.				
SECOND SHIFT								
	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95
Journeyman Rate . Hrs	19.70	21.18	22.65	24.13	25.60	27.08	28.55	30.03
V & H x Hrs Paid	3.26	3.50	3.74	3.99	4.23	4.47	4.71	4.96
Pension Gross Wage	22.96	24.68	26.39	28.12	29.83	31.55	33.26	34.99
U.B.C. Per Capita x Hrs Paid	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Spec Assess x Hrs Paid	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Total Taxable Wage	23.21	24.93	26.64	28.37	30.08	31.80	33.51	35.24
H & W Ins x Hrs Paid	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05
H & W MRA x Hrs Paid	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Pen. x Hrs Paid	10.53	11.32	12.11	12.90	13.68	14.47	15.25	16.05
Supp Pen x Hrs Paid	6.33	6.68	7.04	7.39	7.74	8.09	8.45	8.80
App Trn x Hrs Paid	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UBC H & S x Hrs Paid	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
UBC MLMP Fund x Hrs Paid	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Total Package	<u>48.77</u>	<u>51.63</u>	<u>54.49</u>	<u>57.36</u>	<u>60.20</u>	<u>63.06</u>	<u>65.91</u>	<u>68.79</u>
	1.00							

Southeast	Southeastern Journeyman Rates 6-01-19 thru 5-31-20										
FIRST SHIFT	_										
				Cert.							
	Journey.	Fore.	Genl.	Weld.							
Journeyman Rate . Hrs	29.50	31.50	32.50	31.50							
V & H x Hrs Paid	5.00	5.35	5.56	5.07							
Pension Gross Wage	34.50	36.85	38.06	36.57							
U.B.C. Per Capita x Hrs Paid	0.05	0.05	0.05	0.05							
Spec Assess x Hrs Paid	0.20	0.20	0.20	0.20							
Total Taxable Wage	34.75	37.10	38.31	36.82							
LL & W Inc y Hrs Paid	7.05	7.05	7.05	7.05							
H & W MRA x Hrs Paid	0.50	0.50	0.50	0.50							
Pen. x Hrs Paid	15.76	16.34	16.68	15.87							
Supp Pen x Hrs Paid	8.84	9.09	9.24	8.89							
App Trn x Hrs Paid	1.00	1.00	1.00	1.00							
UBC H & S x Hrs Paid	0.10	0.10	0.10	0.10							
UBC MLMP Fund x Hrs Paid	0.05	0.05	0.05	0.05							
Total Package	68.05	71.23	72.93	70.28							

Sou	Southeastern Rates 6-01-19 thru 5-31-20										
*These rates apply to \$2.00/	hr. shift pre	mium									
*For other shift premiums, please contact the Fringe Benefit office for rates.											
SECOND SHIFT							Cort				
	lourney		Fore		Genl		Weld				
Journeyman Rate . Hrs	31.50		33.50		34.50		33.50				
V & H x Hrs Paid	5.35		5.70		5.91		5.42				
Pension Gross Wage	36.85		39.20		40.41		38.92				
U.B.C. Per Capita x Hrs Paid	0.05		0.05		0.05		0.05				
Spec Assess x Hrs Paid	0.20		0.20		0.20		0.20				
Total Taxable Wage	37.10		39.45		40.66		39.17				
H & W Ins x Hrs Paid	7.05		7.05		7.05		7.05				
H & W MRA x Hrs Paid	0.50		0.50		0.50		0.50				
Pen. x Hrs Paid	16.84		17.40		17.72		16.95				
Supp Pen x Hrs Paid	9.15		9.40		9.55		9.20				
App Trn x Hrs Paid	1.00		1.00		1.00		1.00				
UBC H & S x Hrs Paid	0.10		0.10		0.10		0.10				
UBC MLMP Fund x Hrs Paid	0.05		0.05		0.05		0.05				
Total Package	71.79		74.95		76.63		74.02				

Plan Year Ending	Base Units	Average Hourly	Contributions Excluding EWL	EWL	Return on Assets
4/30:	(Hours)	Rate	Payments	Payments	(Mkt Value)
2010	5,796,364	\$ 8.88	\$ 51,098,236	\$ 357,188	13.43%
2011	6,267,773	10.44	65,371,474	55,520	10.62%
2012	6,882,663	12.23	82,849,388	1,355,000	-3.63%
2013	6,452,511	14.33	91,919,158	540,000	6.31%
2014	6,201,665	15.78	97,871,522	-	10.51%
2015	6,771,552	15.76	105,528,508	1,180,886	4.42%
2016	7,306,229	15.23	111,258,164	-	-0.22%
2017	7,266,322	14.69	106,706,279	-	11.13%
2018	8,184,597	15.05	123,139,985	7,236	7.87%
2019	7,953,779	14.37	111,201,999	3,061,736	6.26%

Pension Plan's Ten-Year Experience for Certain Critical Assumptions

Averages

5-year	7,496,496	15.02	111,566,987	849,972	5.82% ¹
10-year	6,908,345	13.67	94,694,471	655,757	6.55% ¹

Sources

- Hours: 2010-2018 from valuation data, 2019 supplied by administrative manager
- Contributions Excluding EWL Payments and Return on Market Value of Plan Assets: 2010-2018 from audited financial statements, 2019 from unaudited financials
- EWL Payments: Supplied by Fund Counsel
- Average Contribution Rate: Calculated from other columns

¹Geometric average shown

Pension Plan's Demonstration of Sensitivity of Projections

The following exhibits provide 4 separate, <u>deterministic</u> solvency ratio projections intended to help gauge the sensitivity of the projections to certain key assumptions as required by Section 6.05 of Revenue Procedure 2017-43. Each exhibit was prepared <u>recognizing</u> the proposed suspension. As permitted by Section 6.05, Exhibits III and IV do <u>not</u> recognize any change in expected benefit payments that may result from using alternate assumptions regarding future contribution base units.

- **Exhibit I** projects the Pension Plan's solvency ratio using assumed rates of return reduced by one percentage point (beginning with the plan year ending April 30, 2021);
- **Exhibit II** projects the Pension Plan's solvency ratio using assumed rates of return reduced by 2 percentage points (beginning with the plan year ending April 30, 2021);
- **Exhibit III** projects the Pension Plan's solvency ratio using a 3.21% contribution base unit trend (beginning with the plan year ending April 30, 2021), which is equal to the trend that the Pension Plan experienced over the 10 plan years ending April 30, 2019; and
- **Exhibit IV** projects the Pension Plan's solvency ratio using a 2.21% contribution base unit trend (beginning with the plan year ending April 30, 2021), which is equal to the trend assumed in Exhibit III reduced by one percentage point.

Dian Voars Ending	Assumed Rates of Return Used For:							
4/30:	Section 4.02(1) of Rev. Proc. 2017-43	Exhibit I	Exhibit II					
2021-2029	6.50%	5.50%	4.50%					
2030-2043	7.50%	6.50%	5.50%					
2044-2048	7.30%	6.30%	5.30%					
2049-2053	7.20%	6.20%	5.20%					
2054+	7.50%	6.50%	5.50%					

The assumed rates of return for Exhibits I and II are as shown below:

The alternative rate of return assumptions above were assumed to first apply <u>following</u> the initial period. That is, the April 30, 2020 market value of plan assets is the same for all scenarios.

Hours (contribution base units) increased from 5,796,364 in plan year ending April 30, 2010 to 7,953,779 in plan year ending April 30, 2019. This represents a compound annual increase of <u>3.21%</u> per year for the 10-year period.

Based on the preceding calculation, the assumed work hours for Exhibits III and IV are as shown below:

Dian Voar Ending	Assumed Work Hours Used For:								
4/30:	Section 4.02(1) of Rev. Proc. 2017-43	Exhibit III	Exhibit IV						
2021	8,000,000	8,472,607 ¹	8,309,221 ²						
2022	7,800,000	8,744,578	8,492,855						
2023	7,000,000	9,025,279	8,680,547						
2024	7,000,000	9,314,990	8,872,387						
2025	7,000,000	9,614,002	9,068,466						
2026+	7,000,000	increases @3.21%/yr.	increases @2.21%/yr.						

The alternative work hours assumptions above were assumed to first apply <u>following</u> the initial period. That is, the April 30, 2020 market value of plan assets is the same for all scenarios.

¹ Hours for plan year ending April 30, 2019 (7,953,779) increased by 3.21% for 2 years (compounded)

² Hours for plan year ending April 30, 2019 (7,953,779) increased by 2.21% for 2 years (compounded)

Exhibit I – Deterministic Projection of Solvency Ratio Recognizing Proposed Suspension and Using Assumed Rates of Return Reduced By One Percentage Point

The projected Solvency Ratio for Plan Years ending April 30, 2021 through April 30, 2044 using assumed rates of return reduced by one percentage point is shown below:

			3. EWL	4. EWL						
			Payments	Payments			7.		9. Resources	Solvency
Plan Year	1. Beginning	2. Employer	Prior	Future	5. Benefit	6.	Investment	8. Ending	(1)+(2)+(3)+(4)-	Ratio
Ending	Assets	Contributions	Wthdrwls	Wthdrwls	Payments	Expenses	Income	Assets	(6)+(7)	(9)/(5)
4/30/2021	\$779,361,598	\$120,000,000	\$36,159	\$963,841	\$143,894,673	\$4,090,000	\$42,122,809	\$794,499,734	\$938,394,407	6.52
4/30/2022	\$794,499,734	\$117,000,000	\$36,159	\$963,841	\$143,994,631	\$4,182,025	\$42,867,627	\$807,190,705	\$951,185,336	6.61
4/30/2023	\$807,190,705	\$105,000,000	\$36,159	\$963,841	\$147,266,205	\$4,276,121	\$43,143,075	\$804,791,454	\$952,057,659	6.46
4/30/2024	\$804,791,454	\$105,000,000	\$36,159	\$763,841	\$150,817,500	\$4,372,334	\$42,905,310	\$798,306,930	\$949,124,430	6.29
4/30/2025	\$798,306,930	\$105,000,000	\$36,159	\$613,841	\$154,549,465	\$4,470,712	\$42,439,201	\$787,375,954	\$941,925,419	6.09
4/30/2026	\$787,375,954	\$105,000,000	\$36,159	\$613 <i>,</i> 841	\$158,109,270	\$4,571,303	\$41,737,337	\$772,082,718	\$930,191,988	5.88
4/30/2027	\$772,082,718	\$105,000,000	\$36,159	\$613,841	\$161,466,157	\$4,674,157	\$40,801,066	\$752,393,470	\$913,859,627	5.66
4/30/2028	\$752,393,470	\$105,000,000	\$36,159	\$613,841	\$164,796,000	\$4,779,326	\$39,623,694	\$728,091,838	\$892,887,838	5.42
4/30/2029	\$728,091,838	\$105,000,000	\$36,159	\$613,841	\$167,932,887	\$4,886,861	\$38,197,883	\$699,119,973	\$867,052,860	5.16
4/30/2030	\$699,119,973	\$105,000,000	\$36,159	\$613,841	\$170,726,967	\$4,996,815	\$43,165,400	\$672,211,591	\$842,938,558	4.94
4/30/2031	\$672,211,591	\$105,000,000	\$36,159	\$613 <i>,</i> 841	\$173,081,923	\$5,109,243	\$41,336,166	\$641,006,591	\$814,088,514	4.70
4/30/2032	\$641,006,591	\$105,000,000	\$36,159	\$613 <i>,</i> 841	\$174,950,557	\$5,224,201	\$39,243,374	\$605,725,207	\$780,675,764	4.46
4/30/2033	\$605,725,207	\$105,000,000	\$36,159	\$613,841	\$176,333,890	\$5,341,746	\$36,901,305	\$566,600,876	\$742,934,766	4.21
4/30/2034	\$566,600,876	\$105,000,000	\$12,056	\$637,944	\$177,313,332	\$5,461,935	\$34,322,486	\$523,798,095	\$701,111,427	3.95
4/30/2035	\$523,798,095	\$105,000,000	\$7 <i>,</i> 236	\$642,764	\$177,725,931	\$5,584,829	\$31,522,901	\$477,660,236	\$655,386,167	3.69
4/30/2036	\$477,660,236	\$105,000,000	\$7,236	\$642,764	\$177,706,404	\$5,710,488	\$28,520,491	\$428,413,835	\$606,120,239	3.41
4/30/2037	\$428,413,835	\$105,000,000	\$7,236	\$642,764	\$177,204,527	\$5,838,974	\$25,331,610	\$376,351,944	\$553,556,471	3.12
4/30/2038	\$376,351,944	\$105,000,000	\$3,618	\$646,382	\$176,248,098	\$5,970,351	\$21,974,402	\$321,757,897	\$498,005,995	2.83
4/30/2039	\$321,757,897	\$105,000,000	\$0	\$650,000	\$174,668,716	\$6,104,684	\$18,472,753	\$265,107,250	\$439,775,966	2.52
4/30/2040	\$265,107,250	\$105,000,000	\$0	\$650,000	\$172,948,591	\$6,242,039	\$14,841,901	\$206,408,521	\$379,357,112	2.19
4/30/2041	\$206,408,521	\$105,000,000	\$0	\$650,000	\$170,586,543	\$6,382,485	\$11,098,685	\$146,188,178	\$316,774,721	1.86

Exhibit I – Deterministic Projection of Solvency Ratio Recognizing Proposed Suspension and Using Assumed Rates of Return Reduced By One Percentage Point (Cont.)

			3. EWL	4. EWL						
			Payments	Payments			7.		9. Resources	Solvency
Plan Year	1. Beginning	2. Employer	Prior	Future	5. Benefit	6.	Investment	8. Ending	(1)+(2)+(3)+(4)-	Ratio
Ending	Assets	Contributions	Wthdrwls	Wthdrwls	Payments	Expenses	Income	Assets	(6)+(7)	(9)/(5)
4/30/2042	\$146,188,178	\$105,000,000	\$0	\$650,000	\$167,975,233	\$6,526,091	\$7,264,564	\$84,601,418	\$252,576,651	1.50
4/30/2043	\$84,601,418	\$105,000,000	\$0	\$650,000	\$164,888,742	\$6,672,928	\$3,356,963	\$22,046,711	\$186,935,453	1.13
4/30/2044	\$22,046,711	\$105,000,000	\$0	\$650,000	\$161,317,987	\$6,823,069	-\$579,525	insolvent	\$120,294,117	0.75

Exhibit II – Deterministic Projection of Solvency Ratio Recognizing Proposed Suspension and Using Assumed Rates of Return Reduced By 2 Percentage Points

The projected Solvency Ratio for Plan Years ending April 30, 2021 through April 30, 2040 using assumed rates of return reduced by 2 percentage points is shown below:

			3. EWL	4. EWL						
			Payments	Payments			7.		9. Resources	Solvency
Plan Year	1. Beginning	2. Employer	Prior	Future	5. Benefit	6.	Investment	8. Ending	(1)+(2)+(3)+(4)-	Ratio
Ending	Assets	Contributions	Wthdrwls	Wthdrwls	Payments	Expenses	Income	Assets	(6)+(7)	(9)/(5)
4/30/2021	\$779,361,598	\$120,000,000	\$36,159	\$963,841	\$143,894,673	\$4,090,000	\$34,464,117	\$786,841,042	\$930,735,715	6.47
4/30/2022	\$786,841,042	\$117,000,000	\$36,159	\$963,841	\$143,994,631	\$4,182,025	\$34,728,872	\$791,393,258	\$935,387,889	6.50
4/30/2023	\$791,393,258	\$105,000,000	\$36,159	\$963,841	\$147,266,205	\$4,276,121	\$34,587,994	\$780,438,926	\$927,705,131	6.30
4/30/2024	\$780,438,926	\$105,000,000	\$36,159	\$763,841	\$150,817,500	\$4,372,334	\$34,008,480	\$765,057,572	\$915,875,072	6.07
4/30/2025	\$765,057,572	\$105,000,000	\$36,159	\$613,841	\$154,549,465	\$4,470,712	\$33,226,762	\$744,914,157	\$899,463,622	5.82
4/30/2026	\$744,914,157	\$105,000,000	\$36,159	\$613,841	\$158,109,270	\$4,571,303	\$32,237,949	\$720,121,533	\$878,230,803	5.55
4/30/2027	\$720,121,533	\$105,000,000	\$36,159	\$613,841	\$161,466,157	\$4,674,157	\$31,044,437	\$690,675,656	\$852,141,813	5.28
4/30/2028	\$690,675,656	\$105,000,000	\$36,159	\$613,841	\$164,796,000	\$4,779,326	\$29,642,085	\$656,392,415	\$821,188,415	4.98
4/30/2029	\$656,392,415	\$105,000,000	\$36,159	\$613,841	\$167,932,887	\$4,886,861	\$28,026,339	\$617,249,006	\$785,181,893	4.68
4/30/2030	\$617,249,006	\$105,000,000	\$36,159	\$613,841	\$170,726,967	\$4,996,815	\$32,021,666	\$579,196,890	\$749,923,857	4.39
4/30/2031	\$579,196,890	\$105,000,000	\$36,159	\$613,841	\$173,081,923	\$5,109,243	\$29,860,947	\$536,516,671	\$709,598,594	4.10
4/30/2032	\$536,516,671	\$105,000,000	\$36,159	\$613,841	\$174,950,557	\$5,224,201	\$27,458,986	\$489,450,899	\$664,401,456	3.80
4/30/2033	\$489,450,899	\$105,000,000	\$36,159	\$613,841	\$176,333,890	\$5,341,746	\$24,829,094	\$438,254,357	\$614,588,247	3.49
4/30/2034	\$438,254,357	\$105,000,000	\$12,056	\$637,944	\$177,313,332	\$5,461,935	\$21,983,045	\$383,112,135	\$560,425,467	3.16
4/30/2035	\$383,112,135	\$105,000,000	\$7,236	\$642,764	\$177,725,931	\$5,584,829	\$18,935,497	\$324,386,872	\$502,112,803	2.83
4/30/2036	\$324,386,872	\$105,000,000	\$7,236	\$642,764	\$177,706,404	\$5,710,488	\$15,702,688	\$262,322,668	\$440,029,072	2.48
4/30/2037	\$262,322,668	\$105,000,000	\$7,236	\$642,764	\$177,204,527	\$5,838,974	\$12,299,425	\$197,228,592	\$374,433,119	2.11
4/30/2038	\$197,228,592	\$105,000,000	\$3,618	\$646,382	\$176,248,098	\$5,970,351	\$8,741,940	\$129,402,083	\$305,650,181	1.73
4/30/2039	\$129,402,083	\$105,000,000	\$0	\$650,000	\$174,668,716	\$6,104,684	\$5,051,221	\$59,329,904	\$233,998,620	1.34
4/30/2040	\$59,329,904	\$105,000,000	\$0	\$650,000	\$172,948,591	\$6,242,039	\$1,240,777	insolvent	\$159,978,642	0.93

Exhibit III – Deterministic Projection of Solvency Ratio Recognizing Proposed Suspension and Using a 3.21% Contribution Base Unit Trend

The projected Solvency Ratio for Plan Years ending April 30, 2021 through April 30, 2065 using a 3.21% contribution base unit trend is shown below:

			3. EWL	4. EWL						
			Payments	Payments			7.		9. Resources	Solvency
Plan Year	1. Beginning	2. Employer	Prior	Future	5. Benefit	6.	Investment	8. Ending	(1)+(2)+(3)+(4)-	Ratio
Ending	Assets	Contributions	Wthdrwls	Wthdrwls	Payments	Expenses	Income	Assets	(6)+(7)	(9)/(5)
4/30/2021	\$779,361,598	\$127,089,109	\$36,159	\$963,841	\$143,894,673	\$4,090,000	\$50,011,898	\$809,477,932	\$953,372,605	6.63
4/30/2022	\$809,477,932	\$131,168,669	\$36,159	\$963,841	\$143,994,631	\$4,182,025	\$52,095,806	\$845,565,751	\$989,560,382	6.87
4/30/2023	\$845,565,751	\$135,379,184	\$36,159	\$963,841	\$147,266,205	\$4,276,121	\$54,468,972	\$884,871,581	\$1,032,137,786	7.01
4/30/2024	\$884,871,581	\$139,724,855	\$36,159	\$763,841	\$150,817,500	\$4,372,334	\$57,040,041	\$927,246,643	\$1,078,064,143	7.15
4/30/2025	\$927,246,643	\$144,210,023	\$36,159	\$613,841	\$154,549,465	\$4,470,712	\$59,810,827	\$972,897,316	\$1,127,446,781	7.30
4/30/2026	\$972,897,316	\$148,839,165	\$36,159	\$613,841	\$158,109,270	\$4,571,303	\$62,809,605	\$1,022,515,513	\$1,180,624,783	7.47
4/30/2027	\$1,022,515,513	\$153,616,902	\$36,159	\$613,841	\$161,466,157	\$4,674,157	\$66,077,622	\$1,076,719,723	\$1,238,185,880	7.67
4/30/2028	\$1,076,719,723	\$158,548,005	\$36,159	\$613,841	\$164,796,000	\$4,779,326	\$69,649,519	\$1,135,991,921	\$1,300,787,921	7.89
4/30/2029	\$1,135,991,921	\$163,637,396	\$36,159	\$613,841	\$167,932,887	\$4,886,861	\$73,562,173	\$1,201,021,742	\$1,368,954,629	8.15
4/30/2030	\$1,201,021,742	\$168,890,156	\$36,159	\$613,841	\$170,726,967	\$4,996,815	\$89,844,745	\$1,284,682,861	\$1,455,409,828	8.52
4/30/2031	\$1,284,682,861	\$174,311,530	\$36,159	\$613,841	\$173,081,923	\$5,109,243	\$96,230,103	\$1,377,683,328	\$1,550,765,251	8.96
4/30/2032	\$1,377,683,328	\$179,906,930	\$36,159	\$613,841	\$174,950,557	\$5,224,201	\$103,340,581	\$1,481,406,081	\$1,656,356,638	9.47
4/30/2033	\$1,481,406,081	\$185,681,943	\$36,159	\$613,841	\$176,333,890	\$5,341,746	\$111,280,068	\$1,597,342,456	\$1,773,676,346	10.06
4/30/2034	\$1,597,342,456	\$191,642,333	\$12,056	\$637,944	\$177,313,332	\$5,461,935	\$120,157,574	\$1,727,017,096	\$1,904,330,428	10.74
4/30/2035	\$1,727,017,096	\$197,794,052	\$7,236	\$642,764	\$177,725,931	\$5,584,829	\$130,093,781	\$1,872,244,169	\$2,049,970,100	11.53
4/30/2036	\$1,872,244,169	\$204,143,241	\$7,236	\$642,764	\$177,706,404	\$5,710,488	\$141,219,926	\$2,034,840,444	\$2,212,546,848	12.45
4/30/2037	\$2,034,840,444	\$210,696,239	\$7,236	\$642,764	\$177,204,527	\$5,838,974	\$153,674,386	\$2,216,817,568	\$2,394,022,095	13.51
4/30/2038	\$2,216,817,568	\$217,459,588	\$3,618	\$646,382	\$176,248,098	\$5,970,351	\$167,607,235	\$2,420,315,942	\$2,596,564,040	14.73
4/30/2039	\$2,420,315,942	\$224,440,041	\$0	\$650,000	\$174,668,716	\$6,104,684	\$183,185,570	\$2,647,818,153	\$2,822,486,869	16.16
4/30/2040	\$2,647,818,153	\$231,644,567	\$0	\$650,000	\$172,948,591	\$6,242,039	\$200,577,759	\$2,901,499,849	\$3,074,448,440	17.78
4/30/2041	\$2,901,499,849	\$239,080,357	\$0	\$650,000	\$170,586,543	\$6,382,485	\$219,966,039	\$3,184,227,217	\$3,354,813,760	19.67

Exhibit III – Deterministic Projection of Solvency Ratio Recognizing Proposed Suspension and Using a 3.21% Contribution Base Unit

Trend (Cont.)

			3. EWL	4. EWL						
			Payments	Payments					9. Resources	Solvency
Plan Year	1. Beginning	2. Employer	Prior	Future	5. Benefit		7. Investment	8. Ending	(1)+(2)+(3)+(4)-	Ratio
Ending	Assets	Contributions	Wthdrwls	Wthdrwls	Payments	6. Expenses	Income	Assets	(6)+(7)	(9)/(5)
4/30/2042	\$3,184,227,217	\$246,754,837	\$0	\$650,000	\$167,975,233	\$6,526,091	\$241,550,923	\$3,498,681,653	\$3,666,656,886	21.83
4/30/2043	\$3,498,681,653	\$254,675,667	\$0	\$650,000	\$164,888,742	\$6,672,928	\$265,542,274	\$3,847,987,924	\$4,012,876,666	24.34
4/30/2044	\$3,847,987,924	\$262,850,756	\$0	\$650,000	\$161,317,987	\$6,823,069	\$284,383,748	\$4,227,731,372	\$4,389,049,359	27.21
4/30/2045	\$4,227,731,372	\$271,288,265	\$0	\$650,000	\$157,557,857	\$6,976,588	\$312,544,630	\$4,647,679,822	\$4,805,237,679	30.50
4/30/2046	\$4,647,679,822	\$279,996,618	\$0	\$650,000	\$153,578,849	\$7,133,561	\$343,658,226	\$5,111,272,256	\$5,264,851,105	34.28
4/30/2047	\$5,111,272,256	\$288,984,510	\$0	\$650,000	\$149,245,028	\$7,294,066	\$377,980,857	\$5,622,348,529	\$5,771,593,557	38.67
4/30/2048	\$5,622,348,529	\$298,260,913	\$0	\$650,000	\$144,625,327	\$7,458,182	\$415,790,643	\$6,184,966,576	\$6,329,591,903	43.77
4/30/2049	\$6,184,966,576	\$307,835,088	\$0	\$650,000	\$140,052,802	\$7,625,991	\$451,106,620	\$6,796,879,491	\$6,936,932,293	49.53
4/30/2050	\$6,796,879,491	\$317,716,594	\$0	\$650,000	\$135,240,426	\$7,797,576	\$495,687,153	\$7,467,895,236	\$7,603,135,662	56.22
4/30/2051	\$7,467,895,236	\$327,915,297	\$0	\$650,000	\$130,385,529	\$7,973,021	\$544,535,900	\$8,202,637,883	\$8,333,023,412	63.91
4/30/2052	\$8,202,637,883	\$338,441,378	\$0	\$650,000	\$125,394,762	\$8,152,414	\$597,989,519	\$9,006,171,604	\$9,131,566,366	72.82
4/30/2053	\$9,006,171,604	\$349,305,346	\$0	\$650,000	\$120,379,652	\$8,335,843	\$656,408,990	\$9,883,820,445	\$10,004,200,097	83.11
4/30/2054	\$9,883,820,445	\$360,518,048	\$0	\$650,000	\$115,646,780	\$8,523,399	\$750,173,953	\$10,870,992,267	\$10,986,639,047	95.00
4/30/2055	\$10,870,992,267	\$372,090,677	\$0	\$650,000	\$110,813,023	\$8,715,175	\$824,819,888	\$11,949,024,634	\$12,059,837,657	108.83
4/30/2056	\$11,949,024,634	\$384,034,788	\$0	\$650,000	\$106,208,722	\$8,911,266	\$906,285,528	\$13,124,874,962	\$13,231,083,684	124.58
4/30/2057	\$13,124,874,962	\$396,362,304	\$0	\$650,000	\$101,730,529	\$9,111,769	\$995,096,997	\$14,406,141,965	\$14,507,872,494	142.61
4/30/2058	\$14,406,141,965	\$409,085,534	\$0	\$650,000	\$97,396,864	\$9,316,784	\$1,091,823,968	\$15,800,987,819	\$15,898,384,683	163.23
4/30/2059	\$15,800,987,819	\$422,217,180	\$0	\$650,000	\$93,640,369	\$9,526,412	\$1,197,062,851	\$17,317,751,069	\$17,411,391,438	185.94
4/30/2060	\$17,317,751,069	\$435,770,352	\$0	\$650,000	\$89,908,710	\$9,740,756	\$1,311,460,238	\$18,965,982,193	\$19,055,890,903	211.95
4/30/2061	\$18,965,982,193	\$449,758,580	\$0	\$650,000	\$86,530,378	\$9,959,923	\$1,435,720,600	\$20,755,621,072	\$20,842,151,450	240.87
4/30/2062	\$20,755,621,072	\$464,195,830	\$0	\$650,000	\$83,328,377	\$10,184,021	\$1,570,596,584	\$22,697,551,088	\$22,780,879,465	273.39
4/30/2063	\$22,697,551,088	\$479,096,516	\$0	\$650,000	\$80,396,100	\$10,413,161	\$1,716,901,479	\$24,803,389,822	\$24,883,785,922	309.51
4/30/2064	\$24,803,389,822	\$494,475,515	\$0	\$650,000	\$77,681,306	\$10,647,457	\$1,875,509,115	\$27,085,695,689	\$27,163,376,995	349.68
4/30/2065	\$27,085,695,689	\$510,348,179	\$0	\$650,000	\$75,204,190	\$10,887,025	\$2,047,361,188	\$29,557,963,841	\$29,633,168,031	394.04

Exhibit IV – Deterministic Projection of Solvency Ratio Recognizing Proposed Suspension and Using a 2.21% Contribution Base Unit Trend

The projected Solvency Ratio for Plan Years ending April 30, 2021 through April 30, 2065 using a 2.21% contribution base unit trend is shown below:

			3. EWL	4. EWL						
			Payments	Payments			7.		9. Resources	Solvency
Plan Year	1. Beginning	2. Employer	Prior	Future	5. Benefit	6.	Investment	8. Ending	(1)+(2)+(3)+(4)-	Ratio
Ending	Assets	Contributions	Wthdrwls	Wthdrwls	Payments	Expenses	Income	Assets	(6)+(7)	(9)/(5)
4/30/2021	\$779,361,598	\$124,638,311	\$36,159	\$963,841	\$143,894,673	\$4,090,000	\$49,932,247	\$806,947,483	\$950,842,156	6.61
4/30/2022	\$806,947,483	\$127,392,818	\$36,159	\$963,841	\$143,994,631	\$4,182,025	\$51,808,612	\$838,972,257	\$982,966,888	6.83
4/30/2023	\$838,972,257	\$130,208,199	\$36,159	\$963,841	\$147,266,205	\$4,276,121	\$53,872,338	\$872,510,468	\$1,019,776,673	6.92
4/30/2024	\$872,510,468	\$133,085,800	\$36,159	\$763,841	\$150,817,500	\$4,372,334	\$56,020,799	\$907,227,233	\$1,058,044,733	7.02
4/30/2025	\$907,227,233	\$136,026,996	\$36,159	\$613,841	\$154,549,465	\$4,470,712	\$58,243,617	\$943,127,669	\$1,097,677,134	7.10
4/30/2026	\$943,127,669	\$139,033,193	\$36,159	\$613,841	\$158,109,270	\$4,571,303	\$60,555,884	\$980,686,173	\$1,138,795,443	7.20
4/30/2027	\$980,686,173	\$142,105,827	\$36,159	\$613,841	\$161,466,157	\$4,674,157	\$62,984,605	\$1,020,286,291	\$1,181,752,448	7.32
4/30/2028	\$1,020,286,291	\$145,246,365	\$36,159	\$613,841	\$164,796,000	\$4,779,326	\$65,549,043	\$1,062,156,373	\$1,226,952,373	7.45
4/30/2029	\$1,062,156,373	\$148,456,310	\$36,159	\$613,841	\$167,932,887	\$4,886,861	\$68,269,478	\$1,106,712,413	\$1,274,645,300	7.59
4/30/2030	\$1,106,712,413	\$151,737,194	\$36,159	\$613 <i>,</i> 841	\$170,726,967	\$4,996,815	\$82,128,309	\$1,165,504,134	\$1,336,231,101	7.83
4/30/2031	\$1,165,504,134	\$155,090,586	\$36,159	\$613,841	\$173,081,923	\$5,109,243	\$86,570,913	\$1,229,624,467	\$1,402,706,390	8.10
4/30/2032	\$1,229,624,467	\$158,518,088	\$36,159	\$613,841	\$174,950,557	\$5,224,201	\$91,434,085	\$1,300,051,882	\$1,475,002,439	8.43
4/30/2033	\$1,300,051,882	\$162,021,338	\$36,159	\$613,841	\$176,333,890	\$5,341,746	\$96,791,230	\$1,377,838,814	\$1,554,172,704	8.81
4/30/2034	\$1,377,838,814	\$165,602,010	\$12,056	\$637,944	\$177,313,332	\$5,461,935	\$102,718,289	\$1,464,033,846	\$1,641,347,178	9.26
4/30/2035	\$1,464,033,846	\$169,261,814	\$7,236	\$642,764	\$177,725,931	\$5,584,829	\$109,300,078	\$1,559,934,978	\$1,737,660,909	9.78
4/30/2036	\$1,559,934,978	\$173,002,500	\$7,236	\$642,764	\$177,706,404	\$5,710,488	\$116,628,959	\$1,666,799,545	\$1,844,505,949	10.38
4/30/2037	\$1,666,799,545	\$176,825,856	\$7,236	\$642,764	\$177,204,527	\$5,838,974	\$124,801,179	\$1,786,033,079	\$1,963,237,606	11.08
4/30/2038	\$1,786,033,079	\$180,733,707	\$3,618	\$646,382	\$176,248,098	\$5,970,351	\$133,921,178	\$1,919,119,515	\$2,095,367,613	11.89
4/30/2039	\$1,919,119,515	\$184,727,922	\$0	\$650,000	\$174,668,716	\$6,104,684	\$144,106,633	\$2,067,830,670	\$2,242,499,386	12.84
4/30/2040	\$2,067,830,670	\$188,810,409	\$0	\$650,000	\$172,948,591	\$6,242,039	\$155,472,417	\$2,233,572,866	\$2,406,521,457	13.91
4/30/2041	\$2,233,572,866	\$192,983,119	\$0	\$650,000	\$170,586,543	\$6,382,485	\$168,142,868	\$2,418,379,825	\$2,588,966,368	15.18

Exhibit IV – Deterministic Projection of Solvency Ratio Recognizing Proposed Suspension and Using a 2.21% Contribution Base Unit Trend (Cont.)

			3. EWL	4. EWL						
			Payments	Payments					9. Resources	Solvency
Plan Year	1. Beginning	2. Employer	Prior	Future	5. Benefit		7. Investment	8. Ending	(1)+(2)+(3)+(4)-	Ratio
Ending	Assets	Contributions	Wthdrwls	Wthdrwls	Payments	6. Expenses	Income	Assets	(6)+(7)	(9)/(5)
4/30/2042	\$2,418,379,825	\$197,248,046	\$0	\$650,000	\$167,975,233	\$6,526,091	\$182,255,864	\$2,624,032,411	\$2,792,007,644	16.62
4/30/2043	\$2,624,032,411	\$201,607,228	\$0	\$650,000	\$164,888,742	\$6,672,928	\$197,953,514	\$2,852,681,483	\$3,017,570,225	18.30
4/30/2044	\$2,852,681,483	\$206,062,747	\$0	\$650,000	\$161,317,987	\$6,823,069	\$209,653,615	\$3,100,906,789	\$3,262,224,776	20.22
4/30/2045	\$3,100,906,789	\$210,616,734	\$0	\$650,000	\$157,557,857	\$6,976,588	\$228,071,924	\$3,375,711,002	\$3,533,268,859	22.43
4/30/2046	\$3,375,711,002	\$215,271,364	\$0	\$650,000	\$153,578,849	\$7,133,561	\$248,442,030	\$3,679,361,986	\$3,832,940,835	24.96
4/30/2047	\$3,679,361,986	\$220,028,861	\$0	\$650,000	\$149,245,028	\$7,294,066	\$270,934,526	\$4,014,436,279	\$4,163,681,307	27.90
4/30/2048	\$4,014,436,279	\$224,891,499	\$0	\$650,000	\$144,625,327	\$7,458,182	\$295,735,065	\$4,383,629,334	\$4,528,254,661	31.31
4/30/2049	\$4,383,629,334	\$229,861,601	\$0	\$650,000	\$140,052,802	\$7,625,991	\$318,603,293	\$4,785,065,435	\$4,925,118,237	35.17
4/30/2050	\$4,785,065,435	\$234,941,542	\$0	\$650,000	\$135,240,426	\$7,797,576	\$347,856,639	\$5,225,475,614	\$5,360,716,040	39.64
4/30/2051	\$5,225,475,614	\$240,133,751	\$0	\$650,000	\$130,385,529	\$7,973,021	\$379,921,551	\$5,707,822,366	\$5,838,207,895	44.78
4/30/2052	\$5,707,822,366	\$245,440,706	\$0	\$650,000	\$125,394,762	\$8,152,414	\$415,014,777	\$6,235,380,673	\$6,360,775,435	50.73
4/30/2053	\$6,235,380,673	\$250,864,946	\$0	\$650 <i>,</i> 000	\$120,379,652	\$8,335,843	\$453,368,189	\$6,811,548,313	\$6,931,927,965	57.58
4/30/2054	\$6,811,548,313	\$256,409,061	\$0	\$650,000	\$115,646,780	\$8,523,399	\$515,849,457	\$7,460,286,652	\$7,575,933,432	65.51
4/30/2055	\$7,460,286,652	\$262,075,702	\$0	\$650,000	\$110,813,023	\$8,715,175	\$564,891,405	\$8,168,375,561	\$8,279,188,584	74.71
4/30/2056	\$8,168,375,561	\$267,867,575	\$0	\$650,000	\$106,208,722	\$8,911,266	\$618,380,577	\$8,940,153,725	\$9,046,362,447	85.18
4/30/2057	\$8,940,153,725	\$273,787,448	\$0	\$650,000	\$101,730,529	\$9,111,769	\$676,646,348	\$9,780,395,223	\$9,882,125,752	97.14
4/30/2058	\$9,780,395,223	\$279,838,151	\$0	\$650,000	\$97,396,864	\$9,316,784	\$740,046,186	\$10,694,215,912	\$10,791,612,776	110.80
4/30/2059	\$10,694,215,912	\$286,022,574	\$0	\$650,000	\$93,640,369	\$9,526,412	\$808,947,661	\$11,686,669,366	\$11,780,309,735	125.80
4/30/2060	\$11,686,669,366	\$292,343,673	\$0	\$650,000	\$89,908,710	\$9,740,756	\$883,750,610	\$12,763,764,183	\$12,853,672,893	142.96
4/30/2061	\$12,763,764,183	\$298,804,468	\$0	\$650,000	\$86,530,378	\$9,959,923	\$964,893,470	\$13,931,621,820	\$14,018,152,198	162.00
4/30/2062	\$13,931,621,820	\$305,408,047	\$0	\$650,000	\$83,328,377	\$10,184,021	\$1,052,842,098	\$15,197,009,567	\$15,280,337,944	183.37
4/30/2063	\$15,197,009,567	\$312,157,564	\$0	\$650,000	\$80,396,100	\$10,413,161	\$1,148,100,654	\$16,567,108,524	\$16,647,504,624	207.07
4/30/2064	\$16,567,108,524	\$319,056,247	\$0	\$650,000	\$77,681,306	\$10,647,457	\$1,251,209,795	\$18,049,695,803	\$18,127,377,109	233.36
4/30/2065	\$18,049,695,803	\$326,107,390	\$0	\$650,000	\$75,204,190	\$10,887,025	\$1,362,752,167	\$19,653,114,145	\$19,728,318,335	262.33

Pension Plan's Projection of Assets, Liabilities, and Funded Percentage

Exhibit I projects the Pension Plan's funded percentage using the value of plan assets and accrued liabilities during the extended period of May 1, 2020 through 2065. The projection <u>includes</u> the impact of benefit suspensions and is made on the same basis as Exhibit III of document 6.2 of Checklist Item #6.

	1. Market	2. Unit Credit	3. Funded	
As of	Value of	Accrued	Percentage	
May 1,	Assets	Liability	(1)/(2)	
2020	\$779,361,598	\$1,974,144,559	39.48%	
2021	\$802,158,427	\$1,994,963,134	40.21%	
2022	\$823,141,327	\$2,012,611,494	40.90%	
2023	\$829,623,062	\$2,026,330,245	40.94%	
2024	\$832,553,557	\$2,036,572,886	40.88%	
2025	\$831,564,830	\$2,043,038,646	40.70%	
2026	\$826,732,477	\$2,045,496,388	40.42%	
2027	\$818,013,839	\$2,043,903,157	40.02%	
2028	\$805,181,839	\$2,037,938,588	39.51%	
2029	\$788,165,894	\$2,027,548,187	38.87%	
2030	\$774,576,787	\$2,012,723,216	38.48%	
2031	\$757,408,586	\$1,993,697,424	37.99%	
2032	\$736,894,794	\$1,970,672,014	37.39%	
2033	\$713,285,306	\$1,943,919,151	36.69%	
2034	\$686,764,239	\$1,913,618,698	35.89%	
2035	\$657,698,518	\$1,880,168,161	34.98%	
2036	\$626,342,756	\$1,843,816,212	33.97%	
2037	\$593,022,705	\$1,804,867,947	32.86%	
2038	\$558,059,642	\$1,763,638,848	31.64%	
2039	\$521,973,588	\$1,720,648,640	30.34%	
2040	\$484,823,203	\$1,675,922,776	28.93%	
2041	\$447,191,452	\$1,630,041,781	27.43%	
2042	\$409,297,562	\$1,583,186,795	25.85%	

Exhibit I – Projections of Plan's Market Value of Assets, Accrued Liability, and Funded Percentage for the period May 1, 2020 through 2065 Recognizing Proposed Suspension

	1. Market	2. Unit Credit	3. Funded
As of	Value of	Accrued	Percentage
May 1,	Assets	Liability	(1)/(2)
2043	\$371,611,522	\$1,535,822,327	24.20%
2044	\$333,967,184	\$1,488,430,764	22.44%
2045	\$297,313,061	\$1,441,222,531	20.63%
2046	\$261,944,726	\$1,394,455,627	18.78%
2047	\$228,320,145	\$1,348,559,149	16.93%
2048	\$196,859,184	\$1,303,910,560	15.10%
2049	\$167,491,216	\$1,260,559,064	13.29%
2050	\$140,816,613	\$1,218,871,307	11.55%
2051	\$117,069,351	\$1,179,019,449	9.93%
2052	\$96,596,870	\$1,141,296,702	8.46%
2053	\$79,655,992	\$1,105,884,269	7.20%
2054	\$66,415,506	\$1,072,671,292	6.19%
2055	\$56,998,039	\$1,041,930,487	5.47%
2056	\$51,447,779	\$1,013,606,741	5.08%
2057	\$49,919,353	\$987,755,128	5.05%
2058	\$52,559,770	\$964,412,176	5.45%
2059	\$59,078,092	\$943,165,488	6.26%
2060	\$69,734,503	\$924,144,792	7.55%
2061	\$84,467,778	\$907,153,499	9.31%
2062	\$103,395,623	\$892,160,172	11.59%
2063	\$126,547,561	\$879,036,121	14.40%
2064	\$154,009,411	\$867,697,536	17.75%
2065	\$185,852,356	\$858,031,188	21.66%