UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Ms. Joanne Throwe
Chair, Environmental Finance Advisory Board
Deputy Secretary
Maryland Department of Natural Resources
580 Taylor Ave, Annapolis MD 21401

FEB 2 8 2019

Dear Ms. Throwe:

Thank you for transmitting to EPA a report from the Environmental Finance Advisory Board (EFAB) regarding requirements of private equity capital providers for financing projects in water quality restoration in the Chesapeake Bay watershed. As requested by Region 3, this report describes the framework in which investment decisions are made and how to make environmental investment more attractive for private equity capital.

The Chesapeake Bay Program's Budget & Finance Workgroup serves as a focal point for coordination related to an overall program finance system. This workgroup, with members from federal agencies, jurisdictions, and research institutions, will examine the report and its associated model.

I appreciate the collective expertise of the Board on this project. As you are aware, Dana Aunkst (aunkst.dana@epa.gov) is the new Director of EPA's Chesapeake Bay Program Office. For follow-up, please coordinate with Carin Bisland (Bisland.carin@epa.gov) of his staff. I look forward to collaborating with the Board again in the future.

Sincerely,

Cosmo Servidio
Regional Administrator
EPA Region III

cc:
Mr. Dana Aunkst, Director, EPA Chesapeake Bay Program
Ms. Sonia Brubaker, Director, Water Infrastructure Resiliency Finance Center
Mr. Edward Chu, EFAB Designated Federal Officer
Ms. Alecia Crichlow, EFAB Project Staff Lead
Ms. Cathy Libertz, Director, EPA Region 3 Water Protection Division

ENVIRONMENTAL FINANCIAL ADVISORY BOARD

DEC 3 2018

Mr. Cosmo Servidio, Regional Administrator
U. S. Environmental Protection Agency
1650 Arch St.
Mailcode - 3DA00
Philadelphia, PA 19103

Dear Mr. Servidio:

The Environmental Financial Advisory Board (EFAB) is pleased to present you with our report on *Illustrative Private Equity Capital Models for Chesapeake Bay TMDL Project*. In this report, we present an equity investor's perspective around financial outcomes, risk, and investment structure.

EPA Region 3 Chesapeake Bay Program Office requested that EFAB help clarify the requirements of private equity capital providers in order to improve access to private equity capital to finance projects geared to reduce non-point source pollution levels for nitrogen, phosphorous, and sediments as mandated under U. S. EPA's Chesapeake Bay (Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia, and the District of Columbia) Total Maximum Daily Load (TMDL) requirements by 2025. With increasing financial needs and stable or decreasing public financing and public/private grant funding available, communities are increasingly required to consider innovative financing approaches that may involve the private equity capital markets to work alongside public finance and grants to finance water quality restoration projects.

To address this charge, EFAB prepared the following: 1) a brief analytical report to identify key stakeholders and to clarify how key stakeholders would approach such a project; and 2) an Excel-based financial model (which will be sent via electronic email), with a manual on how the model works, to demonstrate how private equity organizes and analyzes prospective investment opportunities. In addition to providing the Bay Program Office with an investor's perspective, this report is intended to add to the body of work to ensure that recommendations to date from the University of Maryland Environmental Finance Center (EFC) and others can be implemented into workable, scalable programs.

In our discussions with both the Bay Program and the EFC, this report and corresponding model should serve to educate policymakers and key stakeholders about the roles and limitations of using private equity to secure TMDL compliance. The parties agreed that it would be premature to provide guidance beyond a basic understanding of how private equity financing works at this time—as to calculate demand for such financing would need to follow a comprehensive analysis of project supply and demand across all six Bay States. While the TMDL provides for a uniform regulatory environment in which to evaluate potential opportunities, each individual state has its own rules around qualifying projects and corresponding credit generation, procurement of water quality credits, and the agencies/municipalities that are qualified to purchase those credits as a

We hope that you find this report and corresponding materials valuable to EPA and we thank you for the opportunity to assist you with this charge. Craig Holland and Suzanne Kim who co-chaired this project together are more than happy to lead a webinar, which can be recorded, to demonstrate the operation of the excel spreadsheet.

Sincerely,

Joanne Throwe
EFAB Chair

Enclosure

cc: Ms. Dominique Lueckenhoff, Senior Advisor
Public Private Partnerships

Mr. James Edward, Acting Director
Chesapeake Bay Program

Ms. Carin Bisland, Acting Associate Director
Office of Science, Analysis & Implementation

Ms. Cathy Libertz, Director
Water Protection Division

Mr. Andrew Sawyers, Director
Office of Wastewater Management

Environmental Financial Advisory Board

EFAB

Edward Chu
Designated Federal Officer

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Illustrative Private Equity Capital Model: Chesapeake Bay Water Quality Project

This report has not been reviewed for approval by the U.S. Environmental Protection Agency; and hence, the views and opinions expressed in the report do not necessarily represent those of the Agency or any other agencies in the Federal Government.

November 2018

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ILLUSTRATIVE PRIVATE EQUITY CAPITAL MODEL:

CHESAPEAKE BAY WATER QUALITY PROJECTS

EPA Region 3 Chesapeake Bay Program Office requests that the Environmental Financial Advisory Board ("EFAB") help clarify the requirements of private equity capital providers in order to improve access to private equity capital to finance projects geared to reduce non-point source pollution levels for nitrogen, phosphorous, and sediments as mandated under US EPA's Chesapeake Bay (Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia, and the District of Columbia) Total Maximum Daily Load ("TMDL") requirements by 2025. With increasing needs and limited public financing and public/private grant funding available, communities are increasingly required to consider innovative financing approaches that might involve the private equity capital markets to working alongside public finance and grants to finance water quality restoration projects.

I. INTRODUCTION

A. THE PROBLEM

There is limited, stable public financing and public/private grant funding to design, implement, and complete water quality restoration projects at a scale necessary to meet Chesapeake Bay-wide water quality goals; therefore, stakeholders must also access private capital markets. Some sources of private capital, however, may not currently regard Chesapeake Bay water quality projects as an attractive investment opportunity. The purpose of this research is to understand what information is required in the re/design of projects and programs in order to attract private equity capital while also meeting the objectives of two other major stakeholders, the: (1) municipalities who have traditionally relied on public financing to fulfill regulatory objectives and other ancillary goals; and (2) public lenders who need to leverage limited dollars to yield maximum public benefits.

B. THE ROLE OF ENVIRONMENTAL MARKETS

One way to attract private equity capital is through the creation and/or acquisition of credits that denominate and quantify an environmental outcome. Often referred to as "payments for ecosystem services," these "credits" can come in many forms, including the following:

- Direct transactions between governmental agencies and a regulated entity in the form of fines or tax breaks, at a fixed rate set by the agency managing the program;
- Voluntary transactions done between buyers and sellers to achieve a goal—typically to enhance the buyers' community standing or visibility—at a price set between the transacting parties; or
- A hybrid of these two that forces an ecosystem payment—typically through regulatory or policy action but one that enables the payor to do so through a market, for which there are many buyers and sellers and a dynamic price based on what the market will bear.[1]

Oftentimes, all three of these examples are mistaken for markets, but in reality only the last example is a true "market." It is within this context that private investment can flow into projects—projects that produce an instrument (i.e. a water quality 'credit') in which an investor can take a security interest.

While markets are not the only way to achieve Chesapeake Bay water quality goals or the only means by which to attract private equity capital, for the purpose of simplicity the workgroup decided to focus on existing EPA guidance on nutrient trading as a means of illustrating a private equity investment opportunity.

C. WHAT IS CURRENTLY BEING DONE

There have been studies and pilot programs completed over the last five years that outline considerations and options for creating state- and municipal-sponsored nutrient trading programs. The EPA provides guidance to assist Bay jurisdictions in creating or strengthening trading and offset

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[1] Bayon, R. (n.d.). *Beyond Carbon: Biodiversity and Water Markets*. Ecosystem Marketplace. Retrieved July 31, 2018, from http://www.ecosystemmarketplace.com/publications/beyond-carbon-biodiversity-and-water-markets/

programs within a state or between states while ensuring that EPA expectations are met. These various analyses indicate the potential for great economic benefits for the wastewater, agricultural, and urban stormwater sectors, however, this market still remains at a nascent stage.

In April, 2016, the Environmental Finance Center ("EFC") at University of Maryland convened the Chesapeake Bay Environmental Finance Symposium. The purpose of the symposium was to uncover opportunities to "leverage and/or incentivize private investment in Bay restoration and protection efforts."[2] In August, 2016, the EFC issued a report summarizing insight gained during the symposium and subsequent outreach efforts to a variety of subject-matter experts. The report outlined several areas of consideration to catalyze private investment, including local and basin-wide regulatory and policy recommendations, performance and procurement standards, research into innovative financing structures and public-private-partnerships, among other details.

A 2017 working paper by the World Resources Institute[3] and the Chesapeake Bay Foundation notes that there are three factors that jurisdictions should consider in order to successfully introduce nutrient trading in the stormwater sector, which are as follows:

- Existence of a clear regulatory basis for trading;
- A stormwater discharge permitting strategy that allow and facilities trading; and
- Effective outreach to the agricultural community and/or other landowners that could host credit generating sites.

The goal of this report is not to rehash what has already been studied but rather to focus specifically on the role of the private equity capital markets—and how this source of capital examines investment opportunities.

D. THE CHARGE

This charge is split into the following two sections: 1) a brief analytical report to identify key stakeholders and to clarify how key stakeholders would approach such a project; and 2) an Excel-based financial model, with a manual on how the model works, to demonstrate how private equity organizes and analyzes prospective investment opportunities. The purpose of this charge is the following:

- Provide an equity investor's perspective around financial outcomes, risk, and investment structure; and
- Add to the body of work to ensure that recommendations to date from the EFC and others can be implemented into workable, scalable programs.

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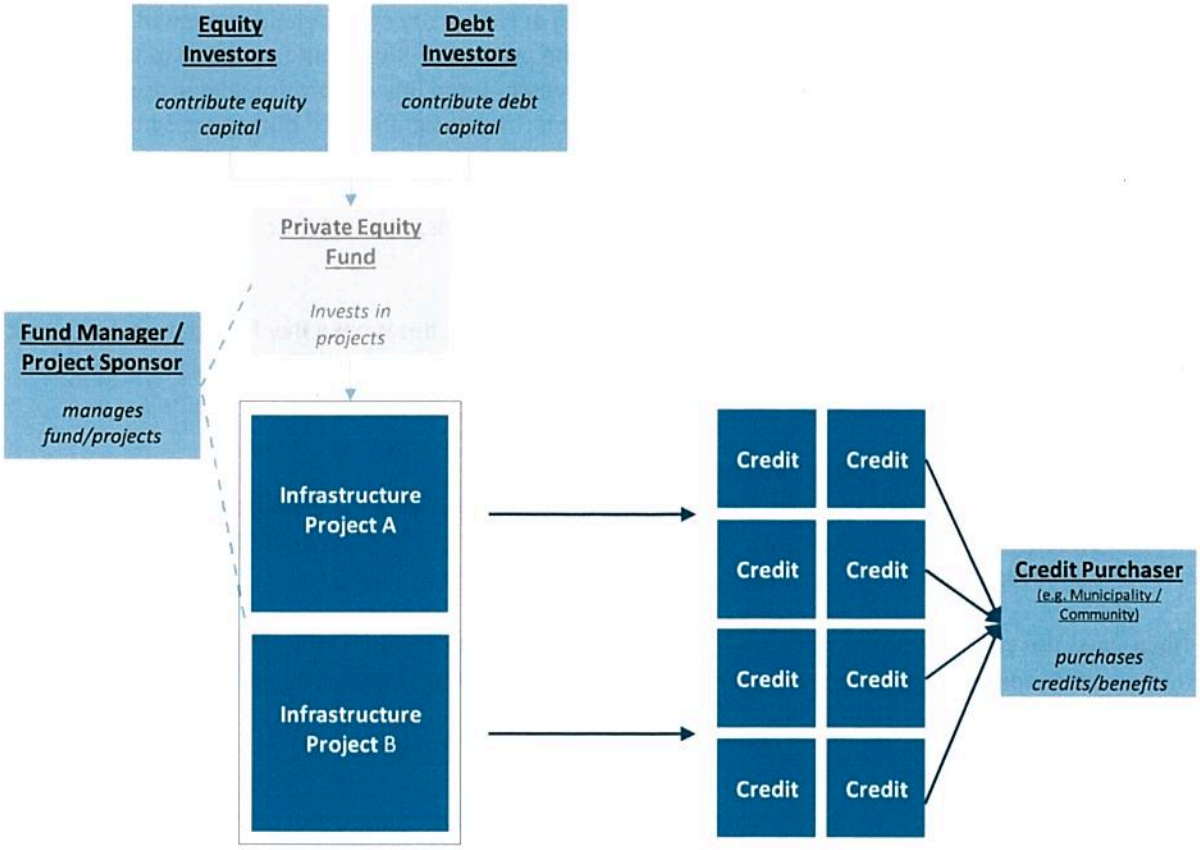
[2] Environmental Finance Center at the University of Maryland. 2016. "Chesapeake Bay Environmental Finance Symposium: Recommendations and Final Report."

[3] Jones, C., B. McGee, L. Epstein, E. Fisher, P. Sanner, and E. Gray. 2017. "Nutrient Trading by Municipal Stormwater Programs in Maryland and Virginia: Three Case Studies." Working Paper. Washington, DC: World Resources Institute. Available online at http://www.wri.org/publication/ nutrient-trading.

II. KEY STAKEHOLDERS AND CAPITALIZATION



A. CAPITAL PROVIDERS

There are two key capital providers—equity investors and lenders who provide debt capital. The descriptions below are not meant to be an exhaustive explanation of either private equity or debt lending, but rather to give a high-level description of the role of each type of capital within the context of infrastructure project finance.

1. EQUITY CAPITAL: PRIVATE EQUITY INVESTORS/PROJECT SPONSORS

Private equity investors typically provide at-risk capital at an early stage of project development. They can be a project sponsor, which is the entity that carries out and manages the projects on the ground, or a combination of project sponsor and external investor(s). By committing equity to a project or venture, these investors are buying an ownership stake in that project or venture. In return, they receive a portion of the project's earnings, commensurate with their percent ownership, after qualifying expenses and debt(s) are paid. Equity investors expect a higher rate of return for taking on early-stage project risk and for their junior position in the capital structure relative to other forms of capital (e.g. debt).

Investors range from single, "family offices" to large institutional capital providers (e.g. large banks). Capital providers may invest in projects with their own funds or pool funds from a variety of institutional and non-institutional capital providers into an investment vehicle (e.g. an infrastructure fund). Those funds are then either invested in a project directly, a project sponsor directly, or into another fund set up by the project sponsor to receive capital. The financial model in this report considers the latter: a project sponsor fund that receives investment from external sources and then allocates them into project vehicles. These project vehicles are sometimes structured as special purpose entities or SPVs and are typically incorporated as Limited Liability Companies, or LLCs.

Each investor type has its own requirements and due diligence processes. It is up to the project sponsor to weigh which external investors are likely to meet the capital needs and capital timing requirements to get a project, or set of projects, successfully completed. Most private equity funds have a five- to seven-year term, which means that private equity investors expect that whatever distributions were anticipated from their investment will be received within five to seven years. Note that, unlike some forms of debt, distributions to equity investors may not happen on a regular basis. Distributions only occur when the fund has excess cash to distribute.

The model is currently preset at 25% project financing from equity.

2. DEBT CAPITAL: LENDERS

Lenders are investors who provide debt capital in the form of loans. Like private equity investors, lenders range in type from small offices, to large institutions, to public agencies. In the project finance context, debt capital is typically used to provide leverage to equity investors in order to provide those investors with a rate of return commensurate with their risk ("risk-adjusted return"). Leverage is achieved by securing debt capital that is cheaper (i.e. a lower rate of return) than what is expected from equity investors.

Unlike equity investors, debt investors enjoy a senior position in the capital structure and expect payments, or debt service, at prescribed amounts and times.

Debt capital is typically drawn down at the point at which pre-project development is completed and design/construction formally commences. It is at this point that many of the risk-factors are known or understood within a range of comfort, that lenders will commit capital and have a reasonable assurance of repayment. The more risk the lender is required to assume under a contract, the higher the rate of return the lender expects.

Projects may have several types of debt capital that assume different levels of risk. This is typically expressed as 1) senior debt (i.e. the primary loan to the project, which is repaid first before any other payments are made), and 2) mezzanine debt/bridge debt/preferred equity, which can be structured in a variety of different ways, has a higher rate of return than the senior debt, and is paid back after the senior debt but before equity investor distributions.

The model is preset at 75% project financing from senior debt that is public or concessionary. No mezzanine, bridge, or preferred equity is assumed. This, however, can be easily included by making the appropriate adjustments in the SUMMARY tab (See rows 130-136).

B. CREDIT PURCHASERS

To attract investment from any of the capital sources listed above, a community would have to play the role of a credit purchaser. In this report, a credit purchaser/community, who is the *beneficiary* of the environmental improvement represented by the credits, "partners" with a project sponsor through a credit purchase agreement. A credit purchase agreement can only be established if a community/credit purchaser has an identified, secured, and reliable revenue stream to purchase credits (e.g. a pledge of its enterprise fund or general government revenues). For the Chesapeake Bay context, credit purchasers are most likely communities and municipalities, but also could be state agencies or private developments, under a regulatory obligation (e.g. MS4 permittees) that can be met through credit purchases. The University of Maryland EFC's Finance Symposium report[4] outlines the various types of credit purchasers and what would be needed to create a scaled market that might attract private investment.

The primary motivation of the credit purchaser for participating in the market is to meet their legal requirements for a total investment cost that is less than the cost for the alternative method. In most cases, the alternative method is for credit purchasers to directly manage its own projects, using its own financing, on land it owns or controls. Accordingly, the metric of most concern for the credit purchaser will be the price per credit. Calculating the costs of financing and incorporating these costs into the credit price will be very useful for the credit purchaser to compare the full cost of different alternatives to meet its goals.

1. THE CREDIT PURCHASE AGREEMENT

The credit purchase agreement contains critical information that the project sponsor needs to define the type and size of capital it requires. In sum, it is the agreement between the beneficiary (community/credit purchaser) and the project sponsor (in this case, the fund manager). It establishes the terms on how and when the beneficiary will offtake or purchase credits from the project sponsor. While not an exhaustive list, the credit purchase agreement must have the following features:

- An agreed upon price per credit generated;
- A term within which the credit seller must deliver the credits;
- The quantity of credits to be delivered;
- A legal definition of what constitutes a "credit" (e.g. lbs. of nutrients, green acres, or other measurable units);
- A legal definition of what invalidates a credit (i.e. failure to maintain the project such that it no longer produces an ecosystem benefit); and
- The time period the seller is required to keep the credits valid (i.e. the Operations and Maintenance period).

Credit purchase agreements may be established on a project-by-project basis or the buyers and sellers may enter into a master agreement, which allows the seller to generate some minimum

[4] Environmental Finance Center at the University of Maryland. 2016. "Chesapeake Bay Environmental Finance Symposium: Recommendations and Final Report."

and/or maximum number of credits across multiple projects. Regardless of whether the contract is project-based or a master agreement, the base features described above apply. The model allows the user to toggle among one of the following two primary credit purchase agreement options (SUMMARY tab, row 154):

1) **"NO". Project Construction Reimbursement:** This option assumes that the credit purchaser has entered into a contract with the project sponsor to deliver a project. Once the project has been verified by the credit purchaser or a third-party (e.g. a regulator or its designee), the credit purchaser will purchase the project from the project sponsor and assume all long-term operations, maintenance, and monitoring. Conversely, the credit purchaser may elect to contract long-term operations and maintenance services to a third-party. At this point, the project sponsor would be free from all responsibilities associated with project performance, with the exception of any performance warranty the project sponsor might have provided to the purchaser under the contract (typically 1-2 years post sale).
2) **"YES". Endowment Model (combined Construction and Operations and Maintenance payment):** This option assumes that the credit purchaser wants to enter into a long-term agreement with the project sponsor, whereby the sponsor receives a certain amount of capital up-front to build and maintain a project for the term of the contract (model currently assumes 20-years). The project sponsor then manages the capital necessary to maintain the project over the contract term by reserving a percentage of the payment into an escrow account for long-term maintenance and monitoring costs. The benefit to the purchaser is this payment can mimic capital construction procurement, while ensuring long-term maintenance. It is assumed that should the project fall out of compliance during the contract term, the purchaser would have remedies to "clawback" some of that capital, fine the project sponsor, and/or seek other forms of redress. Further, an upfront payment for long-term Operations and Maintenance puts the onus of any cost escalation in the long-term O+M onto the project sponsor. In other words, the credit purchaser can budget for a fixed period of project performance without taking on any risk of long-term Operations and Maintenance budget or labor shortfalls. The benefit to the project sponsor is that it allows for long-term capital and operations planning. Further, by bundling both construction and operational services—assuming it has the capacity to do so—the project sponsor can create more value for prospective investors. Note that because the term of agreement (the model currently assumes 20 years) is longer than the term of a fund (typically five to seven years), the fund most likely would transfer long-term Operations and Maintenance funds and obligation to an entity who assume the funds and Operations and Maintenance obligations.

Please note that the model is currently preset at "YES".

Understanding the credit purchase agreement's relationship to credit pricing is critical. Establishing the point at which the credit purchase agreement starts to produce revenues for the sponsor lowers the revenue speculation risk to investors, and thus lowers the "risk-adjusted return" requirement for investors. Like Power Purchase Agreements (PPAs) for energy projects, the credit purchase agreement establishes an important degree of revenue stream certainty.

The workgroup acknowledges there is an infinite range of credit procurement methods, standards, and legal restrictions placed on public agencies. This section is not meant to suggest that only two credit purchase agreements are applicable nor to advocate for any one approach,

but rather to provide a simple-to-understand overview of two typical types of credit purchasing agreements. Any jurisdiction considering a private equity capital approach should consult with its procurement and finance specialists to determine the best approach to project procurement within its local laws.

C. CAPITALIZATION AND KEY STAKEHOLDERS

When capitalizing projects or a project investment fund, project sponsors must balance a variety of stakeholder needs. All investors, whether debt or equity, have unique requirements regarding project return timing, risk, minimum amount of capital they are willing to provide, among others. Similarly, credit purchasers also have specific procurement, legal, and regulatory requirements, which must match up with investor expectations and requirements.

1. HOW PROJECT SPONSORS CHOOSE THE BALANCE BETWEEN DEBT AND EQUITY

The more equity capital a project sponsor raises, the lower its share of the net cash flow once all other expenses are paid. This is because the equity distributions are shared among multiple parties (i.e. external equity investors). Ideally, project sponsors would like to give up as little of the ownership stake in their projects as possible. This means that if a project sponsor has been able to invest itself in the due diligence required to finance a project exclusively with debt capital, it is within its economic interest to do so. In this report, the project sponsor does share net cash flows with external equity investors, as the model assumes both project sponsor and external equity investor capital contributions.

Often, the choice of capital structure comes down to the size and complexity of the project(s), the credit worthiness of the project sponsor and credit purchaser, the security of the credit purchase agreement (i.e. the likelihood the contract will be honored), the debt capital available and willing to finance the project type, and the track record of the project sponsor to deliver projects. If the project is a first-of-its-kind, with a project sponsor that has little or no track record of performance and a small balance sheet (i.e. little cash-on-hand), and a credit purchaser with a low credit rating, it is less likely the project will be able to secure low-cost debt capital. In new or nascent markets, however, these types of projects are necessary to demonstrate a new approach to achieving an outcome. In this instance, a project sponsor might look to government grants or subsidies, foundational grants, and/or some sort of repayment guarantee from an outside lender or foundation to reduce the overall cost of capital.

2. HOW EQUITY INVESTORS EVALUATE AN INVESTMENT

a. Returns and Structure

The expected Internal Rate of Return ("IRR") is the primary financial metric for private capital. It is the rate at which the Net Present Value (NPV) of all cash flows from a project is equal to zero. Because IRR is the most common financial metric, it allows equity investors to evaluate and compare multiple projects or investments using the same basis of calculation. IRR and NPV are calculated using the concept of the "Time Value of Money" which assumes that money received today is worth more than the same amount of money received in the future. Therefore, IRR is particularly sensitive to *when* cash is received. For example, a $5 million investment that returns $10 million in five years will have a higher IRR than a $5 million investment that returns $10 million in ten years. This is because the $10 million received in year five could theoretically

be reinvested into another five-year project that would yield additional capital, while the ten-year investment could not.

The model assumes that investors would evaluate the merits of the investment by looking at its "Nominal IRR," or the rate of return of the fund once all taxes, fund expenses, debt service payments and project sponsor management fees are netted out. The fund structure presented in the model is a typical private equity structure, though, as noted in the next section, there are infinite structures that one could consider. Each has its own expense calculations, management fee rates, hurdle rates, and incentive fees to the sponsor for meeting certain milestones, among other structuring considerations. Regardless of structure, equity investors often seek to ensure that the project sponsor's financial interests are aligned with their own and prefer structures where the sponsor's equity is invested alongside that of their own equity. This helps to ensure that project sponsor decisions are in the best interests of all equity holders in a fund or project.

b. Risks and Risk Mitigation

Once presented with an investment opportunity that assumes a rate of return commensurate with the equity investor's expectations, a sophisticated equity investor also evaluates the major risk factors that might jeopardize the expected rate of return.

First, investors seek to understand the *demand* for a product (in this case a water quality credit): who is interested in purchasing it and why, what the scale of the need is for that product, what type of competition there is for that demand (i.e. other project developers), why a buyer would choose one project/project sponsor over another, among other factors.

Second, investors analyze the risk factors associated with project execution. For example, the potential for cost overruns from construction contractors, timing delays from permitting, unforeseen environmental factors (e.g. brownfield remediation, physical obstructions), easement requirements, and/or other legal delays, or escalation in ongoing project costs (e.g. operations and maintenance, project verification and monitoring). Any delay in project demand, execution, and/or financing will result in a delay in project revenue, which will reduce IRR.

Third, equity investors are also particularly sensitive to the major contributors to cash flow and seek to mitigate their exposure to risks as much as possible. They may do so by phasing in their capital contributions once certain milestones are met, seek to pool capital with others to get greater economies of scale, require their capital contributions be matched with a certain amount of leverage, and/or demand project sponsors forgo fees if certain milestones are not met.

Finally, equity investors require a clear and defined exit strategy. The model presumes that equity investors are paid in full once project revenues are received from credit purchasers, net of any outstanding debt service, fees, and long-term operations and maintenance obligations. In other scenarios, where project sponsors seek to build up long-term value in a company providing services, equity investors in that company may calculate a terminal value or exit multiple whereby they assume the company is sold at some future date at a value higher than their initial contribution. This type of valuation is typical in venture capital, where the timing of net cash proceeds to the equity investor are hard to predict or not possible without a sale or initial public offering ("IPO") of the company.

3. WHAT LENDERS REQUIRE AND COVENANTS

Because many municipalities have utilized debt to finance projects, this report will not discuss this issue in depth. To note, however, is that the model presumes that the debt term coincides with the period over which the project generates credits. In other words, if the project releases credits, and generates revenue from the sale of such credits (the model assumes that credits are sold upon creation), over a five-year period, the workgroup simplified the model to presume that lenders will establish a five-year debt term and that debt is amortized over those five years.

Undoubtedly, there is an infinite range of debt structures. There is a wide variety of how debt covenants—such as "loan-to-value" and "loan-to-cost" metrics, debt service coverage ratios ("DSCR") calculations—are defined and which of these debt covenants are included in a structure. Please note that the workgroup have included DSCR calculations (based on gross revenue, net revenue, and net cash flow) on the bottom of each of the PROJECT tabs.

III. DISCUSSION OF THE EQUITY FINANCIAL MODEL

A. INTRODUCTION

As stated in the previous section, the purpose of this model is to provide insight into how an investor organizes an opportunity and structures the transaction. Models are built and used to understand all of the costs and risk points for an investment that may not have been apparent otherwise. And, when set up correctly, financial models allow for the user to dynamically change key variables, as more information is received or as conditions that affect the investment change. Further, models are used to understand the total cost of a project and the cost of the project's capitalization across the two major categories of capital investment: debt and equity. It is the balance between these two categories that investors calibrate the relationship between leverage and return, according to their unique needs and requirements.

It is critical to point out that the model contained in this report **is not** designed as a decision tool. In other words, the workgroup did not build this model to determine whether a project or set of projects would be worth pursuing. Rather, the model is merely a snapshot of a typical investor's process in order to determine whether a project is investment-worthy. **Specific project costs, capitalization structure, and revenue stream requirements are to be determined on a case-by-case basis and should not be derived in any way from this model.**

B. MODEL STRUCTURE

All of the key inputs for and key outputs of the model are located on the SUMMARY tab. This tab is organized into two major sections: The top section, "FUND LEVEL OUTPUTS/INPUTS", contains key fund level outputs and inputs; while bottom section, "PROJECT LEVEL OUTPUTS/INPUTS", contains key project level outputs and inputs. Generally, throughout this tab are cells with BLUE text. These cells are inputs or assumptions that a user may alter. Cells with BLACK text are outputs and **should not** be altered in order to preserve the model's structure.

The model, which is a Microsoft Excel 2016 workbook, consists of the following nine tabs:

SUMMARY	Location of key user inputs and summary of key model outputs
FUND	All Project tabs roll up into this worksheet *(no user input available; output only)*
PROJECT A	Project level calculations for Project A: "Wet Ponds and Wetlands (New)" *(no user input available; output only)*
PROJECT B	Project level calculations for Project B: "Urban Tree Planting" *(no user input available; output only)*

PROJECT C	Project level calculations for Project C: "Dry Detention Ponds (New)" *(no user input available; output only)*
PROJECT D	Project level calculations for Project D: "Permeable Pavement w/Sand, Veg. (New)" *(no user input available; output only)*
PROJECT E	Project level calculations for Project E: "Bioretention (Retrofit – Highly Urban)" *(no user input available; output only)*
CAPITALIZATION	Overview of capitalization assumptions by Project *(no user input available; output only)*
DEBT SERVICE	Monthly calculation of debt service Debt A and Debt B by Project *(no user input available; output only)*

For this model, we assumed a $50 million fund size, consisting of five, $10 million projects. The projects are based on information in an October 10, 2011, report, "Costs of Stormwater Management Practices in Maryland Counties," prepared for the Maryland Department of the Environment.[5] While the model indicates that 1 credit = 1 acre, the model is not limited to stormwater BMP projects. Acres of impervious runoff treated by a project or best management practice (BMP) can be converted using EPA developed conversion factors or the model could be used to evaluate other BMP projects with known costs and nutrient reduction rates determined through a tool such as CAST (Chesapeake Assessment Scenario Tool). Reduction of nutrients and sediment is what is required by the Chesapeake Bay TMDL, the primary driver of implementing these practices. Also, it is worth noting that project-based, preset inputs used this report are based on pre-GFC ("Great Financial Crisis") information so the cost assumptions most likely are lower than what they should be today.

Notably, the model is designed to **demonstrate the impact of key variables upon project return from the perspective of equity capital** and is not intended to provide information on project costs nor to inform a decision on whether to proceed with a project. Again, the purpose of the model is to provide information on the how private equity capital would analyze projects and should not be used to determine whether a municipality or other regulated entity should proceed on a project nor be used to speculate how a lender or other debt capital provider would underwrite projects.

[5] King, Dennis and Patrick Hagan (University of Maryland Center for Environmental Science). 10 October 2011. "Cost of Stormwater Management Practices in Maryland Counties".

Significantly, the model makes a number of key simplification assumptions including, but not limited to, the following:

- Construction costs are paid upfront and in one lump sum; however, in reality, construction can occur over many months and or years and is often paid when certain "milestones" are met.
- 1 credit = 1 acre managed, which is based on one of Maryland's water quality standards. Other water quality regulatory programs and other BMP specific conversion factors could be used to estimate reductions (e.g. pounds of nitrogen, phosphorus, and sediment). Other jurisdictions may have different credit standards/measurement.
- Credits are created and sold in the same year (i.e. the credit developer never holds a balance year-over-year). This assumption can be changed by adjusting how many credits are sold per year (SUMMARY tab, row 72). It is assumed that credit developers will "build-to-suit" based on a pre-arranged credit purchase agreement with a credit buyer.
- If the O&M Endowment toggle is turned on to YES (SUMMARY tab, row 154), the price of a credit includes the cost of long-term maintenance over a 20-year term. It is assumed that credit buyers will want to purchase in 20-year increments and that credit providers will need capital up-front in order to finance project construction and long-term capitalization. In addition, because most of the revenue is generated in the early years of a project, the term of an equity investor (5-7 years) most likely will be less than that of the project (20 years+), and because of the potential for invalidation risk if long-term maintenance and monitoring costs are tied to the equity investor's return, this toggle should be left as "YES."
- The amount of debt (i.e. leverage) for each project is preset to 75% of the total capital needs. The remaining 25% is assumed to be equity, for which the project developer is responsible for raising and/or providing. The debt rate is set at a "concessionary level" (i.e. below market), as it is assumed that debt will be provided through a public entity (e.g. Clean Water State Revolving Fund). The workgroup makes no representation around the legal arrangement(s) necessary to secure public debt.
- The model assumes project-level investment occurs during the "investment period," which is typically between one to two years of fund "close" (e.g. capital is raised). This assumes that projects are identified prior to fundraising and sufficiently vetted to begin preliminary design shortly after financing is secured. Any costs associated with pipeline development are not considered within this model, beyond preset $250,000 in "Dead Deal Costs" (SUMMARY Tab, Cell M28). Dead deal costs include miscellaneous due diligence and other one-time costs incurred prior to fund close that are reimbursed by the investor(s) to the project sponsor (whether these costs are reimbursed by the investor would be established in an external investor agreement). This annual cost is applied during the first two years of fund as the fund proceeds are invested in projects.
- The model assumes one type of fund structure, commonly known as "2 and 20." The fund manager provides 1% of required equity capital while other investors provide 99% of required equity capital. The fund manager is entitled to an annual management fee of 2% of the value of assets under management. Profits, or net cash flow, are distributed according to original contribution percentages (1% fund manager, 99% other investors), until investors achieve the hurdle rate or IRR, which is currently preset at 10%. Once investors' returns have surpassed the hurdle rate, the fund manager is entitled to 20% of profits while investors are distributed the remaining 80%. This particular structure allows for proper incentive alignment between the fund manager and investor—the fund manager profits only if investors profit. Note that this structure is only of one among many types of fund structures.

C. DEFINITIONS OF KEY INPUTS AND OUTPUTS

1. FUND LEVEL OUTPUTS/INPUTS

NOMINAL INVESTOR IRR, AFTER FEES & EXPENSES	Internal rate of return from the perspective of the investor; Discount rate or rate of return that causes the Net Present Value ("NPV") of all cash flows from the fund, after fees and expenses, to equal to "0" (after fees and expenses).
NOMINAL MANAGER IRR, AFTER FEES & EXPENSES	Internal rate of return from the perspective of the fund manager; Discount rate or rate of return that causes the NPV of all cash flows from the fund, after fees and expenses, to equal to "0" (after fees and expenses).
TOTAL EQUITY CONTRIBUTIONS BY INVESTORS (A)	Sum of all capital contributed by the investors during the life of the fund.
TOTAL EQUITY CONTRIBUTIONS BY MANAGER	Sum of all capital contributed by the fund manager during the life of the fund. Note that investors often require the fund manager to "have skin in the game" to align manager interests to their own.
TOTAL DISTRIBUTIONS TO INVESTORS (B)	Sum of all distributions made to investors during the life of the fund.
TOTAL DISTRIBUTIONS TO MANAGER	Sum of all distributions made to the fund manager during the life of the fund.
TOTAL ASSETS UNDER MANAGEMENT	Total assets under management.
INVESTOR CASH MULTIPLE (B / A)	Ratio between total distributions made to investors and total capital contributions made by investors.

TOTAL ASSETS UNDER MANAGEMENT	Sum of the value of all projects under management (project-level working capital requirements plus all design and construction-related costs).
TOTAL EQUITY COMMITMENT	Total capital contributions by the fund manager and investors.
MANAGER EQUITY CONTRIBUTION	% of total capital contributions made by the fund manager
INVESTOR EQUITY CONTRIBUTION	% of total capital contributions made by investors
PROMOTE STRUCTURE (SINGLE TIER WATERFALL W/NO CLAWBACK)	There are an infinite number of structures and for model simplification purposes, we chose this structure.
HURDLE RATE	Minimum rate of return to the investor required before the fund manager can collect incentive fees, or carried interest.
MANAGER CARRIED INTEREST	Fund manager's share of profits (expressed as a percentage) when the fund's IRR exceeds the a priori established hurdle rate.
INFLATION	Expected annual rate of inflation
FUND EXPENSES	Costs borne by the fund
FUND FORMATION & DEAD DEAL EXPENSES	Costs borne by the fund to establish itself and to conduct detailed due diligence of potential projects
MISC ANNUAL ADMINISTRATION EXPENSES	Annual legal, accounting, audit, and other costs borne by the fund

FUND CASH RESERVE REQUIREMENT, MINIMUM	Working capital or cash kept on hand to handle fund management expenses
FUND TERM	Investment time period of the fund
FUND START DATE (12/31/XX)	Initial closing date of the fund+
FUND LENGTH (YEARS)	Duration of the fund in years

2. PROJECT LEVEL OUTPUTS/INPUTS

NOMINAL IRR, PROJECT LEVEL (PRE-LEVERAGE)	Internal rate of return, pre-leverage; Discount rate or rate of return that causes the NPV of all cash flows from the project to equal to "0" (before any management fees at the fund level).
NOMINAL IRR, PROJECT LEVEL (POST-LEVERAGE)	Internal rate of return, post-leverage; Discount rate or rate of return that causes the NPV of all cash flows from the project to equal to "0" (before any management fees at the fund level).
INITIAL INVESTMENT	Initial capital required at project acquisition
NET REVENUE	Net revenue from credit sales, as adjusted by the sales commission, transaction costs, and O&M endowment funding, and other revenue.
ACCUMULATED CASH REQUIREMENTS (A)	Sum of all equity capital called during the life of the project (before any management fees at the fund level).
NET FREE CASH FLOW (B)	Sum of all project level free cash flow within the category
CASH MULTIPLE (B / A)	Relationship, expressed as a ratio, between dollar invested and dollar returned (before any management fees at the fund level).
PEAK CAPITAL OUTSTANDING	Maximum amount of net capital outstanding during project life
TOTAL GROSS REVENUE GENERATED FROM CREDIT SALES	Gross revenue from credit sales. In many cases this will translate to the revenue requirements that communities will have to generate through taxes, fees, and other sources.

YEAR PROJECT ACQUIRED (12/31/XX)	Year that the project is acquired; Projects should be acquired within the first two years after the Initial Closing Date of the Fund.
PROJECT DISCOUNT RATE (TO CALCULATE RESIDUAL VAUE)	Project discount rate; Rate used to calculate the terminal value or NPV of any residual cash flows after the conclusion of the Fund.
PROJECT LENGTH (YEARS)	Duration of the project (in years) during which credits are produced. Note that the year of acquisition is recognized as "Year 0" in this model.
MONITORING LENGTH (YEARS)	The number of years the regulatory agency requires the project to be monitored.

# TOTAL CREDITS GENERATED / PROJECT	Total number of credits in inventory plus those yet to be released per project
BEGINNING CREDIT INVENTORY	Number of credits that have been released but not yet sold at project acquisition; Must be "0" for Greenfield and Turnkey projects.
ENDING CREDIT INVENTORY (@END OF PROJECT)	Number of credits that have been released but not yet sold at the project conclusion
% OF RELEASED CREDITS SOLD / YEAR	Annual amount of credits sold as a percentage of credits released during that year
% OF TOTAL CREDITS RELEASED IN YEAR ONE	Amount of credits released in Year One as a percentage of # *Total Credits/Project*
% OF TOTAL CREDITS RELEASED ANNUALLY THEREAFTER	Amount of credits released in annually (after Year One) as a percentage of # *Total Credits/Project*
$ / CREDIT	Sale price per credit in 2018 $s
ANNUAL REAL CREDIT PRICE ESCALATOR (ON TOP OF INFLATION)	Tests sensitivity to annual changes in real credit pricing over time
SALES COMMISSION (% OF GROSS CREDIT REVENUE)	Sales commission expressed as a percentage of credit revenue
TRANSACTION FEE (% OF GROSS CREDIT REVENUE)	Transaction costs expressed as a percentage of credit revenue
OTHER TOTAL REVENUE / YEAR	Annual revenue from sources other than from credit sales

TOTAL PROJECT VALUE	
CASH RESERVE REQUIREMENT, MINIMUM	Presumed working capital
TOTAL PROJECT ACRES	Project acres (This is pre-set at a value to make all projects equal to $10 million).
TOTAL LAND ACQUISITION COSTS	
BASE LAND ACQUISITION COST (PER ACRE)	Preset value from 2011 report, "Costs of Stormwater Management Practices in Maryland County". Since these are based on pre-recession numbers, they are most likely too low.
OTHER LAND-RELATED COSTS DUE AT ACQUISITION (PER ACRE)	Variable that could be used to accommodate easements, etc.
CLOSING & ORIGINATION COST (% of BASE ACQUISITION COST)	Closing and origination costs (Other costs stemming from securing project acquisition, including, but not limited to, due diligence and legal costs) expressed as a percentage of the acquisition cost.
TOTAL PRE-CONSTRUCTION COSTS	
SOFT COSTS (PER ACRE)	Includes design, planning, permitting, site surveys, geotechnical surveys. Preset value from a 2011 report, "Costs of Stormwater Management Practices in Maryland County". Since these are based on pre-recession numbers, they are most likely too low.

MISC. OTHER SOFT COSTS (PER ACRE)	Variable that could accommodate entitlements and other technical studies and reports
TOTAL CONSTRUCTION COSTS	Total construction cost over the entire life of the project in 2018 $s
CONSTRUCTION COSTS (PER ACRE)	Includes labor, material and overhead costs, public outreach. Preset value from a 2011 report, "Costs of Stormwater Management Practices in Maryland County". Since these are based on pre-recession numbers, they are most likely too low.
CONSTRUCTION MANAGEMENT (% OF TOTAL CONS. COST EXC CONTINGENCY)	Construction Management fee as a % of total construction costs less contingency
CONSTRUCTION CONTINGENCY (% OF CONSTRUCTION COST)	Contingency, expressed as a % of total construction costs, to accommodate unexpected construction cost overruns
TOTAL CAPITALIZATION	
FINANCING A (SENIOR DEBT)	Most likely some sort of long-term, public/concessionary debt
LOAN-TO-COST	Assumed ratio between loan principal to project value.
PRINCIPAL	Amount borrowed
TERM (YRS)	Term of the debt should be equal to (or less than) the project length (which are the years when the project is generating revenue).
AMORTIZING OR INTEREST ONLY	Can toggle between amortizing or interest only
RATE	Should be less than market rate, if public/concessionary debt is assumed
FINANCING B (MEZZANINE OR BRIDGE DEBT OR PREFERRED EQUITY)	Placeholder for market-rate debt
PRINCIPAL	Amount borrowed
TERM (YRS)	Term of the debt should be equal to (or less than) the project length (which are the years when the project is generating revenue).
AMORTIZING OR INTEREST ONLY	Can toggle between amortizing or interest only
RATE	Should be market rate
TOTAL EQUITY	Equity Capital provided by Private Capital
TOTAL CAPITALIZATION	Debt + Equity Capital = Project Value
O & M ENDOWMENT	
TOTAL PROJECT ENDOWMENT SIZE	Total endowment cost over the entire life of the project in 2014 $s; Covers maintenance and monitoring costs beyond the investment life of the project
ANNUAL ENDOWMENT FUNDING	Annual contribution to the endowment fund, expressed as a percentage of gross credit sales
ASSUMED ENDOWMENT REAL GROWTH RATE	Presumed real rate that that the endowment is expected to grow annually
ESTABLISH O & M ENDOWMENT? (USE PULL-DOWN MENU)	Should be set to "YES" to ensure that there is a way to pay for O&M expenses beyond the years the project is generating revenue.

TOTAL ANNUAL O & M COSTS	
ANNUAL MAINTENANCE COST (PER ACRE)	Annual maintenance and monitoring costs in 2018 $s. Preset value from a 2011 report, "Costs of Stormwater Management Practices in Maryland County". Since these are based on pre-recession numbers, they are most likely too low.
ANNUAL MARKETING COST (PER ACRE)	Annual marketing cost in 2018 $s
ANNUAL MISCELLANEOUS COST (PER ACRE)	Annual miscellaneous costs in 2018 $s; Includes insurance, property taxes, etc.
ANNUAL REAL COST ESCALATOR, TYP.	Tests sensitivity to annual changes in real cost over time
ANNUAL PROJECT MANAGEMENT FEE (% OF PROJECT VALUE)	Project management fee expressed as a % of project value
ANNUAL ASSET MANAGEMENT FEE	Asset management fee expressed as a % of project value

D. INTERPRETING THE MODEL OUTPUTS

The following are disclaimers to interpreting the model outputs:

- Results should not be used by beneficiaries to determine whether to proceed with a project;
- Results should not be used by investors to determine whether to invest in a project;
- Outputs are dependent on inputs ("garbage in", "garbage out");
- Outputs are merely forward-looking "estimates" or forecasts—actual results will most likely deviate from the forecasted output;
- Results may vary from reality based on the actual credit purchase agreement established and investor agreement signed—there are infinite variations to both that could change model results;
- Results may vary from reality based on the actual project—the preset model uses five illustrative project types whose cost structure was based on historical data.