

Explaining Two Trends in Wifia Loan Program Selected Applications 2017-2019

Discussion Outline

February 6, 2020

Version 2.0

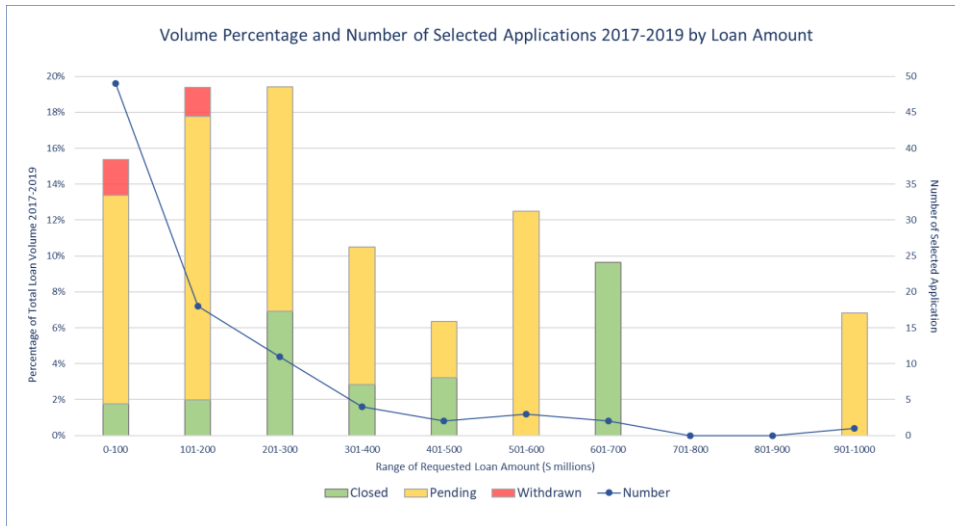
Topics

1. Selected Applications 2017-2019: Two Interesting Trends
2. Explaining the Trends: Borrower Objectives
3. Explaining the Trends: Lender Perspective
4. How to Measure and Describe?

1a Selected Applications 2017-2019: Lots of Data

The list of 90 selected applications to date for 89 projects and \$13.6 billion of loan volume constitutes a significant data set.

- Some may be withdrawn or otherwise fail to close – but all selected applications reflect a lot of planning, analysis and decision-making by both applicant and the Program.
- Since all selected applicants are (or are involved with) public water systems, plenty of in-depth background data associated with the planned projects and financings is publicly available.



The ranges of application loan size and project type are relatively dispersed.

- Loans sought range from \$5 million to \$930 million, with an average and median of \$151 million and \$85 million, respectively.
- Project type generally reflects infrastructure investment requirements of the water sector.

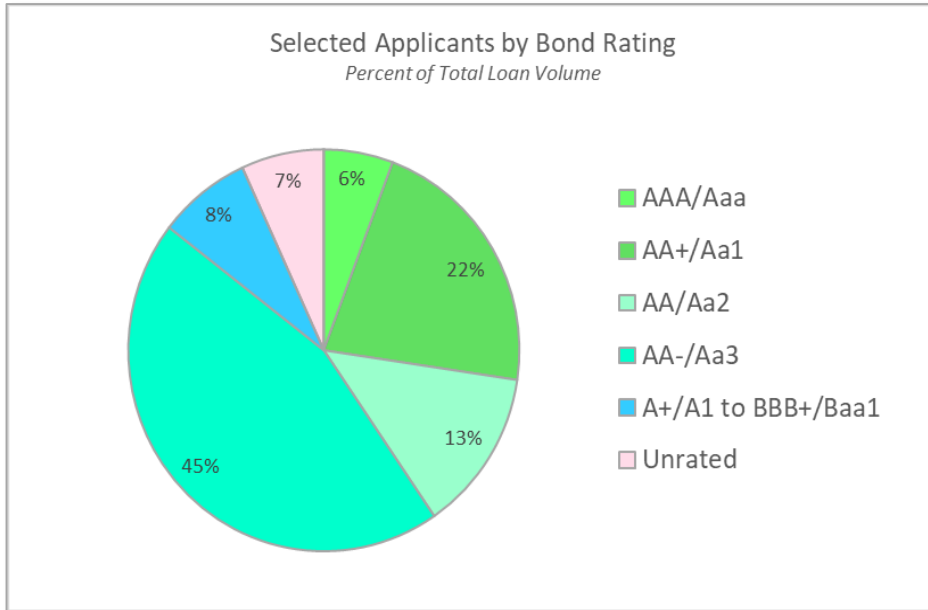
1b Preliminary Indications in Credit Quality and Project Optionality

Two important aspects of selected applications were looked at in more depth: Credit quality and project optionality.

- Public credit ratings of each applicant (which may be different than the specific project) were searched online to estimate basic credit quality and access to public bond market.
- Project optionality – essentially whether project is contingent on Wifa loan – was preliminarily scored by basic description from public information and relevant keywords. See Appendix A.

Selected Applications 2017-2019							
Preliminary Scoring Codes							
Status	Bond Rating		Project Optionality: Based on Project Description and keywords				
P: Pending	1. AAA	Aaa	1. Non-optional: Replace, rehabilitate, repair, outdated, aged, regulatory, compliance, CSO, critical, demand, remediate				
C: Closed	2. AA+	Aa1	2. State Revolving Funds: Assumed waiting list for critical local projects, effectively non-optional				
W: Withdrawn	3. AA	Aa2	3. Quasi-optional: Enable, improve, resiliency, sustainable, efficiency				
	4. AA-	Aa3	4. Optional: Alternative, project, new, pilot, technology, desalination				
	5. A+	A1					
	6. A	A2					
	7. A-	A3					
	8. BBB+	Baa1					
	NR	Not Rated					
Basic Preliminary Data (Primary source: EPA Wifa website; secondary sources: online search, EMMA and rating agency websites)							
Applicant	Project	Project Description	Wifa Loan	Project Size	Status	Bond Rating	Project Optionality
2019							
City of Phoenix Water Services Department	Zone 3D and 4A Improvements Program	The Zone 3D and 4A Improvements Program will install both boosters and water mains to interconnect the north and south systems and enable the City to move water from wells throughout the southern part of the City to areas at higher elevation that are presently served predominantly with Colorado River water.	\$172 million	\$319 million	P	2	3
Vallejo Flood & Wastewater District	Secondary Effluent Project	The project will replace Vallejo Wastewater's primarily utilized and outdated treated effluent pump station, the Mare Island Pump Station, with a new effluent pump station to improve system reliability and protect water quality in the San Francisco Bay.	\$12 million	\$22 million	P	4	1
San Luis & Delta-Mendota Water Authority	Jones Pumping Plant Unit Motor Rehabilitation Project	The Jones Pumping Plant Unit Motor Rehabilitation Project will rehabilitate six unit-motors that have reached the end of their service life to improve the overall resiliency, reliability, and efficiency of the plant.	\$19 million	\$36 million	P	3	1
San Francisco Public Utilities Commission, Wastewater Enterprise	San Francisco Public Utilities Commission	The Headworks Project will replace the two outdated existing headworks treatment facilities at the Southeast Plant with a single centralized preliminary treatment facility to provide a centralized and efficient preliminary treatment system.	\$236 million	\$438 million	P	4	1
East County Advanced Water Purification Joint	East County Advanced Water Purification Project	The Advanced Water Purification Project will treat the East County's wastewater locally and implement potable reuse by providing Advanced Water Purification treated water to Lake Jennings for surface water augmentation.	\$342 million	\$668 million	P	NR	4

1c Credit Quality Trend: High Public Bond Ratings



Vast majority of selected applicants are highly-rated public systems with cost-effective access to the tax-exempt bond market.

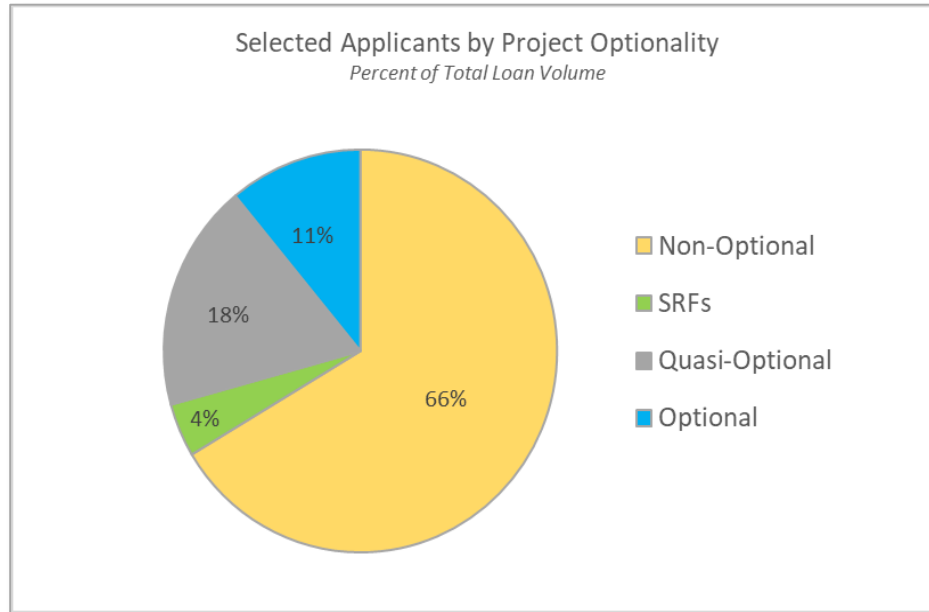
- 93% of applicants have formal investment-grade bond ratings, with 85% being rated AA-/Aa3 or better.
- Tax-exempt interest rates for bonds rated AA-/Aa3 or better are only slightly higher than US Treasury rates in the 30-year market. Lower-rated bonds have higher rates.
- Trend noted by OMB in last appropriations bill? (see box below)

Why this trend is unexpected:

- The highest benefit from Wifia's UST rates go to lowest investment grade borrowers with limited access to the tax-exempt bond market – yet these appear to be only a small proportion of total.
- Rates are at historic lows and the credit markets are wide-open for highly rated borrowers – why are they going through the Wifia process?

13 Finance and Innovation Act of 2014, \$55,000,000, to re-
 14 main available until expended: *Provided*, That such costs,
 15
 16 *Credit trend apparently* all be as de-
 17 *reflected in latest appropriation:* dget Act of
 18 *about 0.50% FCRA cost* available to
 19 *assumed vs. about 1% in prior* amount of di-
 20 *years* total loan
 20 principal, including capitalized interest, any part of which
 21 is to be guaranteed, not to exceed \$11,500,000,000; Pro-

1d Project Optionality Trend: Most Projects Will Happen Anyway



Majority of selected applicants appear to have non-optional projects

- Assuming SRFs must fund their project list, about 70% of application volume appears to be for basic projects that must proceed.
- A further 18% seem more optional, but contingent on non-financing factors unrelated to Wifia loan.
- Only 11% appear to be marginal enough for Wifia to possibly make a difference.
- Bluefield Research explicitly noted this trend in 2019. (see box below)

Why this trend is unexpected:

- A classic rationale for loan programs is to encourage tangible capital expenditures that *would not have happened otherwise* by offering attractive terms – this does not appear to be the case here.
- Most selected application projects appear to be driven by basic engineering factors that likely aren't influenced (e.g. upsized) by financial terms.

Rarely does a failure to secure a WIFIA loan cause a project to be cancelled, even more so with the refined project priorities. Shovel ready means they are already positioned to seek other sources of funding.

Bluefield Research Note 08/19/2019

1e Not a ‘Usual Suspect’ – But What’s the Additionality?

Preliminary trends show the Program is *definitely not* one of the ‘usual suspects’ rounded up by critics of federal loan programs:



“Credit-Challenged Borrowers”? The opposite is clearly the case – most applicants have ratings far higher than minimum statutory requirement of investment-grade and the Wifia/OMB review process for specific loans is very thorough.



“Corporate Welfare”? Selected applicants are (or are involved with) public-sector agencies who can borrow in the tax-exempt market and are subject to oversight and/or regulation. Hard to see how windfall profits could arise from Wifia loan.



“Government Picking Winners and Losers”? Projects generally appear to be basic required infrastructure investments that are non-optional, and that the local community has decided to pay for prior to making financing choices.

But the preliminary trends also prompt several questions

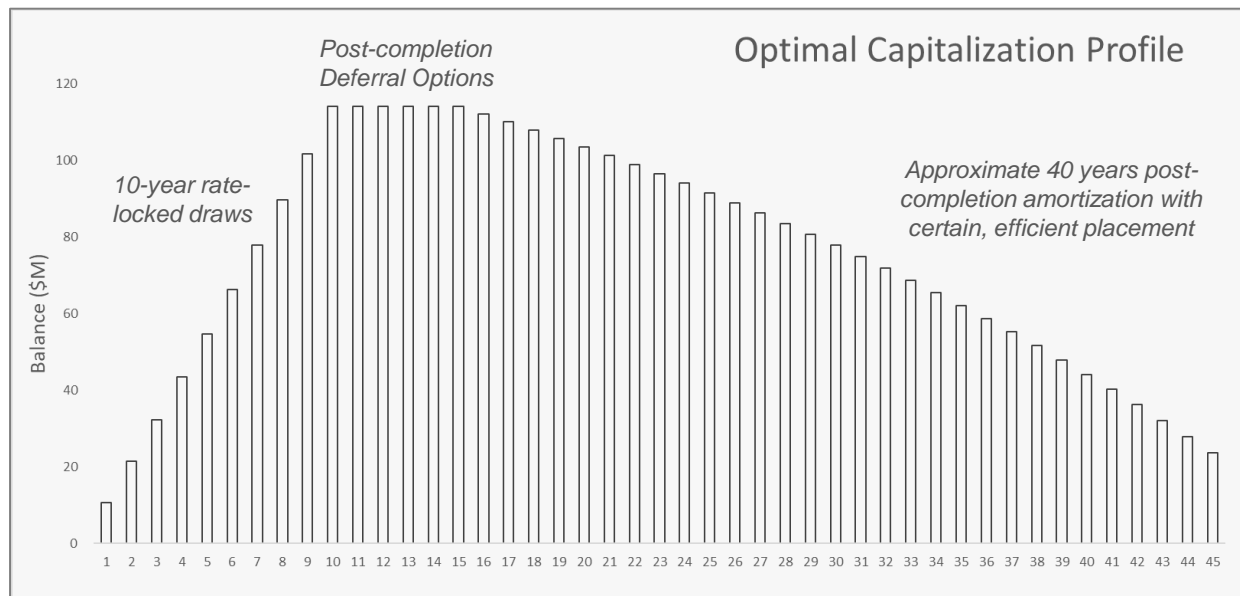
Debt markets are currently ferociously competitive. Highly rated borrowers have many cost-effective tax-exempt and other alternatives, yet Wifia may reach \$25 billion in closed and deal pipeline loan volume in just four years of operations.

- What need among these borrowers is the Program addressing? Is this need related to borrower objectives for the project being financed?
- Why can't or won't private markets address this need for highly rated borrowers?
- Most importantly, what's the 'additionality' -- something that would *not* have happened otherwise – of the Program with respect to US water infrastructure?

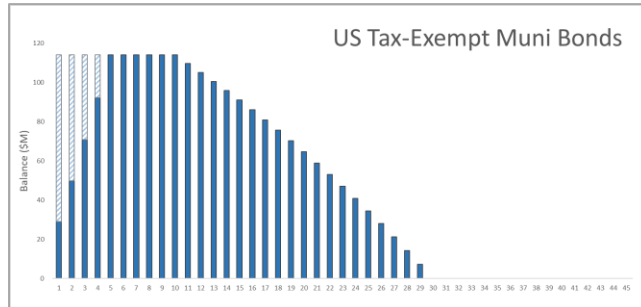
2a Borrower Objective: Fine-Tuning Capitalization of Big Projects?

Theory: Highly rated borrowers seek to optimize debt capitalization of big, long-lived projects to maximize efficient use of local resources and minimize uncertainty. This is a fine-tuned exercise, including many factors:

- A long-lived project will likely have a long construction period – how to manage risk of rate rises?
- A big project may need a significant increase in water rates – how to manage this increase over time to be least disruptive to the community but still financially cost-effective?
- A big tax-exempt financing will use up bond market capacity – better to keep that powder dry? But will placement in another, unfamiliar market be time-consuming and uncertain?
- Example 'wish list' for debt capitalization of long-lived project:

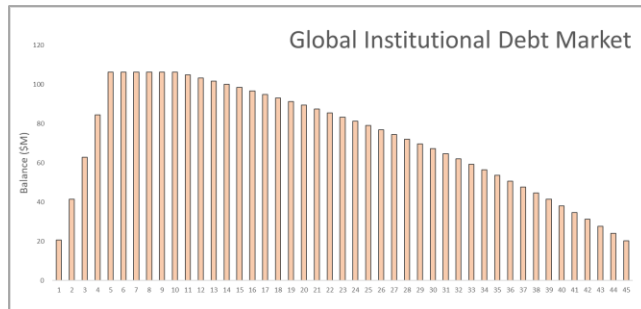


2b Borrowers Have Good – But Not Quite Perfect – Options



✓ Tax-exempt bond rates within 30-year market are generally less than or close to US Treasury rates for highly rated borrowers. Par prepay after 5 or 10 years.

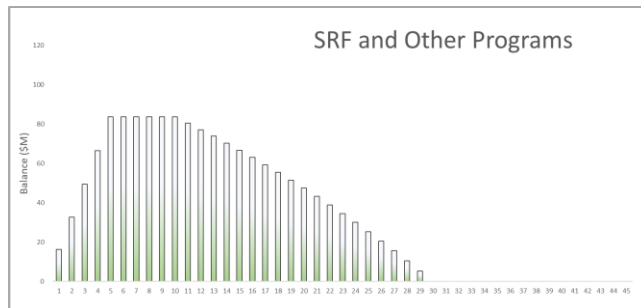
x Mainly limited to a US retail investor base that monetizes the tax benefit within 30-year term in a small-denomination public bond form. Tax rules also cause more negative arbitrage in escrow accounts.



✓ Institutional debt markets for highly rated borrowers are deep, offer very long tenors and lend in many forms.

x Taxable rates are much higher than tax-exempt, and prepayment incurs a make-whole penalty.

x Often new territory for public-sectors issuers, raising placement uncertainty and additional transaction costs.



✓ SRFs offer discounted rates. Public water systems are naturally familiar with their state programs.

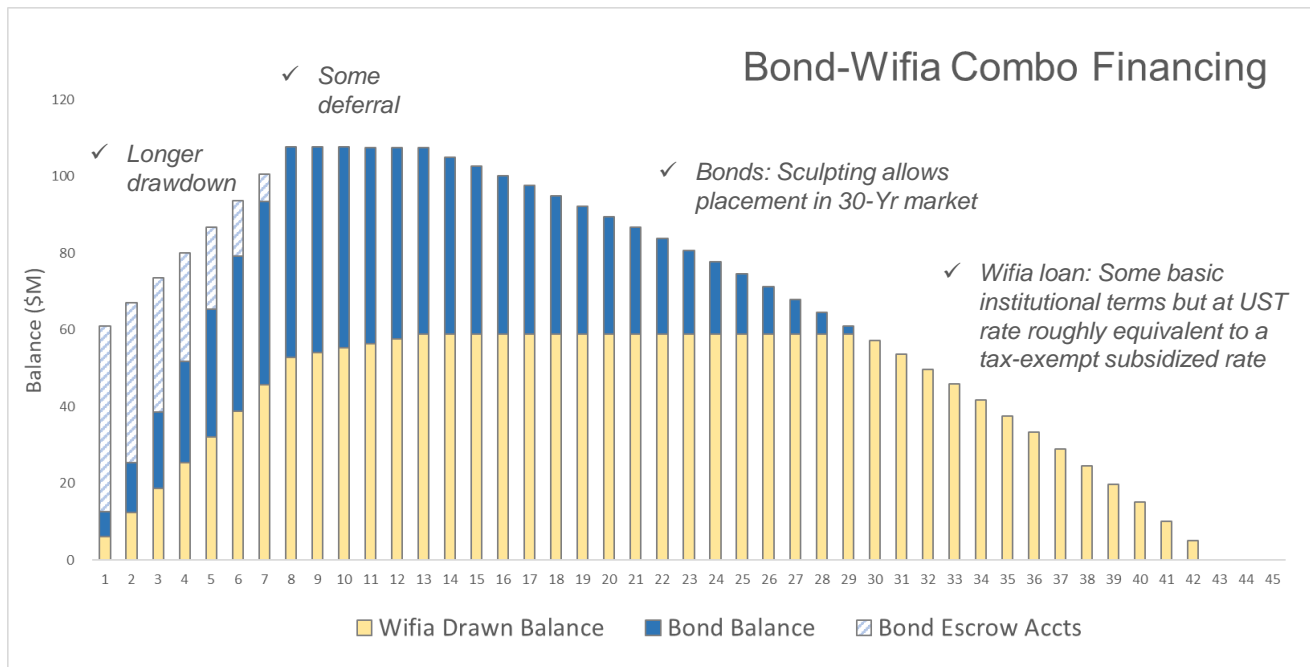
x Similar term and standardized form limitation with exceptions, as in tax-exempt market. Large communities may be excluded, or loan amounts may be capped.

x Waiting lists and prioritization of smaller, more challenged applicants may lead to placement uncertainty.

2c The Program Offers a Unique Deal, Closer to Optimal

Theory: A Wifia loan combined with a tax-exempt bond issue provides two-tranche capitalization that's closer to optimal for long-lived assets.

- Non-pro-rata amortization ('sculpting') allows the bonds to be placed within their natural 30-year market at lowest yields. This also reduces negative arbitrage on escrows.
- In addition to rate-locked drawdown and deferral, the Wifia loan tranche combines (1) some institutional features that are useful for long-lived assets (tenor, placement) with (2) UST flat-forward rates that are roughly equivalent to attaching the tax-exempt subsidized rate to an institutional loan.
- In effect, the Program acts as a debt market 'adjunct' for long-lived infrastructure projects.



3a Lender Perspective: Market Distortion from Retail Investor Base?

Theory: Due to long-established tax-exempt subsidy, the muni market has become primary source of debt capital for state & local public infrastructure. The market's investor base (US retail public bond buyers) is great for debt terms within 30 years. But this base requires significantly higher yields for longer terms, which is a disadvantage for optimal capitalization of long-lived infrastructure projects. See Appendix B

30 Years	US Retail Muni Buyer	Global Institutional	Wifia Loan Program
Base Yield (UST)	2.20%	2.20%	2.20%
Liquidity Premium + Profit	0.47%	0.55%	0.00%
Annual Credit Loss Cost	0.05%	0.05%	0.05%
From Federal Taxpayers*	-0.53%	0.00%	-0.05%
Observed Market Yield	2.20%	2.80%	2.20%

45 Years	US Retail Muni Buyer	Global Institutional	Wifia Loan Program
Base Yield (UST)	2.20%	2.20%	2.20%
Liquidity Premium + Profit	0.97%	0.60%	0.00%
Annual Credit Loss Cost	0.05%	0.05%	0.05%
From Federal Taxpayers*	-0.63%	0.00%	-0.05%
Interpolated/Estimated Yield	2.60%	2.85%	2.20%

- Within the 30-year muni market, highly rated bonds are liquid and issued in small denominations – perfect for US retail buyers who can monetize the tax exemption.
- Low liquidity premium plus tax benefit means tax-exempt yields below or close to UST rates.
- Outside the 30-year market, there's much less liquidity. This is especially difficult for US retail buyers – and required yields rise significantly.
- If the tax-exemption applied global institutional investors, rates in that market would also be around UST flat even beyond 30 years.
- This discontinuity (caused by the retail-oriented mechanics of the tax-exemption subsidy) is a distorting factor for long-lived infrastructure capitalization.

*Assumes 25% tax rate for muni buyers; ~0.50% FCRA reserve for Wifia loan

3b Federal Lender Policy Context: OMB 129

Theory: Is this theory of Program as a 'market adjunct' consistent with federal policy objectives?

1. The Federal objectives to be achieved, including:

- a. Whether the credit program is intended to:
 - i. **Correct a capital market imperfection**, which should be defined and quantified;
 - ii. **Subsidize borrowers** or other beneficiaries, who should be identified; and/or
 - iii. **Encourage certain activities**, which should be specified.
- b. Why they cannot be achieved without Federal credit assistance, including:
 - i. A description of existing and **potential private sources of credit by type of institution**, and the availability, terms and conditions, and cost of credit to borrowers;
 - ii. An explanation as to whether and why these **private sources of financing must be supplemented and/or subsidized**;

5. The effects on private capital markets.

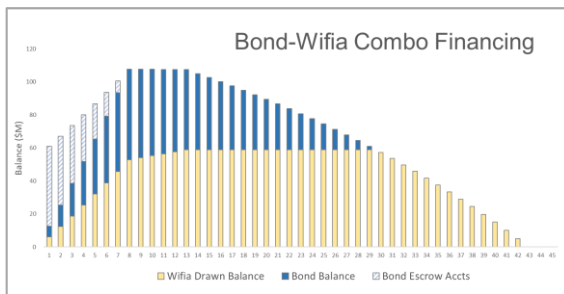
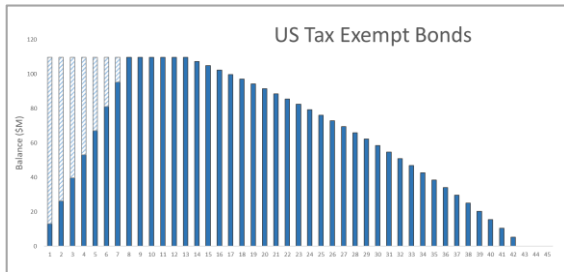
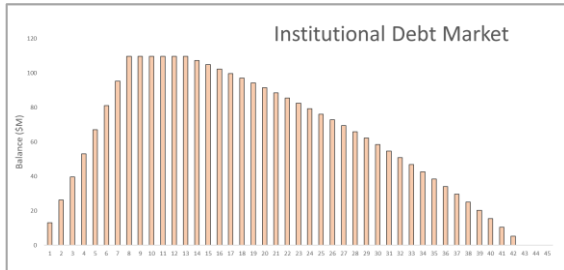
The review should estimate the **extent to which the program substitutes directly or indirectly for private lending** and analyze any elements of program design that encourage and supplement private lending activity, with the **objective that private lending is displaced to the smallest degree** possible by agency programs.

- ✓ Program mitigates the market distortion against long-lived assets caused by tax-exemption subsidy being primarily available only to US retail buyers
- ✓ Extends roughly similar subsidy as tax-exemption directly to public-sector agencies for terms beyond 30 years.
- ✓ Encourages better allocation of community resources for big long-lived infrastructure projects – *this is the Program's specific US infrastructure additionality.*
- ✓ Private markets are a good option, but currently slightly distorted against long-lived public infrastructure assets
- ✓ Private infrastructure debt markets supplemented with Wifia 'market adjunct' fixes the distortion very efficiently, without causing other distortions

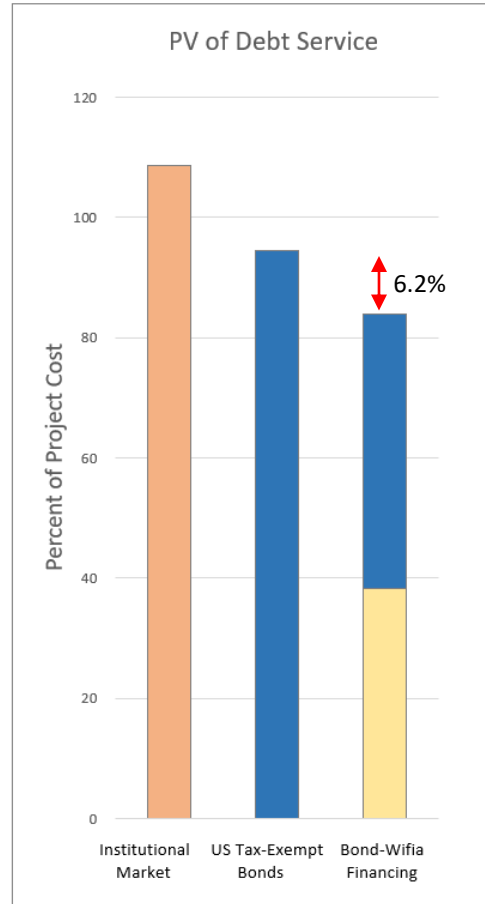
- ✓ The Program will not displace lending when the 30-year tax-exempt market is the best option to finance a public infrastructure asset
- ✓ Only debt related to the distortion for long-lived infrastructure assets is displaced – highly rated borrowers make a fine-tuned decision about their best options

4a Measure: Apples-to-Apples Comparison of Debt Service PV

Step 1: Model alternatives comparably



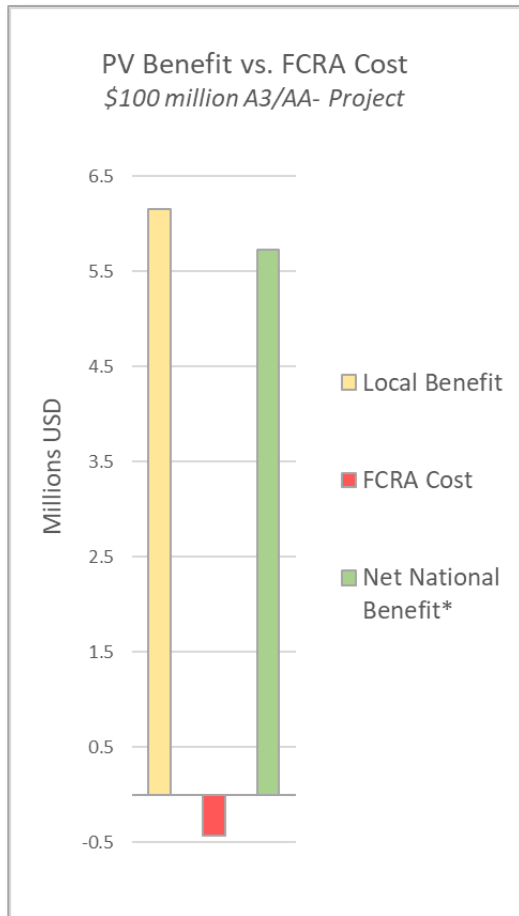
Step 2: Compare PV of debt service



- Comparing the discounted present value (PV) of different costs is standard benefit-cost methodology and public-sector Value-for-Money analyses.
- PV analysis is also used in muni bond industry's main bond evaluation software, DBC.
- Basic benefit is the difference in debt service PV between Wifia financing and next-best alternative.
- In context of long-lived infrastructure capitalization, this benefit number has real meaning.
- The PV benefit represents value of local resources saved by Wifia loan, that otherwise would have gone to pay an additional liquidity premium to a sub-optimal investor base.

4b Describing the Numbers in Policy Terms

Program results in policy terms should work for both local beneficiaries and federal taxpayers.



**Not including potential impact on federal revenue by displacement of tax-exempt debt.*

Local Benefit

- The local benefit is the PV of debt service savings made possible by Wifia financing.
- This is a clear net gain to the local community, regardless of national impact.

FCRA Cost

- Since federal lender does not require liquidity premium or profit, the only significant cost to federal taxpayers of the Wifia loan is the FCRA credit loss reserve subsidy.
- This is small amount for highly rated loans, as estimated market data.

Net National Benefit

- The 'net national benefit' is the difference between the local benefit and the cost of that benefit to federal taxpayers, expressed in dollar terms or per-dollar 'multiplier'.
- This net benefit a true gain in economic efficiency, not a transfer payment. Improved efficiency arises from better allocation of local resources and utilization of intrinsic strengths of US as lender.
- The net national benefit of Wifia Program appears to be very significant.

Summary

1. **Two Trends:** Most selected applications are highly rated borrowers with non-optional projects. How to explain this?
2. **Borrower Theory:** Borrowers are seeking to fine-tune debt capitalization of long-lived projects – Wifia helps them optimize use of local resources.
3. **Lender Theory:** Tax-exempt market is slightly distorted against long-lived infrastructure due to retail investor base – Wifia helps fix this by supplementing private markets.
4. **Best way to measure & describe:** Lower PV of debt service compared to (1) project cost for borrower and (2) FCRA credit subsidy for federal lender. Key concept: 'Net National Benefit'

Appendix A

Selected Applications 2017-2019

Preliminary Scoring Codes

Status	Bond Rating	Project Optionality: Based on Project Description and keywords
P: Pending C: Closed W: Withdrawn	1. AAA Aaa 2. AA+ Aa1 3. AA Aa2 4. AA- Aa3 5. A+ A1 6. A A2 7. A- A3 8. BBB+ Baa1 NR Not Rated	1. Non-optional: Replace, rehabilitate, repair, outdated, aged, regulatory, compliance, CSO, critical, demand, remediate 2. State Revolving Funds: Assumed waiting list for critical local projects, effectively non-optional 3. Quasi-optional: Enable, improve, resiliency, sustainable, efficiency 4. Optional: Alternative, project, new, pilot, technology, desalination

Basic Preliminary Data (Primary source: EPA Wifia website; secondary sources: online search, EMMA and rating agency websites)

Applicant	Project	Project Description	Wifia Loan	Project Size	Status	Bond Rating	Project Optionality
2019							
City of Phoenix Water Services Department	Zone 3D and 4A Improvements Program	The Zone 3D and 4A Improvements Program will install both boosters and water mains to interconnect the north and south systems and enable the City to move water from wells throughout the southern part of the City to areas at higher elevation that are presently served predominantly with Colorado River water.	\$172 million	\$319 million	P	2	3
Vallejo Flood & Wastewater District	Secondary Effluent Project	The project will replace Vallejo Wastewater's primarily utilized and outdated treated effluent pump station, the Mare Island Pump Station, with a new effluent pump station to improve system reliability and protect water quality in the San Francisco Bay.	\$12 million	\$22 million	P	4	1
San Luis & Delta-Mendota Water Authority	Jones Pumping Plant Unit Motor Rehabilitation Project	The Jones Pumping Plant Unit Motor Rehabilitation Project will rehabilitate six unit-motors that have reached the end of their service life to improve the overall resiliency, reliability, and efficiency of the plant.	\$19 million	\$36 million	P	3	1
San Francisco Public Utilities Commission, Wastewater Enterprise	San Francisco Public Utilities Commission	The Headworks Project will replace the two outdated existing headworks treatment facilities at the Southeast Plant with a single centralized preliminary treatment facility to provide a centralized and efficient preliminary treatment system.	\$236 million	\$438 million	P	4	1
East County Advanced Water Purification Joint Powers Authority	East County Advanced Water Purification Project (ECAWP Project)	The Advanced Water Purification Project will treat the East County's wastewater locally and implement potable reuse by providing Advanced Water Purification treated water to Lake Jennings for surface water augmentation.	\$342 million	\$668 million	P	NR	4
City of Roseville	Water Future Initiative	The Water Future Initiative will expand Roseville's Aquifer Storage and Recover Program by six new well sites and construct a new 12 million gallons per day (MGD) tertiary filtration system, a pilot-scale study of a carbon-based advanced treatment (CBAT) train, and a 3 MGD CBAT facility.	\$37 million	\$69 million	P	2	4

Appendix A (cont.)

Monterey One Water	Pure Water Monterey Groundwater Replenishment Project	The Pure Water Monterey project will produce up to 10,350 acre-feet per year of new waters by recycling wastewater.	\$44 million	\$175 million	P	4	4
City of Oceanside	Buccaneer Sewer Lift Station and Force Main Project	The Buccaneer Sewer Lift Station and Force Main Project will optimize and enhance the City's wastewater system by redirecting sewage flows from the aging La Salina Wastewater Treatment Plant to the existing centralized reclamation facility, the San Luis Rey Water Reclamation Facility, for treatment and injection into the Mission Groundwater Basin.	\$47 million	\$87 million	P	4	1
City of Oceanside	Pure Water Oceanside and Lower Recycled Water Distribution System Expansion Project	The Pure Water Oceanside Project will enhance the City's water system by constructing a new Advanced Water Purification Facility and expanding the existing recycled water distribution system.	\$57 million	\$104 million	P	4	4
Soquel Creek Water District	Pure Water Soquel	Pure Water Soquel will use proven water purification technology to clean recycled water to produce safe, high-quality drinking water and a reliable, sustainable, and drought-resistant water supply.	\$49 million	\$91 million	P	NR	4
Poseidon Resources	Huntington Beach Desalination Plant	The Huntington Beach Desalination Plant Project will construct a seawater desalination facility that would convert seawater into 50 million gallons per day (MGD) of high-quality potable drinking water using a reverse osmosis desalination process.	\$585 million	\$1.09 billion	P	8	4
South Coast Water District	Doheny Ocean Desalination Project	The Doheny Ocean Desalination Project will produce up to 5 million gallons per day (MGD) of reliable, sustainable, locally controlled, and drought-proof water supply.	\$60 million	\$111 million	P	NR	4
City of Daly City	Vista Grande Drainage Basin Improvement Project	The Vista Grande Drainage Basin Improvement Project will address storm-related flooding in the Vista Grande Drainage Basin while providing the additional benefit of augmenting the water level of Lake Merced.	\$61 million	\$113 million	P	2	1
City of San Mateo	Basins 2 and 3 Collection System Improvements Project	The Basins 2 and 3 Collection System Improvements Project will improve the City's sanitary sewer collection system and meet regulatory requirements by replacing and upgrading aging lift stations, sewer mains, and manholes, and constructing a new wastewater flow equalization facility.	\$85 million	\$158 million	P	2	1
Miami-Dade Water and Sewer Department	South District Wastewater Treatment Plant Expansion	The South District Wastewater Treatment Plant Expansion will increase the treatment capacity from 112.5 million gallons per day (MGD) to 131 MGD annual average daily flow, and the peak hourly flow capacity from 285 MGD to 329 MGD to meet requirement of Florida's Ocean Outfall Legislation and a consent decree.	\$223 million	\$414 million	P	4	1
Polk Regional Water Cooperative	Alternative Water Supplies Program	The Alternative Water Source Program will construct 37 Lower Floridan Aquifer wells, two water treatment plants, and transmission systems to distribute 17.5 million gallons per day (MGD) of alternative water supply.	\$235 million	\$437 million	P	NR	4
City of Atlanta	Water Distribution System Resiliency Program	The Water Distribution System Resiliency Program will rehabilitate and replace aging infrastructure, facilitate water quality compliance, and provide continuous water supply to customers.	\$35 million	\$65 million	P	2	1

Appendix A (cont.)

City of Joliet	Joliet Alternative Water Source Program	The Alternative Water Source Program will construct infrastructure needed to access a new source for drinking water to replace the City's current primary water source, the deep sandstone aquifer.	TBD	TBD	P	3	3
Sewerage and Water Board of New Orleans	Sewer System Evaluation and Rehabilitation Program	The Sewer System Evaluation and Rehabilitation Program will rehabilitate and repair the sewer system to minimize sanitary system overflows and comply with the Consent Decree.	\$111 million	\$206 million	P	6	1
Baltimore City Department of Public Works	Wastewater Infrastructure Rehabilitation	The City of Baltimore will rehabilitate and upgrade major components of its wastewater collection and treatment facilities to ensure system reliability, safeguard the public health and environmental quality, and continue compliance with permits and other relevant regulations.	\$129 million	\$239 million	P	4	1
Baltimore City Department of Public Works	Water Infrastructure Rehabilitation	The proposed projects will address critical improvements to the comprehensive water distribution system to improve its reliability, performance, and drinking water quality.	\$209 million	\$388 million	P	4	1
Baltimore City Department of Public Works	Stormwater Management Project	The City of Baltimore will complete ten stormwater projects to fulfill the Total Nitrogen, Phosphorus and Sediment reduction requirements for the Chesapeake Bay Total Maximum Daily Load, assist in flooding issues, and repair and replace aging infrastructure.	\$54 million	\$100 million	P	4	1
Downriver Utility Wastewater Authority	Biosolids Dryer Facility and Other Critical Projects	Downriver Utility Wastewater Authority will implement projects to increase the resiliency of its system, including the construction of in-direct heating biosolids dryers, rehabilitation of the sewer and manholes, repair and testing of the electrical system and equipment.	\$13 million	\$24 million	P	8	3
New Jersey Infrastructure Financing Authority	New Jersey Infrastructure Bank Pool	The project will expand the reach of the New Jersey State Revolving Fund Program and allow it to support additional projects across the state.	\$149 million	\$380 million	P	1	2
Greenville Utilities Commission	Water Treatment Plant Phase 1 Upgrades	The Water Treatment Plant Phase 1 Upgrades project will increase the plant's capacity from its current 19.2 million gallons per day (MGD) firm capacity to 32 MGD, which is anticipated to meet system demands through 2035.	\$29 million	\$55 million	P	3	1
Metro Flood Diversion Authority	Fargo-Moorhead Metropolitan Area Flood Risk Management Project	The Fargo-Moorhead Metropolitan Area Flood Risk Management Project will manage uncontrolled stormwater that threatens the metropolitan area and causes high water in the Red River by temporarily storing it on vacant land.	\$561 million	\$1.13 billion	P	3	1
City of Portland	Bull Run Treatment Program	The City of Portland will complete three projects required by state and federal law to reduce potential levels of lead at the tap, remove the microorganism Cryptosporidium and other potential contaminants, and connect the filtration water treatment plant to the existing conduits.	\$554 million	\$1.03 billion	P	4	1
City of Beaverton	Water Supply Improvement Program	The Water Supply Improvement Program will include a series of projects that will enhance the reliability and resiliency of the water system to meet the needs of a growing urban area.	\$58 million	\$107 million	P	4	3
Narragansett Bay Commission	Bucklin Point Resiliency Improvements	The Bucklin Point Resiliency Improvements project will address various needs to ensure that the wastewater treatment facility can treat flows that would have previously	\$17 million	\$32 million	P	4	1

Appendix A (cont.)

		overflowed and operate efficiently, especially during periods of elevated wet weather flows.						
Bristol County Water Authority	Pawtucket Pipeline	The Pawtucket Pipeline project will construct a new water supply pipeline from the Pawtucket Water Supply Board in Pawtucket, RI, to provide the Bristol County Water Authority with an alternate water supply.	\$26 million	\$48 million	P	NR	1	
Columbia Power & Water Systems	Long Term Water Supply Program	The Long-Term Water Supply Program includes water supply, treatment and distribution system projects to meet the increasing water demands of the customer base while providing drought resiliency for the region.	\$106 million	\$197 million	P	NR	1	
Salt Lake City, Department of Public Utilities	Water Reclamation Facility Nutrient Project	The Nutrient Project will reconstruct the 55-year old water reclamation facility and implement a new treatment process to meet new regulatory total phosphorus limits and increase system resiliency.	\$355 million	\$660 million	P	3	1	
City of Alexandria, Sanitation Authority	Tunnel System	The River-Renew project will remediate four Combined Sewer Overflow Outfalls in Alexandria and drastically reduce the discharge of combined sewage to Alexandria's waterways.	\$189 million	\$352 million	P	2	1	
City of Newport News, Waterworks Department	Advance Metering Infrastructure Project	The Advance Metering Infrastructure (AMI) project will replace the outdated metering system with new AMI meters that can be read automatically for approximately 130,000 water meters across the system's service area.	\$24 million	\$44 million	P	2	1	
Hampton Roads Sanitation District	SWIFT (Sustainable Water Initiative for Tomorrow)	The SWIFT Program will implement more than forty individual capital projects to improve the quality of the Chesapeake Bay by reducing surface water discharge of treated effluent by approximately 100 million gallons per day (MGD).	\$930 million	\$1.73 billion	P	4	1	
City of Tacoma Sewer Utility	CTP Electrical Distribution System Replacement Project	The Electrical Distribution System Replacement Project will repair, replace, and rehabilitate the entire electrical distribution system at the Central Wastewater Treatment Plant.	\$17 million	\$31 million	P	4	1	
King County	Ship Canal Water Quality Project	The Ship Canal Water Quality Project will build an offline storage tunnel to reduce the number and volume of Combined Sewer Overflows that discharge into the Lake Washington Ship Canal from the Ballard, Fremont, Wallingford, and north Queen Anne neighborhoods of the city.	\$98 million	\$181 million	P	2	1	
City of Wausau	Drinking Water System Treatment Facility Project	The Drinking Water System Treatment Facility Project will construct a new treatment facility to address needs at the City's existing water treatment facility related to aging facilities, water treatment, code compliance, and location.	\$22 million	\$41 million	P	4	1	
2018								
City of Phoenix	Water Main Replacement Program	The Water Main Replacement Program will replace over 150,000 linear feet (LF) of water distribution mains, including replacement of the corresponding water service lines, hydrants and valves, annually.	\$49 million	\$100 million	W	4	1	
San Mateo-Foster City Public Financing Authority	San Mateo Wastewater Treatment Plant Upgrade and Expansion Project	The San Mateo Wastewater Treatment Plant will be modified to replace and repair aging infrastructure, provide capacity for wet weather flows, eliminate effluent blending, produce a higher quality effluent, enhance system reliability, and support sustainability goals.	\$277 million	\$566 million	P	2	1	

Appendix A (cont.)

Coachella Valley Water District	Coachella Valley Stormwater Channel Improvement Project	Coachella Valley Stormwater Channel Improvement Project will make stormwater channel improvements to increase capacity to capture and convey stormwater, reduce stormwater runoff to the surrounding areas, and help the district meet design standards.	\$22 million	\$45 million	P	1	1
Poseidon Resources	Carlsbad Intake Project	Carlsbad Intake Project will rehabilitate the existing Carlsbad Desalination Plant to reconfigure the existing intake and discharge facilities, address compliance with the May 2015 amendment to the Water Quality Control Plan, Ocean Waters of California, and provide for a up to 10 percent increase in production capacity.	\$32 million	\$67 million	P	8	1
City of Stockton Public Financing Authority	Regional Wastewater Control Facility Modifications Project	The Regional Wastewater Control Facility Modifications project will construct new aeration basins and associated secondary clarifiers to be compliant with effluent limits for nitrogen compounds and rehabilitate other components of the system.	\$53 million	\$195 million	P	4	1
Silicon Valley Clean Water	Regional Environmental Sewer Conveyance Upgrade (RESCU) Program	The Regional Environmental Sewer Conveyance Upgrade Program consists of a combination of rehabilitating, repurposing, and decommissioning existing conveyance system assets , and the construction of replacement assets to address the imminent failure of the community's wastewater systems.	\$218 million	\$517 million	C	2	1
City of Sunnyvale	Sunnyvale Cleanwater Program Phase 2	The Sunnyvale Cleanwater Program Phase 2 project includes rehabilitation of the existing 29.5 million gallons per day (MGD) secondary and tertiary treatment facilities, construction of new secondary treatment and solids handling facilities, and reconstruction of support facilities necessary to operate the plant.	\$166 million	\$339 million	P	2	1
San Juan Water District	Hinkle and Kokila Reservoir Rehabilitation and Replacement	The Hinkle and Kokila Reservoir Rehabilitation and Replacement project involves the replacement and rehabilitation of two existing potable drinking water storage reservoirs to improve the inlet and outlet structures and replace the covers.	\$12 million	\$28 million	W	2	1
City of Los Angeles	Donald C. Tillman Advanced Water Purification Facility	The City of Los Angeles plans a major capital improvement project, the Donald C. Tillman Advanced Water Purification Facility, to turn the City's wastewater into a sustainable water source for groundwater replenishment.	\$185 million	\$378 million	P	2	3
Inland Empire Utilities Agency	Recycling plant No. 5 Expansion Project	RP-5 Expansion Project will expand the RP-5 Liquids Treatment System to meet service area growth , relocate the RP-2 Solids Treatment to RP-5, and construct a new solids treatment plant at RP-5.	\$138 million	\$345 million	P	3	1
Sanitation District No. 2 of Los Angeles County	Joint Water Pollution Control Plant Effluent Outfall Tunnel	The Joint Water Pollution Control Plant Effluent Outfall Tunnel Project will replace the two existing Joint Water Pollution Control Plant (JWPCP) effluent outfall tunnels to provide seismic resistance and system redundancy.	\$426 million	\$869 million	P	4	1
City of Antioch	Brackish Water Desalination Project	The City will construct the new Antioch Brackish Water Desalination Project with the capacity to produce up to 6 million gallons per day (MGD) of desalinated product water to offset the use of purchased water.	\$32 million	\$66 million	W	5	4
Coachella Valley Water District	North Indio Regional Flood Control Project	The proposed project is a 3.3-mile regional stormwater channel conveyance facility to manage and capture storm water and reduce reoccurring runoff and debris to the City of Indio and parts of the unincorporated county.	\$29 million	\$59 million	P	1	1

Appendix A (cont.)

District of Columbia Water and Sewer Authority	Comprehensive Infrastructure Repair, Rehabilitation and Replacement Program	The Comprehensive Infrastructure Repair, Rehabilitation and Replacement Program will rehabilitate, upgrade and/or replace aging water and wastewater infrastructure throughout the system.	\$144 million	\$295 million	P	1	1
Florida Keys Aqueduct Authority	Florida Keys Imperiled Water Supply Rehabilitation	The Florida Keys Imperiled Water Supply Rehabilitation project will include replacement of the existing, failing seawater Reverse Osmosis Facility, approximately 12 miles of piping, and a water distribution pump station.	\$45 million	\$91 million	P	4	1
City of North Miami Beach Water	Regional Potable Water Improvements	The North Miami Beach Water Regional Potable Water Improvements will include a 4-phased expansion and rehabilitation of the aged Norwood Water Treatment Plant and its distribution and water supply facilities to meet current and future demands.	\$62 million	\$126 million	P	5	1
Miami-Dade County	Wastewater Treatment Plant (WWTP) Electrical Distribution Building Upgrade	The Wastewater Treatment Plant Electrical Distribution Building Upgrade will design and construct five new electrical distribution buildings across Miami-Dade County's three wastewater treatment plants.	\$343 million	\$699 million	P	4	3
Tohopekaliga Water Authority	Accelerated Gravity Sewer Assessment and Rehabilitation Project	The Accelerated Gravity Sewer Assessment and Rehabilitation project will rehabilitate 65 high priority wastewater pumping station basins including over 900,000 feet of gravity mains.	\$32 million	\$65 million	P	2	1
Pinellas County Utilities	Water Reclamation Facility Improvements	The Water Reclamation Facility Improvements Project will include installation of a cloth media filter system, new disinfection system, and other structural modifications at the William E. Dunn Water Reclamation Facility and improvement of the grit removal system at the South Cross Bayou Water Reclamation Facility.	\$13 million	\$27 million	W	3	3
DeKalb County Government	Priority Areas Sewer Assessment & Rehabilitation Program (PASARP) Consent Decree Packages	Priority Areas Sewer Assessment & Rehabilitation Program Consent Decree Packages will rehabilitate and repair an aging wastewater collection and treatment system to comply with its December 2011 Sanitary Sewer Overflow Consent Decree.	\$251 million	\$526 million	P	4	1
City of Atlanta	North Fork Peachtree Creek Tank and Pump Station	North Fork Peachtree Creek Tank and Pump Station Project will construct an off-line temporary 15-million-gallon capacity storage tank for peak wet weather sewage flow from the Peachtree Creek North Fork trunk sewer.	\$55 million	\$113 million	P	2	1
City of Wichita	Northwest Water Treatment Facility (NWWTF)	The Northwest Water Treatment Facility will provide 120 million gallons per day (MGD) of firm capacity and replace the existing, aging Main Water Treatment Plant (MWTP).	\$270 million	\$550 million	P	2	1
City of Frontenac	Water Supply, Treatment, Distribution and Storage Improvements and Additions	The proposed drinking water system project includes a new well, water treatment facility upgrades, water distribution system improvements , existing 75,000-gallon elevated water storage tank improvements, and a new 250,000-gallon elevated water storage tank.	\$5 million	\$11 million	W	NR	1

Appendix A (cont.)

Louisville and Jefferson County Metropolitan Sewer District	Upper Middle Fork Pump Station (UMFPS) - Louisville, Kentucky	The Upper Middle Fork Pump Station project includes replacement of the existing Upper Middle Fork Pump Station with a new efficient 30 million gallons per day (MGD) Pump Station, installation of a relief interceptor to convey flows in excess of the current interceptor capacity, installation of a diversion gate, and extension of 30-inch force main from the pump station site to the Hikes Lane Interceptor.	\$44 million	\$90 million	W	4	1
Louisville and Jefferson County Metropolitan Sewer District	Ohio River Flood Pump Station Capacity Upgrades, Louisville, Kentucky	This project will evaluate and expand the existing Ohio River Flood Protection System to accommodate an increased total pumping capacity of approximately 1,600 million gallons per day (MGD) to meet a 10-percent annual chance of exceedance, 24-hour storm based on a projections to the year 2035.	\$118 million	\$240 million	W	4	1
Louisville and Jefferson County Metropolitan Sewer District	Morris Forman Biosolids Processing Solution, Louisville, Kentucky	Morris Forman Biosolids Processing Solution project will consist of new construction and replacement/refurbishment of existing equipment to provide sustainable Class A biosolids, allow for energy recovery and production for on-site use, and reduce the amounts of dewatered solids sent to landfill.	\$88 million	\$179 million	P	4	1
American Water Capital Corporation	St. Louis Area Water Main Replacement and Lead Abatement Program	The St. Louis Area Water Main Replacement and Lead Abatement Program will include the replacement of approximately 100 miles of main and adjacent customer-owned lead service lines.	\$84 million	\$171 million	W	6	1
American Water Capital Corp. (AWCC) - Joplin	Joplin Water Supply Reservoir	The Joplin Water Supply Reservoir project will construct a new dam, 1,000 to 1,500-acre water supply reservoir, and pumping facilities to provide a reliable water supply source for the Joplin area.	\$103 million	\$210 million	P	6	3
Kansas City Missouri Water Services Department	Blue River WWTP Biosolids Facility Project	The Blue River Wastewater Treatment Plant Biosolids Facility Project will improve the existing solids management processes to meet anticipated solids capacity, reliability, and regulatory requirements through 2035.	\$51 million	\$105 million	W	3	1
City of Cortland	City of Cortland Clinton Avenue Gateway Project	The Clinton Avenue Gateway project will replace aged water, sanitary sewer, and storm drainage, including water main, services, hydrants and valves.	\$9 million	\$19 million	P	5	1
Monroe County	Frank E. Van Lare Secondary Treatment Upgrades	The Frank E. Van Lare Secondary Treatment Upgrades project will improve secondary system treatment performance by implementing miscellaneous plant infrastructure improvements that will facilitate the Rapid Response Plan, improvements to the aeration system, and improvements to the secondary clarifiers.	\$15 million	\$31 million	W	6	3
Brunswick County	Northwest Water Treatment Plant 36 MGD Improvements Project	The Brunswick County's Northwest Water Treatment Plant will add advanced treatment processes that can reliably remove harmful contaminants and expand from 24 million gallons per day (MGD) to 36 MGD to keep up with growth in Brunswick County.	\$74 million	\$152 million	P	4	1
Enid Municipal Authority	Enid KLWS Pipeline	The Kaw Lake Alternative Water Supply Project consists of four infrastructure construction projects: (1) a micro-tunnel intake to withdrawal water from Kaw Lake; (2) 70-miles raw water conveyance pipeline; (3) a new 10.5 million gallons per day (MGD) water treatment plant (WTP); and (4) distribution system improvements.	\$53 million	\$146 million	W	3	4

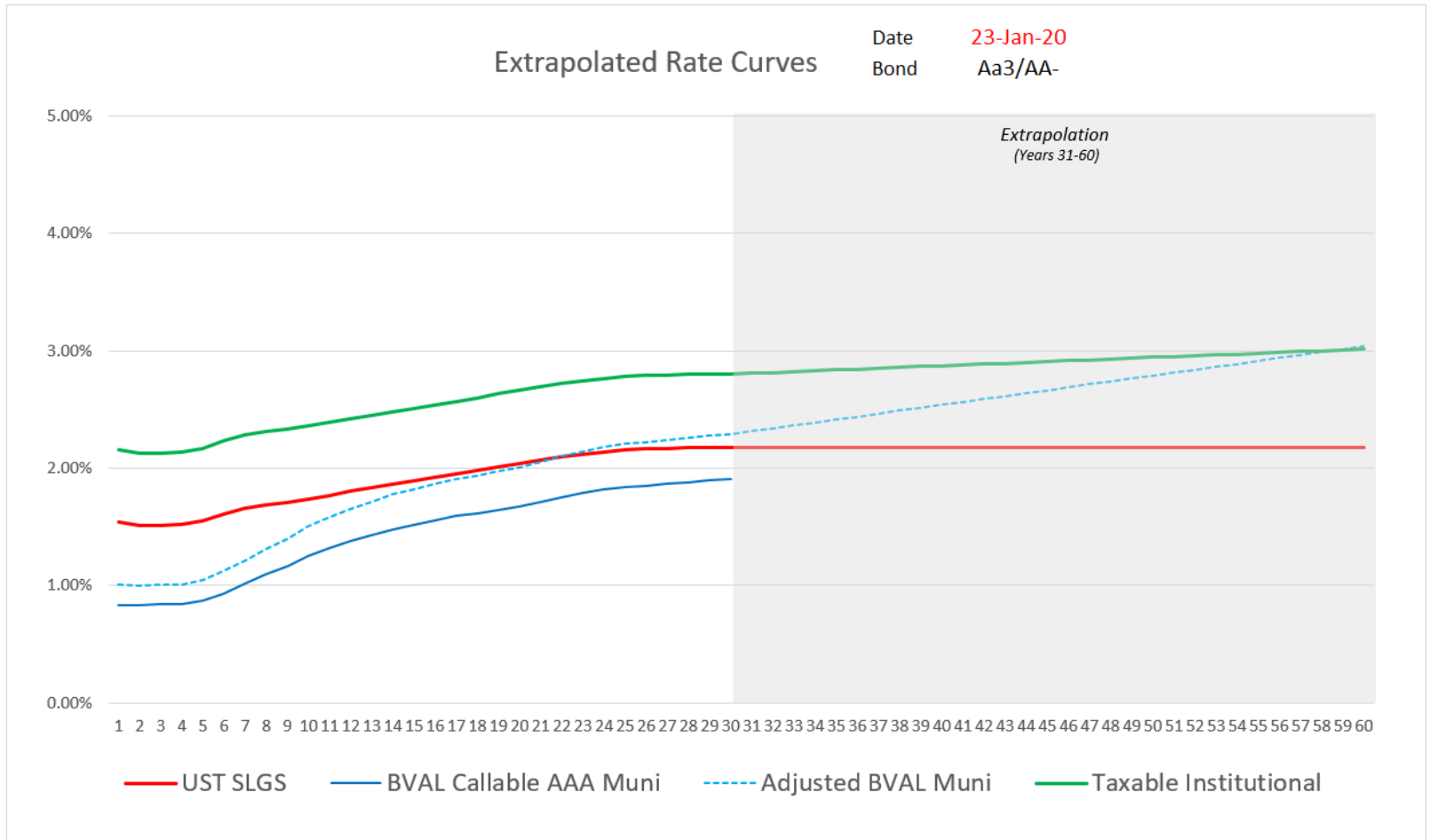
Appendix A (cont.)

City of Hillsboro	Willamette Water Supply Program (WWSP)	Phase 1 of the Willamette Water Supply Program (WWSP) will provide 60 million gallons per day (MGD) of <u>resilient drinking water</u> to the City of Hillsboro and Tualatin Valley Water District.	\$250.5 million	\$1.3 billion	C	2	3
Tualatin Valley Water District	Willamette Water Supply Program (WWSP)	Phase 1 of the Willamette Water Supply Program (WWSP) will provide 60 million gallons per day (MGD) of <u>resilient drinking water</u> to the City of Hillsboro and Tualatin Valley Water District.	\$387.7 million	\$1.3 billion	C	2	3
City of Lancaster	Sewer System Improvements	The Sewer System Improvements program will include <u>replacement and rehabilitation</u> of sewers, upgrades to three pumping stations, study and implementation of a groundwater injection program, and stream daylighting.	\$22 million	\$44 million	W	4	1
Narragansett Bay Commission	Combined Sewer Overflow (CSO) Phase III Facilities	The <u>Combined Sewer Overflow</u> (CSO) Phase III Facilities project includes design and construction of a storage tunnel and associated infrastructure to provide a storage volume of 58.6 million gallons.	\$268.7 million	\$548 million	C	4	1
City of Memphis	T.E. Maxson Wastewater Treatment Facility Process and Biosolids Upgrades Program	The T.E. Maxson Wastewater Treatment Facility Process and Biosolids Upgrades Program will include projects to subdivide an existing lagoon, construct a new administration building, <u>renovate</u> an existing lagoon, and <u>replace</u> belt filter presses and primary clarifiers.	\$144 million	\$250 million	P	3	1
City of Seattle	Ship Canal Water Quality Project	Ship Canal Water Quality Project will build an offline storage tunnel to reduce the number and volume of <u>Combined Sewer Overflows</u> (CSOs) that discharge into the Lake Washington Ship Canal from Ballard, Fremont, Wallingford, and north Queen Anne.	\$197 million	\$402 million	P	3	1
City of Waukesha Water Utility	Great Lakes Water Supply Project (Great Water Alliance [GWA] Program)	The Great Lakes Water Supply Project will include the <u>infrastructure needed to transition from the city's contaminated</u> groundwater water supply to Lake Michigan water and then return it to Lake Michigan after use and high levels of wastewater treatment.	\$116 million	\$300 million	P	4	1
2017							
Miami-Dade County	Ocean Outfall Discharge Reduction and Resiliency Enhancement Project	Construction of new wells at three wastewater treatment plants to allow for <u>redirecting existing effluent discharges</u> from the ocean outfalls to injection wells.	\$99.7 million	\$203.5 million	C	4	1
Metropolitan St. Louis Sewer District	Deer Creek Sanitary Tunnel and Sanitary Relief	Construction of a pump station at the downstream end of a sanitary sewage storage tunnel and approximately 15,900 feet of 8-inch to 54-inch sanitary sewer and slip-line 1,700 feet of sanitary sewer and appurtenances to <u>address sanitary sewer overflows</u> .	\$47.7 million	\$97 million	C	2	1
City of Omaha	Saddle Creek Combined Sewer Overflow Retention Treatment Basin	Construction of a new retention treatment basin to address <u>combined sewer overflows</u> in the Saddle Creek Basin.	\$69.7 million	\$142.2 million	C	2	1
Orange County Water District	Groundwater Replenishment System Final Expansion	Expansion of the existing water recycling plant from 100 million of gallons per day to 130 million of gallons per day by using treated wastewater from the Orange County Sanitation District Plant #2.	\$135 million	\$282 million	C	2	3

Appendix A (cont.)

City of San Diego	Pure Water San Diego	Construction of Phase 1-North City of San Diego's multi-year Pure Water program to achieve 30 million of gallons per day of purified water production by 2021.	\$614 million	\$1.4 billion	C	4	3
Indiana Finance Authority	Indiana Finance Authority FY 2017	Expand the reach of its Clean Water and Drinking Water State Revolving Fund programs and fund dozens of additional projects in communities across the state.	\$436 million	\$890 million	C	1	2
King County	Georgetown Wet Weather Treatment Station	Construction of a new Wet Weather Treatment Station using high-rate clarification, conveyance pipelines, and outfall structure to treat and convey combined sewer overflows prior to being discharged into the Lower Duwamish Waterway.	\$134.5 million	\$275 million	C	2	1
Baltimore City Department of Public Works	Comprehensive Wastewater Repair, Rehabilitation, and Replacement Program	Fourteen projects to repair, rehabilitate, and replace existing wastewater conveyances, update treatment plants, and manage stormwater. The sanitary sewer collection system projects include pipe and manhole rehabilitation. All collection system projects will be undertaken with a common purpose to eliminate sanitary sewer overflows (SSOs). The wastewater facility projects will all ensure the reliability and performance of the wastewater treatment plants.	\$202 million	\$942 million	C	4	1
Maine Water Company	Saco River Water Treatment Facility	Construction of a new 20 million of gallons per day water treatment facility to replace the existing facility that has been providing service to the communities of Biddeford, Saco, Old Orchard Beach, and Scarborough, Maine since 1884.	\$25 million	\$50 million	W	NR	1
City of Oak Ridge	Water Treatment Plant Design and Construction	Design and construction of a new 16 million of gallons per day membrane treatment plant and associated assets to replace the existing 80-year old conventional treatment plant, which is currently at capacity and beyond its useful life.	\$20.7 million	\$42 million	C	3	1
City of Morro Bay	Water Reclamation Facility Project	Replacement of the 62-year-old Morro Bay-Cayucos Wastewater Treatment Plant with a new water reclamation facility.	\$82 million	\$167 million	P	NR	1
San Francisco Public Utilities Commission	Southeast Water Pollution Control Plant Biosolids Digester Facilities Project	Replacement of the outdated existing 60-year old solids treatment facilities with infrastructure that produces higher-quality Class A biosolids, captures and treats odors more effectively, and maximizes biogas utilization and energy recovery.	\$699 million	\$1.4 billion	C	4	1

Appendix B: Extrapolated Rate Curves



Contact

InRecap LLC

John Ryan

Telephone: 1.917.270.3784
Email: jryan@inrecap.com
Website: www.inrecap.com