GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

COMMONWEALTH OF VIRGINIA
JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION

2017 QUADRENNIAL ACTUARIAL AUDIT OF THE VIRGINIA529 PREPAID TUITION PROGRAM

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TRANSMITTAL LETTER

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May 4, 2017

Mr. Hal Greer
Director
Commonwealth of Virginia
Joint Legislative Audit and Review Commission
201 North Ninth Street, Suite 1100
General Assembly Building, Capitol Square
Richmond, VA 23219

Re: 2017 Quadrennial Actuarial Audit of the Virginia529 Prepaid529 Program

Dear Mr. Greer:

Presented in this report are the results of the 2017 Quadrennial Actuarial Audit of the Virginia529 Prepaid529 Program ("Prepaid529"). This audit was conducted in accordance with the Virginia College Savings Plan Oversight Act (§30-330 - §30-335 of the *Code of Virginia)* to provide the General Assembly with a comprehensive overview of the actuarial soundness of the Prepaid529. This audit consisted of a non-replication actuarial audit of the June 30, 2016, actuarial valuation of the Prepaid529 as performed by the retained actuary, Milliman.

The results of the audit are presented in the following format:

A. Executive Summary
B. General Audit Approach
C. Contract Data
D. Plan Assets
E. WAT Calculation
F. Economic Assumptions
G. Demographic Assumptions
H. Actuarial Valuation Methods
I. Actuarial Liability Test Life Review
J. Actuarial Report Content, Detail, Format and Clarity
K. Reasonableness of Actuarial Report Conclusions
L. Actuarial Principles and Practices Employed by Actuary
M. Reasonableness of Pricing for Actuarially Sound Funding
N. Implications of Proposed Change in Benefit Structure
O. Comments and Considerations from GRS from 2013 Audit
P. Virginia529 Prepaid529 Program Response

This study was performed at the request of the Commonwealth of Virginia Joint Legislative Audit and Review Commission ("JLARC"). It may be shared with other interested parties only with the permission of the JLARC. If shared with other parties, it should be shared in its entirety.

This study was performed by actuaries experienced with prepaid tuition programs as well as public sector retirement systems.

We would like to acknowledge the cooperation of the staff of the Virginia College Savings Plan ("Virginia529") as well as Alan Perry of Milliman. Their full and willing cooperation was critical to the successful completion of this report.

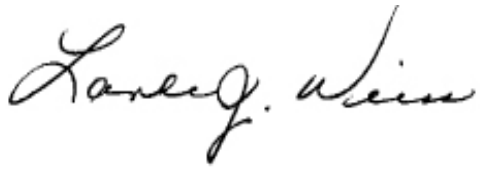
It is important to remember that actuarial calculations are based on assumptions regarding future events. Future actuarial measurements may differ significantly from the current measurements due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

The actuaries signing this report, Lance J. Weiss and Amy Williams, are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

GRS is independent of the Virginia529, Prepaid529, JLARC and Milliman.

If you have any questions on this report or need additional information, please feel free to contact us.

Respectfully submitted,



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Consultant

SECTION A

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

In accordance with the Virginia College Savings Plan Oversight Act (§30-330 – §30-335 of the *Code of Virginia),* Gabriel, Roeder, Smith & Company ("GRS") was hired to conduct the 2017 Quadrennial Actuarial Audit of the Virginia529 Prepaid529 Program ("Prepaid529").

The purpose of this audit is to provide the General Assembly with a comprehensive overview of the actuarial soundness of the Prepaid529. This audit consisted of a non-replication actuarial audit of the actuarial policy and practices of the Prepaid529.

Based on the results of our audit, we believe that:

- Prepaid529 is actuarially sound (i.e., the Fund has sufficient assets (including the value of future installment payments due under current contracts) to cover the actuarially estimated value of the tuition obligations under those contracts (including any administrative costs associated with those contracts), and
- the primary actuarial assumptions (including the investment return assumption of 6.25 percent and the tuition increase assumption of 5.00 percent for the first two years and 6.50 percent thereafter) are reasonable.

Although this audit report contains a number of recommendations which we believe will improve the measurement and communication of the actuarial valuation results, we do not expect that any of these recommendations would have a material impact on the actuarial valuation results.

Following is a high level summary of the areas addressed in the audit and our associated findings:

1. Reasonableness of the funding results and conclusions of the June 30, 2016, actuarial valuation of the Prepaid529 as produced by Milliman, the Virginia529 actuary. This assessment includes a validation of the reasonableness of the liabilities by investigating individual test cases and using actuarial estimation techniques to approximate aggregate results that are used to compare the liabilities documented in the report.

    - GRS was able to independently replicate the present value of future obligations payable from the Prepaid529 and the present value of future installment contract payments due to the Prepaid529 within 2 percent for the majority of the test lives. The differences in the present value of future obligations and present value of future installment contract payments that were larger than 2 percent were due to lower frequency situations. Although we have recommended changes in the actuarial valuation methodology for these situations, these changes would not be expected to have a material change on the overall actuarial valuation results.

2. The degree to which the beneficiary data is sufficient to support the conclusions of the June 30, 2016, actuarial valuation and the use and appropriateness of any assumptions made by Milliman regarding the data.

    - We performed consistency checks between the original data produced by the Virginia529 and the retained actuary's "scrubbed" data file. We found the

EXECUTIVE SUMMARY

"scrubbed" data to be consistent with the original data and therefore, we concluded that the retained actuary's "scrubbed" data file is a reasonable representation of the original data provided by the Virginia529. Overall, we also found the data used in the actuarial valuation to be reasonable and appropriate.

3. Whether the June 30, 2016, actuarial valuation performed by Milliman was conducted in accordance with generally accepted best practices for actuaries, as well as the principles and practices prescribed by the Actuarial Standards Board.

    - In general, we find that Milliman followed the appropriate Actuarial Standards of Practice (ASOPs) that are the most applicable for a prepaid tuition program.

4. The content, detail, format, clarity and scope of the June 30, 2016, actuarial valuation report prepared by Milliman.

    - We reviewed the June 30, 2016, actuarial valuation report prepared by Milliman and find that the report is generally complete and contains the appropriate information.

5. The reasonableness and appropriateness of the actuarial assumptions and methods used by Milliman in the June 30, 2016, actuarial valuation.

    - In general, we find that the economic and demographic actuarial assumptions employed by Milliman in their June 30, 2016, actuarial valuation are reasonable.

6. Whether Prepaid529 is presently being funded on an actuarially sound basis and will likely be in the future based on the results of the June 30, 2016, actuarial valuation. The assessment also considers a) whether the funded status of the Prepaid529 program is appropriate, and b) potential considerations regarding the actuarial valuation and funded status of the program that could result from changes that Virginia529 intends to propose to modify the benefit structure of the program to an enrollment-weighted average tuition (WAT) payout model.

    - Milliman concluded that Prepaid529 was actuarially sound because the Fund has sufficient assets (including the value of future installment payments due under current contracts) to cover the actuarially estimated value of the tuition obligations under those contracts (including any administrative costs associated with those contracts). We agree with this conclusion.

    - Based on the current funding level (129 percent with a 96 percent probability of Prepaid529 funds exceeding obligations) and the average load of about 11 percent on contract prices to increase the actuarial reserve of the program, we believe the pricing methodology is actuarially sound.

    - As a result of the actuarial soundness, funding level, and average load on contract pricing, we recommend two options to be considered going forward:

        i. Based on the funding level of the program, VA529 could decrease the pricing reserve on Prepaid529 contracts.

EXECUTIVE SUMMARY

ii. Prepaid529 could consider an asset allocation that further reduces risk in order to maintain a surplus position if there is adverse future investment experience. A change in asset allocation would likely require a change in the investment return assumption used in the actuarial valuation.

- We would not expect any adverse impact on the funded status or actuarial valuation of the current program as a result of implementing an enrollment-weighted average tuition (WAT) payout model for new contracts, assuming the following:

  i. Prepaid529 continues to operate as a single program with two different benefit structures (the current benefit structure for current contracts and the proposed WAT payment structure for new contracts)

  ii. All program assets are invested together (allowing the program to maintain the current target asset allocation to support the current investment return assumption)

  iii. Appropriate changes in assumptions and valuation methods are made to reflect the change to an enrollment-weighted average tuition (WAT) payout model for new contracts

  iv. Contract prices continue to contain a similar reserve/load (about 11% for the 2016-2017 prices) or a lower reserve/load if deemed appropriate and equitable

  v. The level of contract sales is maintained or increases from its current levels

- We recommend that prior to implementation of an enrollment-weighted average tuition (WAT) payout model for new contracts, a full actuarial study be performed with projections in order to understand the short and long-term implications of the change based on actuarial assumptions agreed upon by the actuary and Virginia529.

7. Comment on whether Virginia529 has satisfactorily addressed considerations and recommendations offered by GRS in the 2013 Quadrennial Actuarial Audit of the Virginia529 Prepaid529 program.
   - Changes in assumptions were made since the 2012 actuarial valuation and reflected in the 2016 actuarial valuation that were consistent with the recommendations that GRS made as part of the 2013 Quadrennial Actuarial Audit of Prepaid529.
   - There were no changes made with respect to the minor considerations that GRS included in the 2013 audit. However, Milliman did provide the following information:
     i. Disclosure in the actuarial valuation report that the expense assumptions were developed from a cost analysis by Virginia529 Plan staff
     ii. Additional pricing assumptions for 2016 as requested by GRS for the 2017 audit

EXECUTIVE SUMMARY

- We are repeating our recommendation (from the 2013 Quadrennial Actuarial Audit that we completed) that additional disclosure on pricing assumptions and expenses be included to increase transparency to contract purchasers and other interested parties

This report also contains a series of relatively minor recommendations for the Virginia529 and Milliman. A summary of these recommendations follows:

- Although the footnote on the exhibit in Appendix B indicates "Table only includes contracts with at least one semester of tuition remaining", the counts appear to include all contracts with remaining tuition benefits (including contracts currently with unpurchased tuition benefits if there are installment contract payments remaining).
  - We recommend that the footnotes in the report exhibits be reviewed to ensure consistency with the information that is shown. We agree that excluding contracts which have a very small amount of tuition units remaining increases the usefulness of the exhibit and it is something that GRS does with our prepaid tuition plan clients.
  - Virginia529 may want to review these contracts and make updates to the contract data or follow up with contract holders, as needed.
- There are contracts that currently have or are projected to have remaining contract installment payments at the projected matriculated date
  - We recommend that Virginia529 and Milliman discuss whether changes will be made to the underlying raw data or if assumptions should be made in the actuarial valuation to address this.
- We recommend that the assumption for tuition increases continue to be reviewed annually to confirm that the ultimate assumption of 6.5 percent continues to be reasonable, and that the assumption be adjusted as appropriate.
- We recommend that more disclosure be added to the actuarial assumptions section of the actuarial valuation report with respect to certain assumptions.
- We recommend reviewing the assumption that once contract beneficiaries begin utilizing their contract benefits (first matriculate), they will redeem two semesters each year until benefits are fully used.
- We recommend that Milliman and Virginia529 review (1) the data underlying the 5 percent assumption for rollovers/cancellations beginning in the year of assumed matriculation and (2) the application of this assumption in the actuarial valuation to ensure that the assumption is consistent with the actual experience of the Prepaid529.
- We recommend reviewing the consistency of how contract payments were classified for purposes of developing both the cancellation/rollover assumption beginning in the year of assumed matriculation and the bias load assumption (in particular for contract beneficiaries for whom their account balance was higher than the tuition at their school).

SECTION B

GENERAL AUDIT APPROACH

GENERAL AUDIT APPROACH

In accordance with the Virginia College Savings Plan Oversight Act (§30-330 – §30-335 of the *Code of Virginia),* Gabriel, Roeder, Smith & Company ("GRS") was hired to conduct the 2017 Quadrennial Actuarial Audit of the Virginia529 Prepaid529 Program ("Prepaid529").

This purpose of this audit is to provide the General Assembly with a comprehensive overview of the actuarial soundness of Prepaid529. This audit consisted of a non-replication actuarial audit of the actuarial policies and practices of Prepaid529.

This audit addresses the following areas:

1. Reasonableness of the funding results and conclusions of the June 30, 2016, actuarial valuation of Prepaid529 as produced by Milliman, the Virginia529 actuary. This assessment includes a validation of the reasonableness of the liabilities by investigating individual test cases and using actuarial estimation techniques to approximate aggregate results that are used to compare the liabilities documented in the report.
2. The degree to which the beneficiary data is sufficient to support the conclusions of the June 30, 2016, actuarial valuation and the use and appropriateness of any assumptions made by Milliman regarding the data.
3. Whether the June 30, 2016, actuarial valuation performed by Milliman was conducted in accordance with generally accepted best practices for actuaries, as well as the principles and practices prescribed by the Actuarial Standards Board.
4. The content, detail, format, clarity and scope of the June 30, 2016, actuarial valuation report prepared by Milliman.
5. The reasonableness and appropriateness of the actuarial assumptions and methods used by Milliman in the June 30, 2016, actuarial valuation.
6. Whether Prepaid529 is presently being funded on an actuarially sound basis and will likely be in the future based on the results of the June 30, 2016, actuarial valuation. The assessment also considers a) whether the funded status of the Prepaid529 is appropriate, and b) potential considerations regarding the actuarial valuation and funded status of the program that could result from changes that Virginia529 intends to propose to modify the benefit structure of the program to an enrollment-weighted average tuition (WAT) payout model.
7. Comment on whether Virginia529 has satisfactorily addressed considerations and recommendations offered by GRS in the 2013 Quadrennial Actuarial Audit of the Virginia529 Prepaid529 program.

The table on the following page presents a summary of the approach and steps GRS completed on behalf of the 2017 Quadrennial Actuarial Audit of the Prepaid529:

GENERAL AUDIT APPROACH

TASK DESCRIPTION		
PROJECT PLANNING	1	**Project Planning with Client and Team**
		a.) Confirm Statement of Needs with JLARC
		b.) Send Final Statement of Needs
		c.) Prepare and send Work Plan to JLARC
DATA	2	**Census Data**
		a.) Prepare and send data request
		b.) Conference call with JLARC, Virginia529 and Milliman to confirm data request
		c.) Submit data (Raw data and valuation ready data)
		d.) Submit pricing reports, experience studies, assumption tables, etc
		e.) Compare valuation data and raw data
		f.) Review data assumptions utilized by Milliman
	3	**Weighted Average Tuition (WAT) Data**
		a.) Submit tuition, fee and headcount source data
		b.) Review WAT calculation
	4	**Financial Data**
		a.) Submit Virginia529 financial statements
		b.) Review Virginia529 financial statements
ASSUMPTIONS AND METHODS	5	**Actuarial Assumptions and Methods**
		a.) Review demographic actuarial assumptions
		b.) Review actuarial soundness valuation methods
		c.) Review economic actuarial assumptions
		d.) Scheduled status call with GRS and JLARC
ACTUARIAL LIABILITIES	6	**Actuarial Liabilities**
		a.) Request test lives data
		b.) Submit test lives data
		c.) Review test lives
ACTUARIAL VALUATION AND REPORT	7	**Actuarial Soundness Valuation and Report**
		a.) Review content, detail, format and clarity of Milliman actuarial report
		b.) Review Milliman pricing reports
		c.) Review conclusions reached in Milliman report
		d.) Review actuarial principles and practices used by Milliman
		e.) Scheduled status call with GRS and JLARC
REPORT AND BRIEFINGS	8	**Deliverable Schedule**
		a.) Draft report to JLARC
		b.) Report comments from JLARC
		c.) First exit conference
		d.) Second Draft Report to JLARC
		e.) Report comments from Virginia529 and Milliman
		f.) Second exit conference
		g.) Final report copies to JLARC
		h.) Briefing to JLARC

SECTION C

REASONABLENESS OF ACTUARIAL REPORT CONCLUSIONS

REASONABLENESS OF ACTUARIAL REPORT CONCLUSIONS

The basic conclusions presented in the June 30, 2016, actuarial valuation report prepared by Milliman for the Program include the following:

- Milliman indicates that the main purpose of the June 30, 2016, actuarial valuation of the Program is to calculate the actuarial present value of the obligations under the prepaid tuition contracts purchased through June 30, 2016, and compare the value of those obligations with the assets in the Program as of that date.
    - We find that this is the appropriate main purpose of the actuarial valuation.

- Milliman indicates that "Actuarial soundness" is not a precise concept and there is no generally accepted understanding of the meaning of this phrase within the actuarial profession, especially with respect to prepaid tuition plans. Although the term "Actuarial soundness" is used in the Code of Virginia regarding Prepaid529, it is not specifically defined. When applied to the Prepaid529, however, Milliman assumes that the phrase "actuarially sound," means that the Fund has sufficient assets (including the value of future installment payments due under current contracts) to cover the actuarially estimated value of the tuition obligations under those contracts (including any administrative costs associated with those contracts).
    - We agree with this assumption.

- Milliman concluded that actuarial liabilities of the program should be evaluated using sound actuarial principles that are generally consistent with the practices and principles widely used for retirement programs. They based this conclusion on the fact that no generally accepted standards of practice have evolved within the actuarial profession specifically addressing prepaid tuition programs and they chose the standards applicable to retirement programs because such programs generally provide for payments at some future date where that payment has a high probability of payment at, or close to, some specific age.
    - We agree with this conclusion.

- Milliman concluded that based on the results of the June 30, 2016, actuarial valuation, the Program had assets that exceed the "best estimate" of the obligations by roughly $589.7 million or 29.0 percent.
    - Based on our review and analysis, we believe this conclusion is reasonable.

- Milliman concluded that the amount of assets necessary to have a 50 percent probability of meeting all program obligations, including administrative expenses, associated with contracts issued as of June 30, 2016, is $2,035.6 million. The actual Prepaid529 fund balance as of June 30, 2016, was $2,625.3 million, which results in the Prepaid529 being 129.0 percent funded as of June 30, 2016.
    - Based on our analysis, we believe this conclusion is reasonable.

REASONABLENESS OF ACTUARIAL REPORT CONCLUSIONS

- Milliman prepared a cash flow projection based on a set of deterministic assumptions that produce the same Present Value of Obligations for Future Payments as the "best estimate" actuarial assumptions used in their Monte Carlo simulations. They concluded that at the end of the 2041 Fiscal Year all tuition obligations associated with contracts already purchased are expected to be paid resulting in a final cumulative surplus of $2,484 million.
    - Based on our analysis, we believe this conclusion is reasonable.

Based on our review, we find that the conclusions included in the Milliman June 30, 2016, actuarial valuation report are generally reasonable, and that Milliman used reasonable assumptions, and complied with actuarial standards and guidelines.

SECTION D
CONTRACT DATA

CONTRACT DATA

We have reviewed the original data provided by the Virginia529 to the retained actuary, Milliman, for accuracy, reasonableness and appropriateness. In addition, we reviewed the data that was directly used by Milliman in the valuation. This data would commonly be referred to as "scrubbed" data. Overall, we found the data used in the valuation to be reasonable and appropriate.

Both the scrubbed data and the original data files contained 65,101 data records. 55 records from the original data file were excluded from the number of contracts shown in the exhibits in Appendix B of the actuarial valuation report. (Appendix B shows a summary of contract data by Plan Type (University, Community College or a combination of the two), Matriculation Date and Years of tuition benefits purchased.) Although the footnote indicates "Table only includes contracts with at least one semester of tuition remaining", the counts appear to include all contracts with remaining tuition benefits (including contracts currently with unpurchased tuition benefits if there are installment contract payments remaining). With these minor exceptions, we were able to closely match the data exhibits. There was a small discrepancy in the Tier 1 (University Contract) exhibit. In addition, we noted that the number of remaining payments for installment contracts was rounded in the "scrubbed" data file.

We performed consistency checks between the original data and Milliman's "scrubbed" data file. We found the "scrubbed" data to be consistent with the original data and therefore, we concluded that the "scrubbed" data file is a reasonable representation of the original data originally provided by the Virginia529.

We recommend that the footnotes in the report exhibits be reviewed to ensure consistency with the information that is shown. We agree that excluding contracts that have a very low amount of tuition units remaining increases the usefulness of the exhibit and it is something that GRS does with our other prepaid tuition plan clients.

In the raw data, we identified approximately 500 University contract beneficiary records with less than 0.25 remaining semesters of tuition (and no remaining contract installment payments for unpurchased tuition benefits). In addition, although the contract data indicates that payments have been made for some records, the total tuition units purchased indicates 0. We recommend that Virginia529 review these items and make updates to the contract data or follow up with contract holders, as needed.

There are about 200 records with remaining payments and a projected college enrollment year prior to the valuation year (2016). In addition, there are records where, based on the remaining number of payments, payments are projected to be made after the projected college enrollment year.

- We recommend that Virginia529 and Milliman discuss whether changes will be made to the underlying raw data or if assumptions should be made in the actuarial valuation to address this. Following are some adjustments that could be considered:
  - Assume that contract beneficiaries past their projected college enrollment year will not make any additional contract payments and they will be entitled to only the tuition benefits purchased to date;
  - Assume that contract holders will accelerate the remaining contract payments such that all payments are assumed to be made prior to the projected college enrollment year; and

CONTRACT DATA

- Assume that contract beneficiaries will delay matriculation until all remaining contract payments have been made.

We do not expect that changes or additional assumptions made to the data would have a material impact on the actuarial valuation results.

Recommendations

- Although the footnote on the exhibit in Appendix B indicates "Table only includes contracts with at least one semester of tuition remaining", the counts appear to include all contracts with remaining tuition benefits (including contracts currently with unpurchased tuition benefits if there are installment contract payments remaining).
  - We recommend that the footnotes in the report exhibits be reviewed to ensure consistency with the information that is shown. We agree that excluding contracts that have a very small amount of tuition units remaining increases the usefulness of the exhibit and it is something that GRS does with our other prepaid tuition plan clients.
  - Virginia529 may want to review these contracts and make updates to the contract data or follow up with contract holders, as needed.
- There are contracts that currently have or are projected to have remaining contract installment payments at the projected matriculated date
  - We recommend that Virginia529 and Milliman discuss whether changes will be made to the underlying raw data or if assumptions should be made in the actuarial valuation to address this.

SECTION E

PLAN ASSETS

PLAN ASSETS

One of the primary purposes of an actuarial valuation of a prepaid tuition program is to determine the present value of the obligations for prepaid tuition contracts purchased through the actuarial valuation date (June 30, 2016) and compare such liabilities with the value of the assets associated with the program as of that same date. Accordingly, it is very important to make sure that the assets reported by the actuary are accurate and complete.

We reviewed the value of the Prepaid529 assets as reported by Milliman in the June 30, 2016, actuarial valuation report. As of June 30, 2016, Milliman reported program investments of $2,426,559,071 on a market value basis. In addition, Milliman calculated the present value of installment contract receivables to equal $198,758,778 for a total value of fund assets of $2,625,317,849. Please note that it is customary and accepted practice to include the present value of installment contract receivables in the total value of fund assets for the purpose of determining the deficit/surplus of a prepaid tuition program as of a particular point in time.

We also reviewed the Annual Financial report of the Virginia529 for the fiscal year ended June 30, 2016, (dated October 15, 2016) and the financial information sent to Milliman for the actuarial valuation. We were able to reconcile the asset value as reported by Milliman in the June 30, 2016, actuarial valuation report with the assets of the Prepaid529 as reported in the Annual Report. We were also able to match the beginning and ending net position as reported in the Annual Report with the same values as reported by Milliman in the June 30, 2016, actuarial valuation report.

We reasonably replicated the present value of installment contract receivables within 1.5 percent assuming 1) a discount rate of 6.25 percent, 2) using the fractional remaining payments as provided in the original data and 3) subtracting $1 from each payment to account for purchase expenses.

PLAN ASSETS

Following is a comparison of the projected amounts for current contracts as of June 30, 2016.

Projected Installment Payments ($ in Millions)

Fiscal Year	Milliman	GRS
2017	$46.8	$47.0
2018	39.2	39.5
2019	33.1	33.6
2020	27.5	27.9
2021	22.9	23.2
2022	18.5	18.8
2023	15.2	15.5
2024	12.2	12.5
2025	9.6	9.8
2026	7.4	7.6
2027	5.6	5.8
2028	4.1	4.3
2029	2.9	3.1
2030	2.0	2.1
2031	1.4	1.5
2032	0.8	0.9
2033	0.4	0.5
2034	0.1	0.1

Recommendations

We have no recommendations regarding the plan assets.

SECTION F

WEIGHTED AVERAGE TUITION AND FEES CALCULATION

WEIGHTED AVERAGE TUITION AND FEES CALCULATION

We have reproduced the Weighted Average Tuition and Fees (WAT) development shown in Appendix D of the actuarial valuation report and have verified the tuition and fee and full time enrollment counts by school used in the calculation. We find the WAT development for both the four-year Universities and the two-year community colleges to be reasonable. The WAT is based on 2016-2017 tuition and fees and is weighted by 2015-2016 academic enrollments. Using lagged enrollment is typical for a prepaid tuition plan as more current data is not usually available at the time of the actuarial valuation. Provided there are no major shifts in enrollment from year to year, this method will produce consistent results over time.

We also calculated the WAT using enrollment data specific to the Prepaid529 at the actuarial valuation date. This check serves as a basis for the Bias Load of 8 percent applied to University contracts and 1 percent applied to Community College contracts. The Bias Load is included in the actuarial valuation to recognize the propensity for beneficiaries to attend higher priced Colleges and Universities. As shown below, the University WAT specific to Prepaid529 tuition units used (provided as part of the actuarial valuation data) is approximately 7.5 percent greater than the overall WAT calculated using Undergraduate Headcount for 2015-2016. The Community College WAT specific to Prepaid529 enrollment is approximately 1.2 percent greater than the overall WAT calculated using Undergraduate Headcount for 2015-2016.

	University	Community College
WAT Using Fall Undergraduate Headcount for 2015-2016	$ 11,961	$ 5,263
WAT Using prePAID Enrollment as of the Valuation Date	$ 12,852	$ 5,325
Percent Different	7.45%	1.18%

Based on these relationships, the current bias loads of 8 percent applied to University contracts and 1 percent applied to Community College contracts are reasonable.

Recommendations

We have no recommendations regarding the calculation of the Weighted Average Tuition and Fees (WAT).

SECTION G

ECONOMIC ACTUARIAL ASSUMPTIONS

ECONOMIC ACTUARIAL ASSUMPTIONS

Actuarial Assumptions

The actuarial valuation report prepared by Milliman contains a description of the actuarial assumptions which were used in the actuarial valuation of the Prepaid529 as of June 30, 2016. Additionally, Virginia529 provided us with supplemental material and documents that provide more details on the development of the economic actuarial assumptions. We have reviewed this detail, and performed additional procedures, in order to assess the reasonableness of the assumptions used in the actuarial valuation.

The set of actuarial assumptions is one of the foundations upon which an actuarial valuation is based. An actuarial valuation of a prepaid tuition program is, essentially, a statistical projection of the amount and timing of future tuition payments to be paid under the plan. In any statistical projection, assumptions as to future events will drive the process. Actuarial valuations are no exception.

It is important to understand the nature of the prepaid tuition program plan and the plan sponsor when assessing the reasonableness of the actuarial assumptions. No projection of future events can be labeled as "correct" or "incorrect." However, there is a "range of reasonableness" for each assumption. We evaluate individual elements as follows:

- Whether or not they fall within the range of reasonableness; and
- If they fall within that range, whether they are reasonable for the actuarial valuation of the plan.

Actuarial assumptions for the valuation of prepaid tuition plans are of two types:

- Economic assumptions; and
- Demographic assumptions.

We have assessed the reasonableness of both types as part of this actuarial audit.

Economic Actuarial Assumptions

Economic assumptions reflect the effects of economic forces on the projections of tuition payments payable from the plan and in the discounting of those payments to a present value.

Economic assumptions are based, at their core, on the assumed level of price inflation. Each economic assumption is then developed from expected spreads over price inflation. Since price inflation is relatively volatile and is subject to a number of influences not based on recent history, these assumptions are less reliably based on recent past experience than are the demographic assumptions.

ECONOMIC ACTUARIAL ASSUMPTIONS

The key economic assumptions applicable to the Prepaid529 are:

1. Assumed Rate of Inflation – The rate of price inflation (as measured by the Consumer Price Index for all Urban consumers) which underlies the remainder of the economic assumptions. The current assumption is 2.5 percent.
2. Assumed Rate of Investment Return – The rate at which projected future tuition payments under the system are reduced to present value. The current assumption is 6.25 percent.
3. Assumed Rate of Tuition Increase – The annual rate at which tuition payments at Universities and Communities Colleges are expected to increase for contract holders. The current assumption is 5.0 percent for 2017 and 2018 and 6.5 percent for 2019 and thereafter.
4. Reasonable Rate of Interest – The rate at which contract payments are credited interest. The current assumption is .16 percent for 2016-2017, 1.25 percent for 2017-2018, 2.25 percent for 2018-2019, and 3.25 percent thereafter.

Inflation

By "inflation," we mean price inflation, as measured by annual increases in the Consumer Price Index (CPI). This inflation assumption underlies all of the other economic assumptions. The current annual inflation assumption is 2.50 percent.

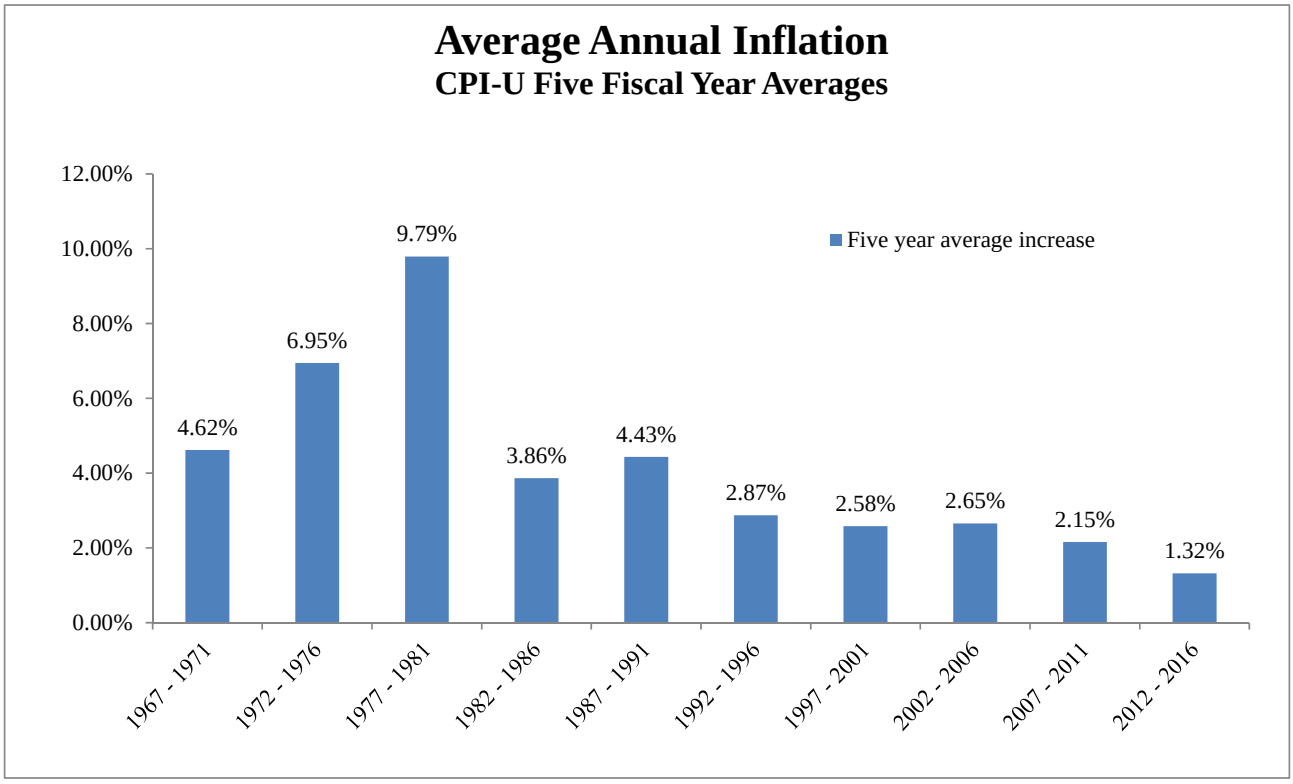
Over the five-year period from June 2011 through June 2016, the CPI-U increased at an average rate of 1.32 percent. However, the assumed inflation rate is only weakly tied to past results.

The following table shows the average inflation over various periods, ending June 2016.

Fiscal Year	Annual Increase in CPI-U
2011-12	1.66%
2012-13	1.75%
2013-14	2.07%
2014-15	0.12%
2015-16	1.00%
3-Year Average	1.06%
5-Year Average	1.32%
10-Year Average	1.74%
20-Year Average	2.18%
25-Year Average	2.32%
30-Year Average	2.66%
40-Year Average	3.68%
50-Year Average	4.10%

ECONOMIC ACTUARIAL ASSUMPTIONS

The graph below shows the average inflation over five-year periods over the last 50 years:



Future Inflation Expectations

Since price inflation is relatively volatile and is subject to a number of influences not based on recent history, economic assumptions are less reliably based on recent past experience than are the demographic assumptions. Therefore, it is important not to give undue weight to recent experience. We must also consider future expectations as well.

One measure of future expected inflation is the spread between yields on U.S. Treasuries and U.S. TIPS. (Treasury Inflation-Protected Securities, or TIPS, provide protection against inflation. The principal of a TIPS increases with inflation and decreases with deflation, as measured by the Consumer Price Index. When a TIPS matures, you are paid the adjusted principal or original principal, whichever is greater. U.S. Treasuries provide a specific before-inflation (nominal) return.)

The spread between yields on U.S. Treasuries and U.S. TIPS calculation varies depending on the maturity selected. Moreover, there may be other influences on the result such as a risk premium on Treasuries and a liquidity premium on TIPS.

The yield on 30-year Treasuries as of December 30, 2016, was 3.06 percent and the yield on inflation index TIPS was 0.99 percent for a raw difference of 2.07 percent. This is close to the Federal Reserve's target inflation rate of 2.0 percent.

ECONOMIC ACTUARIAL ASSUMPTIONS

We also surveyed the inflation assumption used by a number of well-known investment consulting firms. In our sample of eight investment consulting firms, the inflation assumption ranged from 1.56 percent to 2.75 percent, with an average of 2.22 percent.

Another point of reference is the Social Security Administration's (SSA) 2016 Trustees Report, in which the Office of the Chief Actuary is projecting a long-term average ultimate annual inflation rate of 2.6 percent under the intermediate cost assumption. (The ultimate inflation assumption is 2.0 percent and 3.2 percent respectively in the low cost and high cost projection scenarios.) The Social Security Trustees report uses the ultimate rates for their 75-year projections, much longer than the longest horizon we can discern from Treasuries and TIPS.

Based on the information from different sources on expectations for future inflation, we believe the current 2.5 percent inflation assumption is reasonable.

ECONOMIC ACTUARIAL ASSUMPTIONS

Actuarial Standards of Practice

The Actuarial Standards Board (ASB) promulgates actuarial standards of practice (ASOPs) for use by actuaries when rendering actuarial services in the United States. The ASB is vested by the U.S.-based actuarial organizations with the responsibility for promulgating ASOPs for actuaries rendering actuarial services in the United States. Each of these organizations requires its members, through its Code of Professional Conduct, to satisfy applicable ASOPs when rendering actuarial services in the United States. Because no generally accepted standards of practice have evolved within the actuarial profession that specifically address prepaid tuition programs, we have referenced the ASOPs that are applicable to retirement systems. We chose such standards because prepaid tuition programs, like retirement plans, generally provide for the payment of a benefit at a future date.

Although the Board of Virginia529 is the ultimate decision-making body with regard to approval of the actuarial assumptions used in the annual actuarial valuations, Milliman must still comply with the Actuarial Standards of Practice when providing advice or recommendations to the Board on the selection of actuarial assumptions.

Pension actuaries are required to comply with Actuarial Standard of Practice No. 27 (ASOP No. 27) in setting or recommending economic assumptions, including the assumed investment return rate. According to ASOP No. 27, each economic assumption selected (or recommended) by the actuary should be reasonable. For this purpose, an assumption is reasonable if it has the following characteristics:

- It is appropriate for the purpose of the measurement;
- It reflects the actuary's professional judgment;
- It takes into account historical and current economic data that is relevant as of the measurement date;
- It reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data, or a combination thereof; and
- It has no significant bias (i.e., it is not significantly optimistic or pessimistic).

Also according to ASOP No. 27, the actuary should recognize the uncertain nature of the items for which assumptions are selected and, as a result, may consider several different assumptions reasonable for a given measurement. The actuary should also recognize that different actuaries will apply different professional judgment and may choose different reasonable assumptions. As a result, a narrow range of reasonable assumptions may develop both for an individual actuary and across actuarial practice.

ECONOMIC ACTUARIAL ASSUMPTIONS

Investment Return Assumption

The assumed rate of investment return is the rate that assets are expected to earn in the future. The assumed rate of investment return is also used to reduce to a present value the projected future tuition payments under the program. The current assumption is 6.25 percent.

The allocation of assets within the universe of investment options will significantly affect the overall fund performance. Therefore, it is meaningful to identify the range of expected returns based on the fund's targeted allocation of investments and an overall set of capital market assumptions.

Based on information in a memo from Mercer dated June 13, 2016, and provided to us by Virginia529, the following table illustrates the plan's current target asset allocation:

Asset Category	Allocation Percentage
Equities	
Domestic Large Cap	7.5%
Domestic Small Cap	7.5%
International Developed	10.0%
Emerging Markets	7.5%
Total Equity	**32.5%**
Core Fixed Income	
Aggregate Fixed Income	15.0%
Inflation Index Bonds	5.0%
Stable Value	5.0%
Total Core Fixed Income	**25.0%**
Non-Core Fixed Income	
Convertibles	7.5%
High Yield	10.0%
Emerging Market Debt	10.0%
Total Non-Core Fixed Income	**27.5%**
Alternatives	
Real Estate (Private)	2.5%
Private Equity	7.5%
Hedge Funds	5.0%
Total Alternatives	**15.0%**
Total All Asset Categories	**100.0%**

ECONOMIC ACTUARIAL ASSUMPTIONS

Because GRS is an actuarial and benefits consulting firm and does not provide investment advice, we reviewed capital market assumptions developed and published by eight independent investment consulting firms, including Mercer.

These investment consulting firms periodically issue reports that describe their capital market assumptions; that is, their estimates of expected returns, volatility and correlations among the different asset classes. The assumptions provided to us by most of the investment consultants are for 2016. While some of these assumptions may be based upon historical analysis, many of these firms also incorporate forward looking adjustments to better reflect near-term and long-term expectations. The estimates for core investments (i.e., fixed income, equities and real estate) are generally based on anticipated returns produced by passive index funds.

Given the Plan's current target asset allocation (as shown on the previous page) and the capital market assumptions from the eight investment consultants, the development of the average one-year nominal return, net of investment expenses, is provided in the following table. Based on each investment consulting firm's assumptions, we estimated the expected real return of the Plan's portfolio (col. (4)). Next, based on the actuary's inflation assumption, we estimated the nominal return net of investment expenses (col. (6)).

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2)–(3)	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)		Standard Deviation of Expected Return (1-Year)
(1)	(2)	(3)	(4)	(5)	(6)		(7)
1	6.23%	2.25%	3.98%	2.50%	6.48%		9.55%
2	6.76%	2.50%	4.26%	2.50%	6.76%		12.05%
3	6.66%	2.25%	4.41%	2.50%	6.91%		11.47%
4	6.63%	2.20%	4.43%	2.50%	6.93%		10.07%
5	6.77%	2.00%	4.77%	2.50%	7.27%		11.01%
6	7.30%	2.26%	5.04%	2.50%	7.54%		10.18%
7	6.65%	1.56%	5.09%	2.50%	7.59%		9.87%
8	7.52%	2.20%	5.32%	2.50%	7.82%		10.70%
Average	**6.82%**	**2.15%**	**4.66%**	**2.50%**	**7.16%**		**10.61%**

As the table shows, the average one-year nominal return (net of expenses) of the eight firms is 7.16 percent, which is greater than the current assumption of 6.25 percent. However, this one-year nominal return statistic does not reflect that year-to-year volatility in investment returns results in a lower average return over time.

Therefore, in addition to examining the expected one-year return, it is important to review anticipated volatility of the investment portfolio and understand the range of long-term net return that could be expected to be produced by the investment portfolio. The following table provides the

ECONOMIC ACTUARIAL ASSUMPTIONS

40th, 50th and 60th percentiles of the 10-year geometric average of the expected nominal return, net of expenses, as well as the probability of exceeding the current 6.25 percent assumption.

Investment Consultant	Distribution of 10-Year Average Geometric Net Nominal Return 40th	50th	60th	Probability of exceeding 6.25%
(1)	(2)	(3)	(4)	(5)
1	5.30%	6.05%	6.82%	47.40%
2	5.13%	6.09%	7.05%	48.27%
3	5.39%	6.30%	7.21%	50.55%
4	5.66%	6.46%	7.26%	52.61%
5	5.84%	6.71%	7.59%	55.30%
6	6.25%	7.06%	7.87%	60.02%
7	6.36%	7.14%	7.93%	61.36%
8	6.45%	7.30%	8.15%	62.28%
Average	**5.80%**	**6.64%**	**7.48%**	**54.72%**

As the above table shows, there is a 20 percent likelihood (i.e., the difference between the 40th and 60th percentiles) that the 10-year average net nominal return will be between 5.80 percent and 7.48 percent. The table also illustrates that there is a 60 percent likelihood that the 10-year average net nominal return will be 5.80 percent or higher. Finally, the results of our analysis show that there is more than a 50 percent chance of exceeding the current assumption of 6.25 percent over the next 10 years based on the capital market assumptions of six of the eight investment consulting firms included in the study.

Based on Mercer's memo dated June 13, 2016, they have estimated that a return of 6.8 percent will be met or exceeded with a probability of 50 percent.

Since the 6.25 percent assumption falls well within the range of reasonable assumptions and there is about a 55 percent chance of producing an average return that exceeds 6.25 percent over the next 10 years (based on the GRS analysis), we believe it is a reasonable assumption.

Review of Tuition Increase Assumption

The current annual tuition increase assumption is 5.0 percent for the next two years (Fall 2017 and Fall 2018) and 6.5 percent each year thereafter for both Universities and Community Colleges.

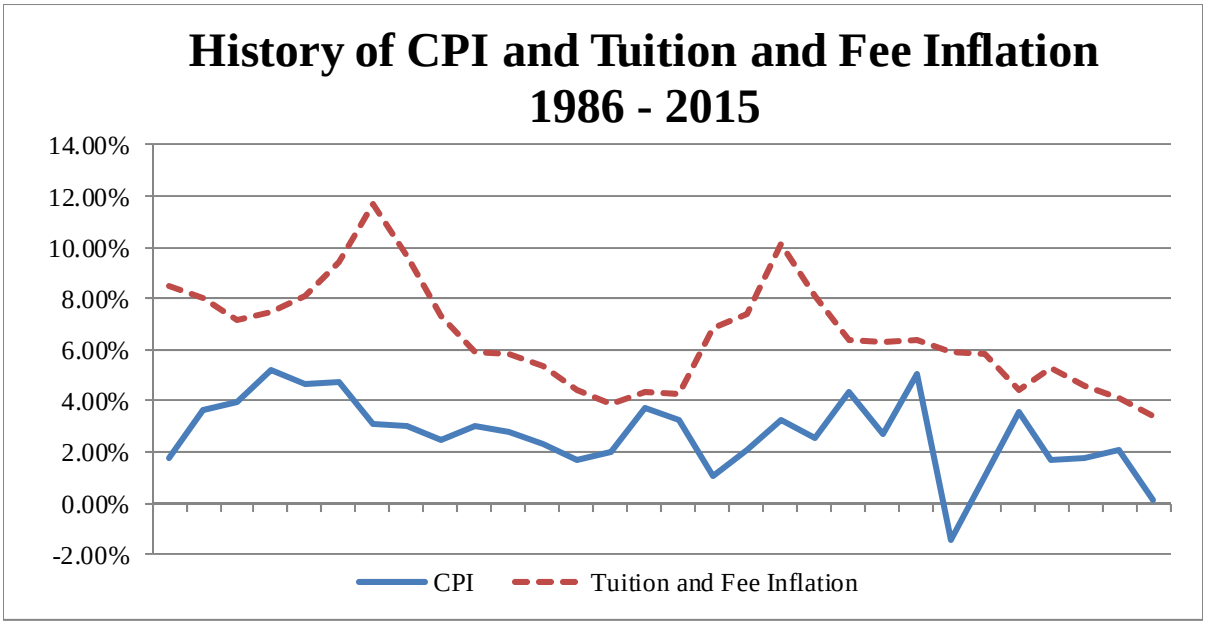
ECONOMIC ACTUARIAL ASSUMPTIONS

The historical compounded annual increase in average tuition reported in the Milliman report follows:

Period	University	Community College
Over last 5 years	4.7%	4.7%
Over last 10 years	6.2%	8.8%
Over last 15 years	7.9%	10.6%
Over last 20 years	5.6%	6.7%
Over last 25 years	5.7%	6.7%

One point to note is that beginning with the 2011-2012 year, Community College Tuition and Fees was measured as an enrollment weighted average and prior to that, a non-enrollment weighted average was used. This resulted in a one-year 27 percent increase, thus raising the average annual tuition increases for Community Colleges. The University Tuition and Fees was always measured as an enrollment weighted annual average so there is some difference in the statistics between the two different categories of schools.

The Bureau of Labor Statistics publishes a tuition and fee price index. Increases in tuitions and fees have typically exceeded increases in the Consumer Price Index ("CPI"). The graph below shows the relationship between the annual CPI and Tuition and Fee Increases.



Over the last 30 years, tuition and fee increases have exceeded CPI in all years. The annual averages over that period are 6.53 percent for tuition and fees and 2.69 percent for CPI resulting in a 3.84 percent spread.

ECONOMIC ACTUARIAL ASSUMPTIONS

Fiscal Year	Annual Increase in CPI-U	Annual Increase in Tuition and Fees (National)	Difference Between Tuition and Fee and CPI Increases
2010-2011	3.56%	4.41%	0.86%
2011-2012	1.66%	5.31%	3.65%
2012-2013	1.75%	4.54%	2.79%
2013-2014	2.07%	4.14%	2.07%
2014-2015	0.12%	3.40%	3.28%
3-Year Average	1.31%	4.03%	2.71%
5-Year Average	1.83%	4.36%	2.53%
10-Year Average	2.07%	5.25%	3.18%
20-Year Average	2.26%	5.64%	3.38%
25-Year Average	2.46%	6.26%	3.80%
30-Year Average	2.69%	6.53%	3.84%

Based on the historical statistics on CPI and tuition and fee inflation, we believe that annual tuition and fees increases will likely exceed CPI increases on average by 2.50 to 3.50 percentage points in the near term. Based on the current inflation assumption of 2.50 percent, this would result in a tuition and fee increase assumption of 5.00 percent to 6.00 percent.

Therefore, we find the current assumption of 5.0 percent for the next two years (Fall 2017 and Fall 2018) and 6.5 percent each year thereafter reasonable for both Universities and Community Colleges.

Another important consideration, however, is whether the ultimate annual 6.5 percent tuition increase assumption is really sustainable over the long term. Since the rate of tuition increase has a material impact on the pricing of new contracts, it is important that the assumption not only be reasonable, but also sustainable over the long term. With an annual 6.5 percent increase in tuition each year going forward, the cost of college may become unaffordable to future generations of students. For example, if over a 12- to 18-year period, tuition increases at an annual rate of 6.5 percent and wages increase at a rate closer to 3.0 percent, then the cost of tuition may not be reasonable in relation to wages (tuition would have increased by about 210 percent over an 18-year period compared to increased wages of only 70 percent). Further, Virginia's governance structure for higher education is decentralized, which makes it difficult to predict future tuition increases.

For these reasons, we recommend that the assumption for tuition increases continue to be reviewed annually, and adjusted as appropriate.

ECONOMIC ACTUARIAL ASSUMPTIONS

Reasonable Rate of Return

At redemption, each contract pays the current tuition and mandatory fees at the Virginia public university or community college that the beneficiary attends. The benefits vary if the beneficiary does or does not attend a Virginia public university or community college. (For beneficiaries attending an out-of-state public or private college or university, Prepaid529 will pay the lesser of 1) the payments made on the contract plus interest at the composite reasonable rate of return or 2) the average in-state undergraduate tuition and mandatory fees at Virginia public schools for the same academic year the benefits are used.) With the establishment of the Virginia Invest529 Program, contract holders have the option of rolling over the value of their prepaid contract into a savings account. The value of the prepaid contract for such rollovers is the accumulated contributions at the reasonable rate of return set by the Board. This option to roll over the contract has effectively added a minimum benefit to the Program.

The reasonable rate of return tracks the quarterly performance of the Institutional Money Funds Index as reported in the Money Fund Monitor by iMoneyNet.

The current actuarial assumption for the reasonable rate is 0.16 percent for 2016-2017 and has an expected mean of 1.25 percent for 2017-2018, 2.25 percent for 2018-2019, and 3.25 percent thereafter. The actual reasonable rate has been less than 0.25 percent since the third quarter of 2009. We believe the long-term assumption of 3.25 percent is probably reasonable over the longer term, but definitely on the conservative side when considering more recent experience.

Recommendations

- We recommend that the assumption for tuition increases continue to be reviewed annually, and adjusted as appropriate.

SECTION H

DEMOGRAPHIC ACTUARIAL ASSUMPTIONS

DEMOGRAPHIC ACTUARIAL ASSUMPTIONS

We reviewed the 2014 experience study report of the Prepaid529 prepared by Milliman covering the 10-year period from July 1, 2003, through June 30, 2013. The report examined experience for the following assumptions:

1. The year, relative to the expected matriculation year, in which contract units will first be redeemed (Matriculation);
2. The proportion of tuition payouts going to Virginia public schools, Virginia private schools and out of state schools (Utilization of Tuition Years);
3. The cost of tuition payouts to Virginia four-year universities and community colleges relative to enrollment-weighted average tuition (Bias); and
4. Rates of contract cancellations and rollovers (Forfeiture).

Matriculation and Utilization of Tuition Years Assumptions

In general, we find these assumptions to be reasonable; however, they do contain some degree of conservatism. Based on the actual matriculation rates shown on page 4 of the experience study, a higher percentage of contract beneficiaries are assumed to first matriculate at older ages (21 or older) than the experience shows. However, because the investment return assumption (6.25 percent) is lower than the ultimate tuition increase assumption (6.50 percent), assuming a delay in utilization produces higher liabilities than earlier commencement of benefits.

The current utilization (benefit usage) assumption is as follows:

“It is assumed that participants will begin utilizing their contract at the following rates, and then redeem up to two semesters of tuition per year until the contract is depleted.”

We recommend reviewing the assumption that once contract beneficiaries begin utilizing their contract benefits (first matriculate), that they will redeem two semesters each year until benefits are fully used. Based on our experience with our other prepaid tuition clients, not all contract beneficiaries are utilizing a full year of tuition benefits each year once they matriculate. Therefore, we have separate matriculation and benefit utilization assumptions (or assumptions that reflect both matriculation and benefit usage).

Following is the utilization assumption used in the actuarial valuation as of June 30, 2016:

“Starting in the year of matriculation, it is assumed that 76% of beneficiaries will attend a public university in Virginia, 7.6% will attend a private university in Virginia, 11.4% will attend a university in another state, and 5.0% will request a cancellation, transfer, or rollover to a savings plan.”

This assumption is consistent with the recommendations in the experience study that 5 percent of contract beneficiaries ages 18 and older will request a cancellation or rollover, and of those that take a qualified distribution, 80 percent of beneficiaries will attend a public university in Virginia, 8 percent will attend a private university in Virginia and 12 percent will attend a university in another state.

DEMOGRAPHIC ACTUARIAL ASSUMPTIONS

However, based on the data on unit redemptions for four-year university contracts over a 10-year period shown in Appendix I of the experience study report (and summarized in the table below), about 17 to 19 percent of contract units redeemed between the ages of 18 and 22 (or 24) were rolled over or cancelled. Based on our understanding of the application of the assumptions for the actuarial valuation, only 5 percent of contract units assumed to be remaining at first matriculation year (age 18) would be assumed to be rolled over or cancelled.

Age	Rollover/ Cancel	Out of State	Virginia Private	Virginia Public	Virginia CC	Total Units Redeemed
18	10,393	5,396	2,532	27,250	672	46,243
19	7,369	4,876	2,173	26,248	669	41,335
20	5,440	4,189	1,953	24,613	402	36,597
21	3,823	3,442	1,675	21,691	244	30,875
22	1,782	424	224	2,501	126	5,057
23	1,068	145	97	800	60	2,170
24	600	67	51	372	28	1,118
Total Units Redeemed	30,475	18,539	8,705	103,475	2,201	163,395
% of Total	18.7%	11.3%	5.3%	63.3%	1.3%	100.0%
Total Age 18-21	27,025	17,903	8,333	99,802	1,987	155,050
% of Total	17.4%	11.5%	5.4%	64.4%	1.3%	100.0%
Current Assumption	5.0%	11.4%	7.6%	76.0%	0.0%	100.0%

In Appendix IV of the experience study report, which analyzed experience over a three-year period, an adjustment was made to shift some of the rollovers to Virginia public universities.

We recommend that Milliman and Virginia529 review the data on this assumption and the application of the assumption in the actuarial valuation to ensure that the assumption is consistent with the experience of the Prepaid529. The current assumption (that assumes a higher percentage of contract beneficiaries use tuition benefits) is more conservative than assuming a rollover which would be contract payments with interest at the reasonable rate of return.

Bias Assumption

Based on the data in the experience study, payouts have been between 6 and 8 percent higher for university contracts and about 1 percent higher for community college contracts compared to the WAT. The current bias load is 8.0 percent for university contracts and 1.0 percent for community college contracts, which we find reasonable. It is not clear whether the payout analysis includes the payout of the account balance (if the account balance with interest at the reasonable rate of return is higher than tuition and fees at the contract beneficiary's school).

We recommend consistency between the contract experience included to develop the benefit utilization assumptions and the bias load. For example:

- If rollovers due to the account balance being higher than tuition at the contract beneficiary's school were classified as attending a public university in Virginia for purposes of developing assumptions, then we believe the account balance payments should also be taken into

DEMOGRAPHIC ACTUARIAL ASSUMPTIONS

consideration in development of the bias load (to recognize contract beneficiaries are also attending schools with lower tuition).

- If rollovers due to the account balance being higher than tuition at the contract beneficiary's school *were not* classified as attending a public university in Virginia for purposes of developing assumptions and were classified as cancellations/rollovers, then we believe the account balance payments *should not* be taken into consideration in development of the bias load.

Forfeiture Assumptions

Contract holders may cancel (forfeit) their contracts and request a refund of their contract payments with interest. Upon forfeiture, they are not entitled to additional benefits from the Prepaid529. The current forfeiture assumption is 0.5 percent per year prior to the first year of assumed matriculation (age 18). This assumption is generally consistent with the analysis in the experience study. The actual rate of forfeiture is higher (about 2 to 3 percent) in the year prior to assumed matriculation (age 17). A higher forfeiture rate could be considered for the year prior to matriculation. We find the current assumption to be reasonable and slightly conservative for the year prior to matriculation.

Administrative Expenses

Assumed maintenance expenses of $57.25 per contract and annual distribution costs per contract of $25.35 are included in the present value of future obligations for the Prepaid529. These assumptions are based on a cost analysis performed by the Virginia529 staff with adjustments for anticipated increases since the analysis was performed in 2013.

Recommendations

- We recommend reviewing the assumption that once contract beneficiaries begin utilizing their contract benefits (first matriculate), that they will redeem two semesters each year until benefits are fully used.
- We recommend that Milliman and Virginia529 review the data on the 5 percent assumption for rollovers/cancellations beginning in the year of assumed matriculation and the application of the assumption in the actuarial valuation to ensure that the assumption is consistent with the experience of the Prepaid529.
- We recommend reviewing the consistency of how contract payments were classified for purposes of developing the cancellation/rollover assumption beginning in the year of assumed matriculation and the calculation of the bias load (in particular for contract beneficiaries for which their account balance was higher than the tuition at their school).

SECTION I

ACTUARIAL VALUATION METHODS

ACTUARIAL VALUATION METHODS

The common practice by actuaries who conduct actuarial valuations of prepaid tuition programs is to determine the present value of obligations for future tuition payments and administrative expenses under a "deterministic" valuation approach. Under a deterministic approach, the liabilities are projected based on a specific set of variables and assumptions. In effect, the purpose of a deterministic valuation is to develop expected results. However, only if actual future experience duplicates the underlying variables will the liabilities of the plan be exactly as determined.

Because the probability of one set of assumptions being exactly realized is rather low, Milliman utilized a "stochastic" projection (sometimes called a Monte Carlo simulation) in order to simulate multiple sequences of outcomes so that a range of results was obtained. This method resulted in a distribution of possible outcomes, which reflects the uncertainty and volatility of the real world. Instead of using assumptions that specifically represent future outcomes, stochastic projections use parameters that characterize the conditions underlying future events.

Based on Milliman's stochastic analysis, they determined that the amount of assets necessary to have a 50 percent probability of meeting all program obligations, including administrative expenses, associated with contracts issued as of June 30, 2016, is $2,035.6 million. The actual Prepaid529 fund balance as of June 30, 2016, was $2,625.3 million, which results in the Prepaid529 being 129.0 percent funded as of June 30, 2016.

We find the use of a stochastic valuation approach by Milliman to determine the present value of obligations for future tuition payments and administrative expenses, as compared to a deterministic valuation approach, to be an appropriate valuation methodology for the purpose for which it is used. In fact, it is a robust methodology and has the potential to provide more information than a deterministic approach.

Milliman also prepared a cash flow projection based on a set of deterministic assumptions that produce the same Present Value of Obligations for Future Payments as the "best estimate" actuarial assumptions used in their Monte Carlo simulations. The assumptions include a 5.92 percent return on the Prepaid529 assets and a tuition and fee increase assumption of 5.0 percent for the first two years and 6.5 percent assumption thereafter. They concluded that "at the end of the 2041 Fiscal Year all tuition obligations associated with contracts already purchased are expected to have been paid resulting in a final cumulative surplus of $2,484.0 million". However, Milliman also clarifies that "Since the actuarial assumptions are intended to represent "best estimates" of future expenses, there is a 50% chance that actual results will be better than this projection and a 50% chance that actual results will be worse." What this means is if no new contracts are sold and all actuarial assumptions were exactly realized, at the end of fiscal year 2041 there would be program assets of $2,484.0 million and no additional tuition benefits to be made. We find the deterministic approach to the cash flow projections found in the valuation report to be reasonable.

Recommendations

We have no recommendations regarding the actuarial valuation methods. However, we recommend that Prepaid529 consider an asset allocation that further reduces risk in order to maintain a surplus position if there is adverse future investment experience. A change in asset allocation would likely require a change in the investment return assumption used in the actuarial valuation.

SECTION J

ACTUARIAL LIABILITY TEST LIFE REVIEW

ACTUARIAL LIABILITY TEST LIFE REVIEW

GRS reviewed and replicated the liabilities for 14 test lives in order to assess that the liabilities were being calculated consistently with the contract beneficiary census data provided and the actuarial assumptions and methods as disclosed in the June 30, 2016 actuarial valuation report, including a deterministic investment return assumption of 6.25 percent.

A summary of the replication results and key contract beneficiary census data can be found on the page following the commentary on the test life review.

Application of Actuarial Assumptions and Methods

GRS found that the actuarial assumptions and methods applied in the test cases were generally consistent with those disclosed in the June 30, 2016 actuarial valuation report. GRS selected 14 contract beneficiary records for testing who had projected enrollment years before, equal to and after the valuation year of 2016. We also selected beneficiaries who had already used tuition benefits and those who had not yet used benefits.

Although not explicitly stated in the actuarial report, contract beneficiaries with projected enrollment dates prior to the actuarial valuation year (2016) who had not yet used tuition benefits were assumed to have a matriculation year equal to the actuarial valuation year and therefore the matriculation rates in the report were applied (Test Lives 1, 4, 6). Beneficiaries who had begun using tuition benefits with a matriculation year equal to or prior to the actuarial valuation year were assumed to redeem two semesters of benefits each year until all benefits were depleted (Test Lives 2, 3, 7). Beneficiaries who had begun using tuition benefits with a matriculation year after the actuarial valuation year were assumed to defer the use of their remaining benefits until their projected enrollment year and therefore the matriculation rates in the report were applied (Test Life 8).

Beneficiaries with university contracts who had begun using tuition benefits also had the assumptions applied for attendance at different types of schools (76% attend a public university in Virginia, 7.6% attend a private university in Virginia, 11.4% attend a university in another state and 5% request a cancellation or a rollover) (Test Lives 1, 6, 8). Beneficiaries with community college contracts are assumed to have community college tuition benefits paid beginning in the matriculation year (there is no assumption applied for cancellation or rollover).

Future installment payments were projected with rates applied for the percentage of contract beneficiaries remaining in the Prepaid529 with a future benefit payable. For beneficiaries who were not scheduled to have completed payment of their contract installment payments prior to their projected matriculation year, (1) tuition benefits were assumed to begin and (2) as tuition benefits were assumed to be paid, the contract installment payment was assumed to decrease (before payments for the contract were fully made) (Test Lives 6, 9).

For Test Life 6, 76% of contract benefits are assumed to be used at in-state public schools. Therefore, full payment of the contract installment payments should be made for the percentage of contract beneficiaries assumed to attend in-state public schools. For the contract benefits assumed to be used at private or out of state schools, or cancelled or rolled over (remaining 24%), the

ACTUARIAL LIABILITY TEST LIFE REVIEW

account balance used for benefits was consistent with a lower amount of payments that were made by the contract holder. Therefore, there was not a large inconsistency in the contract payments made and the tuition benefits paid out for the 24% (contract beneficiaries not assumed to attend in-state public schools). For Test Life 9 (a community college contract), 100% of benefits are assumed to be used to pay tuition benefits for community colleges. Therefore, the test life results from Milliman were not reflecting the full amount of payments required from the contract holder (which understates the present value of future installment payments and overstates the net obligation from the Prepaid529).

For beneficiaries who were scheduled to complete their installment payments prior to their projected matriculation year, the installment payments projected by GRS were slightly higher than those projected by Milliman (Test Lives 10, 12, 14).

Replication of the Present Value of Obligations

GRS was able to independently replicate the present value of future obligations payable from the Prepaid529 for nine of the 14 test lives within about 0.5 percent. For the five remaining test lives, one was a one semester university contract, three were university contracts in which some tuition benefits had been used and one was a combination contract that included both community college and university years.

For Test Life 8, GRS assumed that the remaining benefits would be used beginning in the actuarial valuation year because 3.5 years of tuition benefits had already been paid out. Milliman assumed that the 1.5 remaining years would be paid beginning in the projected matriculation year of 2019.

For Test Lives 2, 3, 12 and 14, although the differences between the results were larger than 0.5 percent, they were still within 3 percent, which we would consider reasonable.

Replication of the Present Value of Future Installment Contract Payments

Five of the 14 test lives had remaining contract installment payments to be made. For two of the five test lives, the present value of future installment contract payments calculated by GRS was about 120 percent higher than the amount calculated by Milliman. This is due to the number of remaining contract payments extending beyond the projected matriculation date. GRS assumed that the contract payments would still be made (to be consistent with the tuition benefits paid out). Milliman assumed that tuition benefits were assumed to begin before all contract installment payments were made, and as tuition benefits were assumed to be paid, the contract installment payment was assumed to decrease (before payments for the contract were fully made).

For the remaining test lives, GRS was able to replicate the present value of future installment contract payments within 3 percent. As noted in the previous audit, Milliman bases the present value of future installment payments on the rounded number of remaining payments. For example, for test life 14, there were 204.51 remaining installment contract payments, which Milliman rounded up to 205. The projected future installment payments amounts exclude a $1 expense amount per payment. This is consistent with the $1 processing expense amount per payment not

ACTUARIAL LIABILITY TEST LIFE REVIEW

being included in the maintenance expense of $57.25 (or any other expenses) included in the present value of future obligations.

Recommendation

For beneficiaries who are not scheduled to have made all contract installment payments prior to the projected college entrance date, we recommend that an assumption be made in order for the projected results to be consistent with the administration of the Program. (For example, assume the contract payment schedule is accelerated such that all payments are made prior to the projected college entrance year.) In addition, if contract payment amounts that are not made in accordance with the payment schedule are increased as part of the administration of the Program, we recommend that this is incorporated in the actuarial valuation to the extent practicable.

We also recommend that more disclosure be added to the actuarial assumptions section of the actuarial valuation report with respect to:

1) Projected utilization of benefits for combination contracts (where no benefits have been paid out). (The usage of community college and university tuition benefits are assumed to be distributed evenly across the four year benefit period – community college tuition benefits are not necessarily used before university tuition benefits.)
2) The assumption for cancellation, transfer or rollover to a savings plan for community college and combination contracts starting in the year of projected matriculation
3) Projected utilization of benefits for contract beneficiaries with projected college entrance years prior to the actuarial valuation year

ACTUARIAL LIABILITY TEST LIFE REVIEW

Test Life Number	Contract Type	Projected Enrollment Year	(Community College/ University) Years Contracted	Years Used	Payments Remaining Number	Years	Present Value of Obligations Milliman	GRS	Difference	Present Value of Future Installment Payments Milliman	GRS	Difference
1	UNIV	2000	0/4	0/0	0	0	$45,760.35	$45,843.20	0.2%	$0.00	$0.00	0.0%
2	UNIV	2012	0/1	0/0.4005	0	0	$6,768.98	$6,713.73	-0.8%	$0.00	$0.00	0.0%
3	UNIV	2013	0/2	0/0.3751	0	0	$20,393.20	$20,100.18	-1.4%	$0.00	$0.00	0.0%
4	COMM	2014	2/0	0/0	0	0	$10,559.82	$10,560.21	0.0%	$0.00	$0.00	0.0%
5	BOTH	2015	2/1	0/1	0	0	$10,567.55	$10,567.57	0.0%	$0.00	$0.00	0.0%
6	UNIV	2015	0/4	0/0	63.16	5.26333333	$44,362.50	$44,118.78	-0.5%	$2,907.73	$6,964.51	139.5%
7	COMM	2016	3/0	1.6298/0	0	0	$7,296.30	$7,308.76	0.2%	$0.00	$0.00	0.0%
8	UNIV	2019	0/5	0/3.5	0	0	$16,884.58	$15,735.71	-6.8%	$0.00	$0.00	0.0%
9	COMM	2020	1/0	0/0	181	15.0833333	$5,403.46	$5,402.20	0.0%	$1,282.58	$2,725.81	112.5%
10	UNIV	2023	0/3	0/0	55.3	4.60833333	$37,924.33	$37,987.80	0.2%	$9,852.28	$10,035.93	1.9%
11	UNIV	2025	0/2	0/0	0	0	$24,588.21	$24,633.05	0.2%	$0.00	$0.00	0.0%
12	UNIV	2027	0/0.5	0/0	133	11.0833333	$7,287.39	$7,103.47	-2.5%	$8,018.41	$8,132.71	1.4%
13	UNIV	2031	0/4	0/0	0	0	$50,323.95	$50,527.55	0.4%	$0.00	$0.00	0.0%
14	BOTH	2033	2/2	0/0	204.51	17.0425	$36,694.76	$37,037.12	0.9%	$44,918.49	$45,489.95	1.3%

SECTION K

ACTUARIAL REPORT CONTENT, DETAIL, FORMAT AND CLARITY

ACTUARIAL REPORT CONTENT, DETAIL, FORMAT AND CLARITY

Actuarial Standards of Practice

Because no generally accepted actuarial standards of practice ("ASOP") have evolved within the actuarial profession that specifically address prepaid tuition programs, we have referenced the ASOPs that are used for retirement systems. We chose such standards because prepaid tuition programs, like retirement plans, generally provide for the payment of a well defined benefit at a future date.

ASOP No. 4

ASOP No. 4, Measuring Pension Obligations and Determining Pension Plan Costs, provides guidance for measuring pension obligations and communicating the results. The Standard lists specific elements to be included, either directly or by references to prior communication, in pension actuarial communications. The pertinent items that should be included in an actuarial valuation report for a pension plan should include:

- The purposes of the measurement and a statement that the measurement may not be applicable for other purposes.
- The measurement date (the effective date of the calculations, the date as of which the participant and financial information were compiled, and the sources and adequacy of such information).
- A description of adjustments made for events after the measurement date (if applicable).
- An outline of the benefits being discussed or valued, a description of known changes from the most recent valuation and any significant plan provisions not included in the actuarial valuation, along with the rationale for not including the provisions.
- A summary of the participant information and description of hypothetical data (if used).
- A description of any accounting policies or funding elections made by the principal that are pertinent to the measurement.
- A description of the actuarial assumptions, cost method and the asset valuation method used such that another actuary qualified in the same practice area could determine whether the results in the actuarial valuation report are reasonable.
- Information regarding the contribution allocation procedure.
- Disclosures on funded status that are not prescribed by federal law or regulation:
    - Whether the funded status measure is appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations;
    - Whether the funded status measure is appropriate for assessing the need for or the amount of future contributions; and
    - If applicable, a statement that the funded status measure would be different if the measure reflected the market value of assets rather than the actuarial value of assets.
- A statement, appropriate for the intended users, indicating that future measurements (for example, funded status) may differ significantly from the current measurement.
- A description of known changes in assumptions and methods from the most recent valuation and an explanation of the information and analysis that led to the changes (if the changes were not the result of a prescribed assumption).

ACTUARIAL REPORT CONTENT, DETAIL, FORMAT AND CLARITY

- A description of cost allocation or contribution allocation procedures (if the changes were not the result of a prescribed assumption).
- A statement, if applicable, that the actuary's use of approximations and estimates could differ materially from results based on detailed calculations.

ASOP No. 41

ASOP No. 41, Actuarial Communications, provides guidance to actuaries with respect to actuarial communications.

The requirements for actuarial communications are as follows:

- Form and content of each actuarial communication are appropriate for the circumstances, taking into account the intended users.
- Actuarial communications are clear and use language appropriate for the circumstances, taking into account the intended users.
- Actuarial communications should be issued within a reasonable time period, taking into account the needs of the intended users.
- Actuarial communications should clearly identify the actuary responsible and the extent to which the actuary is available to provide supplementary information and information, unless the actuary judges it inappropriate.

ACTUARIAL REPORT CONTENT, DETAIL, FORMAT AND CLARITY

Findings and Recommendations

We have reviewed the June 30, 2016, actuarial valuation report prepared by Milliman and generally find that the report is complete and contains the appropriate information. However, we have the following minor recommendations for modifications to the report which in our opinion would allow it to adhere more closely with ASOP No. 4 and 41.

- The date as of which the participant and financial information were compiled could be identified more clearly in the text of the certification letter. The current language is as follows:
  - The results contained in this report are based on contract data and preliminary financial statements provided by the Virginia College Savings Plan. We have relied on this data in preparing this report.
- Disclosure of whether the funded status measure is appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.
- The summary/outline of the benefits being discussed or valued could be expanded to be more robust, and an explicit statement regarding whether there are (or are not) any significant benefits not included in the actuarial determinations could be added.

As previously stated, Milliman utilized a "stochastic" projection (sometimes called a Monte Carlo simulation) in order to simulate multiple sequences of outcomes so that a range of results was obtained. This method resulted in a distribution of possible outcomes, which reflects the uncertainty and volatility of the real world. Instead of using assumptions that specifically represent future outcomes, stochastic projections use parameters that characterize the conditions underlying future events.

Based on Milliman's stochastic analysis, they determined and illustrated in their report the amount of assets necessary to have different percentage probabilities of meeting all program obligations, including administrative expenses based on capital market assumptions, adjusted to result in a median return of 6.25 percent, as set by Virginia529. For example, Milliman indicates that the amount of assets necessary to have a 50 percent probability of meeting all program obligations, including administrative expenses, associated with contracts issued as of June 30, 2016, is $2,035.6 million. In a similar manner, they indicate that the amount of assets necessary to have a 96 percent probability of meeting all program obligations, including administrative expenses, associated with contracts issued as of June 30, 2016, is $2,625.3 million, which is the actual Prepaid529 fund balance as of June 30, 2016.

The Board may consider also reviewing results based on the unadjusted capital market assumptions in order to assess the probability of the current assets meeting all program obligations.

SECTION L

ACTUARIAL PRINCIPLES AND PRACTICES EMPLOYED BY ACTUARY

ACTUARIAL PRINCIPLES AND PRACTICES EMPLOYED BY ACTUARY

Actuarial Standards of Practice

Because no generally accepted standards of practice have evolved within the actuarial profession that specifically address prepaid tuition programs, we have referenced the ASOPs that are used for retirement systems for purposes of conducting this 2017 Quadrennial Actuarial Audit of the Prepaid529. We chose such standards because prepaid tuition programs, like retirement plans, generally provide for the payment of a benefit at a future date. These include the following Actuarial Standards of Practice:

- ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions;*
- ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*;
- ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*; and
- ASOP No. 44, *Selection and Use of Asset Valuation Methods for Pension Valuations*.

In general, we find that Milliman followed the appropriate ASOPs that are the most applicable for a prepaid tuition program.

Recommendations

We have no recommendations regarding the actuarial principles and practices employed by the actuary.

SECTION M

REASONABLENESS OF PRICING FOR ACTUARIALLY SOUND FUNDING

REASONABLENESS OF PRICING FOR ACTUARIALLY SOUND PRICING

Reasonableness of Pricing for Actuarially Sound Pricing

GRS performed a review of the 2016-2017 pricing analysis performed by Milliman. The pricing reserve (load) is calculated as part of the pricing analysis and is equal to the portion of the contract price in excess of the amount expected to be needed to pay all future tuition benefits and fees and expenses attributable to the contract. The purpose of the pricing load is to increase the actuarial reserve of the program. Based on Milliman's analysis, the average reserve in prices (load) contained in the Tier I (University) prices for 2016-2017 is 11.3 percent. Based on calculations performed by GRS using the same detailed expense assumptions and distribution by age and contract type of the 3,000 annual expected contracts to be sold (in addition to the assumptions from the June 30, 2016, actuarial valuation to calculate the present value of future tuition benefits), GRS calculated an average reserve in prices (load) of 11.8 percent. Therefore, we find that the calculation of the pricing load of 11.3 percent performed by Milliman is reasonable.

Based on the lump sum prices and an installment interest rate of 6.50 percent, GRS calculated extended payment amounts that were $1 higher than those shown in the pricing analysis. However, when using the investment return assumption of 6.25 percent, GRS was able to exactly match the extended payment amounts. GRS recommends that Milliman review the extended payment amounts to confirm the interest rate that is used and make updates as needed.

Consistent with the recommendation from the 2013 Audit, we recommend that Milliman provide additional disclosure on the pricing including:

- Expenses or adjustments included in the present value of obligations (used to calculate the pricing reserve/load)
  - One time fees
    - $25 enrollment fee
    - $242 fee per semester purchased
  - Ongoing fees
    - $57.25 annual maintenance fee (assumed to increase annually by 3%)
    - $25.35 payout fee (assumed to increase annually by 3%)
  - Payment processing fee of $1 per payment

The additional disclosure will provide further transparency and disclosure by Virginia529 to prospective contract purchasers.

Consistent with the recommendation from the 2013 Audit, we recommend that Virginia529 consider providing additional disclosure on the Prepaid529 contract prices including:

- Pricing reserve/load included in contract prices
- Assumptions used to develop pricing load including administrative expense assumptions

REASONABLENESS OF PRICING FOR ACTUARIALLY SOUND PRICING

Based on the current funding level (129 percent funded with a 96 percent probability of the Prepaid529 funds exceeding obligations), there is a very low probability that any additional reserve from future contracts would be needed to pay tuition benefits for current contract beneficiaries. Therefore, the current average pricing load of about 11 percent on contract prices could be considered to be conservative. Because new contract sales are typically the only funding source for a prepaid program if there is adverse experience, we believe that the pricing methodology is actuarially sound. However, based on the funding level of the program and the assumptions that are used in the development of the pricing load (which contain a reasonable level of conservatism), we believe VA529 could decrease the pricing load.

Following are some considerations in setting contract prices and the resulting average pricing load:

- Equity between cohorts of contract holders who purchased in different years
  - Should prices ever decrease?
  - Should prices always increase by at least the increase in the WAT?
- Risk tolerance of the Board and Program
  - What probability of having sufficient assets to pay all tuition benefits should be reflected in the contract prices?

Recommendations

- Consistent with the recommendation from the 2013 Audit, we recommend that Virginia529 and Milliman consider providing additional disclosure of the components included in the Prepaid529 contract prices.
- We recommend that Virginia529 and Milliman consider reducing the pricing load.

SECTION N

IMPLICATIONS OF PROPOSED CHANGE IN BENEFIT STRUCTURE

IMPLICATIONS OF PROPOSED CHANGE IN BENEFIT STRUCTURE

Proposed Change in Benefit Structure

In its 2016 Sustainability Study dated October 1, 2016, Virginia529 provides the history of the Prepaid529 program, discusses challenges facing the program, and lists options for consideration and recommendations for changes to the program. Virginia529 staff and Milliman have recommended implementing an enrollment-weighted average tuition (WAT) payout model for new contracts. Under this model, the Prepaid529 would change from the current arrangement of paying actual tuition and mandatory fees for contract beneficiaries attending Virginia public institutions and a different amount for contract beneficiaries attending Virginia private schools and out of state schools to instead paying the same amount (the WAT) no matter where the contract beneficiary attends college.

Virginia529 and Milliman have recommended keeping Prepaid529 open for new contract sales as opposed to closing it. We would not expect any adverse impact on the funded status or actuarial valuation of the current program as a result of implementing an enrollment-weighted average tuition (WAT) payout model for new contracts, assuming the following:

- Prepaid529 continues to operate as a single program with two different benefit structures;
- All program assets are invested together (allowing the program to maintain the current target asset allocation to support the current investment return assumption);
- Appropriate changes in assumptions and valuation methods are made to reflect the change to an enrollment-weighted average tuition (WAT) payout model for new contracts;
- Contract prices continue to contain a similar reserve/load (about 11% for the 2016-2017 prices); and
- The level of contract sales is maintained or increases from its current levels.

Recommendations

We recommend that prior to implementation of an enrollment-weighted average tuition (WAT) payout model for new contracts, a full actuarial study be performed with projections in order to understand the short and long-term implications of the change based on actuarial assumptions agreed upon by the actuary and Virginia529. GRS' preliminary review should not be considered a substitute for a full actuarial study.

SECTION O

COMMENTS AND CONSIDERATIONS FROM GRS FROM 2013 AUDIT

COMMENTS AND CONSIDERATIONS FROM GRS FROM 2013 AUDIT

Comments from GRS from 2013 Audit Report

The 2013 audit report contained several items that we recommended the Virginia529 consider. A summary of these considerations follows:

- If the Virginia529 wanted to increase the probability of realizing an average return that exceeds the assumed 6.75% rate of return, which would provide more conservatism to account for potential future adverse experience, we suggested reducing the assumption below 6.75%;
- We suggested that the Virginia529 consider adopting a graded schedule of tuition increases that starts out at 7.5 percent for the near term but grades down over time to a lower, more sustainable rate;
- We recommended that the Virginia529 review recent forfeiture experience and consider increasing the forfeiture assumption to better align with recent observed experience; and
- We recommended that the Virginia529 consider adding a small Bias Load to the Community College contracts to recognize that Prepaid529 contract beneficiaries on average are attending higher priced Community Colleges compared to all students enrolled in Community Colleges in Virginia.

This report also contained a series of relatively minor recommendations for the Virginia529 and Milliman. A summary of these recommendations follows:

- We recommended that the Virginia529 and Milliman provide additional disclosure on the development of the expense assumption in the actuarial valuation report so that the reasonableness of the expense assumption for only the Prepaid529 can be ascertained during future audits;
- We recommended that Milliman review its methodology for calculating the present value of future installment contract payments that include fractional amounts to ensure the correct expected amount is being valued; and
- We recommended that Milliman provide additional disclosure on all assumptions used to develop the 10 percent load on pricing to provide additional transparency.

Commentary on How/If the 2013 GRS Comments Were Addressed

Main Considerations

- Virginia529 made the following assumption changes which are consistent with GRS' comments from the 2013 audit
  - Decreased investment return assumption from 6.75 percent to 6.25 percent
  - Decreased the tuition increase assumption from 7.50 percent to an ultimate assumption of 6.50 percent (which is a lower, more sustainable rate)

COMMENTS AND CONSIDERATIONS FROM GRS FROM 2013 AUDIT

- Increased the assumed forfeiture rates from rates ranging from 0.02 percent to 0.10 percent to a flat rate of 0.50 percent (and cancellation/rollover rates once beneficiaries attain their assumed matriculation year)
- Increased the bias load from 0.0 percent to 1.0 percent for Community College contracts

Minor Considerations

There were no changes made with respect to the minor considerations that GRS had from the 2013 audit. However, Milliman did provide the following information:

- Disclosure in the actuarial valuation report that the expense assumptions were developed from a cost analysis by Virginia529 Plan staff; and
- Additional pricing assumptions for 2016 as requested by GRS for the 2017 audit.

SECTION P

VIRGINIA529 PREPAID529 PROGRAM RESPONSE

Mary G. Morris
Chief Executive Officer
Direct: 804-786-0832

June 23, 2017

Hal Greer
Director
Joint Legislative Audit and Review Commission
919 East Main Street, Suite 2101
SunTrust Building
Richmond, Virginia 23219

Re: 2017 Quadrennial Actuarial Audit of the Prepaid529 Program

Dear Mr. Greer:

Thank you for the opportunity to review and comment on the exposure draft of the *2017 Quadrennial Actuarial Audit of the Prepaid529 Program*. (the Audit) recently completed by Gabriel Roeder Smith and Company (GRS). The Virginia529 Prepaid529 program (Prepaid529) is one of three[1] qualified tuition programs (within the meaning of §529 of the Internal Revenue Code) administered by the Virginia College Savings Plan (Virginia529 or the Plan), an independent agency of the Commonwealth of Virginia, pursuant to its statutory authority under Title 23.1, Subtitle II, Chapter 7 of the Code of Virginia (Va. Code §§ 23.1-700 *et seq.*). Virginia529 also administers the new ABLEnow disability savings program pursuant to the same statutory authority.

The Audit consisted of a non-replication actuarial audit of the June 30, 2016 actuarial valuation of Prepaid529 as performed by Virginia529's actuary, Milliman, Incorporated (Milliman) and related actuarial policy and practices. We are pleased that GRS was able to (i) independently replicate key results, (ii) agree with Milliman's conclusion that Prepaid529 was actuarially sound, (iii) conclude that the actuarial valuation was conducted in accordance with generally accepted practices for actuaries, as well as the principles and practices prescribed by the Actuarial Standards Board, (iv) conclude the primary actuarial assumptions and methods were reasonable and (iv) conclude that the pricing methodology utilized by Milliman and Virginia529 was actuarially sound.

[1] CollegeWealth closed to new accounts in FY2017 and is no longer maintained as a stand-alone program; Invest529 offers an FDIC-Insured Portfolio to replace CollegeWealth.

We generally concur with the Report's findings and recommendations, outlined in the Executive Summary of Section A thereof and appreciate the findings and conclusions of the reasonableness of actuarial report conclusions contained in Section C thereof. Virginia529 will confer with Milliman on points raised in the Report for further consideration and determine appropriate ways to address in future reports the minor recommendations related to additional disclosure about certain assumptions and present value calculations. Virginia529 aims to provide full transparency and ample disclosure and welcomes suggestions to enhance each.

Although we concur generally with the Report's findings and recommendations, certain observations and considerations in the Report warrant additional comment and context, provided below.

Section M. Reasonableness of Pricing: Actuarial Reserve – Pricing Load. GRS recommended (page 38), based on Prepaid529's funded status (129 percent as of June 30, 2016), that Virginia529 consider reducing the pricing reserve on its contracts which they note is actuarially sound but "could be considered to be conservative.". In establishing the annual contract pricing, Virginia529's Board and Audit and Actuarial Committee historically have included a minor amount to maintain an actuarial reserve of about 10 percent. This reserve acts as a buffer to protect program assets against severe market fluctuations as well as significant and unforeseen increases in tuition and fees, by individual institutions and in the aggregate across Virginia's fifteen public institutions of higher education. Since its inception in the late 1990's, Prepaid529 has seen two historic capital markets downturns and single-year tuition increases as high as 22.1 percent. In each case, these events had considerable impact on Prepaid529's actuarial funded status. One of the primary reasons Prepaid529 remains well-funded today is that Virginia529's Board establishes contract prices based on sound and prudent assumptions that are reviewed and established annually. In addition, the Board retains an actuarial reserve and adopts prices absent speculation of future events and funded status. We embrace a conservative approach in the administration of Prepaid529 as that approach best protects current and future contract holders as well as the Commonwealth of Virginia which supports the Program with a statutory sum sufficient appropriation to ensure the Plan can meet its current obligations. The Plan remains sensitive to issues of price and the cost of Prepaid529 contracts. Maintaining the appropriate balance and assumptions and strategies to price Prepaid529 contracts as attractively as possible while meeting its responsibility to ensure the Plan is positioned to meet all future obligations without utilization of the statutory backup is always top of mind at the Plan.

Section I. Actuarial Valuation Methods: Asset Allocation. Although GRS had no recommendations regarding actuarial valuation methods, they suggested (page 28) that Virginia529 consider "an asset allocation that further reduces risk in order to maintain a surplus position if there is adverse future investment experience." Virginia529 employs a robust and professional process in the management of its investment portfolios and responsibilities and

annually reviews and considers the Prepaid529 asset allocation, projected long-term return assumption and projected volatility.

Pursuant to its historic practice (codified in the Code of Virginia in 2009), the Plan has an Investment Advisory Committee (IAC) which, per the statute is to "provide sophisticated, objective, and prudent investment advice and direction". The IAC operates under a Board approved Charter which outlines the duties and responsibilities of the IAC. Virginia529 also operates under Investment Policies and Guidelines for Prepaid529 approved by the Virginia529 Board.

The IAC annually reviews Prepaid529's asset allocation in connection with its review and recommendation of the long-term investment return assumption that is used in the actuarial valuation report and in contract pricing. In addition, Virginia529 periodically employs its actuary (Milliman) and investment consultant (Mercer Investment Consulting LLC) to conduct an in-depth asset-liability study to review Prepaid529's asset allocation and make recommendations as to any changes to Prepaid529's investment risk/return profile. The last such study was completed in the spring of 2016. The study included a review of the current asset allocation and five alternative portfolios, including one designed to de-risk the investment strategy. The de-risking strategy considered in 2016 would have resulted in a reduction to the actuarial expected return from 6.25 to 5.75 percent. The study's results demonstrated that the current asset allocation was largely efficient given its objectives and that none of the five alternative asset allocation scenarios produced clearly superior long-term results to the current allocation; the de-risking solution produced results that were clearly inferior to the other alternatives. Based on that study, Virginia529 confirmed its asset allocation in 2016 and does not contemplate changes to the asset allocation strategy in the short term. As discussed above, this is an ongoing process and the Plan always considers the interplay between projected volatility, or risk, and projected return.

Sections D and J. Contract Data: Assumptions re: Installment Payments Due. The Report addresses a limited number of Prepaid529 contracts which reflect remaining payments due and payable beyond projected enrollment years (page 9 and page 31 both address this scenario). The Report recommends that Milliman address and consider the underlying raw data with respect to such contracts. Virginia529 does not distribute any Program benefits until **all** payments have been made, so there is no monetary risk to Prepaid529 from contracts which appear for whatever reason to have payments due beyond the contract benefit payment date. The current presentation is conservative, consistent with the Plan's basic philosophy.

GRS recommends that Milliman consider changing its methodology to be consistent with the administration of the Program (e.g., assume that contract holders will accelerate remaining contract payments such that all payments are assumed to be made prior to the projected college enrollment year) and Milliman and Virginia529 agree to make that change in the valuation report for the year ended June 30, 2017.

Section H. Demographic Assumptions. The Report (pages 25-27) generally finds that the demographic assumptions are reasonable but contain some degree of conservatism. GRS recommends that Milliman review the assumptions related to (i) the rate at which contract beneficiaries are assumed to utilize contract benefits, (ii) the 5 percent assumption for rollovers/cancellations, and (iii) consistency of how contract payments were classified for purposes of developing the cancellation/rollover assumptions and the calculation of the bias load.

In the summer of 2014, when Virginia529 had sufficient historical distribution experience with Prepaid529, Milliman completed an experience study which examined Prepaid529 transactions over a ten-year period from July 2003 through June 2013. The purpose of the study was to evaluate actual transaction history to determine whether the assumptions used (other than the investment return and future tuition growth) should be revised based on actual experience. The assumptions tested included (i) contract cancellations and rollovers, including transfers to Invest529 that were primarily utilized to provide the maximum benefit to those students attending lower-priced Virginia public schools; (ii) the proportion of payouts going to Virginia universities and community colleges, Virginia private and out of state institutions; (iii) the year, relative to the expected matriculation year, in which benefits were first used; and (iv) the cost of payouts to Virginia universities and community colleges relative to enrollment-weighted average tuition. As a result of the experience study, the Board adopted several changes in the assumptions in August 2014, which were incorporated into the 2014 actuarial valuation report and the 2014-15 enrollment period contract pricing, reflecting the demographic assumptions noted by GRS. Milliman and Virginia529 continue to evaluate these assumptions on an annual basis and plan to conduct another experience study in the future. The Plan is satisfied currently with the demographic assumptions and general conservative approach.

Section N. Proposed Changes to Benefit Structure. The Report in Section N opined that, with certain stated assumptions, it expected no adverse impact on the funded status or actuarial valuation of the current program as a result of any proposed or potential changes in the benefit structure for new contracts. To provide context for this section of the Report, in late 2015, the Virginia529 Board authorized a study, to be completed in 2016, to examine the future long-term sustainability of Prepaid529, considering a variety of options, including:

i. Maintain the current program unchanged;
ii. Maintain the status quo but with minimal modifications (e.g., single-price model; single-tier pricing);
iii. Close the current program to new enrollment and manage existing contracts through depletion;
iv. Consider a new structure, such as weighted average tuition payout program for new contracts; and/or

v. Consider a new structure that includes risk sharing among Virginia529 and Virginia public higher education institutions for new contracts (Florida, Texas and Private College 529 provide possible templates for this model).

In October 2016, after review of the Prepaid529 study, the Virginia529 Board authorized staff to explore the development of changes to Prepaid529, specifically to develop a benefit model for new contracts based on enrollment-weighted average tuition (WAT) for Virginia public institutions of higher education. In addition, the Board authorized offering a single tier contract during the 2016-2017 enrollment period. Existing, outstanding Prepaid529 contracts would be unaffected by any benefit model changes. During FY2017, Virginia529 and Milliman have worked to develop the potential new program structure and are providing periodic progress reports to the Virginia529 Board.

No decisions have been made with respect to moving forward with the new benefit model and staff currently are meeting with stakeholders in higher education and the legislative and executive branches to discuss the proposed model, which would require changes to the Virginia529 enabling legislation prior to implementation. GRS recommended that prior to implementation of a new benefit model a full actuarial study be performed. Virginia529 has employed Milliman in the development of the new model and Milliman has developed projections to understand the short and long-term implications of proposed changes in the benefit model.

We again express our appreciation to the actuaries at GRS and the JLARC staff for the professional, courteous and cooperative manner in which they conducted their work during the course of the audit.

Sincerely,

Mary G. Morris

c: Members, Virginia529 Board
Kimberly Sarte, JLARC
Joe McMahon, JLARC