



Flood Mitigation Impact Bond

OVERVIEW

This bond allows institutional investors to invest in natural flood mitigation infrastructure in the New York Tri-State area. This natural infrastructure will protect vulnerable areas from flood damage and lead to long-term savings for homeowners, the government, insurance companies, and others.

THE CHALLENGE: FLOOD RISK

Flooding is the most damaging natural disaster in the U.S. On average, the U.S. spends over \$8 billion in annual flood damage repairs. Large storms can lead to much greater damages. For instance, in 2012, Hurricane Sandy resulted in repairs of over \$30 billion. The Federal Emergency Management Agency (FEMA) insures over \$1 trillion through the National Flood Insurance Program (NFIP), including over \$119 billion for the NY Tri-State area.¹ Homeowners currently pay flood insurance premiums that represent only a fraction of the risk they face. FEMA subsidizes 50-67% of these flood insurance premiums through NFIP.² These subsidies are unsustainable and FEMA must explore options to reduce flood risk and reduce future financial liability.

Extreme weather events and associated flooding will increase with a changing climate and as infrastructure failures rise. Flood mitigation infrastructure in the U.S. is in disrepair. The American Society of Civil Engineers recently rated the country's levee system a D-.³ The U.S. Army Corps of Engineers (USACE) lacks the resources and capacity necessary to maintain infrastructure and is searching for creative strategies to finance infrastructure projects, particularly in the NY Tri-State area.

THE OPPORTUNITY: NATURAL INFRASTRUCTURE

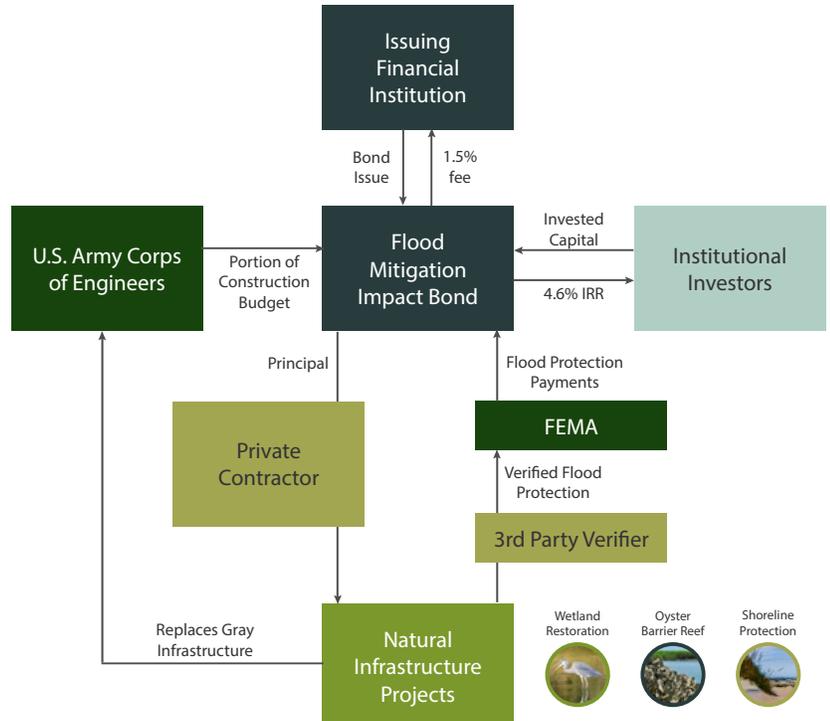
Investor appetite for environmental bonds is high with issuances of over \$14 billion in 2013 alone.⁴ The Flood Mitigation Impact Bond (FMIB) will mobilize private capital to invest in coastal ecosystem restoration through natural infrastructure projects. Like built infrastructure, natural infrastructure (e.g., wetlands and oyster beds) provides flood protection by dissipating waves. Natural infrastructure is often more affordable than built infrastructure. For example, oyster beds have an installation cost of \$1 million/mile, while gray infrastructure rock barriers have a cost of \$1.5-3 million/mile.⁵ Furthermore, the Homeowner Flood Insurance Affordability Act of 2014 requires FEMA to consider the benefits of natural infrastructure.

FLOOD MITIGATION IMPACT BOND

FMIB offers investors a 4.6% return from coastal ecosystem restoration projects in the NY Tri-State Area. There are two primary streams of revenue going to bondholders.

Revenue Stream #1: The FMIB will mimic the "Pay for Performance" (PFP) structure successfully used by social impact bonds. Natural infrastructure projects will deliver measurable reductions in flood risk – on average \$51,000/ha⁶ annually for wetlands – which will lower future FEMA disaster relief spending and NFIP claim payouts. Once delivery of flood protection services is verified, FEMA will issue flood protection payments to FMIB based on the cost savings received as stipulated in the PFP contract. We believe there is significant appetite for this as FEMA already pays homeowners for flood risk reductions through the Community Rating System program.

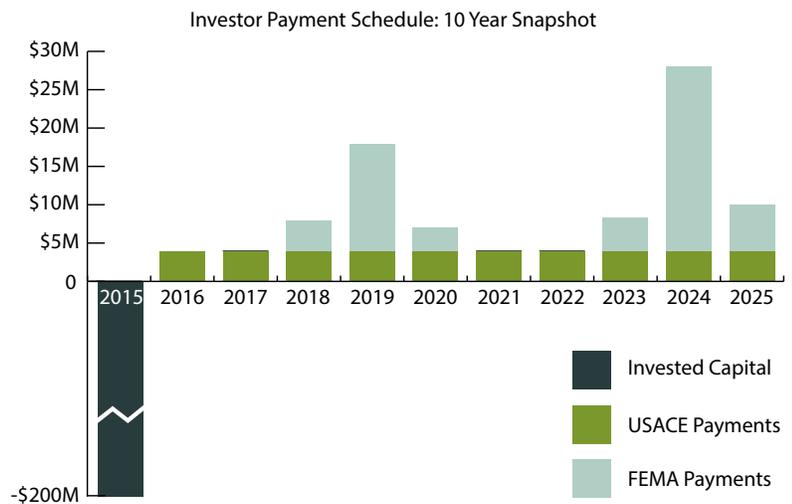
Revenue Stream #2: The FMIB will also receive funds from the USACE, who are expected to pay into the fund in exchange for the natural infrastructure projects. Not only will the projects fulfill USACE's mandate, the natural infrastructure projects will be less costly for the USACE to maintain in the future. Projects will be implemented through existing USACE-approved contractors, allowing the FMIB to function within USACE's normal budget allocation process. The USACE payments will provide stable cash flows that complement the more volatile PFP payments from FEMA.



Additional Revenue Streams: Wherever possible, the project will sell easements, seek grant funding, and build alternative revenue streams to further enhance investor returns.

ASSUMPTIONS

- Flood insurance claims and disaster relief spending are projected to rise. NFIP policyholders will increase by 80-100% by 2100. As a result, annual NFIP premiums are expected to increase from \$3.2 billion to \$6.4-11.2 billion by 2100.⁷
- Government agencies are liquidity constrained, creating a need for private capital. The NFIP has been at high risk for fiscal insolvency since 2006, with a deficit of \$24 billion currently owed to the U.S. Treasury.⁸
- FEMA and USACE will be willing to pay a portion of future cost savings to bondholders. Past political activity, such as Biggert-Waters Insurance Flood Reform Act of 2012 and the Homeowner Flood Insurance Affordability Act of 2014, are evidence of the political appetite to relieve the government from its flood insurance liabilities. Natural infrastructure is an efficient use of funds; each \$1 spent on mitigation results in a savings of \$4.⁹



RISK FACTORS

- Volatility of flood events: smoothing volatility through 50 year offering
- Securing contractual agreement among government partners: many precedents exists, e.g., U.S. Forest Service for wildfire risk reduction.
- Ability to measure flood mitigation performance: by using the extensive system of USGS flood gauges, sophisticated modelling, and a third-party verifier, we will be able to gather robust flood data and partner with the USACE on a project-by-project basis through contract agreements similar to those established with regional mitigation banks.

ENVIRONMENTAL AND SOCIAL IMPACT: FMIB will restore ~700 acres of coastlines providing numerous measurable ecosystem service benefits, e.g., water quality improvement, wildlife habitat, and recreation and tourism.

IMPACT METRICS: Flood mitigation will be measured by creating local flood benchmarks with sophisticated modelling and ongoing USGS flood datasets to track project performance. Additional ecosystem services can also be measured by USGS (water quality), NFWF (wildlife habitat), and Tri-State Area city and state governments (recreation and tourism).

SCALABILITY: Our target region for this bond only represents 22% of FEMA’s insurance obligations. This model has significant replication potential in areas vulnerable to flooding such as the Gulf Coast and the Outer Banks, for example.

BOND OVERVIEW:			
Target Bond Offering: \$200MM	Asset class: Fixed Income	Investment Criteria: • FEMA-designated high flood risk zones • 10-50 contiguous acres & ecological significance • 50 year min. commitment from partners and agencies	Expected Project-Based Cash Flows: • Performance Payments from FEMA • Contractual payments from USACE • Alternative Revenues: recreational fees, oyster beds leases & oyster sales, biodiversity credits sales, etc. • Easement sales to USDA NRCS Agricultural Conservation Easements Program on qualified wetland
Target Investors: Institutional	Bond life: 50 years		
IRR: 4.6%	Fee: 1.5% on committed capital		

¹FEMA. Policy & Claim Statistics for Flood Insurance. FEMA, 2015.

²White Paper: True Market-Risk Rates for Flood Insurance. Property Casualty Insurers, June 2011.

³ASCE. 2013 Report Card for America’s Infrastructure. ASCE, 2013.

⁴Goldman Sachs Environmental Markets Group. White Paper: Environmental Finance Innovation Summit Summary. Goldman Sachs, 2014.

⁵Green Infrastructure Case Studies: Case Studies evaluated by participating companies for creation of the White Paper “The Case for Green Infrastructure.” The Nature Conservancy, 2013.

⁶Costanza, et al. “The Value of Coastal Wetlands for Hurricane Protection.” AMBIO: A Journal of the Human Environment 37(4):241-248. 2008.

⁷AECOM. The Impact of Climate Change and Population Growth on the National Flood Insurance Program through 2100. AECOM, 2013.

⁸National Flood Insurance Program. U.S. Government Accountability Office, 2015.

⁹FEMA. 2013 Budget Request – Federal Emergency Management Agency. FEMA, 2013.