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Fidelity Brokerage Services LLC., SIPC 900 Salem Street, Smithfield, RI 02917

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This overview provides information about the major municipal borrowers in the State of Connecticut and the Commonwealth of Massachusetts and their bond programs. The borrowers described in this guide include some of the most established and recognized issuers in the municipal market, as well as issuers of bonds under programs that have been established more recently. They reflect the largest and most active issuers in the two states, and encompass various types of debt. In many cases, a single borrower may issue debt under multiple programs that are each repaid with a different revenue source; most of the significant active bond programs are covered for these borrowers. While underlying ratings are shown, individual series or maturities within each of the bond programs may be insured and may not have underlying ratings.

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Introduction

This introduction is intended to provide an overview of the long-term economic and fiscal developments taking place in the State of Connecticut and in the Commonwealth Massachusetts. Several factors are weighed and counterbalanced when determining these long-term trends. In terms of the economy, unemployment, job creation, and industry diversity are considered. Trends in the tax base are examined by looking at per capita income, tax burden, and shifts in adjusted gross income into and out of the two states. Finally, trends in the states’ fiscal positions are presented in terms of liabilities and reserves.

Of the 50 state economies, Connecticut and Massachusetts rank 1st and 2nd largest, respectively, as measured by per capita personal income from all industries. While both state economies have seen earnings from the finance and insurance industry contribute to a larger than average share of the total, Massachusetts has been more successful at diversifying its economy away from this historically more volatile sector. In 2017, 13% of Connecticut’s personal income came from the finance and insurance sector, which compared to 9% in Massachusetts and 7% nationally. The measure of the states’ overall economic diversity may be derived using the Hachman Index. This is an index of similarity that measures how closely industry earnings of the subject region (Connecticut or Massachusetts) resembles that of the reference region (United States). The value of the index is between zero and one. As the value of the index approaches one, this means that the subject region’s employment distribution among industries is more similar to that of the reference region. If the reference region is the nation, and, given the assumption that the nation’s economy is diversified, a larger Hachman Index value means that a subject region is more diversified (and therefore less specialized). In 2017, Connecticut had a Hachman Index value of 0.89 and Massachusetts had a value of 0.89, indicating that both states were near the middle of the distribution, which is described by a median of 0.89 for all states. Both states have experienced a decline in the share of income earned from the manufacturing sector since the 1950s. However, Connecticut’s economy began becoming more reliant on income from the finance and insurance sector in the 1990s, with that sector representing 19% of total personal income at the peak in 2010. Massachusetts’ personal income from that sector peaked the same year at 13%. While both states have retained sizable manufacturing industries, more generally, service industries have displaced manufacturing as the drivers of personal income growth, although more so in Massachusetts than in Connecticut. The finance and insurance and the manufacturing sectors were the largest in terms of personal income in Connecticut, while professional services and healthcare were the largest in Massachusetts.

The charts on the following page illustrate the trends in the states’ economic diversity (Hachman Index), and in the four largest private sector industries in terms of personal income in 2017.
Introduction

State of Connecticut Economic Diversity and % of Personal Income Derived from Top 4 Private Sector Industries

Commonwealth of Massachusetts Economic Diversity and % of Personal Income Derived from Top 4 Private Sector Industries

Source: Bureau of Economic Analysis, Bureau of Labor Statistics, Fidelity Capital Markets; May 30, 2018
Connecticut maintained a lower unemployment rate than Massachusetts on average from the mid-1970s until 2008. There were periods during economic expansions in which Massachusetts outperformed, but these periods were short-lived. During national economic recessions in particular, Massachusetts’ unemployment rate increased at a faster pace than Connecticut’s. However, since the recovery that began in 2009, Massachusetts’s unemployment rate has remained lower – a stretch of time not seen in the relative unemployment rates for the two states in the prior 40 years. This development may indicate that structural changes in certain private employment sectors have occurred between the two states since 2008.

Another measure of employment health comes from the Census Bureau's Longitudinal Business Database (LBD), which contains the results of a census of business establishments and firms in the U.S. The census includes measures of establishment openings and closings, firm startups, job creation and destruction by firm size, age, and industrial sector, and several other statistics on business dynamics. One such measure is the net job creation rate, which takes into account gross job creation and gross job destruction figures within a year’s period, in order to find net job creation rates among businesses of all sizes within each state. Like all aggregate economic statistics, the net job creation rate is not without its flaws, as it fails to capture the quality of jobs being destroyed and created. However, it may be useful in assessing the general trend of business dynamism within a state. The net job creation rates for Connecticut and Massachusetts averaged 0.63% and 0.76%, respectively, in the 21-year period ending 2007. However, from 2009 through the most current year of the survey (2015), Connecticut’s annual average net job creation rate dropped to approximately zero, while the annual average rate for Massachusetts remained at its long-term average.

The unemployment rate and net job creation statistics indicate that Massachusetts has maintained a more dynamic business climate, one that has enabled the state to better adjust to changes taking place in the broader economy, and one that may be better suited to taking advantage of any structural labor market changes that have taken place since 2008.

The charts on the following page illustrate the trend in the states’ unemployment and net job creation rates.
Introduction

Connecticut and Massachusetts are wealthy states, having ranked first and second highest in per capita personal income (PCPI) in 2017, respectively. Both states have experienced upward sloping trends in PCPI when compared to the nation. In 2017, Connecticut’s PCPI was 139% of the U.S., up from 117% in 1977, while Massachusetts’ PCPI as a percent of the nation increased to 131% from 103% over the same period. Massachusetts has been rapidly closing the gap with Connecticut since 2009, ending 2017 with an 8 percentage point difference, or the narrowest difference since at least 1977.

While the two states ranked highest in PCPI, their state personal tax burdens were closer to the national average. The state personal tax burden is calculated by taking total state tax revenue excluding corporate income and severance taxes divided by total state personal income excluding federal transfer receipts. Importantly, the state personal tax burden does not include local taxes such as property taxes, which if included could place the two states above the national average. Connecticut residents were subject to a 7.1% state personal tax burden and Massachusetts residents to a 7.7% rate; the median for U.S. states was 7.6%. Since the late 1970s Massachusetts’s state personal tax burden has generally declined along with that of the national median, with the gap narrowing significantly in the 2000s. Connecticut’s state personal tax burden has fluctuated to a greater extent, but has tended to return to its long-term average of 8.0% over time.

Higher living costs and changing demographics in the two states may be pressuring their tax bases, which have exhibited outmigration in terms of shifts in adjusted gross income (AGI). Looking solely at changes in a state’s population may provide limited value in this regard because it does not directly measure changes in the tax base. Rather, the migration of AGI between and among the states provides a more accurate measure of the trend in a state’s tax base. The Statistics of Income Division of the IRS maintains records of all individual income tax forms filed in each year, including the state of residence of the filers. The data used to produce the migration statistics come from individual income tax returns and represent between 95% and 98% of total annual filings. One gauge of the degree of movement in a state’s tax base is the extent to which it is on the sending or receiving end of AGI migration. The net dollar flow of AGI between Connecticut and Massachusetts and other states, as well as the number of inflows received from and outflows sent to every other state, provide a good indication of how the two states’ tax bases are changing. Since the 1992-1993 period, growth in the tax base for Massachusetts has kept the net dollar flow of AGI within a range of -0.2% and -1.0% of the tax base. For the most recent 2015-2016 period the net dollar flow of AGI as a percent of the tax base for Massachusetts was -0.5%, close to its long-term average of -0.4%. For Connecticut, the most recent figure was -1.7%, which represented the largest outflow both in absolute terms as well as in relation to the tax base. Additionally, for the most recent 2015-2016 period the states lost part of their tax bases to 45 and 32 other states, respectively – meaning that Connecticut had a net inflow from only 5 states, and Massachusetts was more evenly balanced with a net inflow from 18. The charts on the following pages illustrate the trend in the states’ per capita personal income, state personal tax burden, and tax base.
Introduction

State of Connecticut and Commonwealth of Massachusetts
Tax Burden

Source: Tax Foundation, Fidelity Capital Markets; May 30, 2018

State of Connecticut and Commonwealth of Massachusetts
Per Capita Personal Income as a % of U.S.

Source: Bureau of Economic Analysis, Fidelity Capital Markets; May 30, 2018
Source: IRS, Fidelity Capital Markets; May 30, 2018
Connecticut’s and Massachusetts’ wealthy tax bases have enabled the states to support large debt burdens. Total net tax supported debt (NTSD) of $23.3 billion in Connecticut and $40.7 billion in Massachusetts rank them 6th and 3rd highest among states, respectively. At 9.7% and 9.8% of personal income their NTSDs rank 3rd and 2nd, respectively, and significantly above the 2.5% U.S. state median. Part of the explanation for their high debt levels may be attributed to the financing of projects that in other states are financed at the local level. Nevertheless, their debt burdens are high, and when unfunded pension system liabilities are factored in, both states fair even worse relative to their peers. Connecticut reported an unfunded pension system liability of $37.4 billion, which was 39% funded as of June 30, 2016, the most recent valuation date. Massachusetts reported an unfunded pension system liability of $35.7 billion, which was 59% funded as of June 30, 2017. Neither state has a history of maintaining strong pension funding levels, although both have enacted recent reforms despite the fact that material near-term progress is not expected. Going forward, both states have committed to fully funding their actuarially required contribution (ARC) amounts. Most states do not annually set aside 100% of their other post employment benefits (OPEB) ARC, and Connecticut and Massachusetts are not different in this respect. Both states have incurred substantial OPEB commitments, with Connecticut’s most recent unfunded liability at $21.9 billion and Massachusetts’ at $19.4 billion.

One measure of a state’s financial flexibility is its unrestricted reserves and rainy day fund balances. At fiscal year end 2017, Connecticut had unrestricted reserves in its general fund of negative $821 million, and a committed rainy day fund balance of $213 million; the combined balance equated to negative 3.5% of general fund expenditures. Massachusetts had unrestricted reserves in its general fund of $939 million, and a committed rainy day fund balance of $1.3 billion, resulting in a combined balance of 6.1% of general fund expenditures. While Massachusetts has consistently maintained positive reserve balances, growth in the Commonwealth’s budget has resulted in declining reserves as a percentage of spending.

The charts on the following page illustrate the trend in the states’ NTSDs and reserve levels.
Introduction

State of Connecticut and Commonwealth of Massachusetts
Net Tax-Supported Debt as a % of Personal Income

Source: Moody’s, Fidelity Capital Markets; May 30, 2018

State of Connecticut and Commonwealth of Massachusetts
General Fund and Rainy Day Reserves as a % of Expenditures

Source: State comprehensive annual financial reports, Fidelity Capital Markets; May 30, 2018
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State of Connecticut

General Obligation Bonds

Moody’s A1  S&P A  Fitch A+

Purpose

- Bond proceeds were used for various capital improvement projects.

Bonds Outstanding

- $18.4 billion as of June 30, 2017

Security

- The bonds are secured by the full faith and credit of the State of Connecticut.

- The State general obligation bond procedure act pursuant to which the bonds are issued further provides the appropriation of all necessary amounts for the punctual payment of principal and interest.

All Governmental Funds
Revenues for the FY Ending
June 30, 2016 (In Millions)
$28,026.36

- Taxes 7%
- Federal Grants 4%
- Lottery, Casino Gaming & Tobacco Settlement 3%
- Charges for Services, Licenses, Permits, Fees & Fines 29%
- Other 57%

All Governmental Funds
Expenditures for the FY Ending
June 30, 2016 (In Millions)
$28,820.90

- General Government 40%
- Health & Human Services 17%
- Transportation 11%
- Education 7%
- Legislative, Judicial & Corrections 7%
- Debt Service 7%
- Public Safety 5%
- Capital Outlay, Development & Conservation 3%

June 30, 2017
State of Connecticut

State Revolving Fund (Clean Water Fund)
General Revenue Bonds

Moody’s Aaa  S&P AAA  Fitch AAA

Purpose

- Bond proceeds were used to provide a source of low interest loans and other types of financial assistance to local entities for the construction, rehabilitation, expansion or improvement of wastewater treatment or drinking water facilities.

- The loans provided were either at heavily discounted interest rates or the State paid for a portion of the project and the remaining loan was at a low interest rate.

Security

- The bonds are secured by all available funds of the program, which are derived from borrower loan repayments and program equity, as well as interest earnings and support funds.

- Each borrower must deliver a Borrower Obligation which provides for the repayment of the principal and interest on the loan. The Borrower Obligation is either a general obligation or a revenue obligation of each participant.

Bonds Outstanding

- $852 million as of June 30, 2017

Anticipated Borrowings

- None
Special Tax Obligation Bonds

Moody’s A1 S&P AA  Fitch A+

Purpose

- Bond proceeds were used to fund the Infrastructure Program, which was established in 1984. The program finances the ongoing requirements of all aspects of the State highways and bridges, interstate highway system projects, waterway facilities, mass transportation and transit facilities, aeronautic facilities, maintenance garages, and highway safety programs.

Security

- The Bonds are special obligations of the State payable solely from Pledged Revenues and other moneys pledged including investment earnings. Pledged Revenues consist of motor fuels tax; motor vehicle receipts; motor vehicle related licenses; permits and fees; oil companies tax payments; sales tax related to DMV payments; motor vehicle fines and other items. The Pledged Revenues are credited to the Special Transportation Fund.

- The obligation of the State to pay the Debt Service Requirement of the senior Bonds will be further secured by a Gross Pledge and a lien upon certain amounts held in the Special Transportation Fund.

- The second lien Bonds are secured by a second lien on Pledged Revenues and amounts held in the Special Transportation Fund.

- The Debt Service Reserve Fund Requirement for the senior Bonds is equal to MADS.

- The Debt Service Reserve Fund Requirement for the second lien Bonds is equal to MADS on the senior and second lien Bonds less the amount on deposit in the Senior Debt Service Reserve Fund.

Bonds Outstanding

- $5.0 billion as of June 30, 2017

Debt Service Reserve Fund

- The Debt Service Reserve Fund Requirement for the senior bonds is equal to MADS.

- The Debt Service Reserve Fund Requirement for the second lien Bonds is equal to MADS on the senior and second lien Bonds less the amount on deposit in the Senior Debt Service Reserve Fund.

- Remaining Fund resources, subject to appropriation, may be applied to debt service on the State’s GO bonds issued for transportation purposes and to the payment of State budget appropriations for the Department, the DMV and the Department of Public Safety.
Special Tax Obligation Bonds (cont.)

Moody’s A1 S&P AA  Fitch A+

**Rate Covenant**
- The State covenants to provide Pledged Revenues in each fiscal year, after deducting payments for required reserves under the Senior Indenture, in an amount equal to at least 2x the aggregate principal and interest requirements on all senior Bonds outstanding and interest on senior notes. As long as second lien Bonds are outstanding, the Pledged Revenue Coverage Requirement must include coverage for all bonds outstanding.

- The State is obligated pursuant to the Second Lien Indenture to provide Pledged Revenues, in each fiscal year, after deducting payments for required reserves, in an amount equal to at least 2x the aggregate principal and interest requirements on all bonds outstanding.

**Additional Bonds Test**
- Additional senior Bonds may be issued if certain conditions are met including that Pledged Revenues for any 12 month period in the preceding 18 months must equal at least 2x the aggregate principal and interest requirements on senior Bonds and interest requirements on senior notes.

- Additional second lien Bonds may be issued if certain conditions are met including that Pledged Revenues for any 12 month period in the preceding 18 months must equal at least 2x the aggregate principal and interest requirements on all Bonds outstanding and additional Bonds.

- The Second Lien Indenture provides that the State may not issue senior Bonds unless the coverage test described above is met for all outstanding Bonds and notes.

**Anticipated Borrowings**
- $800 million annually through fiscal year 2020.

- As long as the second lien Bonds are outstanding, the State has covenanted not to issue senior short-term notes.
City of Hartford, CT

General Obligation Bonds

Moody’s A2  S&P A  Fitch NR

Purpose

- Bond proceeds were used to finance construction at magnet and public school facilities and police and fire complexes, as well as for various infrastructure improvements.

Bonds Outstanding

- $601 million as of June 30, 2017

Additional Bonds Test

- Under Connecticut law, municipalities can not incur indebtedness through the issuance of general obligation bonds that will cause aggregate indebtedness by class to exceed the following:
  - General Purpose: 2.25x annual receipts from taxation.
  - School Purpose: 4.50x annual receipts from taxation.
  - Sewer Purpose: 3.75x annual receipts from taxation.
  - Urban Renewal Purpose: 3.25x annual receipts from taxation.
  - Pension Deficit Funding: 3.00x annual receipts from taxation.
- In no case shall total indebtedness exceed seven times annual receipts from taxation.

Security

- The bonds are general obligations and are secured by the full faith and credit of the City of Hartford.
- Public Act 17-2, authorizes the OPM Secretary and state treasurer to enter into contract with Tier III and Tier IV municipalities to provide them with financial assistance. A contract between the state and Hartford pursuant to this authorization was effectuated March 29. Contract assistance is limited to annual debt service on bonds outstanding as of the contract date or refunding bonds. The contract provides for the state to make direct payments to the city, trustee, paying agent or bondholder. The contract constitutes a full faith and credit obligation of the state.

Anticipated Borrowings

- None specified
## Yale University Bonds

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proceeds were used for general University purposes, providing flexible</td>
<td>The bonds are an unsecured general obligation of the University.</td>
</tr>
<tr>
<td>cash resources to the University. Proceeds were also used for financing</td>
<td></td>
</tr>
<tr>
<td>a variety of capital projects and refunding outstanding bonds.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bonds Outstanding</th>
<th>Anticipated Borrowings</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2.8 billion as of June 30, 2017</td>
<td>None anticipated.</td>
</tr>
</tbody>
</table>
Yale-New Haven Hospital Revenue Bonds

Moody’s Aa3  S&P AA-  Fitch AA-

Purpose

- The Yale-New Haven hospital, (“Hospital”) is located in New Haven, CT and is currently licensed for 966 beds. The Hospital and Yale University have entered into an agreement in which the Hospital acts as the primary teaching hospital for the Yale University School of Medicine. Bond proceeds were used to fund various capital expenditures.

Security

- The obligation is secured by the Hospital’s pledge of Gross Receipts, which are defined as all receipts, revenues, income and other moneys received by or on behalf of the Hospital.

- The Hospital covenants that it will not create any lien upon the Hospital’s property unless permitted under the bond Indenture.

Bonds Outstanding

- $819 million as of September 30, 2017

Debt Service Reserve Fund

- None

Anticipated Borrowings

- None specified
Yale-New Haven Hospital Bonds (cont.)

**Rate Covenant**

- The Hospital must maintain a Long-Term Debt Service Coverage Ratio, Income Available for Debt Service to MADS, of at least 1.25x unless the Authority and credit facility provider agree on a lower amount.

**Additional Bonds Test**

- Parity bonds are permitted in the event that for long-term indebtedness the total principal amount of debt can not exceed 15% of the Hospital's operating revenues.

- For long-term indebtedness incurred for the purpose of refunding, such refunding can not increase MADS by more than 10%.

- In addition, second lien bonds are permitted.
Fairfield University Bonds

Moody’s A3  S&P A-  Fitch NR

Purpose
- Fairfield University is an independent, co-educational institution of higher education. Bond proceeds were used to refund existing bonds, to fund the Debt Service Reserve account, and to fund various capital improvement projects.

Security
- The obligation to repay the loan is an unsecured general obligation of the University.
- While the bonds are not secured by a mortgage, the University covenants not to create any mortgage, lien, or security interest on its property, without the prior written consent of the Authority.

Bonds Outstanding
- $240 million as of June 30, 2017

Debt Service Reserve Fund
- The Debt Service Reserve Fund must equal the lesser of (i) 10% of the then-outstanding principal; (ii) MADS or (iii) 125% of the Average Annual Debt Service.

Anticipated Borrowing
- None specified
Fairfield University Bonds (cont.)

<table>
<thead>
<tr>
<th>Rate Covenant</th>
</tr>
</thead>
<tbody>
<tr>
<td>The University agrees to maintain a Long-Term Debt Service Coverage Ratio, Income Available for Debt Service to MADS, of at least 1.25x.</td>
</tr>
<tr>
<td>The University covenants to maintain its tuition and other charges to provide Operating Revenues sufficient to cover all operating expenses, debt service on the bonds, and all other obligations of the University.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Bonds Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional bonds are permitted if certain conditions are met, such as:</td>
</tr>
<tr>
<td>(i) for long-term indebtedness the principal amount of long-term debt will not exceed 15% of the Operating Revenues and the Long-Term Debt Service Coverage Ratio will be maintained at a minimum of 1.25x, and</td>
</tr>
<tr>
<td>(ii) if the bonds are issued for the purpose of refunding, MADS can not be increased by more than 10%.</td>
</tr>
</tbody>
</table>

Moody’s A3  S&P A-  Fitch NR
Quinnipiac University Bonds

Purpose

- Quinnipiac University (the "Institution") is a private, coeducational institution of higher education with its main campus located in Hamden, CT. Bond proceeds were used for various capital improvement projects on the University’s three campuses.

Bonds Outstanding

- $450 million as of June 30, 2017

Debt Service Reserve Fund

- The Debt Service Reserve Fund is not required to be funded as long as the Bond Insurer consents. Currently none of the outstanding bonds have a Debt Service Reserve Fund.

- When the Debt Service Reserve Fund is required, the amount deposited must equal the lesser of (i) 10% of the then-outstanding principal, (ii) MADS, or (iii) 125% of the Average Annual Debt Service.

Security

- The bonds are secured by a mortgage granted to the Authority on the Institution’s main campus. The mortgage is an absolute, unconditional, and general obligation of the Institution. In addition, there are restrictions on the creation or imposition of liens.

Anticipated Borrowing

- None specified
Quinnipiac University Bonds (cont.)

Rate Covenant
- The Institution agrees to maintain a Long-Term Debt Service Coverage Ratio, Income Available for Debt Service to MADS, of at least 1.25x.
- The Institution covenants to set tuition and other fees so that together with its general funds will provide revenue sufficient to cover all obligations of the Institution including operating expenses and debt service.

Additional Bonds Test
- Additional bonds are permitted if certain conditions are met, such as:
  (i) for long-term indebtedness the principal amount of long-term debt will not exceed 15% of the Operating Revenues and the Long-Term Debt Service Coverage Ratio will be maintained at a minimum of 1.25x, and
  (ii) the Net Revenues Available for Debt Service in each of the two prior fiscal years must exceed 125% of the maximum total principal and interest requirements or the sum of Expendable Fund Balances and the Endowment Fund must equal at least 75% of the Institution’s total outstanding debt, including the additional issuance.
Housing Mortgage Finance Program Bonds

Moody’s Aaa  S&P AAA  Fitch NR

Purpose

- The Authority was created for the purpose of increasing the supply of and assisting in the purchase, development, and construction of housing for low and moderate income families and persons throughout the state.

- Bond proceeds were used to finance single family mortgage loans throughout the state, to refund outstanding bonds, and to fund the Housing Mortgage Capital Reserve Fund.

Security

- The bonds are general obligations of the Authority.

- The bonds are secured by the revenues and assets which consist primarily of interest in first lien mortgages, investments and reserves held with the Trustee, and all funds available to the Authority on behalf of the Housing Mortgage Finance Program.

Bonds Outstanding

- $4.0 billion as of December 31, 2017

Anticipated Borrowings

- On average, the Authority issues $125 million in bonds approximately 4 times a year to finance single family mortgage loans. However, none specified.
South Central CT Regional Water Authority

Water System Revenue Bonds

Moody’s Aa3  S&P AA-  Fitch NR

Purpose

- The Authority owns and operates an extensive water supply and distribution system which serves customers in fifteen municipalities and owns land in five additional municipalities within the District. Bond proceeds were used to acquire utilities, fund a variety of system improvements and to finance necessary deposits into certain other funds.

Security

- The bonds are secured by a pledge of net revenues as well as all moneys and securities in all the funds established by the bond resolution. Revenues include income derived from the payment of rates and charges for water service and investments in the funds other than the Construction Fund. Revenues do not include, however, government grants and contributions for capital improvements. The payment of debt service has priority over any claim from Payments-in-lieu-of-Taxes (PILOT). PILOTs are required to be paid to municipalities in which the Authority owns property.

Bonds Outstanding

- $544 million as of May 31, 2017

Debt Service Reserve Fund

- The Debt Service Reserve Fund must equal the lesser of (i) MADS (ii) 10% of the stated principal amount, or (iii) 125% of the Average Annual Principal and Interest Requirements.

Anticipated Borrowing

- None specified
Water System Revenue Bonds (cont.)

Rate Covenant

- The Authority has covenanted to set rates for the Water System at levels sufficient to produce the greater of: (i) revenues that will equal at least all expenses, PILOTS, debt service requirements, and any other obligation of the Water System, (2) Net Revenues that will equal at least 110% of debt service, or (3) Net Revenues prior to PILOT payments that will equal at least 125% of debt service.

Additional Bonds Test

- Additional bonds are permitted to be issued on parity with the existing outstanding bonds as long as such bonds do not exceed $10 million or 10% of the aggregate amount of bonds outstanding unless they are being issued for refunding or completion purposes. In addition, (i) Revenues during any twelve consecutive month period out of the preceding 18 months can not be less than 100% of all expenses and obligations (ii) Net Revenues can not be less than 110% of MADS and (iii) Net Revenues plus PILOT payments must equal at least 125% of MADS.
General Obligation Bonds

Moody’s Aa3  S&P AA  Fitch NR

Purpose

- This District provides water supply, sewer collection, treatment and disposal services to its eight member communities including Bloomfield, East Hartford, Hartford, Newington, Rocky Hill, West Hartford, Wethersfield, and Windsor. The District also has special agreements for water supply and sewage disposal facilities with 10 non-member towns and various state facilities. Bond proceeds provide funding for various public improvement projects.

Bonds Outstanding

- $503 million as of December 31, 2016

Security

- The bonds are general obligations of the District and secured by the District’s authority to levy unlimited taxes on the eight member municipalities.

Anticipated Borrowing

- None specified.

Debt Service Reserve Fund

- None.
Hartford County Metropolitan District

Clean Water Project Revenue Bonds

Moody’s Aa2  S&P AA-  Fitch NR

Purpose

- The District developed the Clean Water Project (CWP) in order to address a consent decree with the State Department of Environmental Protection, Department of Justice and US Environmental Protection Agency by 2029. The District implemented the Clean Water Project Charge (formerly Special Sewer Service Surcharge) in fiscal 2008 in anticipation of issuing debt specifically for the CWP.

Security

- The bonds are secured by a gross revenue pledge of the District's dedicated Clean Water Project Charge revenues, including transfers from the Rate Stabilization Fund. The charge is applied to the water bill of property owners that utilize any of the District’s services for sewage collection, treatment, and disposal. The District has the legal authority to raise the charge without limitation.

Bonds Outstanding

- $217 million as of December 31, 2016

Debt Service Reserve Fund

- None.

Anticipated Borrowing

- The estimated cost of the CWP is $2.4 billion. District voters approved two $800 million referendums (in 2006 and 2012) for the CWP, and another $800 million referendum is expected to go to voters sometime in 2020-2023. The District plans to fund remaining CWP costs through state revolving fund loans, state and federal grants, and, to a lesser extent, revenue bonds.
Hartford County Metropolitan District

Clean Water Project Revenue Bonds (cont.)

Moody’s Aa2  S&P AA-  Fitch NR

Rate Covenant
- The District has covenanted to set the Clean Water Project Charge sufficient to produce gross revenues equal to at least 120% of debt service. After debt service on the bonds is paid, residual revenues are deposited in the Rate Stabilization Fund where they are legally available to pay debt service on any debt issued to fund the CWP as well as capital expenses for the CWP. The District can make transfers from the Rate Stabilization Fund to pay debt service in any period of up to 35% of debt service on the bonds; these transfers can be included as revenue to meet the rate covenant. Clean Water Project Charge revenues and transfers from the Rate Stabilization Fund to pay debt service are together referred to as Pledged Revenues.

Additional Bonds Test
- Additional bonds are permitted to be issued on parity with the existing outstanding bonds as long as Pledged Revenues during either of the two prior fiscal years are equal to at least 120% of aggregate annual debt service on all outstanding bonds for such fiscal year. Pledged Revenues may be adjusted to reflect any subsequently adopted increases in the Clean Water Project Charge as if such charges had been in effect from the beginning of such fiscal year.
General Obligation Bonds

Moody’s A1  S&P AA-  Fitch A

Purpose

- Bond proceeds were used to fund the UCONN 2000 program which is an infrastructure improvement program for the University. The program’s purpose is to modernize, rehabilitate and expand the physical plant of the University.

Bonds Outstanding

- $1.7 billion as of May 31, 2018

Security

- The bonds are general obligations of the University of which the University’s full faith and credit are pledged.
- To date, all of the general obligation bonds are additionally secured by the pledge of and a lien upon the State Debt Service Commitment, which is a commitment by the State to appropriate an annual amount for the punctual payment of Special Debt Service Requirements on securities issued as general obligations of the University. The University can issue bonds without the state commitment, but has not done so.

Anticipated Borrowing

- $200 million annually in fiscal years 2018 and 2019.
General Obligation Bonds (cont.)

Moody’s A1  S&P AA-  Fitch A

Security, cont.

- Bonds are payable from all Assured Revenues which include fees, tuition, grants and gifts, annual State appropriations for operating expenses and the annual amounts of the State Debt Service Commitment. Currently the bonds with such security are limited to $2.2 billion exclusive of any amounts for refunding purposes.

- The State commits to appropriate annually an amount for operations of the University, after consideration of other amounts available for operations, which will allow the University to continue to operate pursuant to the provisions of the Constitution of the State.

Rate Covenant

- The University covenants to set tuition and other charges, such that revenues, when added to other Assured Revenues, shall be sufficient to permit the University to operate and maintain itself and to cover the Special Debt Service Requirements on outstanding bonds.
The Commonwealth of Massachusetts

General Obligation Bonds

Moody’s Aa1  S&P AA  Fitch AA+

Purpose
- Bond proceeds were used to finance capital projects of the Commonwealth and to refund certain bonds.

Bonds Outstanding
- $24.2 billion as of June 30, 2017

Security
- The bonds are secured by the full faith and credit of the Commonwealth of Massachusetts. However, Massachusetts’ General Laws impose a limit on state tax revenue growth. The limitation for each fiscal year is equal to the average positive rate of growth in total wages and salaries during the three preceding calendar years. In addition, the law provides that no more than 10% of the total appropriations in any fiscal year may be expended for payment of principal and interest on general obligation debt.

Anticipated Borrowings
- $2.3 billion in fiscal years 2019-2023.
General Obligation Bonds (cont.)

All Governmental Funds Revenues for FY Ending June 30, 2017 (In Millions) $53,391.29

- 49% Federal Grants
- 29% Taxes
- 18% Assessments
- 2% Other

All Governmental Funds Expenditures for FY Ending June 30, 2017 (In Millions) $58,593.23

- 44% Education
- 17% Healthcare
- 13% Local Aid & Capital Outlay
- 11% Public Safety
- 6% Debt Service
- 3% Transportation
- 2% Other

Source: Commonwealth of Massachusetts Comprehensive Annual Financial Report
June 30, 2017
## Commonwealth Transportation Fund Bonds

**Purpose**
- Bond proceeds are used to finance the accelerated capital improvement of bridges and rails and related infrastructure pursuant to the Accelerated Bridge Program and Rail Enhancement Program.

**Bonds Outstanding**
- $2.3 billion as of June 30, 2017

**Debt Service Reserve Fund**
- None

**Security**
- The Bonds are special obligations of the Commonwealth payable solely from certain Pledged Revenues which are deposited into the Commonwealth Transportation Fund including revenues generated by the excise tax imposed on fuel, excluding aviation fuel, by the provisions of Chapter 64A, 64E and 64F of the Massachusetts General Laws and all the Registry Fess received by the Registrar of the Motor Vehicles pursuant to Section 33 of Chapter 90 of the General Laws.

- The 6.86 cents of the 21-cent gas tax that is levied on each gallon of gasoline sold in the Commonwealth is pledged on a subordinate basis to the Commonwealth’s Federal Highway Grant Anticipation Notes.
Commonwealth Transportation Fund Bonds (cont.)

Moody’s Aa1  S&P AAA  Fitch NR

Rate Covenant

- The Commonwealth shall not impair the rights and remedies of the Trustee and the owners of the Bonds under the Trust Agreement with respect to the CTF Pledge Funds. In order to change the rate of the Registry Fees or the Gas Tax credited to the CTF, the Commonwealth must certify that CTF Pledged Funds received in any 12 consecutive months of the last 18 months, as adjusted for the proposed change, shall be at least equal to 4.0x MADS.

Additional Bonds Test

- CTF Pledged Funds for any 12 consecutive months of the last 18 months must be at least 4.0x MADS, including the Additional Bonds to be issued.

Anticipated Borrowings

The Commonwealth of Massachusetts

Commonwealth Transportation Fund Bonds - Flow of Funds

Monthly Deposits → CTF Pledged Funds → Debt Service Fund → Bond Related Costs Fund → Rebate Fund

- Monthly Transfers for Debt Service Payments:
  - 1/5th Interest
  - 1/10th Principal

Monthly Revenue Deposits to CTF:

- December 15: Interest Payment
- June 15: Principal and Interest Payment

Source: Official Statement
The Commonwealth of Massachusetts

Special Obligation Bonds – Convention Center

Moody’s A1  S&P A  Fitch NR

Purpose

- Bond proceeds were used to finance the costs incurred by the Commonwealth for constructing or renovating three convention and exhibition centers located in the cities of Boston, Springfield and Worcester.

Bonds Outstanding

- $575 million as of June 30, 2017

Debt Service Reserve Fund

- The Trust Agreement requires a Capital Reserve Fund to be established and provides for its funding and maintenance in an amount at least equal to the lesser of (i) 10% of the original principal amount of all Bonds outstanding, (ii) 125% of the average aggregate amount of principal and interest becoming due in any fiscal year on all Bonds outstanding, or (iii) the Maximum Adjusted Bond Debt Service Requirement in any fiscal year on all Bonds Outstanding.

Security

- The Bonds are secured by a pledge of and lien on Pledged Receipts collected by the Commonwealth within the Boston/Cambridge Area and the Greater Springfield Area and the City of Worcester, including the Room Occupancy Taxes, Vehicular Rental Surcharge and other Revenues.

- Pledged Receipts include: (1) 2.75% room occupancy excise tax on lodging establishments within the Tax Base, (2) 5.7% room occupancy excise tax on lodging establishments within the cities of Boston, Cambridge, and Springfield, (3) an additional 4% room occupancy excise tax on certain hotel rooms in Springfield, (4) a surcharge on all vehicular rental transaction contracts in Boston, (5) 5% sales tax on meals, beverages, and tangible personal property sold in certain establishments in Boston, Cambridge, and Springfield, (6) 5% surcharge on the water and land-based sightseeing tours and cruises in Boston, and (7) $2 per day parking surcharge in parking facilities in conjunction with the Projects.
The Commonwealth of Massachusetts

Special Obligation Bonds – Convention Center (cont.)

Moody’s A1  S&P A  Fitch NR

Rate Covenant

- The Commonwealth has covenanted in the Convention Center Act and in the Trust Agreement that so long as any Bonds are outstanding the rates of the respective room occupancy taxes, the vehicular rental surcharge, the sightseeing surcharge, the sales taxes, and the parking surcharge pledged to the payment of the Bonds will not be reduced below the rates in effect at the dates of the original issue of such Bonds.

Additional Bonds Test

- The Commonwealth must demonstrate that the amount of Pledged Receipts collected during any 12 consecutive months out of the preceding 18 months was at least equal to 150% of the Maximum Adjusted Bond Debt Service Requirement due in the current or any future fiscal year for all Bonds outstanding including the proposed additional Bonds.

Anticipated Borrowings

- On July 29, 2014, the Governor approved legislation authorizing the issuance of $1.1 billion of additional bonds to finance an expansion of the convention center. The expansion project is currently on hold.
Massachusetts Department of Transportation

### Metropolitan Highway System Senior Revenue Bonds

<table>
<thead>
<tr>
<th><strong>Purpose</strong></th>
<th><strong>Security</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Bond proceeds were used to pay certain costs relating to the Central Artery/Tunnel Project in Boston, to refund certain outstanding indebtedness of the Massachusetts Turnpike Authority, to fund the Senior and second lien Debt Service Reserve Funds, and to pay portions of interest due.</td>
<td>- The Bonds are secured by a senior lien pledge of the System’s Net Revenues derived from the Accepted Metropolitan Highway System that includes tolls, rates, fees, rentals, and other charges/revenues and certain investment income. The senior Bonds are further secured by a first claim on $25 million in annual Contract Assistance by the Commonwealth of Massachusetts and by a second lien claim on an additional $100 million in annual Contract Assistance payable first to the second lien Bonds. Contract Assistance payments are full faith and credit general obligations of the Commonwealth. The senior lien is closed to new issuance except for refunding bonds.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Debt Service Reserve Fund</strong></th>
<th><strong>Bonds Outstanding</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- The Debt Service Reserve Fund must equal the lesser of (i) 10% of the original net proceeds from the sale of such series, (ii) 125% of Average Annual Debt Service, or (iii) MADS.</td>
<td>- $976 million as of June 30, 2017</td>
</tr>
</tbody>
</table>

Moody’s A3  S&P A+  Fitch A+
**Rate Covenant**

- The Department is required to set tolls, rentals, and other charges such that Net Revenues for such fiscal year must equal the greater of (i) 1.20x the Senior Net Debt Service, (ii) 1.15x the Combined Net Debt Service, or (iii) 1.00x the Combined Net Debt Service plus the Capital Reinvestment Requirement for that fiscal year which is established by the Department in its annual budget.

**Additional Bonds Test**

- Additional Bonds may be issued if following the issuance of additional bonds, Net Revenues will be estimated to equal at least 1.2x Senior Net Debt Service and 1.15x Combined Net Debt Service.
Massachusetts Department of Transportation

Metropolitan Highway System Second Lien Revenue Bonds

Moody’s Aa2  S&P AA  Fitch AA+

Purpose

- Bond proceeds were used to pay certain costs relating to the Central Artery/Tunnel Project in Boston, to refund certain outstanding indebtedness of the Massachusetts Turnpike Authority, to fund the Senior and second lien Debt Service Reserve Funds, and to pay portions of interest due.

Security

- The Bonds are secured by a second lien pledge of the System’s Net Revenues derived from the Accepted Metropolitan Highway System that includes tolls, rates, fees, rentals, and other charges/revenues and certain investment income. The second lien Bonds are further secured by a first claim on $100 million in annual Contract Assistance by the Commonwealth of Massachusetts and by a second lien claim on an additional $25 million in annual Contract Assistance payable first to the senior lien Bonds. Contract Assistance payments are full faith and credit general obligations of the Commonwealth.

Debt Service Reserve Fund

- The Debt Service Reserve Fund must equal the lesser of (i) 10% of the original net proceeds from the sale of such series, (ii) 125% of Average Annual Debt Service, or (iii) MADS.

Bonds Outstanding

- $864 million as of June 30, 2017
Rate Covenant

- The Department is required to set tolls, rentals, and other charges such that Net Revenues for such fiscal year must equal the greater of (i) 1.20x the Senior Net Debt Service, (ii) 1.15x the Combined Net Debt Service, or (iii) 1.00x the Combined Net Debt Service plus the Capital Reinvestment Requirement for that fiscal year which is established by the Department in its annual budget.

Additional Bonds Test

- Additional Bonds may be issued if following the issuance of additional bonds, Net Revenues will be estimated to equal at least 1.15x Combined Net Debt Service.
Massachusetts Department of Transportation

Metropolitan Highway System Revenue Bonds - Flow of Funds

Revenue Fund

Operating Fund

Senior Debt Service Fund

Senior Debt Service Reserve Fund

Second Lien Debt Service Fund

Second Lien Debt Service Reserve Fund

Rebate Fund

Capital Reinvestment Fund

General Fund

Source: Official Statement
Massachusetts Bay Transportation Authority

Sales Tax Bonds

Moody’s Aa2 S&P AA Fitch NR

### Purpose
- The Massachusetts Bay Transportation Authority ("MBTA") finances and operates mass transportation facilities within 175 cities and towns.
- Bond proceeds are used to fund the MBTA’s capital improvement program.

### Bonds Outstanding
- $3.8 billion as of June 30, 2017

### Debt Service Reserve Fund
- The minimum Senior/second lien Debt Service Reserve Requirement for any series of Senior/second lien Sales Tax Bonds respectively is an amount equal to one-half the lesser of (i) 10% of the original net proceeds from the sale of such series, (ii) 125% of Average Annual Debt Service, or (iii) MADS.

### Security
- The bonds are special obligations of the MBTA payable solely from Pledged Revenues which consists of the Dedicated Sales Tax. This revenue source is calculated as the greater of Base Revenue or Dedicated Sales Tax Revenue. Base Revenue amount increases by the percentage change in inflation, as measured by the Boston Consumer Price Index for the prior year except under certain conditions. The Dedicated Sales Tax Revenue amount is equal to the amount raised by a 1% statewide sales tax, allocated from the State’s existing 6.5%.
- In addition, the Bonds are secured by (i) amounts received from the Trustee under the Assessment Bond Trust Agreement, and (ii) the Deficiency Fund and the Capital Maintenance Fund including the investments.
Massachusetts Bay Transportation Authority

Sales Tax Bonds (cont.)

Moody’s Aa2  S&P AA  Fitch NR

**Rate Covenant**
- The Commonwealth covenants that as long as Bonds secured by Dedicated Revenues, defined as Assessments (revenue source discussed in the MBTA Assessment Bonds section) and Dedicated Sales Tax, are outstanding the rate of the sales tax will not be set below the Dedicated Sales Tax amount. In addition, the Annual Aggregate Assessments shall not be reduced below approximately $136 million.

**Anticipated Borrowings**
- None specified.

**Additional Bonds Test, cont.**
- (ii) For the current and future fiscal years, the sum of the Assessment Floor amount (pursuant to Section 35T of Chapter 10 Mass. General Laws) plus the Residual Sales Tax divided by Net Debt Service on outstanding assessment bonds will be equal to or greater than 1.5x; and

- (iii) Must demonstrate (A) the Base Revenue Floor amount for each fiscal year during which the new series will be outstanding will be equal to or greater than the sum of (i) the Combined Net Debt Service for all series of Sales Tax Bonds outstanding after issuance and (ii) the aggregate estimated payments due and payable on prior obligations for the current and future fiscal years or (B) the Historic Dedicated Sales Tax Revenue amount less the aggregate estimated payments due and payable on prior obligations for the current and future fiscal years, divided by, for each fiscal year, (a) the Senior Net Debt Service for all series of bonds and (b) the Combined Net Debt Service for all series of bonds, will be equal to or greater than 2.0x and 1.5x, respectively.

**Additional Bonds Test**
- Additional bonds may be issued as long as the following conditions are met:

  (i) The amount on deposit in the senior and second lien Debt Service Reserve Funds, after the issuance of additional Bonds, will at least equal the respective reserve requirements;
Massachusetts Bay Transportation Authority

Assessment Bonds

Moody’s Aa1  S&P AAA  Fitch NR

Purpose

- Bond proceeds are used to fund the MBTA’s capital improvement program.

Security

- The bonds are secured by all Pledged Revenues defined as Assessments on 175 cities and towns located in the Authority’s service area. The Assessments constitute unconditional general obligations of each community and are paid on a quarterly basis via automatic deductions by the Commonwealth of a portion of each community’s local aid payments.

- In addition, the Bonds are secured by (i) amounts received from the Trustee under the Sales Tax Bond Trust Agreement, and (ii) the Deficiency Fund and the Capital Maintenance Fund including the investments.

Bonds Outstanding

- $700 million as of June 30, 2016

Debt Service Reserve Fund

- The Debt Service Reserve Fund must equal the lesser of: (i)10% of the original net proceeds from the sale of such series, (ii) MADS, or (iii) 125% of Average Annual Debt Service.
Assessment Bonds (cont.)

Rate Covenant

- The Commonwealth covenants that as long as Bonds secured by Dedicated Revenues, defined as Assessments and Dedicated Sales Tax, are outstanding the rate of the sales tax will not be set below the Dedicated Sales Tax amount. In addition, the Annual Aggregate Assessments shall not be reduced below approximately $136 million.

Anticipated Borrowings

- None specified.

Moody’s Aa1  S&P AAA  Fitch NR

Additional Bonds Test

- The Authority may issue additional debt in the event the following tests are met (and some others):

  (i) The amount on deposit in the Debt Service Reserve Fund after the issuance of additional bonds will be at least equal to the Reserve Requirements,

  (ii) For each year, the Assessment Floor amount divided by Net Debt Service on outstanding Assessment Bonds will equal at least 1.00 and if those outstanding Assessment Bonds are rated by Moody’s then it must equal at least 1.2x or such lesser amount acceptable by Moody’s, and

  (iii) For each year, the sum of the Assessment Floor amount plus the Residual Sales Tax, divided by the Net Debt Service will equal at least 1.5x or the aggregate of the amounts on deposit in each Qualified Reserve Fund will equal the Qualified Reserve Fund Requirement.
Massachusetts Bay Transportation Authority

Flow of Funds

Assessments

MBTA State and Local Contribution Fund

Assessments Pledged Revenue Fund

(Daily)

Debt Service Fund

Principal Account

Interest Account

DSRF

To cure deficiencies in the other Trust Agreement

Deficiency Fund

Capital Maintenance Fund

General Fund

To Pay MBTA Operating Expenses and Other Costs

Dedicated Sales Tax

Sales Tax Pledged Revenue Fund

(Semi-annually)

Senior Debt Service Fund

(Includes CP Program)

Principal Account

Interest Account

Senior DSRF

Second Lien Debt Service Fund

Interest Account

Principal Account

Second Lien DSRF

To Pay Prior Obligations

General Fund

In the event the Authority is otherwise unable to make the certification, payment of the Prior Obligations is made prior to the deposits to the Senior Debt Service Fund.
Metropolitan Boston Transit Parking Corporation

Systemwide Senior Lien Parking Revenue Bonds

Moody’s A1   S&P A+   Fitch NR

Purpose

- Metropolitan Boston Transit Parking Corporation (the “Corporation”) is a nonprofit agency and instrumentality of the MBTA. The Corporation was established for the sole purpose of issuing the bonds on behalf of the MBTA.

Bonds Outstanding

- $305 million as of June 30, 2017

Debt Service Reserve Fund

- The Debt Service Reserve Fund must equal 50% of MADS, provided that in no event shall the amount exceed the least of (i) 10% of the original net proceeds of the Bonds, (ii) MADS, and (iii) 125% of average annual debt service.

- Replenishment is required in one-sixth monthly payments over six months in the event the Fund is drawn.

Security

- Pursuant to a transfer and disposition agreement between the MBTA and the Corporation, the MBTA continues to own and operate the parking facilities, but assigns to the trustee for deposit in the Revenue Fund all Gross Revenues of the parking facilities.

- Pursuant to the transfer and disposition agreement the MBTA agrees not to make amendments that would materially adversely affect bondholders, including not to expand the existing facilities or construct new ones that would create competition and adversely affect the Rate Covenant.

- In addition, the MBTA agrees not to dispose of any parking facilities without demonstrating that revenues from all facilities, excluding the one to be disposed of, for 12 consecutive months of the prior 24 months immediately preceding the proposed disposition, were 1.5x MADS.
The MBTA agrees to establish and maintain parking rates and charges sufficient to provide 1.25x coverage of MADS.

The Corporation may issue additional Bonds if Revenues derived from the parking facilities for the 12 successive months in the last 18 immediately preceding months were equal to at least 1.5x MADS, assuming the issuance of the Bonds.

None specified.
Systemwide Senior Lien Parking Revenue Bonds - Flow of Funds

**MBTA Parking Customers**
- Cash Receptacle
- Attendant Payment
- Pay by Phone
- Monthly Permits
- CharlieCard

**MBTA Controlled Group Parking Bank Accounts**
- 7 accounts, corresponding to operating contracts “groups”
- Daily deposits of all gross daily parking revenue
- Monthly permit revenues received monthly
- Enforcement fines deposited daily

**MBTA Parking Revenue Concentration Account**
- Daily roll-up of all 7 groups parking bank accounts

**Corporation Bond Trustee**
- Revenue Fund
- Debt Service Fund Monthly Deposits
- Debt Service Reserve Fund

**Excess Revenues Released to MBTA General Fund**

Revenue Audit & Reconciliation Process Conducted by MBTA
Revenue Bonds

**Purpose**
- The Authority controls, operates and manages Logan International Airport, Hanscom Field, the Worcester Regional Airport and various seaport properties. Bond proceeds were used to finance the construction and renovation of the above mentioned properties.

**Bonds Outstanding**
- Senior Lien - $1.4 billion as of June 30, 2017

**Debt Service Reserve Fund**
- The balance of the Reserve account will not exceed MADS. The 1978 Trust agreement requires upon issuance of any additional Bonds, there must be a deposit to the Reserve account in an amount equal to at least one-half of the difference between (a) the amount of the increase in the MADS requirement and (b) the amount in the Reserve account in excess of the MADS requirement on all then-outstanding bonds.

**Security**
- The Bonds are payable from the Authority's Net Revenues which includes all tolls, rates, fees, rentals, and other charges from its Projects (subject to limited exclusions) and certain investment income along with other revenues.
- In addition, all of the Bonds are secured by a lien and charge on all funds and accounts created under the 1978 Trust Agreement.
Massachusetts Port Authority

Revenue Bonds (cont.)

Moody’s Aa2  S&P AA  Fitch AA

Rate Covenant

- The Authority covenants to charge tolls, rates, fees, rentals and other charges as may be necessary so that the Revenues, in each fiscal year, will equal the greater of (a) an amount sufficient to cover operating expenses plus 125% of Debt Service Requirements on all outstanding bonds or (b) an amount sufficient to cover operating expenses, to make required deposits into various funds, and to make any required payments to the Commonwealth.

Additional Bond Test

- Bonds may be issued if Net Revenues during any 12 consecutive months out of the most recent 18 month period are at least 125% of MADS on all outstanding debt and additional debt.

Anticipated Borrowings

- None specified.
Massachusetts Water Resources Authority

Senior General Revenue Bonds

<table>
<thead>
<tr>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Authority controls a water distribution system and a sewer system serving 61 communities. The Bond proceeds were used for capital improvements in rehabilitating, repairing, and maintaining the systems and ensuring they are in compliance with the various environmental laws.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Debt Service Reserve Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Debt Service Reserve Fund Requirement is equal to the aggregate of each series requirements for all outstanding Bonds. The Series Debt Service Requirement is equal to the lesser of (i) 100% of the Average Annual Adjusted Debt Service for such series, (ii) 10% of the original net proceeds, (iii) 125% of the Average Annual Debt Service or (iv) MADS.</td>
</tr>
</tbody>
</table>

| The Authority has approved proposed modifications to the General Resolution which, if it receives the necessary approvals, would materially change a number of provisions. The Debt Service Reserve Fund requirement will change from a per-series basis to an aggregate basis and one of the standards of the requirements will change from 100% of Average Annual Adjusted Debt Service to 50% of Maximum Annual Adjusted Debt Service. |

<table>
<thead>
<tr>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Authority pledges its net revenues and all funds established under the General Resolution except the Operating Fund, the Note Payment Fund, the Rebate Fund and subordinate lien Debt Service Reserve Funds. Revenues are defined as all income, revenue, receipts and other moneys derived by the Authority from its operation of the systems.</td>
</tr>
</tbody>
</table>

| The Authority provides services to Local Bodies on a wholesale basis. The obligation of the Local Bodies to pay for these services is a general obligation payable from any and all sources of revenue available to the Local Bodies. |

<table>
<thead>
<tr>
<th>Bonds Outstanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3.2 billion as of June 30, 2017</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Anticipated Borrowings</th>
</tr>
</thead>
<tbody>
<tr>
<td>None specified.</td>
</tr>
</tbody>
</table>
Massachusetts Water Resources Authority

Senior General Revenue Bonds (cont.)

Moody’s Aa1  S&P AA+  Fitch AA+

Rate Covenant

- The Authority will set rates and charges sufficient to realize a Primary Bond Coverage Ratio of 1.2 plus the amount necessary to fund the Community Obligation and Revenue Enhancement Fund so that the balance thereof equals debt service on beginning Bonds outstanding of such fiscal year times the Supplemental Bond Coverage Ratio of 0.1. The Authority plans to terminate the Community Obligation and Revenue Enhancement Fund.

- The Primary Bond Coverage Ratio, Revenue Available for Debt Service divided by Senior Debt Service, can not be less than 1.1. In addition, no adjustment can cause the Combined Debt Service Coverage Ratio, the sum of the Primary Bond Coverage Ratio and the Supplemental Bond Coverage Ratio defined as Revenue Available for Debt Service divided by Total Debt Service, to be less than 1.2. The Authority plans to eliminate the Supplemental Bond Coverage Requirement.

Additional Bonds Test

- The Authority can issue new Bonds if the Combined Debt Service Coverage Ratio Covenant for the most recent period of 12 consecutive months is met and (i) projected revenues available for Bond debt service will be sufficient to satisfy the Combined Debt Service Coverage Ratio, or (ii) projected revenues, including increases in rates and charges then approved and including increases in operating expenses, will be sufficient to pay debt service on all Bonds and certain required reserve deposits.

- These requirements do not need to be met for Bonds issued to refund other Bonds as long as debt service is not increased and the latest maturity date of secured Bonds is not extended. Upon the issuance of Bonds for refunding purposes or otherwise, the Debt Service Reserve Fund must be fully funded.
Subordinate Lien General Revenue Bonds

Purpose
- The Authority controls a water distribution system and a sewer system servicing 61 communities. The Bonds proceeds were used for capital improvements in rehabilitating, repairing, and maintaining the systems and ensuring they are in compliance with the various environmental laws.

Bonds Outstanding
- $817 million as of June 30, 2017

Security
- The Authority pledges its Net Revenues and any funds established under the General Resolution except the Operating Fund, the Debt Service Fund, the Debt Service Reserve Fund, the Note Payment Fund, and the Rebate Fund. Revenues are defined as all income, revenue, receipts and other moneys derived by the Authority from its operation of the systems. The claim is subordinate to the senior Bonds.

- The Authority provides services to Local Bodies on a wholesale basis. The obligation of the Local Bodies to pay for these services is a general obligation payable from any and all sources of revenue available to the Local Bodies.

Debt Service Reserve Fund
- While the resolution allows for a subordinate lien Debt Service Reserve Fund, there is none presently.

Anticipated Borrowings
- None anticipated.
Massachusetts Water Resources Authority

Subordinate Lien General Revenue Bonds (cont.)

Moody’s Aa2  S&P AA  Fitch AA

<table>
<thead>
<tr>
<th>Rate Covenant</th>
<th>Additional Bonds Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The Authority must comply with a subordinate lien Combined Debt Service Coverage Ratio Covenant which requires the Authority to set rates and charges sufficient to provide revenues available for Bond debt service in each fiscal year at least equal to (a) 1.1x debt service on the subordinate lien Bonds and all outstanding Bonds plus (b) the amount necessary to fund the Community Obligation and Revenue Enhancement Fund to the Supplemental Bond Coverage Requirement. The Authority plans to terminate the Community Obligation and Revenue Enhancement Fund.</td>
<td>- The Authority can issue new Bonds if the Combined Debt Service Coverage Ratio Covenant for the most recent period of 12 consecutive months is met and (i) projected revenues available for Bond debt service will be sufficient to satisfy the Combined Debt Service Coverage Ratio, or (ii) projected revenues, including increases in rates and charges then approved and including increases in operating expenses, will be sufficient to pay debt service on all Bonds and certain required reserve deposits.</td>
</tr>
<tr>
<td></td>
<td>- These requirements do not need to be met for Bonds issued to refund other Bonds as long as debt service is not increased and the latest maturity date of secured Bonds is not extended. Upon the issuance of Bonds for refunding purposes or otherwise, the Debt Service Reserve Fund must be fully funded.</td>
</tr>
</tbody>
</table>
Massachusetts Clean Water Trust

Pool State Revolving Fund Bonds

Moody’s Aaa  S&P AAA  Fitch  AAA

Purpose

- The Trust was established to provide financial assistance to borrowers for water pollution abatement projects and drinking water projects. The Pool State Revolving Fund Bonds (Pool SRF) are one of four programs offered. The other three are the Massachusetts Water Resources Authority (MWRA) SRF Bonds, the South Essex Sewerage District (SESD) SRF Bonds, and the New Bedford SRF Bonds.

Security

- Approximately 68% of the loans funded by the Pool SRF Bonds will be general obligations of the related borrowers payable from general revenues, including taxes. The remaining percent will be revenue obligations payable solely from water and wastewater revenues of the related borrowers.

- Reserve funds are established to reduce financing costs for the Trust’s borrowers by applying investment earnings on such reserve funds to pay a portion of the debt service on the related Bonds.

- The Trust’s SRF programs were established to accept federal grants and required the Commonwealth to match 20% of the grants. The matching payment is a general obligation of the Commonwealth.

Bonds Outstanding

- Senior Lien - $1.5 billion as of June 30, 2017
- Subordinate Lien - $1.4 billion as of June 30, 2017
Pool State Revolving Fund Bonds (cont.)

Security, cont.

- Each borrower is obligated to repay the principal amount of its loan at a subsidized interest rate of 2% or less. The Trust has the right to intercept local aid payments made by the Commonwealth to a city or town in the event the specific municipality fails to make payments.

- In addition to matching funds, the Commonwealth provides assistance payments to the Trust on behalf of each borrower. The obligation is a general obligation of the Commonwealth in which the State’s full faith and credit are pledged. Payments are made during the first twenty years of the Bond’s term.

Debt Service Reserve Fund

- Each series has its own Reserve Fund which is required to initially equal between 33% and 50% of the original principal. (Except for the 2004 refunding Bonds which will be maintained at 10%)

- Pool SRF Bonds are further secured by the Pool Program Reserve Fund and all SRF Bonds are further secured by the Deficiency Fund.

- On each day the Trust pays down the principal, the Reserve Fund is reduced proportionally. As amounts are released from each Reserve Fund securing a series of Pool SRF Bonds, together with amounts released from the other revolving Bond funds which were refunded in part by Pool SRF Bonds, the amounts are transferred to the Pool Program Reserve Fund. Amounts not required to be used or held in such fund are immediately transferred to the Deficiency Fund.

Anticipated Borrowings

- None specified.
Massachusetts Clean Water Trust

Flow of Funds*

Revenue Fund

In order of Priority

- Debt Service Fund
- Rebate Fund
- Leveraged Bond Fund
- Pool Program Reserve Fund
  
  1st pays any deficiencies in the Debt Service Fund and amounts not required to be used are transferred
- Deficiency Fund
- Debt Service Reserve Fund
- Redemption Fund

Equity Fund**

State's Matching Contribution

Investment Earnings on Equity Funds

Federal Capitalization Grants

On Reserve Funds for SRF Bonds

And other available Federal Assistance

Leveraged Bond Fund

Investment Earnings

Equity Funds

As borrowers pay down the principal balances of their loan, and as the Trust pays principal on its SRF Bonds, proportional amounts are released from reserves pledged to secure the related SRF Bonds and are returned to the Trust. The released funds are used establish new reserve funds for SRF Bonds or for the Trust’s eligible purposes. The amounts released from the reserve fund are transferred to the pool program reserve fund and then to the deficiency fund.

Source: Official Statement

* Simplified Flow of Funds for one series of bonds in the Pool Bonds Program, assuming there is no payment default with respect to any Pool State Revolving Fund bond. Both the Clean Water Program and Drinking Water Program bonds are treated the same. In addition, the diagram above does not apply to the 2004 Refunding Bonds.

** Equity Funds are not pledged as security for any State Revolving Fund Bonds.
Massachusetts Municipal Wholesale Electric Company

Power Supply Revenue Bonds

Moody’s A1  S&P A+  Fitch A+

Purpose

- The Massachusetts Municipal Wholesale Electric Company (“MMWEC”) owns interest in five electric generating units which are included in eight Projects created for the purpose of owning, operating and financing such interest and selling the capacity and energy produced.

- The five electric generating units include Stony Brook Intermediate, Stony Brook Peaking, Seabrook Station, Millstone Unit No.3, and Wyman Unit No. 4. The members and project participants include 6 Vermont utilities and 28 Massachusetts utilities such as Braintree, Danvers, and Holyoke.

- The original Bond (Prior Bonds) proceeds were used to finance the eight Projects. Additional Bond proceeds were used to refund the Prior Bonds.

Security

- All of the MMWEC Bonds are supported by the revenues from the take-or-pay power sales agreements with MMWEC’s participants. The power sales agreements are court tested and affirmed valid. Each participant covenants in its Power Sales Agreement to fix electric rates sufficient to provide revenues adequate to meet its obligations and other required payables.

- Each project is separately secured. There is no cross collateralization among the projects.

- Although Bonds for each project are secured separately, the operational and financial performance of one Project may affect others due to the involvement of most Participants in a number of Projects.

- In most Power Sales Agreements, each project participant remains liable for up to 25% of its share of project costs to cover any default of other project participants.

Debt Service Reserve Fund

- Each Project has a reserve account and may have subaccounts that secure a particular series. The requirement for each initial subaccount is an amount equal to the Maximum Annual Interest on the Project’s bonds outstanding, except for the Project No. 6 DSRF which is equal to $30.5 million.

- Continued on next page
Debt Service Reserve Fund

- A Reserve and Contingency Fund is also established where MMWEC pays monthly from the Revenue Fund for each Project, 10% of the amount required to be paid in such month into the Bond Fund for debt service of such project.

Rate Covenant

- The Authority covenants to set fees such that all revenues and available funds are sufficient to cover debt service, expenses, required payments into the Reserve and Contingency Fund for such projects, and other MMWEC obligations. With the payment to the Reserve and Contingency Fund, MMWEC effectively has a 1.1x rate covenant.

Bonds Outstanding

- $114 million as of December 31, 2016

Additional Bonds Test

- Additional Bonds may be issued so long as the MMWEC is not deficient in its payments into the Bond Fund for the Project or the Reserve and Contingency Fund. It can not be in default on any of its covenants and agreements.

- MMWEC may issue second lien Bonds, but does not have any outstanding at this time.
Project Revenue Bonds

Purpose

- The Authority was created in 1963 to finance the construction of residential, dining, parking, and various projects at the Mass State Colleges, which includes Bridgewater, Fitchburg, Framingham, Salem, Westfield, and Worcester State Colleges as well as MA College of Art and Design, MA College of Liberal Arts and MA Maritime Academy.

- Bond proceeds were used to finance the cost of renovations and expansions of the facilities at the various State Colleges.

Debt Service Reserve Fund

- The Debt Service Reserve Fund is established as security for all Bonds. It is required to be funded at the lesser of (i) 10% of the original net proceeds from the sale of a series (ii) 125% of Average Annual Debt Service or (iii) MADS.

Security

- The Bonds are secured by fees, rents, rates, and other charges imposed by the Authority on the State Colleges for the projects.

- The Board of Higher Education (BHE) pledges a portion of each State College’s gifts, grants and trust funds in an amount equal to 25% of the Average Annual Aggregate Debt Service costs. The BHE also pledges the annual appropriations made by the Legislature on behalf of each State College to secure only that specific State College’s allocable share of debt service on the Bonds.

- Continued on next page
Massachusetts State College Building Authority

Project Revenue Bonds (cont.)

Security, cont.

- The BHE or any State College is permitted to grant a lien on Pledged Funds on parity with the pledge made to the holders of the Bonds if they certify in writing that the total revenues available for expenditure by the applicable State College during each of the three most recently completed fiscal years (including the Pledged Funds but excluding any revenues in respect of such State College) were not less than 200% of MADS on all outstanding debt obligations allocable to such State College.

- Each State College must hold all Revenues derived from System Projects and Campus Projects separate and apart from all other moneys and deposit them in a respective trust.

- Other Reserves include a Capital Improvement Reserve Fund and a Multipurpose Reserve Fund, both are available to pay debt service on Bonds.

Bonds Outstanding

- $1.2 billion as of June 30, 2017

Rate Covenant

- The Authority is required to set charges such that revenues are sufficient to cover at least 1.00x debt service, operating expenses, Debt Service Reserve Fund requirements, and other costs associated with the System Projects.

Moody’s Aa2  S&P A+  Fitch NR
The Authority shall deposit all Revenues, except earnings on investments, into the Revenue Fund to be applied as follows on the last business day of each February and on each October 10 (or the next preceding business day):

1. Debt Service Fund
2. Debt Service Reserve Fund
3. The Authority
4. Operating Fund
5. System Projects Capital Improvement Reserve Account or one or more Campus Project Capital Improvement Reserve Accounts
6. Multipurpose Fund

Source: Official Statement, Fidelity Capital Markets
Dedicated Sales Tax Bonds

Moody’s Aa2  S&P AA+  Fitch AA+

### Purpose
- Bond proceeds were used to fund grants to cities, towns and regional school districts for school construction and renovation projects. In addition, Bond proceeds were used to satisfy the Reserve Fund requirements.

### Bonds Outstanding
- $5.8 billion as of June 30, 2017

### Debt Service Reserve Fund
- The Debt Service Reserve Fund requirement will be set on a series-by-series basis. For the 2007 Series A Bonds it will be the lesser of (i) 10% of principal (ii) 125% of Average Annual Aggregate Debt Service or (iii) MADS. In the event of a reserve deficiency, the Authority is required to replenish the reserve in equal consecutive monthly installments over a three-year period.

### Security
- The Bonds are secured by a Dedicated Sales Tax Revenue equal to 1% of the 5% sales tax imposed by the Commonwealth. The revenue is initially credited to the SMART Fund in the amount equal to the greater of the statutory minimum dollar amount for each year or the “Phase-in Amount”. The amount earmarked to the Fund will gradually increase until 2011, at which time it will equal 100% of the Dedicated Sales Tax Revenue. Certain revenues are excluded from the Dedicated Sales Tax Revenue amount (i.e. taxes on meals).
- If the Bonds secured by the Dedicated Sales Tax Revenues remain outstanding the rate of the taxes will not be reduced below the rates prescribed by the State.
Dedicated Sales Tax Bonds (cont.)

Moody’s Aa2  S&P AA+  Fitch AA+

Additional Bonds Test

- Additional Bonds may be issued if either:
  
  (i) the Dedicated Sales Tax Revenue amount during any 12 consecutive months within the prior 24 months provides at least 1.4x MADS on the Bonds and any additional Bonds; or
  
  (ii) pledged revenues in each fiscal year following the issuance of any additional Bonds are projected to provide at least 1.4x annual debt service, including the new issuance and the Authority must deliver a rating confirmation from each rating agency on the outstanding Bonds.

Anticipated Borrowings

- The aggregate principal amount of all Bonds issued by the Authority can not exceed $10 billion outstanding at any time excluding Bonds issued for refunding purposes.
## Project Revenue Bonds

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMBA was created in 1960 to provide dormitories, dining commons and other buildings and structures for use by the University of Massachusetts, its students, staff and their dependents and other entities associated with the University.</td>
<td>The Bonds are secured primarily by payments made to the Authority under its contracts with the University of Massachusetts, with such payments pledged to the Bond Trustee.</td>
</tr>
</tbody>
</table>

### Bonds Outstanding

<table>
<thead>
<tr>
<th>Security</th>
<th>Bonds Outstanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2.9 billion as of June 30, 2017</td>
<td></td>
</tr>
</tbody>
</table>

### Debt Service Reserve Fund

<table>
<thead>
<tr>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Debt Service Reserve Fund is established as security for all Bonds that have the Commonwealth Guarantee. Each bond year 1/12th of the highest future annual debt service amount is deposited into the reserve until funded.</td>
</tr>
</tbody>
</table>

Moody’s Aa2  S&P AA-  Fitch AA
Anticipated Borrowings

- None specified.

Rate Covenant

- The Authority covenants that it will fix, revise, adjust and collect charges for use of the Projects and any other projects or property revenues pledged sufficient to pay all expenses of the Authority allocable to projects financed.

Additional Bonds Test

- The Authority may issue additional Bonds on parity with or subordinate to the Bonds issued under its Trust Agreements.

- The University of Massachusetts has agreed under separate indentures (not with UMBA) not to request or permit the Authority to issue additional indebtedness if MADS exceeds 10% of total available revenues.
Single Family Housing Revenue Bonds

Purpose

- Bond proceeds were used to finance single family loans in targeted areas at competitive lending rates, and to encourage new construction and rehabilitation.

Security

- The Bonds are special obligations of MassHousing and secured solely by a pledge of all loans, revenues including the payments of principal and interest on the loans, all insurance proceeds and other recovery payments, all moneys in the funds and accounts created by the Bond Resolution (other than the Rebate Fund).

Bonds Outstanding

- $903 million as of June 30, 2017

Debt Service Reserve Fund

- The Debt Service Reserve Fund must be maintained at an amount at least equal to 2% of the sum of (i) the outstanding principal balance of all loans then held under the General Resolution plus (ii) the aggregate amount, if any, then held in all purchase accounts which may be applied to the purchase of loans.

Moody’s Aa1  S&P AA+  Fitch NR

- Each loan purchased under the resolution that has a principal amount in excess of 80% of the Value of the Property must be (i) insured by the Federal Housing Administration ("FHA"); (ii) guaranteed by the United States Veterans Administration ("VA") or by the Rural Housing and Community Development Service ("RHCDS") , (iii) insured by a qualified private mortgage insurance company, (iv) insured by MassHousing’s Mortgage Insurance Fund or (v) insured, guaranteed or otherwise secured by another program of self-insurance established by or on behalf of MassHousing.
Additional Bonds Test

- MassHousing is prohibited from issuing Bonds at any time unless the amount on deposit in the Debt Service Reserve Fund, including any deposit to be made from the proceeds of the Bonds to be issued, is equal to the Debt Service Reserve Fund Requirement calculated at such date of issuance.

- Prior to the delivery of any series of Bonds and prior to the transfer to MassHousing of moneys pledged under the Bond Resolution, MassHousing is required to file a Projection of Revenues demonstrating that following such delivery or transfer, expected Revenues will be sufficient to cover MADS and all expenses.

- In addition, the issuance of additional Bonds can not adversely affect ratings.

Anticipated Borrowings

- None specified.
Massachusetts Housing Finance Agency

Housing Bonds

**Purpose**
- Bond proceeds were used to finance multifamily housing projects.

**Bonds Outstanding**
- $1.7 billion as of June 30, 2017

**Debt Service Reserve Fund**
- The Series Resolution for New Series Bonds requires a deposit to the Debt Service Reserve Fund in the amount equal to 50% of MADS for the New Series Bonds.

**Additional Bonds Test**
- Additional Bonds may be issued under the Resolution only upon confirmation of the ratings of the Bonds outstanding prior to such issuance.
- In addition to parity Bonds issued under the Resolution, MassHousing may issue bonds that are subordinate to the Parity Bonds.

**Security**
- The Bonds are special revenue obligations of MassHousing and secured solely by a pledge of all loans, revenues including the payments of principal and interest on the loans, all insurance proceeds and other recovery payments, all moneys in the funds and accounts created by the Bond Resolution (other than the Rebate Fund).

**Moody’s Aa2  S&P AA  Fitch AA-**

**Anticipated Borrowings**
- None specified.
### Purpose
- Partners Healthcare System, Inc. (the “Institution”) controls a major healthcare system consisting of two tertiary and six community acute care hospitals, one hospital that provides inpatient and outpatient mental health services, three rehabilitation hospitals, and other healthcare and related facilities.
- The Bond proceeds were used for capital improvement projects.

### Bonds Outstanding
- $4.9 billion as of September 30, 2017

### Rate Covenant
- The Institution agrees to maintain a Debt Service Coverage Ratio, Net Revenues plus depreciation, amortization, and interest expense divided by Debt Service Payments on outstanding debt, at least equal to 1.0 in each fiscal year.
- In the event certain metrics and conditions are achieved, the Guarantees may be suspended. This occurs in the event that the Suspension Ratio, all Indebtedness of Affiliates divided by the unrestricted net assets of the Partners System and any Affiliate that are not included on the Partners System’s consolidated financial statement, is less than 25%.

### Security
- The Bonds are secured by the full faith and credit pledge of the Institution.
- The Brigham and Women’s Hospital Inc. and Brigham and Women’s/Faulkner Hospitals Inc. (BWF) together will issue a Guarantee as will the Mass. General Hospital with the General Hospital Corporation, both of which guarantee to the Authority the payment of the Institution's debt service. The Guarantees are unconditional but in the case of the Mass. General Hospital and General Hospital Corp, the guarantee is secured on parity with their outstanding revenue Bonds. The Brigham and BWF guarantees are unsecured.
Partners Healthcare System Bonds (cont.)

Moody’s Aa3  S&P AA-  Fitch AA-

**Additional Bonds Test**

- As long as the guarantee obligations of the Guarantors are suspended, the Institution shall not permit an Affiliate to issue additional Bonds, whether secured or unsecured, unless:

  - (i) such Affiliate delivers a guarantee, substantially similar to the prior guarantee or
  - (ii) such Senior Affiliate Indebtedness is either Indebtedness that, together with all Senior Indebtedness outstanding shall be less than 25% of the sum of (a) unrestricted net assets as shown on the Partners System financials and (b) unrestricted net assets of any Affiliate not included in the Partners System’s financials or Indebtedness that has several other conditions that place a ceiling on the amount of debt to be issued.

**Anticipated Borrowings**

- None specified.
### CareGroup Bonds

<table>
<thead>
<tr>
<th>Purpose</th>
</tr>
</thead>
</table>
| CareGroup is a non-profit corporation that oversees a regional health care delivery system comprised of teaching and community hospitals, physician groups and other caregivers. The Obligated Group includes: Beth Israel Deaconess Medical Center, Inc. (BIDMC), New England Baptist Hospital (Baptist), Beth Israel Deaconess Hospital-Needham, Inc.(BIDN), Mount Auburn Hospital, Mount Auburn Professional Services, Inc. and Medical Care of Boston Management Corporation.  

- The Bond proceeds were used for refunding purposes and for capital improvement projects at the system’s four hospitals. |

<table>
<thead>
<tr>
<th>Security</th>
</tr>
</thead>
</table>
| Each member has pledged a lien on its Gross Receipts to secure all Indebtedness. If any required payment is not made when due, any Gross Receipts, to the extent permitted by law, shall be transferred or paid over immediately to the Master Trustee without being commingled with other funds. The lien for each member will be a first lien. Gross Receipts are defined as all receipts, revenues, rentals, income and other moneys received by or on behalf of the Obligated Group.  

- In addition, BIDMC, Mount Auburn, Baptist and BIDN each granted a mortgage on certain property and a security interest in any rents, income and profits arising from such mortgaged property. |

### Bonds Outstanding

- $552 million as of September 30, 2017

### Debt Service Reserve Fund

- The Debt Service Reserve Fund must be maintained at an amount equal to the lesser of (a) MADS (b) 125% of the Average Annual Debt Service on Bonds outstanding or (c) 10% of the aggregate proceeds of the Bonds upon original issuance thereof.
Rate Covenant

- The Obligated Group agrees to use its best efforts to maintain the Debt Service Coverage Ratio, which is the Aggregate Income Available for Debt Service divided by MADS, at least equal to 1.20x in each fiscal year as well as maintain Days Cash on Hand of at least 65 days at the end of each fiscal year.

Anticipated Borrowings

- $453 million proposed to be issued in 2018 by the Massachusetts Development Finance Agency.

- CareGroup and Lahey Health have announced plans to merge and are in the process of receiving regulatory approvals. The two organizations have announced that if the merger is approved they will combine their respective obligated groups.

Additional Bonds Test

- Each member of the Obligated Group agrees certain conditions must be met before issuing new Bonds. Such conditions include:

  (i) the ratio determined by dividing Aggregate Income Available for Debt Service (from the combined financial statements of the Obligated Group) by MADS including additional Indebtedness, is not less than 1.20x; and the Capitalization Ratio is not greater than 67%;

  (ii) completion indebtedness, in an amount not greater than ten percent of the indebtedness originally incurred for a project, must be certified that the original indebtedness was insufficient and unforeseeable at the time and the completion indebtedness will be sufficient to complete the project;

  (iii) for purposes of refunding, it must be certified that taking the proposed indebtedness and the refunding of the existing indebtedness into account, MADS will not increase by more than 5%.
Purpose

- Boston Medical Center ("Institute") is a private, tax-exempt academic medical center in the South End of Boston.
- The Institute is currently the only member of the Obligated Group.
- Bond proceeds were used to fund capital improvement projects and to deposit funds into the Debt Service Reserve Fund.

Security

- The Bonds are secured by a pledge of and lien on all Revenues to be received from the Institute. Revenues are defined to include all rates, rents, fees, charges and other income of the Institution.
- A mortgage has been granted in favor of the Master Trustee upon the Mortgaged Property. The Indenture contains a covenant against the creation of liens in favor of any party on the Restricted Property of the Institution, with certain exceptions.

Debt Service Reserve Fund

- The Debt Service Reserve Fund must maintain an amount equal to the lesser of (a) 10% of the proceeds (b) MADS, or (c) 125% of the average annual payments of principal and interest on the Bonds.

Bonds Outstanding

- $464 million as of September 30, 2017
Boston Medical Center Bonds (cont.)

Moody’s  Baa2  S&P BBB  Fitch NR

Rate Covenant
- Best efforts will be used to set rates at a level to maintain the Debt Service Coverage Ratio, which is Aggregate Income Available for Debt Service to MADS, at least equal to 1.10x in each fiscal year. If not, the Institute will retain a consultant for recommendations.

Additional Bonds Test
- Each member agrees that it will not incur any Additional Indebtedness unless certain conditions are met, including:
  (i) The ratio determined by dividing Aggregate Income Available for Debt Service by MADS including the additional debt issuance, is greater than 1.20x or
  (ii) The aggregate principal amount of long-term indebtedness incurred and outstanding including the additional indebtedness does not exceed 10% of Adjusted Annual Operating Revenues.

Anticipated Borrowings
- None specified.
Lahey Clinic Medical Center Bonds

Moody’s NR  S&P A  Fitch A

Purpose

- Lahey Clinic is a physician-led, nonprofit group practice. The members of the Obligated Group are the Lahey Clinic Hospital, Lahey Clinic Foundation and the Lahey Clinic.

- The bond proceeds were used for refunding purposes and for capital improvement projects at the various facilities.

Security

- The bonds are secured by revenues derived from the Obligated Group. The payment is a joint and several general obligation of each Member, of which the full faith and credit of the Members are pledged.

- Each member has granted a security interest in its Gross Receipts. This lien is and will be at all times a first lien, subject only to liens permitted by the trust or non-consensual liens arising from law.

- The Members grant to the Trustee a security interest in the moneys and other investments held in the funds established under the agreement.

- The bonds are not secured by a mortgage lien, however, the bond Indenture limits the creation of liens on certain property.

Bonds Outstanding

- $337 million as of September 30, 2017

Anticipated Borrowings

- None specified.

- CareGroup and Lahey Health have announced plans to merge and are in the process of receiving regulatory approvals. The two organizations have announced that if the merger is approved they will combine their respective obligated groups.
Lahey Clinic Medical Center Bonds (cont.)

**Rate Covenant**

- The Obligated Group has covenanted to maintain the MADS Ratio, MADS divided by Aggregate Income Available for Debt Service, to an amount equal to at least 1.10x each year.\(^1\)

**Additional Bonds Test**

- Each member of the Obligated Group agrees that certain conditions must be met before issuing new bonds. Such conditions include:

  (i) Indebtedness not exceeding in aggregate principal amount outstanding at any time 15% of Adjusted Annual Operating Revenues for the recent fiscal year;

  (ii) Long-term indebtedness can not be issued unless the MADS ratio is greater than 1.10 and aggregate principal amount of all outstanding long-term indebtedness will not exceed 67% of the aggregate capitalization of the Obligated Group;

  (iii) Completion Indebtedness in an amount not greater than 25% of the indebtedness originally incurred;

  (iv) For refunding purposes, MADS can not increase by more than 15%.

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\(^1\) While this is the MADS Ratio definition in the Official Statement, we believe the ratio should actually be inverted. The Hospital mentioned that their accountant uses the inverted ratio to determine compliance.
Dana-Farber Cancer Institute Bonds

Purpose

- There are two members of the Obligated Group, the Dana-Farber Cancer Institute, Inc. (“DFCI”) and the Dana-Farber, Inc. (“DFI”), collectively “Institute”. It is a not-for-profit corporation located in Boston, MA and is licensed to operate 27 adult inpatient beds and to provide adult and pediatric outpatient services.

- Bond proceeds were used to fund capital improvement projects, to deposit funds into the Debt Service Reserve Fund, and for refunding purposes.

Bonds Outstanding

- $548 million as of September 30, 2017

Debt Service Reserve Fund

- The Debt Service Reserve Fund must be maintained at an amount equal to the lesser of (a) MADS (b) 125% of the Average Annual Debt Service on bonds outstanding or (c) 10% of the aggregate proceeds of the bonds upon original issuance thereof.

Security

- The bonds are secured by the general obligation pledge of the Institution.

- Each member has granted a security interest in its Gross Receipts. This lien is and will be at all times a first lien, subject only to liens permitted by the trust or non-consensual liens arising from law.

- In addition, the obligation to make payments by the Institute is secured by mortgages granted by DFCI on certain of its Boston properties.

- Each member of the Obligated Group has unconditionally and irrevocably agreed that it shall be jointly and severally obligated, and agreed, to pay all amounts becoming due and payable on all Obligations under the Master Trust Indenture.

Moody’s A1  S&P  A  Fitch NR
Dana-Farber Cancer Institute Bonds (cont.)

<table>
<thead>
<tr>
<th>Rate Covenant</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Obligated Group also agrees to use its best efforts to maintain the Debt Service Coverage Ratio at least equal to 1.15 in each fiscal year as well as maintain Days Cash on Hand of at least 85 days at the end of each fiscal year.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Bonds Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each member agrees that it will not incur any Additional Indebtedness unless certain conditions are met, including:</td>
</tr>
</tbody>
</table>

(i) The aggregate principal amount of all outstanding indebtedness after issuance will not exceed 65% of the aggregate capitalization of the Obligated Group for the most recent fiscal year.

(ii) Completion indebtedness, in an amount not greater than 15% of the indebtedness originally incurred for a project, must be certified that it will be sufficient to complete the project.

(iii) For purposes of refunding, when taking the proposed long-term indebtedness and the refunding of the existing long-term indebtedness into account, MADS will not increase by more than 10%. |
Harvard University Bonds

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Proceeds were used for general University purposes, providing flexible cash resources to the University. Proceeds were also used for financing a variety of capital projects, refunding outstanding bonds, and to pay costs associated with terminating swaps.</td>
<td>- The bonds are an unsecured general obligation of the University pledged by the full faith and credit of the President and Fellows of Harvard College.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bonds Outstanding</th>
<th>Anticipated Borrowings</th>
</tr>
</thead>
<tbody>
<tr>
<td>$4.8 billion as of June 30, 2017</td>
<td>None anticipated.</td>
</tr>
</tbody>
</table>

Moody’s Aaa  S&P AAA  Fitch NR
Important information about this report:

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