Albany Pool Communities and the Capital District Regional Planning Commission

STORMWATER IN-LIEU FEE AND CREDIT BANKING AND TRADING FEASIBILITY REPORT

March 31, 2017

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DRAFT STORMWATER IN-LIEU FEE, CREDIT BANKING AND TRADING FEASIBILITY REPORT

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ACRONYMS AND ABBREVIATIONS

APC	Albany Pool Communities
AWDZ	Anacostia Waterfront Development Zone
BMP	Best Management Practice
CDRPC	Capital District Regional Planning Commission
CFS	Cubic Feet Per Second
CFR	Code of Federal Regulations
CSO	Combined Sewer Overflow
CWA	Clean Water Act
DDOE	District of Columbia Department of the Environment
DNR	Department of Natural Resources
FILO	Fee In-Lieu of
GI	Green Infrastructure
HUC	Hydraulic Unit Codes
IDA	Industrial Development Agency
ILF	In-Lieu Fee
LTCP	Long-Term Control Plan
MS4	Municipal Separate Storm Sewer System
MDEP	Maine Department of Environmental Protection
MNRCP	Main Natural Resource Compensation Program
NCDEQ	North Carolina Department of Environmental Quality
NOI	Notice of Intent
NPDES	National Pollution Discharge Elimination System
NRPA	Natural Resources Protection Act
NYSDEC	New York State Department of Environmental Conservation
OSRV	Off-site Retention Volume
RRv	Runoff Reduction Volume
SPDES	State Pollution Discharge Elimination System
SRC	Stormwater Retention Credit
SWPPP	Stormwater Pollution Prevention Plan
USEPA	United States Environmental Protection Agency
WQv	Water Quality Volume

EXECUTIVE SUMMARY

This Stormwater In-lieu Fee, Credit Banking and Trading Feasibility Report ("Report") has been prepared for the Albany Pool Communities ("APCs"), and the Capital District Regional Planning Commission ("CDRPC") to assess the feasibility of establishing a Stormwater In-lieu Fee ("ILF"), Credit Banking and Trading Program for the APCs. The APCs consist of the cities of Albany, Cohoes, Rensselaer, Troy, Watervliet, and the Village of Green Island. A stormwater ILF program is an innovative alternative to traditional stormwater management funding whereby a municipality or government agency establishes a stormwater retention or detention requirement for development or redevelopment projects and allows the property owner or developer to pay a fee in lieu of meeting the stormwater runoff requirement onsite. A stormwater Credit Banking and Trading program is an innovative market-based approach to stormwater management funding whereby a municipality or government agency allows the property owner or developer to purchase stormwater credits to satisfy the retention or detention requirements or bank the credits such that they can be used by the same developer on another project. The credits are generated and provided by other property owners who have implemented stormwater runoff mitigation projects that have exceeded the requirements.

In general, stormwater ILFs have been used by some municipalities for many years to provide an off-site alternative to stormwater runoff mitigation/compliance. However, the application of the program has been limited. Challenges, such as defining program boundaries, difficulty of predicting revenue streams, and a hesitation for the municipal government to take on risk from the private sector (land developer) may explain the lack of widespread growth of the ILF approach. Stormwater Credit Banking and Trading programs are relatively new. These programs have been adapted from similar approaches used for wetlands impact mitigation and nutrient loadings reduction into sensitive or impaired waterbodies, such as the Chesapeake Bay and the Long Island Sound. While both of these programs are gaining in popularity as they provide a means for meeting more stringent regulatory requirements, the number of established programs today still remains limited. There are no such programs known to be implemented in New York State.

Survey Results. A survey of existing ILF, Credit Banking and Trading programs was completed to gather information from municipalities that have established ILF and/or Credit Banking and Trading programs in order to better understand how these programs work, their advantages, limitations, and applicability to the APCs. A total of nine programs were identified that established mitigation for stormwater, wetlands, or nutrients, and of the nine, five directly involved stormwater ILFs, Credit Banking and Trading, or both. The five most relevant of the programs that were surveyed included programs that were established by Washington D.C., Chattanooga, TN, Park Ridge, IL, Aspen, CO, and San Antonio, TX. A summary of the insights from the survey of these programs follows:

1. In order for an ILF or credit to be utilized, an existing requirement must be in place in the form of a regulation, ordinance, or code that requires stormwater management measures for development or redevelopment projects. If this requirement cannot be met, for example due to site restrictions, an option to pay a fee or purchase credits instead of performing on-site mitigation can be established.

2. A credit banking and trading program requires a “currency” to be established, which is typically based on a pollutant of interest or a volume of stormwater runoff reduction. Examples include a certain number of gallons retained, a number of acres “greened” or managed, and the number of pounds of phosphorous or sediment removed or treated.
3. Program eligibility requirements vary depending on program goals. Some apply only to developers and commercial properties, some apply to all properties meeting established conditions including limits of disturbance, amount of impervious area, proof of adequate financial means, ability to meet requirements, and/or other conditions. An ILF program is best suited to address land development/redevelopment activities in areas where development/redevelopment is occurring or is planned to occur. Stormwater credit and trading programs can be applied for development/redevelopment projects and may also create incentives to meet retrofit programs, such as a Consent Decree-driven CSO reduction programs requiring a specific number of impervious acres to be retrofitted.
4. Some stormwater incentive programs attempt to direct stormwater offsets as close to the property requiring retention as possible. One innovative method to compensate for known impact differences was to establish “zones” with relative values and multiplier factors to adjust for such differences. Another community allowed for “engineering” discretion.
5. One of the significant disadvantages of an ILF program is that it shifts the liability to meet the regulatory requirement from the private sector (land developer) to the public sector (municipality), which is typically the opposite of what is desired by most municipalities.
6. A regional ILF program could fund mitigation outside of the watershed or sewershed and be used for streetscapes and bioswales throughout the APCs to minimize impact to treatment plants and reduce CSOs.
7. ILFs appear more common and easier to implement than credit programs as they require less regulation and administration and provide increased control regarding where, when and how green infrastructure (“GI”) projects are constructed. Credit Banking and Trading programs, however, provide increased opportunity for GI projects, and potential for quicker construction, lower GI costs, and excess retention credits.
8. ILF pricing is typically set by the community based on a number of factors including pricing to incentivize desired behaviors. Credit pricing, however, is typically established based on market dynamics that drive credit pricing.
9. The actual revenues generated from stormwater ILF, Credit Banking and Trading programs do not appear to cover the cost of administration of the program. All of the stormwater ILF and Credit Programs that were found had other sources of program revenues including separate stormwater utility fees.
10. ILF programs are generally managed by the City Engineer’s office within the municipality, and the administration of the program is commonly conducted as a part of existing roles within the office, and therefore, in general new positions were not created specifically to manage the program. However, credit banking and trading programs are more complex and require dedicated staff to manage the program. Credit banking and trading programs for a single small to mid-sized municipality may be cost prohibitive due to lack of scale. However, administration of such a

program regionally could provide the scale necessary to make a credit banking and trading program more economically feasible.

Regulatory Review. A review of the current regulatory framework in New York State and at the Federal level was completed for the purposes of assessing the legal and regulatory feasibility of the APCs implementing an ILF, Credit Banking and Trading program. The results of the review indicated that no Federal or New York State laws or regulations prevent the adoption of an ILF, Credit Banking and Trading program by the APCs. However, such laws and regulations may limit use of or otherwise shape an ILF, Credit Banking and Trading program without specific approval by regulatory agencies.

The State Pollution Discharge Elimination System ("SPDES") General Permit for Stormwater Discharges from Construction Activity (GP-0-15-002) manual and guidance has relevance to stormwater in-lieu fees and Credit Banking and Trading in terms of the size of the disturbance covered under the permit (i.e. one acre or larger), and the requirement to implement stormwater management measures to reduce peak flow rates to less than or equal to pre-development conditions. According to the manual and guidance, the management of peak flow rates following a disturbance must be managed onsite, which limits the applicability of ILF, Credit Banking and Trading programs unless the New York State Department of Environmental Conservation ("NYSDEC") will allow in-lieu offsite mitigation through ILFs and Credit Banking and Trading to meet the runoff requirements. Without this allowance, the manual and guidance significantly diminishes the suitability and feasibility of ILF, Credit Banking and Trading for the APCs. However, if municipalities decide to impose greater restrictions on development (such as the example of requiring peak flow rates following a disturbance to be less than or equal to 80% of pre-development conditions) then an ILF and credit program could be considered to satisfy the more restrictive requirements imposed by municipalities.

Currently, the City of Albany stormwater ordinance requires development that occurs contributory to the combined sewer system ("CSS") to be treated as "undeveloped, open space" for the purposes of assessing existing condition flows for the site. Post-development flows are then restricted to these levels to reduce peak flows conveyed to the CSS and assure that post-development conditions will not increase combined sewer overflows. Likewise, if municipalities extend stormwater mitigation requirements to properties with disturbances that are less than one acre in size, then an ILF, Credit Banking and Trading program could be used, in combination with on-site mitigation, to satisfy these requirements self-imposed by the municipalities.

Inter-municipal cooperation and formation of a joint ILF, Credit Banking and Trading program among the APCs is legally feasible, and there are no legal limitations per se in having the communities jointly develop and implement an inter-municipal agreement for these programs. However, the regulatory implications for credit trading across water and sewer sheds and MS4 areas presents a significant challenge, and at a minimum, the NYSDEC would need to approve the process and the potential for an unbalanced distribution between areas if such options are chosen. The most legally feasible inter-municipal cooperation approach would be for the ILF, Credit Banking and Trading program to be administered regionally, but the ILFs collected and utilized within the same municipality or sewer shed, and the credits purchased and sold within the same municipality or sewer shed. Administering the program on a sewer shed basis may provide added defensibility as it would keep the environmental benefits relevant to the local area. However, this may not be feasible as a sewer shed approach would require sufficient development activity to create a large enough market for Credit Banking and Trading, or

a significant enough pool of ILF revenues to dedicate to other alternative projects within the same sewer shed.

Feasibility Findings. The feasibility of implementing an ILF, Credit Banking and Trading program for the APC's is dependent on a number of factors including, but not limited to, legal structure, agreement on program governance, technical and administrative requirements, program participation, and cost/benefit of alternatives. Based on the successes of ILF, Credit Banking and Trading programs in other locations, and the commitment to meeting the requirements of MS4 permits and mitigating CSO impacts in a collaborative method, the development of such a program for the APCs may provide a viable opportunity to promote GI where it can best serve the APCs. As evident from the survey of existing programs and baseline findings, a number of alternatives are available to the APCs for potential establishment of an ILF and/or Credit Banking and Trading program. These alternatives and considerations include decisions regarding:

- What level of stormwater mitigation will be required, and the development eligibility based on property size and type?
- Which programs to implement, such as only an ILF program, only a Credit Banking and Trading program, both, or neither?
- Which APC communities will implement such programs?
- What would be the "currency" for a trading and ILF program?
- What would be the in-lieu fee set for use of the ILF program?
- The limitations of applying ILF, Credit Banking and Trading across sewer sheds and municipalities.
- Whether developer in-lieu projects (i.e. offsets) will be allowable in addition to the payment of in-lieu fees.
- What limitations will be established for the generation of credits?
- How would credits be verified, and how would performance be measured?
- Would compensatory policies be necessary (i.e. trading ratios, mitigation ratios, etc.)?
- What type of framework would be established for a trading program? (i.e., clearinghouse, exchange, bi-lateral, etc.) and who would administer the program(s)? Would each municipality establish and manage its own program, or would a regional approach to administration of the program be used?

The development and implementation of an ILF, Credit Banking and Trading program for the APCs will require detailed program and process development, consensus building, establishment of legal documents (ordinances and agreements), compilation and development of technical documents (records, databases, software), technical/legal/financial coordination, public hearings and approvals. Existing staff resources would need to be assigned to assist in developing the program and specialized outside resources (legal, technical, financial) would be needed. The development and implementation of an ILF, Credit Banking and Trading program for the APCs may cost several hundred thousand dollars to

establish a detailed program and process development, consensus building, establishment of legal documents (ordinances and agreements), compilation and development of technical documents (records, databases, software), technical/legal/financial coordination, public hearings and approvals. Given the limited resources of the APCs, additional grants would likely be required for development and implementation to improve the financial feasibility of program implementation.

The costs of administering the program will also vary depending on the organization structure and participation, however, if a third-party agency administers the program on behalf of the APCs it is anticipated that the annual cost of the program may be in the range of $25,000 to $100,000 per year depending upon the number of APCs that participate, the level of ILF, Credit Banking and Trading activity, and the level of complexity of the program. Under an approach where the administration of the ILF, Credit Banking and Trading program is performed regionally, it is anticipated that initially, approximately one half full-time equivalent ("FTE") staff would be needed to coordinate and administer the program.

The APCs currently do not have a stormwater utility or associated stormwater user fees that could be used to fund ILF, Credit Banking and Trading programs. Therefore, the primary funding source for the administration of an ILF, Credit Banking and Trading program would likely need to come from existing building permit fees, wastewater user charges, or general government funds. However, a separate fee could be established and paid by property owners as part of the construction permitting process.

In general, an ILF, Credit Banking and Trading program for the APCs is feasible if the NYSDEC allows the APCs to utilize ILF, Credit Banking and Trading to help satisfy the onsite mitigation requirements, and additional grant funds become available to support further development and implementation of the program. Given the recent and planned development activity, a combined ILF, Credit Banking and Trading program may be suitable for the cities of Albany, Cohoes, and Troy, and less suitable for the cities of Rensselaer and Watervliet, and the Village of Green Island because sufficient development activity is needed to create a Credit Banking and Trading market. However, given the limited number of developers and development activity, the municipalities may initially want to consider adoption of ILFs and Credit Banking, but not the Credit Trading portion of the program. This approach would still provide "compensation" to the municipality for development sites where meeting stormwater runoff requirements is infeasible, as well as provide the benefit of flexibility to developers in meeting stormwater runoff requirements through either paying an ILF or substituting stormwater mitigation at one development site for mitigation implemented at another. Postponement of implementing the credit trading portion of the program could initially reduce the cost of administration and address concerns about the potential lack of robustness of a credit trading market.

Communities, such as the City of Rensselaer with relatively low development activity but varying site conditions may be suited for implementation of ILF program without the credit banking and trading component. For communities considering only an ILF program, sufficient development activity would be needed to generate ILF revenues to support the implementation of offsite stormwater mitigation projects over a reasonable timeframe. In addition, allowing developers to propose in-lieu projects, instead of or in addition to ILFs may be appropriate.

Next Steps. The anticipated next steps for the APCs in implementing stormwater ILF, Credit Banking and Trading programs could include all of the following, although only the first has been committed to:

1. Meet with the NYSDEC to review the draft feasibility report and to assess the ability of the APCs to utilize offsite mitigation (including ILFs and credits) to satisfy stormwater mitigation requirements, and to assess the ability to distribute the use of credits and ILFs across different sewer shed and MS4 and CSO areas within municipal boundaries.
2. Meet with municipal elected officials, land development community and other stakeholders, and decision makers to describe the proposed program and assess/confirm municipal interest in adopting the programs
3. Identify suitable grant funding sources to assist in the planning and implementation of the programs. Prepare grant applications and secure grant funding.
4. Prepare an implementation plan for stormwater ILF, Credit Banking and Trading program, which includes programmatic considerations, administration, operational details, detailed cost estimates, and implementation timeline.

1 INTRODUCTION AND PURPOSE

1.1 Introduction

This Stormwater In-lieu Fees and Credit Banking and Trading Report ("Report") has been prepared for the Albany Pool Communities ("APCs"), and the Capital District Regional Planning Commission ("CDRPC") to assess the feasibility of establishing a Stormwater In-lieu Fee ("ILF"), Credit Banking and Trading Program for the APCs. The APCs consist of the cities of Albany, Cohoes, Rensselaer, Troy, Watervliet, and the Village of Green Island.

The Report includes:

1. A description of the purpose and scope of the study and definitions of terms used in this report (Section 1)
2. A description of the APCs existing stormwater management systems (Section 2).
3. A review of legal and regulatory considerations for establishing ILF, Credit Banking and Trading programs (Section 3).
4. Research and survey of existing ILF, Credit Banking and Trading programs (Section 4).
5. A review of alternatives for establishing ILF, Credit Banking and Trading programs for the APCs (Section 5).
6. Conclusions regarding the technical, organizational and financial aspects of such programs for the APCs (Section 6).
7. Discussion regarding the feasibility of implementing an ILF, Credit Banking and Trading program, if deemed feasible, the recommended next steps for program implementation (Section 6).

1.2 Purpose

The purpose of the study was to evaluate the feasibility of implementing and administering an ILF, Credit Banking and Trading program for the APCs, including the technical, organizational, and regulatory feasibility of implementing such a program, and to identify the process and steps that would be needed to implement such a program. This study was intended to satisfy one element of the green infrastructure ("GI") strategy included as part of the Combined Sewer Overflow ("CSO") Long-Term Control Plan ("LTCP") that was prepared by the APCs and approved by the New York State Department of Environmental Conservation ("NYSDEC").[1] Stormwater ILFs and Credit Banking and Trading programs are being considered for the APCs to encourage flexibility in GI implementation across the area, encourage more GI to be implemented, and to reduce the overall cost of GI implementation.

[1] Albany Pool CSO Long Term Control Plan, October 2013.

1.3 Definitions

1.3.1 Stormwater In-Lieu Fee

A stormwater ILF program is an innovative alternative to traditional stormwater management funding whereby a municipality or government agency establishes a stormwater retention or detention requirement for development or redevelopment projects and allows the property owner to pay a fee in lieu of meeting the stormwater runoff requirement onsite. In order for an ILF to be utilized, an existing requirement must be in place in the form of a regulation, ordinance, or code that requires stormwater management measures. If this requirement cannot be met, for example due to site restrictions, the ILF provides an option to pay a fee instead of performing on-site mitigation. The fee value is often determined based on the typical cost of installing the stormwater retention or detention measure. The aggregation of these fees provides a source of revenue for the municipality to install stormwater mitigation in another area of the sewer shed or municipality.

1.3.2 Stormwater Credit Banking and Trading

A stormwater Credit Banking and Trading program is an innovative market-based approach to stormwater management funding whereby a municipality or government agency establishes a stormwater retention or detention requirement for development or redevelopment projects and allows the property owner or developer to purchase stormwater credits to satisfy the retention/detention requirements, or bank the credits such that they can be used by the same developer on another project. The credits are generated and provided by other property owners or developers who have implemented stormwater runoff mitigation projects that have exceeded the requirements. This approach allows utilization of a market for the buying and selling of stormwater credits to assist in satisfying the sites stormwater management requirements.

1.4 Scope of Research Study

The scope of the study consisted of completing research on ILF, Credit Banking and Trading programs sufficient to assess their applicability to the APCs. The work included completing a regulatory assessment, researching programs that have been established by other municipalities across the country, facilitating a program concept workshop with the APCs to aid in developing a potential conceptual ILF, Credit Banking and Trading program, and documenting the results in this feasibility assessment report.

The regulatory assessment consisted of reviewing existing State and Federal stormwater regulations applicable to the APCs to assess the regulatory authority to implement such programs. The assessment was also completed to identify the regulatory requirements and potential limitations of the programs, and the steps that the APCs would need to take to comply with existing regulations. This portion of the study was completed by Towne, Ryan, and Partners, a local law firm.

A survey of existing ILF, Credit Banking and Trading programs that have been established by other municipalities across the country was completed to document the approaches employed by others, to understand the possible required program structure and resources, and to provide insight and lessons learned to help guide the development of a program for the APCs. The survey included municipalities that have established and utilize either an ILF program or a Credit Banking and Trading program, or both.

An ILF, Credit Banking and Trading program concept workshop was completed to review the research findings with the APCs and to facilitate the development of a potential conceptual program for the APCs. At this workshop, the merits, pitfalls, and lessons learned were conveyed to the APCs to help describe how similar programs that have been established work.

This Report was prepared based on the research and workshop discussions described above.

2 BACKGROUND INFORMATION

2.1 Capital District Regional Planning Commission

This study was coordinated and facilitated by the CDRPC, which is a regional planning organization for the Capital District of New York. The CDRPC serves to promote intergovernmental cooperation in the communities residing in Albany, Rensselaer, Saratoga, and Schenectady counties. Inclusive of this mission, the CDRPC has coordinated the efforts to prepare the Phase I CSO LTCP for the APCs in 2007. The intent of the LTCP was to assist with mitigating discharges from the 92 CSOs collectively owned and operated by the APCs that discharge to the Hudson and Mohawk Rivers, along with their tributaries. CDRPC continues to provide assistance to the communities, serving as the designated LTCP project administrator.

2.2 Albany Pool Communities

The APCs are a coalition of six communities in the Capital District:

- City of Albany
- City of Cohoes
- City of Rensselaer
- City of Troy
- City of Watervliet
- Village of Green Island

A map of the location of each of the APCs is provided in Figure 2-1. This coalition has worked together with the CDRPC over the past 10 years to prepare the region's LTCP and to mitigate environmental impacts on shared water resources. Watershed boundaries in this region typically cross several municipal boundaries, which gives further cause for joint agreements to address environmental issues.

As part of the LTCP, the APCs have agreed to take advantage of the benefits of GI in reducing stormwater runoff to the combined sewer system, and to help reduce the overall CSO volume and the frequency of discharges. One of the elements of the GI strategy is to assess the feasibility of a GI banking and credit system.[2] This report addresses this element of the strategy.

Since this study seeks to assess the feasibility of stormwater ILF, Credit Banking and Trading programs, pertinent information regarding the APCs was collected. This information included possible growth areas, watersheds, site characteristics in each municipality, and existing stormwater regulations. A summary of APC demographic and building permit information is provided in Tables 2-1 and 2-2. Additional information pertaining to each of the APCs is also provided below.

[2] Albany Pool CSO Long Term Control Plan Supplemental Document, dated October 2013.

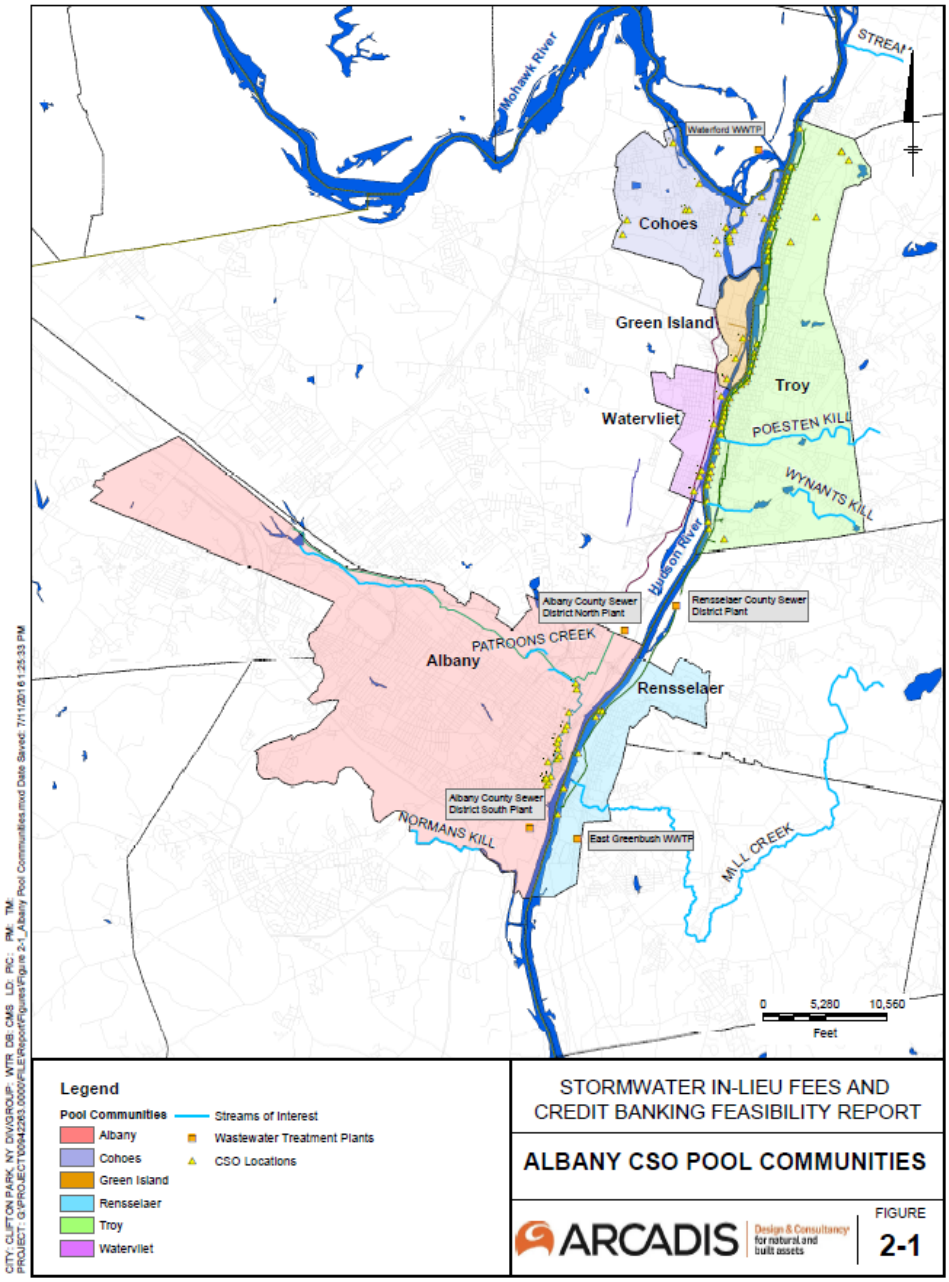


Figure 2-1. Map of Albany Pool Communities

Table 2-1. Albany Pool Community Statistics

Municipality	Land area (sq miles)	Population (2014)	Total Housing Units (2014)	Watershed(s)
City of Albany	21.80	98,665	47,385	Patroon Creek Watershed, Hackett Watershed, Hudson River, Normans Kill, Krumkill
City of Cohoes	4.25	16,248	8,291	Cohoes Cres-Bushkill Watershed, Western Ave Cohoes Watershed, Mohawk River, Salt Kill Watershed
City of Rensselaer	3.30	9,456	4,537	Mill Creek, Quackenkill, Hudson River
City of Troy	11.58	50,005	23,215	Wyants Kill, Hudson River, Anthony Kill, Poesten Kill
City of Watervliet	1.47	10,251	5,282	Hudson River, Dry River Watershed, Salt Kill Watershed
Village of Green Island	0.90	2,620	1,168	Mohawk River, Hudson River, Salt Kill

Source: CDRPC 2016.

Table 2-2. Average Residential Building Permit Statistics (2013-2015)

Municipality	1-Family			2-Family		
	Permits	Units	Cost*	Permits	Units	Cost*
City of Albany	22.0	22.0	$6,063,384	7.0	7.3	$886,676
City of Cohoes	8.7	8.7	$1,298,925	2.0	4.0	$86,667
City of Watervliet	0.7	0.7	$73,333	2.0	4.0	$110,000
Village of Green Island	2.0	2.0	$125,000	1.3	2.7	$0
City of Rensselaer	0.7	0.7	$86,333	0.0	0.0	$0
City of Troy	7.7	7.7	$833,250	0.3	0.7	$64,000

Municipality	3 & 4-Family			5 and Greater Family		
	Permits	Units	Cost*	Permits	Units	Cost*
City of Albany	1.0	1.0	$176,159	9.3	105.0	$15,461,977
City of Cohoes	0.7	2.3	$83,333	68.3	143.0	$29,702,023
City of Watervliet	0.0	0.0	$0	0.0	0.0	$0
Village of Green Island	0.0	0.0	$0	0.0	0.0	$0
City of Rennselaer	0.3	1.0	$120,000	0.0	0.0	$0
City of Troy	0.0	0.0	$0	1.7	23.7	$1,849,306

Source: CDRPC 2016. Cost = developer construction cost (estimated).

Table 2-3. Commercial Building Permit Statistics (2011-2015)

Municipality	# of Commercial Development Permits
City of Albany	65 (33 new, 32 addition/renovation)
City of Cohoes	249
City of Rensselaer	11 (7 new, 4 rehab)
City of Troy	65 (30 new, 35 addition/conversion)
City of Watervliet	69 (7 new, 62 rehab/alteration)
Village of Green Island	4 (2 new, 2 expansion)

Source: Building permit information from Stormwater in-lieu-of Fee and Credit Banking and Trading Concept Workshop Questionnaire.
N/A = Not available.

Table 2-4. Construction Projects by Lot Size Statistics (2011-2015)

Municipality	0.5-1 acre	1+ acre
City of Albany	N/A	N/A
City of Cohoes	8	12
City of Rensselaer	6	0
City of Troy	N/A	N/A
City of Watervliet	2	1
Village of Green Island	2	2

Source: Stormwater in-lieu-of Fee and Credit Banking and Trading Concept Workshop Questionnaire
N/A = Not available.

2.2.1 City of Albany

The City of Albany is the capital of New York State and the seat of Albany County. The City of Albany is located on the west bank of the Hudson River, approximately 10 miles south of the Hudson River's confluence with the Mohawk River. The Hudson River is tidal in this region and remains so until it becomes hydraulically disconnected at the Federal Dam in Troy, New York.

2.2.1.1 Demographics

The downtown area of the City of Albany hosts the State Capital Building, the Governor's Mansion, and many other government buildings that are occupied by state agencies. There are also several colleges and universities situated in the City of Albany, notably the State University of Albany, Albany College of Pharmacy and Health Sciences, Albany Law School, and The College of Saint Rose. The City of Albany is approximately 21.39 square miles in area (US Census, 2010), and has approximately 24 distinct neighbourhoods.

The City of Albany's population density is estimated to be 581.9 persons per square mile (Census Bureau, 2010), with a total population estimated to be 98,424 (CDRPC, 2014). The median household income in 2014 was calculated to be $41,099, with a poverty rate of 26.7%.

2.2.1.2 Development Activity

Over the past three years (2013 to 2015), the development activity within the City of Albany has been moderate. As shown in Table 2-2, the City has had an average of 39 residential building permits issued per year over this timeframe. As shown in Table 2-3, over the past five years, the City has issued 65 commercial building permits, of which 33 have been new construction (development), and 32 have been additions or renovations of existing buildings (redevelopment). New development included 26 new buildings and seven major parking lots, while redevelopment included 13 additions and 19 conversions of use or renovations.

An existing development plan is in place for the City of Albany: Albany 2030. This plan was adopted in April 2012 by the City of Albany Common Council. The intent of the plan is to provide a sustainable approach to local development that will meet the needs of the community while preserving quality of life for its citizens.[3] According to this plan, the number of households in the City of Albany is anticipated to decrease steadily, whereas the surrounding suburban communities are expected to see large population increases during the same period. This plan also details a specific vision for incorporating GI into the City of Albany in several redevelopment areas. For example, a plan exists for Tivoli Park on the north side of the City of Albany that would enhance the park's existing features through GI and other aesthetic improvements.

Based on the moderate recent development activity and the City of Albany's development plans, an ILF, Credit Banking and Trading program may be suitable for the City.

2.2.1.3 Stormwater Management

The City of Albany hosts 11 CSOs under State Pollution Discharge Elimination System ("SPDES") permit No. NY-002 5747. There are several watersheds that intersect the boundaries of the City of Albany: the Krum Kill, the Hackett, the Hunger Kill, the Patroon Creek, and the Normans Kill. The City of Albany is bounded on its southern edge by the Normans Kill and on its western edge by the Krum Kill. The Patroon Creek flows along the City of Albany's northern sections, through Tivoli Park and the Arbor Hill neighbourhood.

Currently, the City of Albany Stormwater Ordinance requires that development which occurs contributory to the combined sewer system (CSS) assume that previously developed parcels be treated as "undeveloped, open space" for the purposes of assessing existing condition flows for the site. Post-development flows are then restricted to these levels to reduce peak flows conveyed to the CSS and assure that post-development conditions will not increase combined sewer overflows.

Several City divisions retain independent stormwater responsibilities that are coordinated by the City. For example, the City Department of Water and Water Supply has the responsibility for construction and post-construction stormwater runoff control and the City Department of Public Works and City Department of Water and Water Supply share responsibility for stormwater housekeeping. A stormwater ILF, Credit

[3] Albany 2030 plan is available at: http://www.albany2030.org/general/final-plan

Banking and Trading program would require close coordination with these departments of the City, if implemented.

2.2.2 City of Cohoes

The City of Cohoes is located on the west bank of the Hudson River, approximately 10 miles north of Albany and adjacent to the Hudson River's confluence with the Mohawk River.

2.2.2.1 Demographics

The City of Cohoes' population density is estimated to be 4,284 persons per square mile (Census Bureau, 2010), with a total population estimated to be 16,248 (CDRPC, 2014). The median household income in 2014 was $44,534, with a poverty rate of 16.1%. The City of Cohoes is 3.77 square miles in area.

2.2.2.2 Development Activity

Over the past three years (2013 to 2015), the development activity within the City of Cohoes has been moderate. As shown in Table 2-2, the City has had an average of 80 residential building permits issued per year over this timeframe. Over the past 5 years Cohoes has approved about 249 commercial building permits as shown in Table 2-3.

In recent years, the City of Cohoes has leveraged its seven miles of waterfront to its advantage through transformations of abandoned industrial buildings into high quality apartments. Housing developments continue to be approved in the community to attract young homeowners and the City of Cohoes has plans to revitalize the downtown business area.

Drivers of development include the State Historic Preservation Office's ("SHPO") Historic Preservation Investment Tax Credit program, Cohoes Industrial Development Agency ("CIDA") Payment In-Lieu of Taxes ("PILOT") program, and CIDA support for preliminary engineering studies. The SHPO credit program is a state-wide program that seeks to encourage the preservation of historic properties rather than allowing for their destruction and replacement. The PILOT program encourages qualifying development activity by allowing developers to make a payment at the beginning of projects in exchange for tax exemptions over time. Finally, CIDA's direct support for preliminary studies can help define projects and build momentum for them.

In the last five years, there have been eight projects of between 0.5 and 1 acre in size, and 12 projects above 1 acre in size and therefore subject to the DEC Stormwater Construction Permit as shown in Table 2-4. In Cohoes, many of the development projects are on city lots that are less than 0.25 acres. Master planning efforts for proposed future development activity are in the process of being revised. Current municipal projects that could be supported using GI include streetscape work on Remsen Street in downtown Cohoes. Other significant development is planned in some areas including Sargent Street between White Street and Ontario Street, the area around the Cohoes Music Hall on Remsen Street, and Saratoga Street north of the Mohawk Paper Mill.

Based on the moderate recent development activity and the City of Cohoes' development plans, an ILF, Credit Banking and Trading program may be suitable for the City.

2.2.2.3 Stormwater Management

The City of Cohoes operates 17 CSOs under SPDES permit no. NY-003 1046. The watersheds that reside at least partially in the City of Cohoes include: the Salt Kill, the Cohoes Crescent-Bush Kill, and the Western Avenue Watershed. The City of Cohoes itself is bounded to the north by the Mohawk River and to the east by the Hudson River.

The City of Cohoes Local Law No. 8 details applicable pre- and post-construction stormwater management regulations, which are in compliance with the New York State Stormwater Management Design Manual. Cohoes has made some effort to implement rough stormwater mitigation measures on small plots where buildings have been demolished and the basements floors have been removed, soil has been broken up and gravel fill has been placed. These lots represent known opportunities for development with soil conditions that may be suitable for further stormwater mitigation. Additionally, Cohoes is already addressing some system operational issues through the utilization of GI. Among the planned development projects soil conditions will vary and their suitability for runoff mitigation will depend on the specific approach taken. Most planned projects in Cohoes are redevelopment projects as there is not significant undeveloped land available within the City.

2.2.3 City of Watervliet

The City of Watervliet is located on the west bank of the Hudson River, approximately 7 miles north of Albany and 3 miles south of the Hudson River's confluence with the Mohawk River. Known as the "Arsenal City," the City of Watervliet is home to the Watervliet Arsenal (the Arsenal), a manufacturing site for the defense industry and United States Army. The Arsenal remains a major employer in the City of Watervliet today, nearly 200 years after it was first established.

2.2.3.1 Demographics

The City of Watervliet's population density is estimated to be 7,624 persons per square mile (Census Bureau, 2010), with a total population estimated to be 10,251 (CDRPC, 2014). The median household income in 2014 was $44,159, with a poverty rate of 14.9%. The City of Watervliet is 1.35 square miles in area.

2.2.3.2 Development Activity

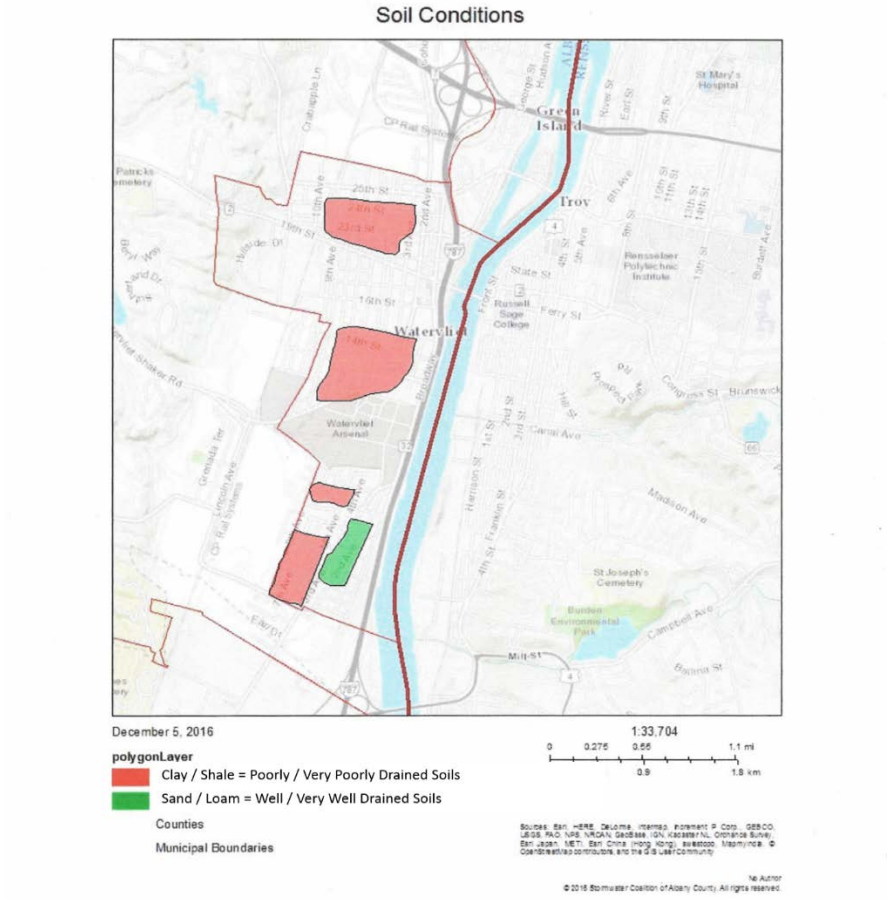
Over the past three years (2013 to 2015), the development activity within the City of Watervliet has been very low. As shown in Table 2-2, the City has had an average of 3 residential building permits issued per year over this timeframe.

The City of Watervliet's Comprehensive Plan, created in 2010, provides a basis for community development in light of population decline in the preceding years.[4] The City of Watervliet can be categorized as densely populated and urban, with a mix of home owners and renters. The Comprehensive Plan details methods to enforce building maintenance standards to promote an attractive downtown area and promote growth. In addition to these improvements, the Comprehensive Plan also includes ways to improve existing recreational facilities and take advantage of waterfront space. From a city planning perspective, the City in Watervliet is unique in that, according to the Comprehensive Plan,

[4] City of Watervliet Comprehensive Plan dated January 19, 2010. Available at: http://www.watervliet.com/city/watervliet-comprehensive-plan.pdf

the City of Watervliet has no parcels exceeding one acre in area, aside from parklands, which may limit the suitability of an ILF, Credit Banking and Trading program if a one acre threshold is used as an eligibility threshold. There are no economic development initiatives supporting growth from municipal or county resources at this time. Over the past 5 years the City has issued 69 commercial building permits, of which 7 have been new construction (development), and 62 have involved rehabilitation or alterations of existing buildings (redevelopment). Most of the city's parcels are already developed, so any planned future projects would be most likely for redevelopment. Currently, there is no one concentrated area of planned redevelopment.

Based on the limited recent development activity and the lack of parcels exceeding one acre in area, an ILF, Credit Banking and Trading program may not be suitable for the City by itself. Additionally, given the soil conditions, participation in a regional effort for the limited redevelopment activity that is occurring is likely only feasible if offsite mitigation is permissible beyond municipality and sewer shed boundaries.



Source: Information provided by the City, December 2016.

Figure 2-2. Watervliet Soil Conditions

2.2.3.3 Stormwater Management

The City of Watervliet operates five CSOs under SPDES permit no. NY-002 0899. The watersheds that partially reside in the City of Watervliet are the Salt Kill and the Dry River. Aside from the city itself, there are three other major contributors to stormwater runoff through the City of Watervliet: the Town of Colonie, the Arsenal, and I-787. According to the Comprehensive Plan, runoff from the Town of Colonie, which borders the City of Watervliet on the west, contributes 80% of the total runoff flow through the City of Watervliet. It is noteworthy that there is an opportunity to work with Non-CSO partners that contribute stormwater flow to the APCs.

The City of Watervliet's local code reflects the standards presented in New York State's Stormwater Design Manual.

Watervliet recently completed a GI project as the first phase of road and utility overhauls for Route 32. No other systemic operational issues, municipal assets or development opportunities have currently been identified as applicable for GI investment. On the Route 32 project, specifically on the 3rd Avenue portion in downtown Watervliet, the City found good soil conditions for GI investment, however, past soil observation from digging and construction activity (i.e. water brakes, utility work etc.) throughout the city suggests that much of the area has clay or shale based soils that offer fewer opportunities as shown in Figure 2-2.

2.2.4 Village of Green Island

The Village of Green Island is located on the west bank of the Hudson River, approximately 8 miles north of Albany and 2 miles south of the Hudson River's confluence with the Mohawk River. The Village of Green Island itself is inclusive of three islands: Green Island, Center Island, and McGill Island. The Village of Green Island experienced a phase of prosperity during the 20th century, and exists today as a primarily blue collar community.

2.2.4.1 Demographics

The Village of Green Island's total population is estimated to be 2,620 (Census Bureau, 2010). Population density is not calculated for the Village of Green Island, as the area of the town is less than one square mile (0.7 square miles). The median household income in 2014 was estimated to be $55,000, with a poverty rate of 13.4%. The Village of Green Island can be described as a small, tight knit community, with Green Island hosting most of the residential and industrial areas, and Center Island holding newer residential development.

2.2.4.2 Development Activity

Over the past three years (2013 to 2015), the development activity within the Village of Green Island has been very low. As shown in Table 2-2, the Village has had an average of three residential building permits issued per year over this timeframe. As shown in Table 2-3, over the past five years, the Village has issued four commercial building permits, of which two have been new construction (development), and two have been expansions of existing buildings (redevelopment). In the last five years, there have

been two projects of between 0.5 and 1 acre in size, and two projects above 1 acre in size that would be subject to the NYSDEC Stormwater Construction Permit requirements, as shown in Table 2-4.

The Village of Green Island Industrial Development Agency ("IDA") is a community organized group formed by the Board of Trustees of the Village in 1979. Due to the area limits of the Village of Green Island, little development is typically planned, nonetheless the IDA exists to promote development of vacant land to increase employment opportunities.

Based on the limited recent development activity and the limited anticipated future development in the Village of Green Island, an ILF, Credit Banking and Trading program may not be suitable for the Village.

2.2.4.3 Stormwater Management

The Village of Green Island operates three CSOs under SPDES permit no. NY-003 3031. The Salt Kill is the only watershed located in Green Island. The Village of Green Island's local code reflects the standards presented in New York State's Stormwater Design Manual.

2.2.5 City of Troy

The City of Troy is located on the east bank of the Hudson River, directly across from the City of Watervliet, approximately 7 miles north of Albany and 3 miles south of the Hudson River's confluence with the Mohawk River. Also known as the "Collar City" due to its manufacturing past in the shirt collar industry, the densely urban City of Troy has experienced a strong period of revitalization and development in recent years, in particular along River Street in downtown Troy.

2.2.5.1 Demographics

The City of Troy's population density is estimated to be 4,840 persons per square mile (Census Bureau, 2014), with a total population estimated to be 50,005 (CDRPC, 2014). The City of Troy is approximately 10.36 square miles, with nine distinct neighbourhoods. The median household income in 2014 was $39,526, with a poverty rate of 27.6%. Several local colleges reside in the City of Troy, including Russell Sage College, Rensselaer Polytechnic Institute, and Hudson Valley Community College.

2.2.5.2 Development Activity

Over the past three years (2013 to 2015), the development activity within the City of Troy has been moderate. As shown in Table 2-2, the City has had an average of 10 residential building permits issued per year over this timeframe. As shown in Table 2-3, over the past 5 years, the City has issued 65 commercial building permits that were constructed, of which 30 have been new construction (development), and 35 have been additions or conversions of existing buildings (redevelopment). New development included 23 new buildings and 7 other structures, while redevelopment included 17 additions and 18 conversions of use.

Development in Troy in recent years has involved the redevelopment of older buildings into apartment units. This redevelopment has spurred the demand for additional parking within the City.

The City of Troy Comprehensive Plan, released on March 15th 2016, takes an innovative approach at tackling a number of development issues.[5] Similar to the City of Watervliet, the City of Troy has experienced a decline in population since its peak during the industrial years of the 20th century. According to the Comprehensive Plan, regionally the capital district is expected to add 64,600 jobs by 2026, and the City of Troy would like to be a major player in hosting this growth through community development initiatives.

Based on the moderate recent development activity and the City of Troy's development plans, an ILF, Credit Banking and Trading program may be suitable for the City.

2.2.5.3 Stormwater Management

Troy operates 48 CSOs under SPDES permit no. NY-009 9309. The watersheds that partially reside in the City of Troy include: the Troy Reservoir, the Sweet Mill Creek, the Rensselaer Lake, and the Wynantskill. GI is a key piece of the City of Troy's Comprehensive Plan to decrease stormwater run-off and improve water quality. Elimination of CSOs, preventing erosion, and improving the condition of the City of Troy's seawall are also priorities within the plan.

The City of Troy's local code reflects the standards presented in New York State's Stormwater Design Manual.

2.2.6 City of Rensselaer

The City of Rensselaer is located on the east bank of the Hudson River directly across from the City of Albany, and 10 miles south of the Hudson River's confluence with the Mohawk River. Similarly, to the other communities adjacent to the Hudson River, the City of Rensselaer seeks to leverage its waterfront for future growth.

2.2.6.1 Demographics

The City of Rensselaer's population density is estimated to be 2,962 persons per square mile (Census Bureau, 2010), with a total population estimated to be 9,456 (CDRPC, 2014). The median household income in 2014 was $48,314, with a poverty rate of 20.0%. The City of Rensselaer is 3.17 square miles in area.

The City of Rensselaer is a working-class community that is also home to the ninth busiest train station in America due to its key location directly north of New York City and west of Boston. Similar to many local communities, the City of Rensselaer was previously a manufacturing and industrial city throughout the 20th century. As business in the Capital District is evolving to be more services- and information-based, the City of Rensselaer is becoming a primarily residential community.

2.2.6.2 Development Activity

Over the past three years (2013 to 2015), the development activity within the City of Rensselaer has been very low. As shown in Table 2-2, the City has had an average of 1 residential building permit per year

[5] City of Troy Comprehensive Plan, dated March 15th, 2016. Available at: http://www.realizetroy.com/

issued over this timeframe. As shown in Table 2-3, over the past five years, the City has issued 11 commercial building permits, of which seven have been new construction (development), and four have involved rehabilitation of existing buildings (redevelopment). In the last five years, there have been six projects of between 0.5 and 1 acre in size, and no projects above 1 acre in size, as shown in Table 2-4. None of these projects would have been subject to the NYSDEC Stormwater Construction Permit requirements.

As a part of the City of Rensselaer Comprehensive Plan, issued January 2006, the community intends to redevelop the waterfront and to take advantage of already established industrial areas to leverage growth.[6] Based on the limited recent development activity and the limited anticipated future development in the City of Rensselaer, an ILF, Credit Banking and Trading program may not be suitable for the City.

2.2.6.3 Stormwater Management

Rensselaer operates seven CSOs under SPDES permit no. NY-002 6026. Two watersheds reside in the City of Rensselaer: the Mill Creek watershed and the Papscanee Creek watershed. The City of Rensselaer's local code reflects the standards presented in New York State's Stormwater Design Manual.

2.3 Current Stormwater Compliance and Agreements

A portion of the communities in the Capital District on the western side of the Hudson River have formed an inter-municipal agreement known as the Stormwater Coalition of Albany County.[7] This Coalition includes the four Albany Pool Communities on the western side of the River: the City of Albany, the City of Cohoes, the City of Watervliet, and the Village of Green Island along with several other non-APC communities. On the eastern side of the Hudson River, the municipalities of Rensselaer County, City of Troy, and the City of Rensselaer have formed a working group to collaborate on stormwater compliance issues. These communities have separate SWMPs and annual reports. All of the Community's local ordinances comply with the requirements of the individual MS4 permits, and New York State Stormwater Management Standards.

These coalitions and working groups were formed to address stormwater issues cooperatively, across municipal boundaries. Each of the individual APCs has an MS4 permit, which has baseline requirements for stormwater management, however MS4 reporting can be accomplished through submission of a single report from all members of the inter-municipal agreements. Both the stormwater coalition and east side working group seek to assist the communities with meeting the MS4 permit requirements in an efficient way in collaboration with the neighboring communities.

[6] City of Rensselaer Comprehensive Plan, dated January 2006. Available at: http://www.rensselaerny.gov/Libraries/Planning_Department/Comprehensive_Plan_2006.sflb.ashx
[7] Information about the Stormwater Coalition available at: http://www.stormwateralbanycounty.org/

3 LEGAL AND REGULATORY REVIEW

The purpose of this section of the report is to review the current regulatory framework in New York State and at the Federal level for stormwater management to assess the legal and regulatory feasibility of the APCs implementing an ILF, Credit Banking and Trading program. This section of the report was prepared based on a technical memorandum prepared by Town, Ryan & Partners, a law firm located in Albany and Saratoga, New York. The complete technical memorandum prepared by Town, Ryan & Partners is provided in Appendix A.

3.1 Federal Regulations

The Clean Water Act ("CWA") establishes the basic structure for regulating discharges of pollutants into waters of the United States and regulating quality standards for surface waters. Under the CWA, the United States Environmental Protection Agency ("EPA") has implemented pollution control programs such as setting wastewater standards, and water quality standards for contaminants in surface waters. The LTCP for the Albany Pool Communities' wastewater systems, under supervision of the NYSDEC, is being undertaken to comply with the requirements of the CWA. The NYSDEC approved the Albany Pool Communities'' LTCP on January 15, 2014.

The Wet Weather Quality Act of 2000, which amended the CWA requires each combined sewer system to conform to the National CSO Control Policy. The National CSO Control Policy is part of the National Pollution Discharge Elimination System ("NPDES") permit program. Under this program, it is unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. Point sources are discrete conveyances, such as pipes or man-made ditches. Industrial, municipal, and other facilities must obtain an NPDES permit if their discharges go directly to surface waters.

The CWA, including the amendment enacted in 2000, does not prohibit the use of stormwater ILF, Credit Banking and Trading programs. However, in order to implement these programs, and incorporate them into the LTCP, the APCs will need to establish that these programs do not result in a violation of the wastewater standards and water quality standards by the CWA, or the National CSO Control Policy mandated by the 2000 amendment to the CWA.

3.2 New York State Laws

The New York State Stormwater Management Design Manual provides guidance to designers on selection of stormwater management practices. The most recent manual was released in January 2015 by NYSDEC, and the manual is generally updated once every four years. This manual is a key component of the Phase II SPDES general permit for stormwater runoff from construction activities in the State of New York. To obtain coverage under this permit, the operator of construction activity must submit a completed Notice of Intent ("NOI") with the NYSDEC, which is meant to affirm that a stormwater pollution prevention plan ("SWPPP") has been created for the site and will be implemented. Regulated municipalities that reside within designated urbanized areas, including each of the APCs, have their own Municipal Separated Storm Sewer System ("MS4") permit. Construction activities involving soil disturbances in excess of one or more acres are required to obtain coverage under the permit, however

disturbances less than one acre can also require coverage at the discretion of NYSDEC or at the discretion of the regulating MS4 community. These determinations are based on the potential of the disturbance to violate a water quality standard within a surface water body in the State of New York.

The permit also outlines the requirements of the SWPPP. The SWPPP describes how storm water runoff will be managed during and post construction. The SWPPP not only details measures that will be taken during construction to control erosion and run-off, but also evaluates the pre-development and post-development peak flow rates and runoff reduction volumes exiting the site. In the case that peak flow rates are higher post-development, stormwater management measures must be taken to reduce peak flow rates to less than or equal to pre-development conditions. There are two categories of development: new development and redevelopment. Although the criteria are more stringent for new development, the premise is the same: to minimize effects of development on surface waterbodies.

The water quality volume ("WQv") for the site must be calculated using guidance from the manual. Methods to manage the WQv may include ponds, wetlands, infiltration, filters and open channels. In the case of new development, it is required that runoff reduction volume ("RRv") measures are employed to reduce 100% of the WQv. RRv measures may include tree plantings, cisterns, porous pavement, or rain gardens among many other alternatives. If site restrictions such as low infiltration soils, seasonal high groundwater, and shallow depth to bedrock exist, then the requirement can be met by a combination of RRv and other stormwater management practices. Although these requirements are not universal (the requirements are more stringent for sensitive watersheds, GP-0-15-002 Appendices), they are applicable in most cases.

Local laws and other MS4 Permit requirements empower and require that local municipalities ensure that the conditions of the General Construction Activity Permits are met, providing front-line oversight of Construction Activity Permit requirements. In addition, MS4 regulated areas disturbing more than one acre of their own land must also obtain Construction Activity Permit coverage.

The SPDES manual and guidance has relevance to stormwater ILF, Credit Banking and Trading in terms of the size of the disturbance covered under the permit (i.e. one acre or larger), and the requirement to implement stormwater management measures to reduce peak flow rates to less than or equal to pre-development conditions. According to the manual and guidance, the management of peak flow rates following a disturbance must be managed onsite, which limits the applicability of ILF, Credit Banking and Trading programs unless the NYSDEC will allow in-lieu offsite mitigation through ILFs and Credit Banking and Trading to meet the runoff requirements. Without this allowance, the manual and guidance significantly diminishes the suitability and feasibility of ILF, Credit Banking and Trading for the APCs. However, if municipalities decide to impose greater restrictions on development (such as requiring peak flow rates following a disturbance to be less than or equal to 80% of pre-development conditions) then an ILF and credit program could be considered to satisfy the more restrictive requirements imposed by municipalities. Likewise, if municipalities extend stormwater mitigation requirements to properties with disturbances that are less than one acre in size, then an ILF, Credit Banking and Trading program could be used, in combination with on-site mitigation, to satisfy these requirements self-imposed by the municipalities.

3.3 Summary of Legal and Regulatory Feasibility

The following summarizes the legal and regulatory feasibility of the APCs adopting an ILF, Credit Banking and Trading program.

- No Federal or New York State laws or regulations were identified that would prevent the adoption of an ILF, Credit Banking and Trading program by the APCs. However, such laws and regulations may limit use of an ILF, Credit Banking and Trading program without specific approval by regulatory agencies. For example, the SPDES general permit outlines the requirements of the SWPPP, which requires that for construction projects, if peak flow rates of stormwater runoff are higher post-development than pre-development, stormwater management measures must be taken to reduce peak flow rates to less than or equal to pre-development conditions. Further, under the SPDES general permit, construction activities involving soil disturbances in excess of one or more acres are required to obtain coverage under the permit, however disturbances less than one acre can also require coverage at the discretion of NYSDEC or at the discretion of the regulating MS4 community. Therefore, unless NYSDEC allows the APCs to utilize ILF, Credit Banking and Trading (i.e. offsite mitigation) measures to satisfy these requirements, the APCs would need to enact more strict runoff requirements, or require development sites smaller than one acre to meet the runoff requirements, in order to make adoption of an ILF, Credit Banking and Trading program usable.
- Inter-municipal cooperation and formation of a joint ILF, Credit Banking and Trading program among the APCs is legally feasible. Each APC's governing body would need, at a minimum, to pass a resolution authorizing an inter-municipal agreement, and then enact legislation allowing ILF, Credit Banking and Trading programs to be implemented in conjunction with their existing stormwater management plans, MS4's and SPDES permits. There are no legal limitations per se in having the communities jointly develop and implement an inter-municipal agreement for these programs. However, the regulatory implications for credit trading across water and sewer sheds and MS4 areas presents a significant challenge, and at a minimum, the NYSDEC would need to approve the process and the potential for an unbalanced distribution between areas if such options are chosen. The most legally feasible inter-municipal cooperation approach would be for the ILF, Credit Banking and Trading program to be administered regionally, but the ILFs collected and utilized within the same municipality or sewer shed, and the credits purchased and sold within the same municipality or sewer shed.
- The APCs will not likely be able to compel state or federal agencies within the APC service areas to participate in the ILF, Credit Banking and Trading program due to state and federal sovereign immunity. Local authorities and school districts are also regulated under separate permits and thus may not be compelled to participate in the program. However, there may be opportunities for partnerships with these agencies to address stormwater runoff.

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4 SURVEY OF ILF, CREDIT BANKING AND TRADING PROGRAMS

4.1 Overview

This section of the report summarizes the research that was completed to identify and evaluate existing ILF, Credit Banking and Trading programs that have been established by other municipalities around the country. In general, stormwater ILFs have been used by some for many years to provide an off-site alternative to stormwater mitigation/compliance. However, the application of the program has been limited. Challenges, such as defining program boundaries and the lack of predictability of revenue streams, as well as a hesitation for the municipal government to take on risk from the private sector (land developer) may explain the lack of widespread growth of the ILF approach. Stormwater Credit Banking and Trading programs are relatively new. These programs have been adapted from similar approaches used for wetlands impact mitigation and nutrient loadings reduction into sensitive or impaired waterbodies, such as the Chesapeake Bay and the Long Island Sound. While both of these programs are gaining in popularity as they provide a means for meeting more stringent regulatory requirements, the number of established programs today still remains limited. Only approximately 6 percent of stormwater utilities surveyed (based on a survey of approximately 78 utilities) have a credit banking or trading program.[8]

The focus of the survey was to gather information from municipalities that have established ILF and/or Credit Banking and Trading programs in order to better understand how these programs work, their advantages, limitations, and applicability to the APCs. A summary of the survey results is provided below.

4.2 Survey of Existing Programs

A survey of existing ILF, Credit Banking and Trading programs was completed by conducting a search of municipalities that have developed such programs throughout the U.S. (through a literature review, contacts with stormwater practitioners, and a web search). Once the municipalities were identified, a survey form was prepared and provided to each municipality for their completion. The survey form was prepared to facilitate consistent data collection and comparison of ILF, Credit Banking and Trading programs in the communities that were surveyed. Each of the municipalities were then contacted to obtain additional information regarding their programs.

As noted above, the number of established programs that focus on stormwater retention are limited. Furthermore, there are varying environmental issues that drive these programs due to varying regulatory requirements, geography and climatological factors. Areas that cope with flooding issues, for example, have programs that are driven by stormwater peak flow reduction and are less driven by water quality. Therefore, the survey was expanded to include a number of programs that were similar but are used to promote stormwater detention, nutrient removal, and/or wetlands mitigation.

[8] 2014 Stormwater Utility Survey, Black & Veatch 2014.

4.3 Summary of Survey Results

A total of nine programs were identified and reviewed that established mitigation for stormwater, nutrients, and wetlands.[9] The five most relevant of the programs that were surveyed that were applicable to APC's stormwater goals and objectives are listed at the top of Table 4-1. Each of these five programs is discussed in detail in this chapter. The remaining four, less relevant programs, pertaining to wetlands and nutrients, are shaded in grey at the bottom of Table 4-1. In addition, Figure 4-1 provides a map of the locations of the nine programs that were identified with a key indicating program type.

Table 4-1. Stormwater In-Lieu Fee, Credit Banking and Trading, and Related Programs

Program Location	Population (US Census Bureau)	Program Name	Program Type
Washington DC	7,170,351 (2015)	Stormwater Retention Credit (SRC) Program	Stormwater ILF, Credit Banking and Trading
Chattanooga, TN	173,778 (2014)	In Lieu Fee and Credit Coupon Program	Stormwater ILF, Credit Banking and Trading
Park Ridge, IL	37,856 (2014)	Stormwater Management Ordinance and Stormwater Detention Fee	Stormwater ILF
Aspen, CO	6,805 (2014)	Fee-In-Lieu Program	Stormwater ILF
San Antonio, TX	1,436,697 (2014)	Fee In-Lieu-of (FILO) Program	Stormwater ILF
Maryland Critical Areas	6,006,401 State of Maryland (2015)	Critical Area Program – Fee in Lieu of Buffer Mitigation	Buffer Mitigation ILF Program
State of Georgia	10,214,860 State of Georgia (2015)	Georgia Department of Transportation Wetlands Banking Program	Wetland Banking Program

[9] Other in-lieu fee programs are also known to exist, including Santa Monica, California, the Neuse River Basin in North Carolina, and Williamsburg, Virginia. These programs were cited in the publication Urban Stormwater Management in the United States, published by the National Research Council of the National Academies Press, 2009.

Program Location	Population (US Census Bureau)	Program Name	Program Type
State of North Carolina	10,042,802 State of North Carolina (2015)	Nutrient Offset Program and Wetlands and Protective Buffer Banking Program	Nutrient Removal and Wetlands/Protective Buffer Credit Banking and Trading Program
State of Maine	1,329,328 State of Maine (2015)	Mitigation and Compensation Credit Program	Wetlands ILF Program

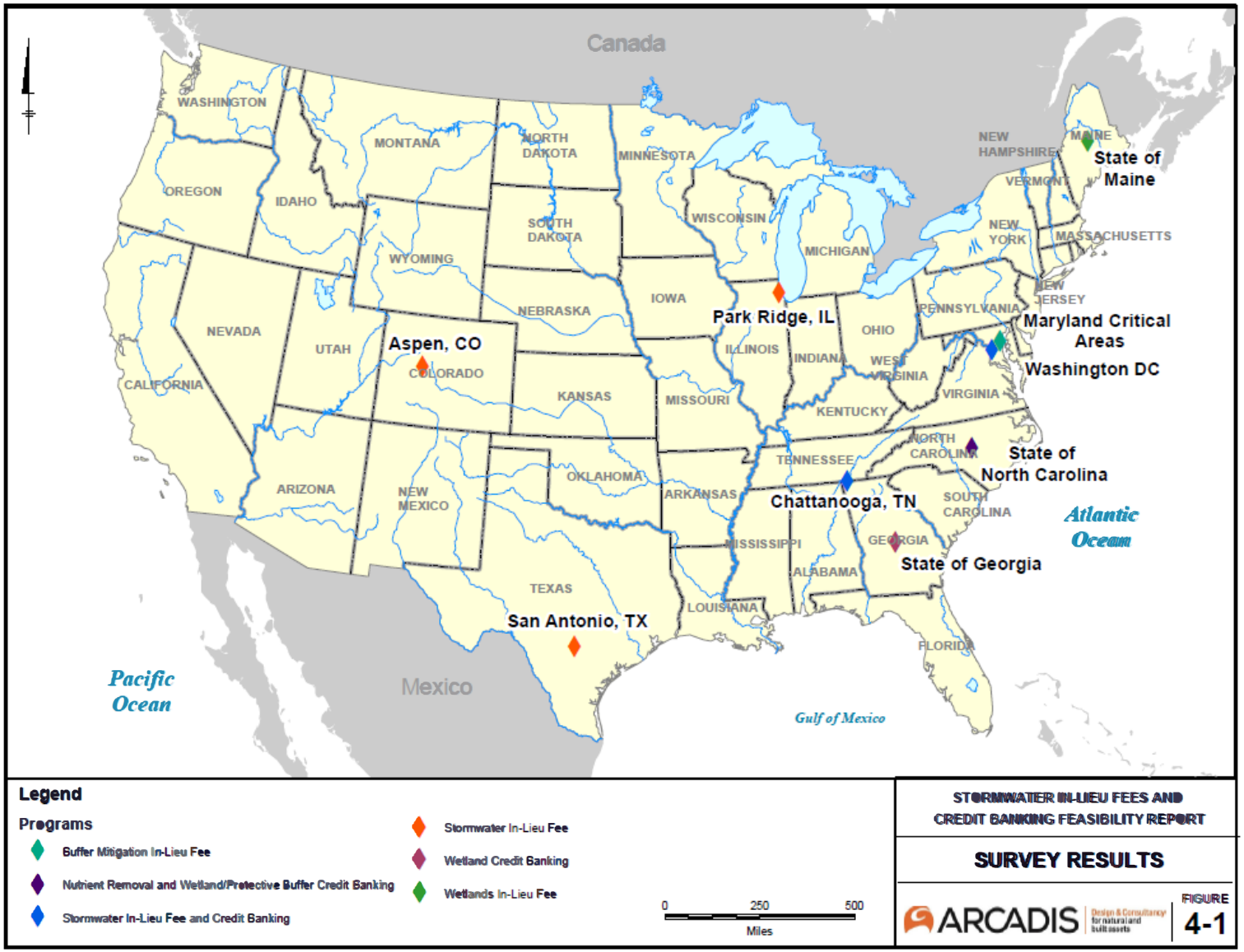


Figure 4-1. Map of Programs Identified

4.3.1 Stormwater Retention Credit Program (Washington D.C.)

Program Overview

The Stormwater Retention Credit ("SRC") Program that was established in Washington D.C. in 2013 applies to major land disturbing projects, which are classified as 5,000 square feet (ft^2) or more land disturbance, and major substantial improvement projects, which are classified as greater than 5,000 ft^2 of disturbance where the cost of improvement equals at least 50% of the assessed value of the structure prior to improvement in Washington D.C. Properties that fall into the category of major land disturbing projects are required to retain the volume from the 90th percentile storm event (1.2 inches of rain), and projects that fall into the category of major substantial improvement projects are required to retain the 80th percentile (0.8 inches of rain) storm event. The projects are required to retain 50% of the retention volume onsite. However, they may meet the remaining required volume by purchasing privately traded SRCs or by paying an ILF to the District of Columbia Department of the Energy & Environment ("DOEE"). As part of the program, DOEE established a SRC registry and online marketplace where approved privately traded SRCs can be bought and sold. Private properties must submit applications to the DOEE for approval prior to listing on registry.

Eligibility Requirements

Site development projects that are classified as major land disturbing projects or major substantial improvement projects qualify for program participation. The area of disturbance that triggers stormwater management is small when compared to New York's disturbance threshold (5,000 ft^2 for Washington D.C. versus an acre or 43,560 ft^2 for New York). The lower the threshold the greater the number of potential program participants.

Regulatory Basis

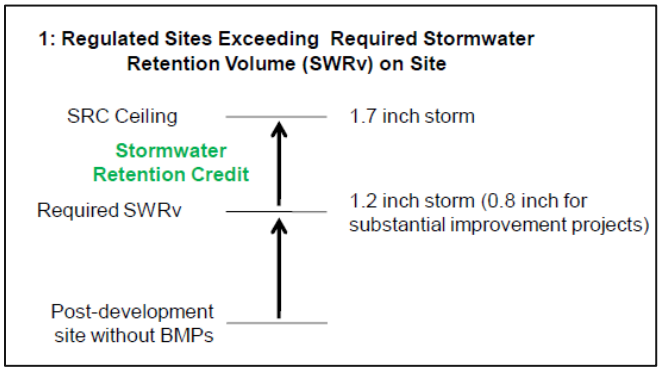
The MS4 permit issued in 2011 to Washington D.C. by EPA Region III required the District to create and manage a stormwater ILF, Credit Banking and Trading program. Therefore, the DOEE set up the stormwater retention guidelines and regulations as a part of their local MS4 requirements and the MS4 NPDES permit for D.C.

Program Specifics

Property owners have the option to meet the requirements entirely onsite, or meet 50% of the requirements onsite and the remaining portion with a combination of onsite mitigation or through the purchase of ILFs or SRCs. SRCs can be purchased from watersheds differing from the development location at an exchange rate of 1 SRC to 1 gallon of Off-Site Retention Volume ("OSRV") for 1 year. There is one zone in the Washington D.C. area, the Anacostia Waterfront Development Zone ("AWDZ") that has a separate governing body. SRCs purchased for development in the AWDZ from outside the Anacostia River watershed are applied at a rate of 1.25 SRCs to 1 gallon of OSRV for 1 year. The ILF is calculated based on the District's estimate of the cost per gallon to install retention facilities within the District.

SRCs can be generated by private property owners for up to 1.7-inches of stormwater retention depending on the contributing area. This is due to the limiting returns for pollutant removal after 1.7-inches of retention as pollutant loading becomes more dilute with increasing volume. Figure 4-2 depicts the allowable volume that can be used to create SRCs. After meeting the site's retention requirements (either 1.2-inches or 0.8-inches of retention) the available maximum volume that can be sold as SRCs is 0.5-inches or 0.9-inches, respectively.

Figure 4-2. Washington D.C. Stormwater Credit Volume



In general, ILFs are priced at a higher cost than the SRCs by design, shifting the responsibility from the municipality to property owners to install retention within the District. The current ILF rate is $3.58 per gallon, and SRCs are currently offered at between $2.00 and $2.55 per gallon. As such, SRC trading is used more frequently than the payment of ILFs. Since program inception, only one ILF was paid by a property owner in the Anacostia River watershed, and this revenue was used by DOEE to implement a stormwater retention project at a middle school in the same watershed.

For the Washington D.C. program, one SRC equals one gallon of runoff retention for one year. The ILF also corresponds to one gallon of runoff retention for one year. There is a one-year lifespan for each SRC and DOEE can certify up to three-years of SRC's as part of their three-year inspection cycle. This provides incentives to property owners for continued maintenance of the GI measures and provides flexibility for SRC generators who decide to leave the market and use their land in other ways.

The stormwater practices that are eligible for generating SRCs include green roofs, rainwater harvesting, disconnected surfaces, permeable pavement, concrete or asphalt, bioretention, infiltration trenches, infiltration basins, grass channels, dry swales, and tree planting and preservation.

A total of four staff manage the program, one on a full-time basis, and three others on a part-time basis. One of the key activities of staff is the inspection of the stormwater practices that generate the SRCs. There is a required submittal during the application process and staff review these applications. The application also includes a maintenance contract or documentation of expertise and capacity to conduct maintenance. Staff performs an initial inspection, and subsequent maintenance inspections are performed at an interval deemed necessary by the DOEE, and are repeated periodically.

4.3.2 In-Lieu Fee and Credit Coupon Program (Chattanooga, TN)

Program Overview

The ILF and Credit Coupon Program in the City of Chattanooga was established in 2013. This program is entirely volume based, and the City refers to the volume required to be captured as the stay on volume ("SOV"). The program is in place to meet bioretention requirements, per Chattanooga's MS4 permit. The permit requires Chattanooga to create a GI program that provides flexibility for developers to meet the SOV requirements, which is the basis for these programs.

Eligibility Requirements

Redevelopment and new development on commercial properties in the City of Chattanooga are eligible to participate in either the ILF or credit coupon program. Developers work with the City and the City's consulting engineers to determine constraints for utilizing the ILF and credit coupon program. In general, ILFs and credit coupons can only be utilized in most cases for up to 50% of the required SOV without demonstrating a hardship. Credits are generated after 1-inch of rainfall volume is able to be retained onsite through bioretention and can either be sold (price is not regulated; the market determines the price) or the developer can receive a credit coupon and apply the coupon to another site in the same watershed.

Regulatory Basis

The ILF and Credit Coupon program was developed in conjunction with the implementation of a stormwater fee (called a "Water Quality Fee") for users of the stormwater system in 2009. The intent of the water quality fee and ILF and Credit Coupon program was to assist the City with meeting MS4 requirements, improve water quality, and reduce the City's stormwater program costs of service. In the first year of the program, property owners were allowed to achieve 100% of their SOV through ILF or credits. However, this has since changed. Commercial properties undergoing redeveloped or new development are now required to achieve at least 50% retention onsite, with the remaining portion able to be satisfied with either onsite mitigation or the purchase of credits or payment of ILF. If hardship is demonstrated, the City may make an exception and allow greater than 50% of the SOV to be mitigated via credits or ILF.

According to the MS4 permit, for certain projects, the total bioretention requirement can be reduced by up to 50%, as a 10% reduction is granted for meeting each of the five following criteria: redevelopment, brownfield development, high density (>7 housing units per acre), vertical density (floor to area ratio of 2 or >18 housing units per acre), and mixed use and transit oriented development (within one half mile of public transit.)

Program Specifics

The ILF and Credit Coupon program is only available for non-residential parcels, but all property owners are subject to the stormwater fee. Credit coupons can be generated for retention exceeding 1-inch of rainfall volume up to 2.1-inches of SOV storage. These coupons can be used in full or in partial amounts at any time; they do not expire, but they must be used at the primary development site. Above 2.1 inches of SOV, pollutant loading is relatively low, so the benefit of installing additional retention begins to decrease. Stormwater management practices that can generate credits include pervious pavement, infiltration beds, infiltration trenches, bioretention, vegetated swales, vegetated filter strips, infiltration

berms, and green roofs. If the retention requirement is exceeded onsite, SOV credit coupons are validated by the City of Chattanooga, and then credits can be sold by the developer or property owner. The funds from these sales are returned to the credit generator.

SOV credit coupons are bought and sold on an open market, and pricing varies. The open market is self-regulating among developers and other generators and purchasers of the credits; the City has no input over sale and purchase of credit coupons, but it does track how many coupons are issued. Credit coupons are based on the SOV, and therefore pricing is evaluated by cubic foot of storage. The City has a feature that is unique in regards to "Credit Coupon Multipliers." Credit coupons earned on redevelopment/retrofit sites can be applied at a ratio of 1:1 (installed: earned) anywhere in the City outside of the Combined Sewer System to meet another site's SOV. For new development sites, the ratio for application is 1.5:1, and can only be applied within the same watershed to meet another site's SOV. The intent of the multiplier is to put a premium on SOV credits installed on redevelopment projects but does not rule out the option for additional SOV installations on new developments.

All funds generated from the ILF program are deposited in the Public Stormwater Project Fund. This fund serves to partially or fully fund design, permitting, construction, and installation of public stormwater best management practices. The City reserves the right to pool fees from multiple sites to fund a project.

According to the City of Chattanooga budget for fiscal year 2017, 12 full time staff work in the stormwater department, and a portion of this staff administer the ILF and Credit Coupon program.

4.3.3 Stormwater Management Ordinance and Detention Fee (Park Ridge, IL)

Program Overview

The City of Park Ridge's stormwater program includes the administration of a stormwater detention fee, which has been in place since 2008. The stormwater detention fee operates as an ILF, and there is no corresponding stormwater Credit Banking and Trading option in this program. The program has established a maximum peak runoff rate for properties. This allowable stormwater "release rate" is 0.15 cubic feet per second (cfs) per acre.

An ILF has been established only in special cases where meeting the maximum runoff requirement is infeasible or cost prohibitive. For example, for sites that are one to three acres in size, achieving the release rate may not be possible since orifices on outlet structures are not allowed to be less than 3-inches in diameter in the City, so the restricted flow on these sites will typically exceed 0.15 cfs per acre. In this special case, the differential between the 3-inch orifice release and 0.15 cfs/acre is deemed the 'excessive release' and requires the developer to pay $30 per cubic foot of excessive release or 5% of the construction cost, whichever is less. This ILF for detention is deposited in the Sewer Fund. The fee can only be paid or utilized in cases of excessive release due to site constraints or unreasonable restrictor size (outlet orifice sizing).

Eligibility Requirements

Property owners are eligible for the ILF program if the property has a 3-inch orifice release and the 0.15 cfs release rate is exceeded, or if the stormwater retention required by the City Stormwater Management Plan cannot be reasonably provided (as determined by the City Engineer), then the developer or owner will pay the City the ILF amount in order to mitigate their excessive flow rate.

Regulatory Basis

The City of Park Ridge issued a stormwater ordinance (Article 11-3) as part of the City's municipal code, which outlines the conditions under which an ILF can be applied. This article is applied to all development (construction or reconstruction) in the City; for residential development, there is a minimum size of 1 acre. A Building Permit is not issued until the Engineering Division approves the sites Stormwater Management Plan and calculations. Developers must first run the analysis, then the determination is made regarding whether or not the fee is allowable. The City's program requirements are stricter than most of the surrounding communities and the governing entity's (the Metropolitan Water Reclamation District's) standards which is currently 0.30 cfs/acre.

Program Specifics

The developer or owner must pay the City a fee of $30 per cubic foot of required stormwater detention not provided, however the fee will not exceed 5% of the construction cost of development (determined by the Director of Public Works). This ILF was determined by an analysis on the cost of detention for several different types of construction projects (residential, commercial, etc.). The rate of $30 per cubic foot of detention reflects a price that would force developers to consider all options for installing detention prior to requesting to pay the fee.

The ILF applies to the entire sewer shed and the money is kept in a single Sewer Fund. Ideally, revenue from one sewer shed is applied to that same sewer shed, but some areas do not require improvements, and so those funds are applied to properties in other sewer sheds. Since 2008, the ILF has increased from $5 to $30, which has caused developers to closely consider their options and install detention on site. In this case, a low ILF will place more impetus on the program administrators to take actions to improve conditions. If the fee is more competitive with the cost of installing detention, developers more closely consider options for detention on site. The ILF program generated approximately $19,000, $107,000, $43,000 and $20,000 in ILF revenue 2012 through 2015, respectively.

The City employs five staff that are involved in the stormwater program (City engineer, 2 engineers, 2 technicians). However, program administration corresponds to only approximately 10% - 20% of their roles.

4.3.4 Fee-In-Lieu Program (Aspen, CO)

Program Overview

The City of Aspen's stormwater program was established in 2008 and contains an ILF component but not a Credit Banking and Trading component. Aspen's detention based program has a simple premise: detention is required for all development or redevelopment projects and is calculated as 6.2 cubic feet per 100 square feet of impervious area. If the property owner decides not to install stormwater detention measures to meet this requirement, the owner can alternatively pay an ILF, which the City government utilizes to upgrade Aspen's stormwater infrastructure. If the disturbed or added impervious area of a development or redevelopment project is less than 25% of the total area of the site, then the detention requirement applies to only the disturbed area. However, if the disturbed or added impervious area comprises more than 25% of the total area of the site, then the site shall be treated as a new development and the total site shall meet the detention requirements. The program was established in response to flooding events in recent years in the City.

Eligibility Requirements

The City Development Engineer determines if a project is located in a qualifying area covered under the stormwater program. If the project is covered by the program and drains to a right of way, the project may qualify at the discretion of the City Development Engineer.

Regulatory Basis

The City has an ordinance in place (Ordinance No. 15) that defines the definition of a redevelopment and development project, the ILF cost, and the calculation used to determine the amount of run off that detention must be provided for.

Program Specifics

The cost of the ILF was determined by the City as the costs to construct one cubic foot of detention. The current fee amount is $76.49 per cubic feet of required detention. The original cost of ILF in 2008 was $70 per cubic foot of detention. The program in Aspen is different than other programs that were surveyed in that the property owner has the option of either mitigating stormwater runoff onsite or satisfying the requirement by purchasing ILFs. There is no minimum amount of onsite retention required. The City presents the ILF as an attractive alternative to designing mitigation, and the ILF is actually slightly less than the typical cost of installing detention. Historically, this program generated $325,000, $107,000, $16,000, $153,000 in ILFs annually from 2011 to 2014, respectively.

Ideally, the City would like to apply the revenue regionally throughout the City, however in instances where the cost of construction is not feasible to provide detention or conveyance using the revenue generated from the program, the detention projects are installed on a site-by-site basis. There is no Credit Banking and Trading as a part of this program. In recent years, the fee was increased to discourage developers from paying the fee for all projects. Since the developers have reacted and have not been attempting to opt for the fee and instead provide detention, the fee was lowered again.

The City employs a stormwater team that works in the engineering department in Aspen, made up of one supervisor and four team members. As a part of their roles, they also manage utilities and other stormwater work unrelated to the program.

4.3.5 Fee In-Lieu-of (FILO) Program (San Antonio, TX)

Program Overview

San Antonio maintains a Regional Stormwater Management Plan (“RSWMP”), which developers must participate in one of three ways: (1) pay a fee in-lieu of on-site detention (except in mandatory detention areas); (2) construct on-site or off-site stormwater detention to mitigate increase in runoff resulting from the proposed development; (3) construct or participate in the construction of off-site regional stormwater facilities to mitigate increased stormwater runoff anticipated from the ultimate development of the watershed. The first of these options is the fee in-lieu of (“FILO”) program, which has been in place since 1997.

Eligibility Requirements

If a project site is not located in a mandatory detention area, a development may qualify for the FILO program by submitting an Adverse Impact Analysis or Storm Water Management Plan prepared by a

licensed professional engineer for the proposed development. After review, a good faith effort needs to be made to determine if detention can be feasibly provided on site. If the development will not cause adverse impacts 2,000 feet downstream (or to the nearest FEMA floodplain, whichever is closest) an ILF can be paid instead of completing onsite mitigation.

Regulatory Basis

The City of San Antonio Unified Development Code Section 35-504, Ordinance No. 2013-01-31-0074 dictates the requirements of the RSWMP. Any development that has an increase in impervious cover greater than 100 square feet is subject to the requirements of the stormwater management plan, including the FILO fee.

Program Specifics

The FILO fees are determined based on the development type (i.e. single family, multifamily, commercial, industrial), and range from $0.15 to $0.25 per square foot of impervious cover. If the site is a redevelopment site, only the additional impervious cover is considered. In certain areas (in accordance with the Inner-City Reinvestment Infill Policy), the fee is 50% of the proposed calculated amount in order to incentivize growth in these areas. At a minimum (100 square feet of impervious cover), the fee that would be paid is between $150 to $250, which may be much less than installing low impact development or detention structures to manage run off from that relatively small surface area. Since 1997, the combination of stormwater utility fees and FILO fee revenues have contributed $59 million to regional stormwater projects. The FILO is blended with the City's stormwater utility revenues, and so therefore refined revenue data is not available.

In developing the fees, the Public Works department worked closely with members of the development community, engineering professionals, school districts, the Real Estate council, San Antonio Apartment Association, and San Antonio Restaurant Association represented through the following stakeholder groups: (i) FILO Stakeholder Working Group, (ii) Development Process Task Force, and (iii) Professional Engineers in Private Practice (“PEPP”) (Taken from City Ordinance 2013-01-31-0074). The program in 2013 pivoted to promote use of funds and stormwater management on a more regional scale (rather than city wide).

The City employs 12 full time staff work in the stormwater department, however managing the FILO program is only a portion of their roles. The City also has a stormwater utility fee program that it manages.

4.4 Discussion of Key Findings from the Survey

Eligibility

Among the more relevant programs to this study, Washington DC and Chattanooga, TN were identified. Both of these cities’ MS4 permits require development of programs to allow for stormwater retention in a flexible structure that allows developers leeway under restrictive site conditions. The requirement for Washington D.C. is equal to 1.2 inches of retention, per the MS4 permit. If this cannot be met, however, the MS4 has a provision that an acceptable plan (submitted by Washington DC and approved by the USEPA) can allow for a portion of this requirement to be managed using ILF, Credit Banking and Trading options.

Chattanooga has a similar provision, with the exception that their requirement is equal to 1 inch of retention. As part of their plans, the communities also evaluated the maximum beneficial retention before the returns on pollutant removal begin to diminish. For Washington D.C., this is 1.7 inches of retention, and for Chattanooga this is 2.1 inches. Therefore, credits are not granted for retention in excess of these volumes.

Both of these programs allowable best management practices ("BMPs") include standard GI features that are also promoted in New York State. This includes rain gardens, bioretention swales, permeable pavement, dry swales, and infiltration basins among others.

Other relevant stormwater programs that were identified included Park Ridge, IL, Aspen, CO, and San Antonio, TX. These programs were created due to city ordinances requiring developers to either reduce peak runoff flow rates or provide detention, and these programs exclusively utilize ILFs and do not have Credit Banking and Trading features. The extent of ILF that can be paid is at the discretion of city officials in most cases, with responsibility held by the City Engineer to make the determination if additional practices can be applied on site to mitigate the issue.

Program Incentives

The main incentive for these programs is to avoid the unnecessary costs of installing stormwater management measures under infeasible conditions. This is a co-benefit to the community and the developer, as the transfer of funds to the community to install measures or the exchange of credits allows for mitigation measures to be installed in ideal conditions, meaning that enhanced stormwater management in other areas may provide a better overall outcome in terms of water quality or quantity in downstream receiving waters. An example of this would be a site that locally has clay soils. If GI is required on site, it is very difficult to drain the retained stormwater when the underlying soils are not highly permeable. In this case, if an ILF or Credit Banking and Trading option is utilized, GI could be installed locally in an area with better conditions.

In addition, other potential incentives also exist, such as a developer may wish to preserve developable land rather than dedicate this land to stormwater management features. This is why some communities integrate opportunity costs into ILFs. Additionally, the private sector tends to seek opportunities to shift risk and responsibility (and costs) to the public sector when this option is available. An offset, trading or ILF program provides this path, so some developers may choose to pay the premium of a higher cost for ILF in order to not have to deal with design, construction, and maintenance of stormwater management on their site.

Rate Structure

Program rate structures rely largely on the type of mitigation and whom the desired responsible party for mitigation will be. If a reduction in peak flow is desired to prevent erosion or flash flooding, then a regulation should exist to limit peak flow rates exiting a site. If the municipality has issues with pollutant loading from local watersheds, then a program based in retention and GI would be more applicable. These conditions may also limit or define the program structure. For example, if the challenge is localized flooding, then a consideration for an ILF or offset program will be a "tighter" (more local) application of the program. In addition, a cost implication could exist with the range/scale of the ILF program. A wider/larger area available for ILF investments may provide more opportunities for ILF investments, which should drive costs down and enhance the ability to find "ideal" sites (i.e., sites that provide the greatest

value to the community through efficient (technical and costs) addressing of the pollutant or parameter of interest.

In general, the rate structures of the surveyed programs utilized cost estimating and market information to determine the cost of installing the mitigation measure. In most cases, the ILF was structured to be greater than the cost of installing the measures, so that the developer or owner would find ways to install the measure on site as a first option. If the municipality utilized Credit Banking and Trading, in most cases the cost was market driven and the price was set by the credit holder. In order to be competitive, credit holders compete to sell their credits, thus keeping credit costs less than ILF costs. One policy issue here to consider is how to develop the fee, and if it should include opportunity costs, as well as whole life-cycle costs (capital plus inspection/maintenance costs). Since the municipality is taking over responsibility for stormwater and the risk inherited in finding a suitable location and ensuring that it is designed, constructed, and maintained properly, an argument can also be made that the private entity should also pay for these risks and responsibilities.

Level of Effort and Cost of Administering the Programs

The programs surveyed were generally managed by the City Engineer's office within the municipality, and the administration of the program was conducted as a part of existing roles within the office, and therefore, in general new positions were not created specifically to manage the program. In the case of Washington D.C., one individual is dedicated to managing the program for the district, along with other partially dedicated staff.

The surveyed programs do not seem to be self-sustaining and therefore require funding for program operation through additional stormwater utility fees. Reasons for this may be that the ILF revenues generated are not dedicated to the administration of the program, rather the money is used for implementing alternative GI projects, or the ILF may be too low and may not take into account life-cycle costs, opportunity costs, and risk considerations. For example, the City of Chattanooga utilizes their stormwater service fee, instituted at the same time as their ILF and Credit Coupon program, to fund the program operation. The City of Aspen has a Stormwater Fund which relies heavily on property taxes and supports the City stormwater team.

Other Lessons Learned

If the initial structure of ILF program rates takes into consideration the cost of constructing retention, the program administrators can determine whether the impetus to install retention or detention will fall on the developer or the municipality. If the rate is higher than the cost of constructing the required measures, then often times the developer will find creative methods to meet the requirement. If the rate is lower than the cost of constructing the required measures, the reverse will happen and the developer will find ways to expose a site hardship. Sufficient upfront research and cost estimating will need to be performed to determine how the program administrators would like to direct the participant's actions.

4.5 Other Programs Evaluated

As part of the Best Management Practices required for CSO system operators, regulated communities are required to ensure that new development and re-development of lands will not result in dry-weather discharges, and that potential increases in flows will not increase the frequency or volume of overflows during wet-weather events. In general, sewer extensions or new users which result in flows in excess of 2,500 gallons per day need to be considered and mitigated, as appropriate. In many instances, the additional flows associated with the development need to be mitigated through the implementation of 4:1 offset projects; taking into account peaking factors that may be experienced as well as uncertainties associated with the predictive flow reductions attributed to the mitigation projects. Some municipalities will allow developers the flexibility of mitigating sewer flows more than required in one area and applying a mitigation credit to another area that discharges to the same CSO if it is cost effective to do so. This could be considered a simple form of wastewater mitigation credit banking. One Capital District community is presently developing a credit banking system in association with a City wastewater flow reduction program to assist developers in meeting these requirements, and as a means to promote economic development activities within their community.

Credit Banking and Trading programs are also a component of other environmental management programs, in particular wetlands and nutrient banking. Although these programs are not the focus of this study, the survey evaluated these programs as well. These other programs that were evaluated are shown in Table 4-2.

Table 4-2. Other Relevant In-Lieu Fee and Banking Programs

Program Location	Population (US Census Bureau)	Program Name	Program Type
Maryland Critical Areas	6,006,401 State of Maryland (2015)	Critical Area Program – Fee in Lieu of Buffer Mitigation	Buffer Mitigation ILF Program
State of Georgia	10,214,860 State of Georgia (2015)	Georgia Department of Transportation Wetlands Banking Program	Wetland Banking Program

Program Location	Population (US Census Bureau)	Program Name	Program Type
State of North Carolina	10,042,802 State of North Carolina (2015)	Nutrient Offset Program and Wetlands and Protective Buffer Banking Program	Nutrient Removal and Wetlands/Protective Buffer Credit Banking and Trading Program
State of Maine	1,329,328 State of Maine (2015)	Mitigation and Compensation Credit Program	Wetlands ILF Program

4.5.1 Maryland Critical Areas

Program Overview

Maryland's Critical Area program is designed to manage and treat stormwater, thus improving water quality. The goal of the program is to improve post development runoff water quality to have 10% less stormwater pollutants than the predeveloped condition. As a part of these requirements, buffer mitigation is also required. If planting requirements for the buffer areas cannot be fully met, an ILF can be paid to be transferred to the Critical Areas Fund. The fee is authorized by the local jurisdiction and can only be paid if there is no feasible alternative.

Eligibility Requirements

The buffer zone is the area directly adjacent to the tidal waters, tidal wetlands, and tributary streams. This area consists of trees, shrubs and other plants that can that can catch sediment carried in runoff from buildings, pavement, and lawns. Where development is proposed within the Critical Area, enhanced stormwater management is required, and thus, establishment of buffer areas.

Regulatory Basis

In 1984, the Chesapeake Bay Critical Area Protection Act was enacted to by the Maryland General Assembly. This legislation sets the precedent for protection of the Critical Areas, and has been amended several times to include additional provisions for water quality and habitat. In 2010, a new amendment to the act included protection of buffer areas, or regions adjacent to the shore. These are ecologically sensitive areas, and thus development is prohibited.

Program Specifics

Local jurisdictions (stormwater authority) assist in deciding whether or not to accept an ILF within this program, working in conjunction with the State of Maryland Critical Areas Commission. Guidance from the Maryland Department of Environment and the Critical Area Commission dictates that local municipalities have the option to have an ILF program, which several counties have created. This program is overseen by the Critical Area Commission, and therefore revenue goes towards the Critical Areas Fund.

4.5.2 State of Georgia

Program Overview

The program that the State of Georgia hosts is targeted at wetland mitigation. In the past, an ILF was collected on projects that disturb wetlands, however due to mobilization issues few projects were completed by the State of Georgia to protect equivalent wetland areas. Credit Banking and Trading mitigation banks were created to promote wetland mitigation through private individuals and organizations, taking the responsibility off of the regulator. The ILF is still maintained as an alternative way to perform mitigation when credits are not available in the applicable watershed area. This is a last resort though, and the Army Corps encourages developers to pursue the Credit Banking and Trading options where available.

Eligibility Requirements

The Georgia Department of Natural Resources (DNR) has established a freshwater wetlands database and minimum criteria for local government consideration of wetlands. The wetland permit program provides a federal permit process that allows activities in wetlands after a public interest review. These activities also require a Section 404 permit from the Army Corps. If the wetland is altered or degraded, and mitigation to offset these losses is not able to be completed, the Credit Banking and Trading and ILF program can be utilized.

Regulatory Basis

The supporting regulatory basis for this program includes the Clean Water Act Requirements for mitigating wetland areas, supported by the Corps Compensatory Mitigation Rule (2008).

Program Specifics

Wetland Credit Banking and Trading in Georgia is largely managed by commercial enterprises operating credit banks. Mitigation banks are created through preservation of tracts of land that are restored, established, or enhanced wetlands, streams, or other aquatic resources. The credits generated through these preservation actions are approved by the regulating body, USACE, and are stored in credit banks. The mitigation banks are largely wetland performance in Georgia.

4.5.3 State of North Carolina

Program Overview

Land owners who have the available land and space to install BMPs to offset nutrient loading to water ways are able to put those credits in an established credit bank (watershed specific). Other developers in the same watershed are able to purchase credits per pound of phosphorous or nitrogen removal. The credits are all verified by the North Carolina Department of Environmental Quality (“NCDEQ”). Individual programs are implemented on the local level, and may be more stringent. At this level, rules regarding Credit Banking and Trading can require developers to purchase credits either only within the same eight digit USGS watershed code or within an area as large as the entire watershed.

Eligibility Requirements

A site must explore all practical alternatives for avoiding and minimizing impacts with their consulting engineer. If the developer is unable to exceed applicable permit thresholds then mitigation will be required. Mitigation consists of purchasing mitigation credits from an approved mitigation bank, paying an ILF, or satisfying the requirement on site. Sites must meet a minimum threshold (pounds per year) and are required to strive to meet the permitted requirement. Any differential between what is met above the minimum and the permitted requirement must be taken care of through the alternative mitigation measures.

Regulatory Basis

The regulatory basis for North Carolina's program exists within the federal rules 40 CFR Part 250/33, part 325 and 332, and North Carolina general statute 1143-214.13.

Program Specifics

The ILF program peaked in 2008 during the housing boom, with $6 to $9 million in collected ILFs. Since that time, the program has decreased in activity significantly as there is less development in general in North Carolina. Rates are set per nutrient type, per watershed. The ILF rate depends on the cost of land in the basin and is adjusted annually for inflation. The ILF relates to individual HUCs (Hydraulic Unit Codes), which are similar to watersheds. The ILF has become more of a back-up measure for developers if credits are not available.

The nutrient offset program has two subsets: Reforestation of riparian areas and stormwater/wetland mitigation. There is a minimum nutrient removal amount that must be met which is lower than the permitted amount. After initial installation of BMPs, a credit release process is conducted over a period of 10 years. As a part of the development package that is put together by the credit bank, the credit release formula is created. Annual monitoring is performed by the credit bank and regulator to ensure that the BMPs are being managed properly.

4.5.4 State of Maine

Program Overview

This program is administrated by the Maine Department of Environmental Protection (“MDEP”) and is targeted towards an entity that is under permit with the state and is impacting natural resources, primarily wetlands, to make a payment directly to the MDEP as an alternative to traditional mitigation processes. These fees are allocated through the Maine Natural Resource Compensation Program (“MNRCP”) (joint program with the MDEP and Army Corps, which is administered through the Nature Conservancy. This program distributes the funds in the form of grants which are allocated to specific biophysical regions in which the impacts occurred.

Eligibility Requirements

A site must explore alternatives with their consulting engineer and the MDEP prior to paying the ILF. If all options are exhausted and on site mitigation is not available, then the ILF can be considered. Since the fee is based on square footage, area disturbed is the measured value. The compensation categories include: wetlands, significant vernal pools, inland wading bird and waterfowl, and shorebird habitats.

Regulatory Basis

The regulatory basis for the ILF program is the Maine Natural Resources Protection Act (“NRPA”), which is a regulatory program administered by MDEP. The program seeks to primarily avoid adverse environmental impacts, minimize impacts that cannot be practicably avoided, and lastly compensate for the impacts that cannot be minimized. The final option is the premise for the ILF program.

Program Specifics

The amount of nutrient removal achieved on site must exceed the minimum thresholds set by the State of Maine. The remainder may be covered by ILFs, however, the State prefers for mitigation through the developer first to avoid payment of an ILF. The program requirements are in line with federal regulations pertaining to protection of environmentally sensitive areas. Approximately 75% of projects with wetland impacts in Maine mitigate using the ILF option, and thus provide funding for alternative projects through the MNRCP.

The ILF rate is location specific and is determined from the calculated cost of creating nutrient removal BMPs in each of Maine's 16 counties. The funds are typically reapplied in the same 'bio region', meaning an area with similar physical and biological features and is typically geographically as close as possible to where the ILF was applied. The Nature Conservancy is in charge of the BMPs that are installed and these can range from shoreline stabilization projects to freshwater wetland creation.

5 ILF, CREDIT BANKING AND TRADING PROGRAM ALTERNATIVES FOR THE ALBANY POOL COMMUNITIES

The feasibility of implementing an ILF, Credit Banking and Trading program for the APCs is dependent on a number of factors including, but not limited to, legal structure, agreement on program governance, technical and administrative requirements, program participation, and cost/benefit of alternatives. Based on the successes of ILF, Credit Banking and Trading programs in other locations, and the commitment to meeting the requirements of MS4 permits and mitigating CSO impacts in a collaborative way, the development of such a program for the APCs may provide a viable opportunity to promote GI where it can best serve the APCs. The following presents a number of options and considerations potentially impacting the feasibility and effectiveness of ILF, Credit Banking and Trading programs for the APCs.

5.1 ILF, Credit Banking and Trading Alternatives/Considerations

As evident from the survey of existing programs and baseline findings, a number of alternatives are available to the APCs for potential establishment of an ILF and/or Credit Banking and Trading program. The program(s) can be local or regional, can be ILF or Credit Banking and Trading only or both, the requirements can be consistent with existing New York State minimum regulations or more restrictive, program eligibility and ILF pricing can be established based on a number of factors.

To assist in identifying potential advantages and disadvantages of alternatives, a summary of the potential opportunities and risks associated with key factors is presented in Table 5-1. These opportunities and risks generally relate to external factors that require further investigation as part of a detailed implementation plan should the APCs decide to move forward with an ILF, Credit Banking and Trading program. Understanding these will set the stage for managing potential barriers to implementation and establishing direction.

Table 5-1. Opportunities and Risk Considerations

Opportunities	Risks
No known legal prohibition on implementing ILF or Credit Banking and Trading in New York State.	Potentially first in New York State. Would be a program "test case".
Potential NYSDEC support for enhancing GI.	Each of the APCs has different needs, resources, and requirements.
Potential opportunity to receive additional grant funding to assist in developing and implementing regional program.	Need to establish potentially complicated program requirements and governance.
Could leverage existing regional APC coordination through the CDRPC, Districts, Counties, and Coalitions.	For offsite ILFs and Credit Banking and Trading to work, might need to establish more restrictive requirements than NYS guidance which mandates on-site mitigation.

Opportunities	Risks
Opportunity to take advantage of regional economies of scale to achieve cost effective GI and stormwater mitigation.	Relative uncertainty regarding program costs, anticipated program participation, and impact on CSO mitigation.
Potentially aids in meeting MS4 and LTCP goals	Requires additional monetary resources for program development, implementation and administration.
Provides economical alternative to developers to meet regulatory requirements	Requires consensus building (among APCs and the public) for program acceptance.
Can be used to fund municipal GI projects	Low participation can make program not cost effective. Anticipate lower participation under 1 acre disturbance limit. Risk of providing stormwater management services (siting, designing, constructing, and maintaining practices) is transferred from the private sector to the public sector.

Based on the research, there are several additional factors and considerations that could potentially impact the feasibility of an ILF, Credit Banking and Trading program for the APCs. These factors and considerations are described below along with various options and their potential benefits and limitations.

5.1.1 Regulatory Considerations

As discussed in Section 3, there are a number of legal and regulatory considerations that could impact the feasibility of an ILF, Credit Banking and Trading program for the APCs. These include whether or not the NYSDEC will require onsite stormwater runoff mitigation to meet the requirements of the New York State Construction General Permit (GP-0-15-002) or whether a combination of onsite and offsite mitigation (through ILFs and Credit Banking and Trading) will be allowed. If only onsite mitigation will be allowed to meet the requirements, then it would negatively impact the suitability of the ILF, Credit Banking and Trading programs for the APCs because it would require the APCs to implement stricter local stormwater regulations than the New York State Construction General Permit in order to make the ILF, Credit Banking and Trading program applicable, i.e., the ILF, Credit Banking and Trading program would apply to the portion of the requirement that is more restrictive than the State regulations, whereas only onsite mitigation would be allowed for the portion needed to meet the State regulations.

Furthermore, the APCs will also need to decide whether or not to apply the ILF, Credit Banking and Trading program to properties with soil disturbance of less than one acre. Under the General Permit, construction activities involving soil disturbances in excess of one or more acres are required to obtain coverage under the permit, while disturbances less than one acre can also require coverage at the discretion of NYSDEC or at the discretion of the regulating MS4 community. Applying the program to construction activities less than one acre will likely increase the amount of ILFs collected and potentially increase the number of credits traded under the program. Due to the volume of historical construction activity, excluding construction activities with disturbance of less than one acre could significantly limit the potential number of credits

available under a Credit Banking and Trading program and would limit the suitability of a Credit Banking and Trading program in communities with very limited development activity.

A summary of some of the program options, benefits, and limitations related to these issues is provided in Table 5-2.

Table 5-2. Regulatory Considerations

	Option	Benefits	Limitations
CSO vs. MS4 Area Eligibility			
a.	Implement higher stormwater retention requirements in MS4 areas than in CSO areas	Increases ability to address flooding issues, and enhances feasibility of ILF, Credit Banking and Trading in these areas.	Political will to raise stormwater retention requirements in MS4 areas.
b.	Implement same stormwater retention requirements as State requirement in MS4 areas and CSO areas	Provides for consistency with existing State regulations. Potentially easier to administer.	Potentially limits the ability to utilize ILF, Credit Banking and Trading if regulations do not allow for off-site mitigation.
Mitigation Requirements			
a.	Post-development runoff control to meet SWPPP requirements met with only onsite mitigation.	Ensures stormwater mitigation occurs in the local area where development / redevelopment is occurring.	Effectively eliminates the ILF or credit banking and trading programs as there would be no demand for credits if onsite mitigation is required. Municipalities would need more restrictive local regulations than NYS requirements, and allow the more restrictive portion to be address through ILF or credit banking/trading.
b.	Post-development runoff control to meet SWPPP requirements met with combination of onsite and offsite mitigation.	Allows stormwater mitigation to be implemented in areas most cost effective or that deliver greater environmental and/or social benefits and outcomes on a per unit investment basis. Allows market driven approach to mitigation.	Would require NYSDEC approval to meet mitigation requirements with a combination of onsite and offsite mitigation options.
Project Eligibility			
a.	Development 1 acre in size or greater	Consistent with NYS stormwater regulations	Limited development activity in some municipalities lowers the suitability of Credit Banking and Trading.

	Option	Benefits	Limitations
b.	Development less than 1 acre in size	Potentially greater stormwater mitigation than other options.	Requires municipalities to implement stormwater ordinances more stringent than NYS requirements.

5.1.2 Programmatic Considerations

There are a number of programmatic considerations that could have an impact on the feasibility of an ILF, Credit Banking and Trading program for the APCs. These programmatic considerations need to be flexible for each of the APCs because the development, financial, and organizational capacity situations of the APCs are also different from community to community. These programmatic considerations include which program each community may want to participate in; both ILFs, Credit Banking and Trading, one or the other, or neither, whether ILFs and credits are allowed to be traded across sewer sheds within each municipality, or across multiple municipalities, and whether the programs should apply the same to both residential and non-residential developments, and to both new development and redevelopment projects.

As discussed in Section 3, there are a number of legal considerations regarding these programmatic considerations. The legal review indicated that buying and selling credits across water and sewer sheds and MS4 areas presents a significant challenge, and at a minimum, the NYSDEC would need to approve the process and the potential for an unbalanced distribution between areas if such options are chosen. However, based on the legal review, there does not appear to be any statutory restrictions for APCs entering into an inter-municipal agreement to implement ILF, Credit Banking and Trading programs across municipal boundaries.

A summary of some of the programmatic options, benefits, and limitations related to these issues is provided in Table 5-3.

Table 5-3. Programmatic Options

	Option	Benefits	Limitations
Programs Offered			
a.	Implement Only ILF program	Allows offsite alternative where onsite mitigation not feasible. Applicable to municipalities with limited development activity.	Less market driven than other options. Requires municipality to implement off-site mitigation rather than developers or owners, and take on added risk that is typically held by the private sector.
b.	Implement Only Credit Banking and Trading Program	Market-based approach to offsite mitigation.	Requires sufficient development activity for a viable credit trading market or may require the municipalities to become purchasers (rather than simply relying on developer demand). This has been a

	Option	Benefits	Limitations
			challenge with other established programs.
c.	Implement Both ILF, Credit Banking and Trading Programs	Applicable to municipalities with a range of development activity. Allows for a market driven approach.	Added administrative complexity.
d.	Implement ILF and Credit Banking, but not the Credit Trading component	Provides the benefit of "compensation" for a waiver where onsite mitigation is not feasible. Provides flexibility to developers. Lowers administrative costs	Limits the flexibility offered to developers or property owners to purchase or sell credits from/to others.
Sewer Shed Considerations			
a.	Limit credits to be traded and ILFs to be used within sewer shed boundaries within the same municipality	Offsite mitigation efforts will address CSO and stormwater issues within the same sewer shed.	Limits the ability to bank and trade credits in an open market within and across each municipality. Requires segregation of ILFs by sewer shed.
b.	Allow credits to be traded and ILFs to be used across sewer sheds within the same municipality	Expands the ability to bank and trade credits in an open market within each municipality. Allows aggregation of ILFs within each municipality.	Offsite mitigation efforts would potentially not benefit the CSO area where the development is occurring. Limits ability to bank and trade credits across each municipality. Requires segregation of ILFs by municipality.
c.	Allow credits to be traded and ILFs to be used across sewer sheds and municipal boundaries	Greatly expands the ability to bank and trade credits in an open market across municipalities. Allows aggregation of ILFs.	Offsite mitigation efforts would potentially not benefit the CSO area or municipality where the development is occurring. Political issues regarding where to spend ILF revenues.
d.	Use policies to drive mitigation investments in areas of greatest benefit	Credit ratios or similar adjustment factors could drive mitigation investments to certain areas, such as if there is a strong desire to get more "greening" of the MS4 area than CSO area.	Adds additional planning elements to the program.
Residential vs. Non-Residential Properties			
a.	Program available for both residential and non-residential properties	Program consistency regardless of development type. Potentially increases number of credits banked and traded, and increases the amount of ILFs collected.	Requires administration of a larger program.

	Option	Benefits	Limitations
b.	Program only available for non-residential properties	Limits the required administration since program participants are fewer. Limits the program to property types that typically generate the biggest bang for the buck outcomes, making it a more efficient option overall.	Limits the number of credits banked and traded potentially impacting the viability of the program. Potentially reduces the amount of ILFs collected.
c.	Include residential properties but create a unique set of incentives for each customer class.	A different set of incentives or conditions for residential properties than for commercial, such as allowing blocks of residential parcels to participate, would expand the applicable of the program to more properties.	Added complexity of the program.
Development vs. Redevelopment			
a.	Program the same for both development and redevelopment (retrofit) projects	Simpler to administer. Provides additional compliance / mitigation options to developers.	Differences in ability and cost of onsite mitigation potentially different between development and redevelopment reducing effectiveness of the program.
b.	ILFs and value of credits different for development and redevelopment projects	Incentivizes more onsite mitigation for development projects, and allows more offsite mitigation at redevelopment sites where onsite mitigation may be more difficult.	More difficult to administer. Unequal ILFs and credit values between development and redevelopment projects may be deemed to be unfair.
In-Lieu Projects vs. In-Lieu Fees			
a.	Allow developers to implement in-lieu projects instead of paying ILFs (This is similar to the concept of credit banking)	Results in cost effective developer-driven mitigation. Could result in mitigation on public property, such as in the right-of-way. Limits administration of ILF collection and use.	Potential difficulty in valuing in-lieu projects such that the work is equivalent to paying ILFs.
b.	Do not allow developers to implement in-lieu projects instead of paying ILFs	None.	Inflexibility, particularly if there is a suitable alternative location where mitigation can be implemented cost effectively.

5.1.3 Governance Considerations

There are a number of governance considerations that could impact the feasibility of implementation of ILF, Credit Banking and Trading programs for each of the APCs. Based on the anticipated amount of activity and staffing effort that would be required to administer such programs, each community would not

likely need more than a fraction of a staff persons' time for administration given the likely volume of activity that would be involved. The activities involved with administering such programs could potentially be added to building and construction permit staff time. It is also important to note that these functions within each APC are already lean and existing staff may not be able to absorb the added activities that would be required to administer an ILF or Credit Banking and Trading program. Therefore, additional staffing would likely be needed to support implementation of such programs.

The APCs may be able to take advantage of economies of scale by aggregating the administration of an ILF, Credit Banking and Trading program under a separate agency, such as the CDRPC, or an inter-municipality district. Regional administration could consist of managing separate programs for each APC that desired to implement such a program, or it could consist of managing a combined regional program. A regional approach could provide a number of advantages, such as reduced redundancy in program administration and program consistency across municipalities. A regional approach, however, requires establishment of participation and a governance structure for implementing the program. A number of options exist and could include all or some of the communities participating. Regional participation can be established through interlocal agreements, creation of a special district, utilization of an existing entity, or other options. Governing oversight and voting say for the program would need to be established based on the agreed organizational structure. In general, operating a single program for the APCs would be more cost-effective, as some of the program management burden would be alleviated by having a single program. Alternatively, the program could be developed jointly by those municipalities interested in program adoption, but ultimately implemented and administered separately by the municipalities.

Note that for the other similar programs that are in existence, the programs were established for only one municipality, not multiple jurisdictions. In addition, they relied on the existing organizational structure to manage the program by simply providing additional resources (staff and related expenses). A regional approach that crosses jurisdictions will require increased diligence and coordination to implement and manage the program.

As discussed in Section 3, there are a number of legal considerations regarding governance. For example, there are no legal limitations per se in having the communities jointly develop and implement an inter-municipal agreement for these programs similar to the completion of the LTCP program. However, Federal, State, and local statutes and permits must be complied with in order for the communities to have a valid joint agreement. Furthermore, each municipality would need to, at a minimum pass a resolution authorizing the inter-municipal agreement and then enact legislation allowing these programs to be implemented, in conjunction with their existing stormwater management plans, MS4 and SPDES permits.

A summary of some of the program options, benefits, and limitations related to governance issues is provided in Table 5-4.

Table 5-4. Governance Options

	Option	Benefits	Limitations
1a	Each municipality establishes and manages its own program	Potentially simpler to implement because Inter-municipality cooperation not required.	Redundant. Inability to take advantage of economies of scale. Lack of development activity in some municipalities to support a separate program.
1b	Program developed jointly but administered separately	Cost effective program development. Municipality administration flexibility.	Inability to jointly share costs of program administration
1c	Regional approach to program administration	Minimizes redundant administration activities. Ability to take advantage of economies of scale.	More complex to setup program since multiple municipalities are involved.
1d	Regional approach to administration and use of credits and in-lieu fees	Pooling of in-lieu fee revenues results in ability to fund alternative projects more quickly. Larger market for credits.	Legal and regulatory ability to pool in-lieu fees and credits. Political challenge of deciding how to use pooled in-lieu fee revenues.

5.1.4 Technical Considerations

There are a number of technical considerations that could have an impact on the feasibility of an ILF, Credit Banking and Trading program for the APCs. These technical considerations include the feasibility of implementing GI and stormwater retention based on subsurface conditions, and the limitations of credit generation allowed under a Credit Banking and Trading program. The subsurface conditions, priority stormwater management projects, current local building codes and stormwater regulations and watershed boundaries vary among the APCs. In addition, each member of the APC has a different development outlook; some communities may have greater capacities than others for construction projects. For example, a highly developed and relatively small community such as Watervliet may not have many opportunities for new development projects that reduce impermeable area by more than one acre, but they may have redevelopment opportunities as they enact their longer-term plan of revitalizing their waterfront. Therefore, for some APCs, ILF, Credit Banking and Trading programs may not be suitable due to the limits of site conditions and potentially limited development activity.

Another technical consideration related to Credit Banking and Trading is the limitation on the amount or value of the credits that can be generated. As measures are implemented that control more excessive stormwater runoff from wet weather events, there is a diminishing level of return from reducing pollutant runoff from the property. This may lower the benefit of the mitigation measure, from a water quality standpoint, in non-CSO areas, but may have benefits in helping to reduce flooding in certain areas. As a result, an option in a Credit Banking and Trading program is to cap the amount of credits that can be generated based on runoff volume.

A summary of some of the program options, benefits, and limitations related to these technical issues is provided in Table 5-5.

Table 5-5. Technical Consideration Options

	Option	Benefits	Limitations
1a	Limitation on the amount of runoff retention that can generate credits	Limits credits from being generated on runoff volume that does not contribute to water quality issues.	By capping credits on runoff retention, it could limit the benefits of the program in preventing CSO discharges downstream or mitigating flooding in certain areas.
1b	No limit on the amount of runoff retention that can generate credits	Could maximize the benefit of the program in terms of reducing CSO discharges and mitigating flooding in certain areas.	During larger wet weather events, excessive runoff may not contribute more to water quality pollutants from the site than from smaller events.

5.1.5 Financial Considerations

The development and implementation of an ILF, Credit Banking and Trading program for the APCs will require detailed program and process development, consensus building, establishment of legal documents (ordinances and agreements), compilation and development of technical documents (records, databases, software), technical/legal/financial coordination, public hearings and approvals. Existing staff resources would need to be assigned to assist in developing the program and specialized outside resources (legal, technical, financial) would be needed. Depending on requirements, the start-up costs may cost several hundred thousand dollars. New York State has grant programs available for regional activities such as that contemplated herein that could potentially be obtained to assist in development and implementation.

The administration of an ILF, Credit Banking and Trading program would likely include the following activities:

- Calculation and establishment of the ILF.
- Review and approval of developer applications for payment of an ILF instead of conducting on site mitigation.
- Tracking of ILF funds collected by municipality and sewer shed.
- Reviewing applications by developers for generating stormwater credits and conducting field inspections to validate stormwater credits.
- Establishment and management of a credit trading platform (if credit trading is part of the program).
- Reviewing and approving applications from developers to purchase stormwater credits rather than complete stormwater mitigation onsite.
- Conduct periodic inspections of developer mitigation measures that generated credits to ensure that measures are in good working condition.

- Coordination with the APCs for ongoing administration of the program, including rule and policy development and adjustments over time as needed, and periodic reporting on program status and activity.
- Collection of funds from APCs participating in the program for program administration.

The costs of administering the program will also vary depending on the organizational structure and participation, however, if a third-party agency administers the program on behalf of the APCs it is anticipated that the cost of the program may be in the range of $25,000 to $100,000 per year depending upon the number of APCs that participate and the level of ILF, Credit Banking and Trading activity. The first year of operation may require additional start-up funding to set up the procedures (e.g., tracking, trading platform, application and inspection forms, etc.) and technical documents as mentioned above.

The survey of existing programs identified that many entities simply assigned additional resources to an existing organization to provide the services, and these resources spent a fraction of their time on administration of the ILF, Credit Banking and Trading program. Only one appeared to hire dedicated staff to administer their ILF, Credit Banking and Trading program. Furthermore, the funding source for these additional resources was often a small component of a larger stormwater utility fee or municipal budget as the ILF revenues vary from year to year and are used primarily for construction projects.

The APCs currently do not have a stormwater utility or associated stormwater user fees that could be used to fund ILF, Credit Banking and Trading programs. Therefore, the primary funding source for the administration of an ILF, Credit Banking and Trading program would likely need to come from existing building permit fees, wastewater user charges, or general government funds. However, a separate fee could be established and paid by property owners as part of the construction permitting process. Under an approach where the administration of the ILF, Credit Banking and Trading program is performed regionally, it is anticipated that at least half to one full-time equivalent ("FTE") staff would be needed to coordinate and administer the program. This staffing estimate, however, may be comprised from a part-time allocation of a number of existing staff. It is anticipated that these staff resources and related support (office, phone, computer, contracted expenses, etc.) will come from an existing organization designated to implement the program on behalf of the APCs. If such a third-party agency administers the program on behalf of the APCs, a payment structure would need to be established such that the APC's participating in the program compensate the agency for program administration.

Alternatively, the planning efforts, including the establishment of program rules and ordinances could be completed on a regional basis to improve the cost effectiveness of program planning, but then implemented and administered by each municipality separately.

The revenues generated from ILFs and the establishment of ILFs will depend upon participation and the cost of anticipated projects. Most of the communities surveyed have great flexibility over establishment of their ILFs and will modify these fees to incentivize certain market behaviors. The value for credits, however, are typically established by the credit market based on cost of implementation of stormwater mitigation.

6 CONCLUSIONS, RECOMMENDATIONS, AND NEXT STEPS

6.1 Conclusions

The following are the principal conclusions and opinions regarding the feasibility of the APCs implementing ILF, Credit Banking and Trading programs. These conclusions and opinions were prepared based on the review of available information, results of the survey of other programs, meetings held with the APCs, and our experience with and knowledge of the APC's LTCP and stormwater management goals:

1. Stormwater ILF, Credit Banking and Trading programs are gaining in popularity and are innovative alternatives to traditional stormwater management funding options that promote GI and provide opportunity for enhancing the cost effectiveness of stormwater management, compliance, and mitigation.

2. A number of existing ILF, Credit Banking and Trading programs have been successfully implemented in several locations around the country, including Chattanooga, TN, Washington, DC, Aspen, CO, San Antonio, TX, and Park Ridge, IL. No such programs have been identified in New York.

3. A legal review of anticipated applicable regulations and Federal and New York State laws did not identify any direct barriers that would prevent the adoption of an ILF, Credit Banking and Trading program by the APCs. However, such laws and regulations may limit use of the program without specific approval by regulatory agencies. Unless NYSDEC allows the APCs to utilize ILF, Credit Banking and Trading to help satisfy the onsite mitigation requirements, the APCs would need to enact more strict runoff requirements, or require development sites smaller than one acre to meet the runoff requirements, in order to make adoption of the program usable.

4. A legal review of implementing such programs for the APCs identified a number of legal procedures and approvals, such as ordinances and inter-municipal agreements, that would be required to establish such programs and will be dependent on the participants and nature of the program.

5. Inter-municipal cooperation and formation of a joint ILF, Credit Banking and Trading program among the APCs is legally feasible, and there are no legal limitations per se in having the communities jointly develop and implement an inter-municipal agreement for these programs. However, the regulatory implications for credit banking and trading across water and sewer sheds and MS4 areas presents a significant challenge, and at a minimum, the NYSDEC would need to approve the process and the potential for an unbalanced distribution between areas if such options are chosen. The most legally feasible inter-municipal cooperation approach would be for the ILF, Credit Banking and Trading program to be either administered separately by each municipality, or administered regionally, with the ILFs collected and utilized within the same municipality or sewer shed, and the credits purchased and sold within the same municipality or sewer shed.

6. Given the recent and planned development activity identified by the municipalities, a combined ILF, Credit Banking and Trading program may be suitable for the cities of Albany, Cohoes, and Troy, and less suitable for the cities of Rensselaer and Watervliet, and the Village of Green Island because sufficient development activity is needed to create a Credit Banking and Trading market. Agencies like Albany County or Rensselaer County could possibly generate credits or potentially serve as a purchaser of credits instead of implementing stormwater mitigation projects in areas that are less technically feasible to help create a market for stormwater credits.

7. Furthermore, given the limited number of developers and development activity, the municipalities may initially want to consider adoption of ILFs and Credit Banking, but not the Credit Trading portion of the program. This approach would still provide "compensation" to the municipality for development sites where meeting stormwater runoff requirements is infeasible, as well as provide the benefit of flexibility to property owners or developers in meeting stormwater runoff requirements through either paying an ILF or substituting stormwater mitigation at one development site for mitigation implemented at another. Postponement of implementing the credit trading portion of the program until such time that more significant development activity occurs could reduce the initial cost of administration and address concerns about the potential lack of robustness of a credit trading market.

8. For some communities, such as the City of Rensselaer with relatively low development activity but varying site conditions, an ILF program without either the credit banking and trading component may be suitable. For communities considering only an ILF program, sufficient development activity would be needed to generate ILF revenues to support the implementation of offsite stormwater mitigation projects over a reasonable timeframe. In addition, allowing developers to propose in-lieu projects, instead of, or in addition to, ILFs may be appropriate.

9. The initial development and implementation of an ILF, Credit Banking and Trading program for the APCs may cost several hundred thousand dollars to establish a detailed program and process development, consensus building, establishment of legal documents (ordinances and agreements), compilation and development of technical documents (records, databases, software), technical/legal/financial coordination, public hearings and approvals. In addition, due to the level of effort required to plan and develop the program, it may be cost effective for the program to be developed jointly by those municipalities interested in program adoption, even if it is ultimately implemented and administered separately by the municipalities. Given the limited resources of the APCs, additional grants would likely be required for development and implementation to improve the financial feasibility of program implementation.

10. The costs of administering the program will also vary depending on the organizational structure and participation, however, if a third-party agency administers the program on behalf of the APCs it is anticipated that the cost of the program may be in the range of $25,000 to $100,000 per year depending upon the number of APCs that participate and the level of ILF, Credit Banking and Trading activity. Under an approach where the administration of the ILF, Credit Banking and Trading program is performed regionally, it is anticipated that initially, approximately half to one FTE staff would be needed to coordinate and administer the program. A regional approach to administering the program may help smaller communities address potential organizational capacity constraints associated with implementing such a program independently.

11. The APCs currently do not have a stormwater utility or associated stormwater user fees that could be used to fund ILF, Credit Banking and Trading programs. Therefore, the primary funding source for the administration of an ILF, Credit Banking and Trading program would likely need to come from existing building permit fees, wastewater user charges, or general government funds.
12. In general, an ILF, Credit Banking and Trading program for the APCs is feasible for some of the APCs if the NYSDEC allows the APCs to utilize ILF, Credit Banking and Trading to help satisfy the onsite mitigation requirements, and additional grant funds become available to support further development and implementation of the program.

6.2 Recommendations

Based on the research completed as part of this project, discussions with the APCs, and information provided by program practitioners, ILF, Credit Banking and Trading programs are feasible for at least some of the APCs under the following conditions:

1. NYSDEC allows the APCs to utilize offsite mitigation (including ILFs and credits) to satisfy the onsite stormwater mitigation requirements;
2. The APCs are awarded additional grant funds to develop and implement an ILF and credit banking program.
3. A credit banking and trading program is administered regionally but applied locally to municipalities suitable to participate in the program.
4. The credit banking and trading program is first implemented with only the credit banking component (i.e. in-lieu projects) without the credit trading component.
5. An ILF program is either locally- or regionally-administered, but applied to each of the municipalities separately.

Given the recent and planned future development activity, a combined ILF, Credit Banking and Trading program may be suitable for the cities of Albany, Cohoes, and Troy, and less suitable for the cities of Rensselaer and Watervliet, and the Village of Green Island because sufficient development activity is needed to create a Credit Banking and Trading market. However, communities such as the City of Rensselaer with relatively low development activity but varying site conditions may be suited for an ILF program without the credit banking and trading component. For communities considering only an ILF program, sufficient development activity would be needed to generate ILF revenues to support the implementation of offsite stormwater mitigation projects over a reasonable timeframe, and these municipalities may be able to administer an ILF program with minimal additional staffing needs. The suitability of ILF, Credit Banking and Trading for the APCs is summarized in Table 6-1.

Table 6-1. Program Potential Suitability for the Albany Pool Communities

Albany Pool Community	In-Lieu Fee Feasibility	Credit Banking and Trading Feasibility
City of Albany	✓	✓
City of Cohoes	✓	✓
City of Rensselaer	✓	
City of Troy	✓	✓
City of Watervliet	✓	
Village of Green Island		

It is also recommended that that APCs consider the following programmatic elements as part an ILF, Credit Banking and Trading program:

a. Limit ILFs and credits to be applied/generated only in the municipality with which they were generated.

b. Allow the programs to apply to redevelopment (retrofits) as well as new development.

c. Program requirements and eligibility should be consistent for each development type initially (e.g. residential vs. commercial, new development vs. redevelopment) for administrative ease.

d. Allow property owners and developers to either implement comparable in-lieu projects (offsets) or pay ILFs to satisfy stormwater mitigation requirements for added flexibility.

e. Provide a limit the amount of runoff retention that can generate credits in MS4 areas because there is a diminishing level of return of retaining excess runoff from a water quality standpoint. Also, provide no limit in the amount of runoff retention in CSO areas because every unit of stormwater retention can potentially reduce CSO volumes in these areas.

6.3 Next Steps

The anticipated next steps for the APCs in implementing stormwater ILF, Credit Banking and Trading program could include all of the following, although only the first has been committed to:

1. Meet with the NYSDEC to review the draft feasibility report and to assess the ability of the APCs to utilize offsite mitigation (including ILFs and credits) to satisfy stormwater mitigation requirements, and to assess the ability to distribute the use of credits and ILFs across different sewer shed and MS4 and CSO areas within municipal boundaries.

2. Meet with municipal elected officials, stakeholders, and decision makers to describe the proposed program and assess/confirm municipal interest in adopting the programs

3. Identify suitable grant funding sources to assist in the planning and implementation of the programs. Prepare grant applications and secure grant funding.
4. Prepare an implementation plan for stormwater ILF, Credit Banking and Trading program, which includes programmatic considerations, administration, operational details, detailed cost estimates, and implementation timeline.

APPENDIX A

Legal and Regulatory Technical Memorandum

To: John M. Mastracchio, Isabella Schroeder, Kara Tedford and Michael Miller

Re: Albany Stormwater In-Lieu and Credit Banking.

Date: July 12, 2016

Preliminary Statement

The purpose of this memorandum is to review the current regulatory framework in the City of Albany, Albany County, New York State and at the Federal level for stormwater management and to review and discuss how to begin to implement stormwater banking and In-Lieu fee programs for the Albany Pool communities.

In response to a Request for Proposal (RFP) issued by the Capital District Regional Planning Commission (CDRPC), Arcadis submitted a proposal and was awarded the contract to complete the Albany Pool Communities Green Infrastructure Stormwater In-Lieu fees and Stormwater Retention Credit Banking Study in connection with the Albany Pool Communities goal of supporting the Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP). This memorandum will address the initial legal and regulatory factors which must be considered when implementing these programs.

1. Executive Summary

Section Two below discusses the Federal, State, County and local statutes regulations and permits which impact the decision to implement stormwater credit banking and In-Lieu fee programs for the Albany Pool Communities. An analysis of the effect and impact of each statute is also provided. In Section Three, we have addressed the practical effects, where possible, of implementing these programs and any challenges or hurdles we have identified at this stage. Section Four addresses certain feasibility and implementation considerations we have identified. Section Five provides our preliminary conclusion.

2. Summary of Stormwater Mitigation Statutes and Regulations:

This section provides a summary of the key Federal, State and local Statues and Regulations governing stormwater discharges, including potential stormwater credit banking and in-lieu fee programs.

A. Federal Statutes

i. **Clean Water Act** (CWA), 33 USC Section 1251, *et seq.* The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972. "Clean Water Act" became the Act's common name with amendments in 1972.

Under the CWA, United States Environmental Protection Agency (EPA), the EPA has implemented pollution control programs such as setting wastewater standards for industry. The EPA has also set water quality standards for all contaminants in surface waters. The LTCP for the Albany Pool Communities' wastewater systems, under the supervision of the New York State Department of Environmental Conservation (NYSDEC), is being undertaken to comply with the requirements of the CWA. The NYSDEC approved the Albany Pool Communities' LTCP on January 15, 2014.

a. **ANALYSIS**: The CWA does not prohibit the use of stormwater credit banking and in-lieu fee programs. However, in order to implement these programs and incorporate them into the LTCP, the Albany Pool Communities will need to establish that these programs do not result in a violation of the wastewater standards and water quality standards mandated by the CWA.

ii. **Wet Weather Quality Act of 2000**, which amended the CWA, 33 U.S.C. Section 1342(q), requires each combined sewer system to conform to the requirements of the National CSO Control Policy. As is set forth below, the National CSO Control Policy is part of NPDES. NYSDEC oversees the state's pollutant discharge elimination system known as SPDES.

a. **ANALYSIS**: This amendment to the CWA does not prohibit the use of stormwater credit banking and in-lieu fee programs. However, in order to implement these programs and incorporate them into the LTCP, the Albany Pool Communities will need to establish that these programs do not result in a violation of the requirements of the National CSO Control Policy mandated by this amendment to the CWA.

iii. **S2768:** There is currently a Bill pending in the Senate, S2768, to amend the CWA to update a program to provide assistance for the planning, design, and construction of treatment works to intercept, transport, control, or treat municipal combined sewer overflows and sanitary sewer overflows, and to require the Administrator of the EPA to update certain guidance used to develop and determine the financial capability of communities to implement clean water infrastructure programs.

a. **ANALYSIS:** If this bill is enacted, it will most likely be implemented and overseen by the NYSDEC. Until the final bill is enacted, we cannot comment definitively on its impact upon the proposed use of stormwater credit banking

and in-lieu fee programs. However, the guidance provisions used to develop and determine the financial capability may be useful in supporting the use of stormwater credit banking and in-lieu fee programs.

iv. NPDES : The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. 33 USC Section 1342. EPA's National Pollutant Discharge Elimination System (NPDES) permit program controls discharges. Point sources are discrete conveyances such as pipes or man-made ditches. Industrial, municipal, and other facilities must obtain an NPDES permit if their discharges go directly to surface waters. In New York State, the State administers the CWA NPDES permit program pursuant to Section 1314 of the CWA. For further anaylsis, see state law SPDES program.

v. **The Endangered Species Act** (ESA) 16 U.S.C. §1531 et seq. (1973), provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead federal agencies for implementing ESA are the U.S. Fish and Wildlife Service (FWS) and the U.S. National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. The FWS maintains a worldwide list of endangered species. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees.

The law requires federal agencies, in consultation with the U.S. Fish and Wildlife Service and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife. Likewise, import, export, interstate, and foreign commerce of listed species are all generally prohibited.

The Office of Pesticide Programs (OPP) implements key portions of the Endangered Species Act. OPP regulates the use of all pesticides in the United States and establishes maximum levels for pesticide residues in food, thereby safeguarding the nation's food supply.

a. **ANALYSIS:** Pool Community members need to be aware of the ESA and OPP mandates and guidelines when determining whether to approve a request by a developer to purchase credits or pay in-lieu fees instead of onsite mitigation. In evaluating any proposed development plan, the area in question will need to be screened to determine whether there are animal or plant endangered species which may be affected by the developer's stormwater management plan. Additionally, the NYS Stormwater Design Manual sets forth standards for the amount and type of acceptable pesticides contained in stormwater runoff. As is set forth in greater detail below, a plan which requires more restrictive limits than the current runoff limits for the municipality, assuming the municipality is in compliance

with CWA, ESA and OPP, should comply with these federal statutes. The use of credit banking and in-lieu fees to achieve this goal is set forth below.

B. New York State Laws

The New York State Stormwater Management Design Manual, updated in August 2010 and January 2015, provides designers with a general overview on how to size, design, select, and locate stormwater management practices at a development site to comply with State stormwater performance standards. This manual is a key component of the Phase II State Pollution Discharge Elimination System (SPDES) general permit for stormwater runoff from construction activities from all sizes of disturbance. The manual serves to clarify requirements contained in the New York State Construction General Permit (GP-0-15-002), which provides coverage for stormwater discharges to surface waters due to construction activities in the State of New York. To obtain coverage under this permit, the operator of construction activity must submit a completed Notice of Intent (NOI) with the NYSDEC, which is meant to affirm that a stormwater pollution prevention plan (SWPPP) has been created for the site and will be implemented. Construction activities involving soil disturbances in excess of one or more acres are required to obtain coverage under the permit, however disturbances less than one acre can also require coverage at the discretion of NYSDEC. These determinations are based on the potential of the disturbance to violate a water quality standard within a surface water body in the State of New York.

The permit also outlines the requirements of the Stormwater Pollution Prevention Plan (SWPPP). The SWPPP not only details measures that will be taken during construction to control erosion and run-off, but also evaluates the pre-development and post-development peak flow rates exiting the site. In the case that peak flow rates are higher post-development, stormwater management measures must be taken to reduce peak flow rates to less than or equal to pre-development conditions. There are two categories of development: new development and redevelopment. Although the criteria are more stringent for new development, the premise is the same: to minimize effects of development on surface waterbodies.

The water quality volume (WQv) for the site must be calculated using guidance from the manual. Methods to manage the WQv include ponds, wetlands, infiltration, filters and open channels. In the case of new development, it is required that runoff reduction volume (RRv) measures are employed to reduce 100% of the WQv. RRv measures include tree plantings, cisterns, porous pavement, or rain gardens among many other alternatives. If site restrictions such as low infiltration soils, seasonal high groundwater, and shallow depth to bedrock exist, then the requirement can be met by a combination of RRv and other stormwater management practices. Although these requirements are not universal (the requirements are more stringent for sensitive watersheds, GP-0-15-002 Appendices), they are applicable in most cases.

a. **ANALYSIS:** This manual and guidance has relevance to stormwater in-lieu fees and credit banking in terms of the size of the disturbance covered under the permit (i.e. one acre or larger), and the requirement to implement stormwater management measures to reduce peak flow rates to less than or equal to pre-development conditions. This management of peak flow rates following a disturbance must be managed onsite, which limits the applicability of in-lieu fee and credit banking programs. However, if municipalities decide to impose greater restrictions on development (such as requiring peak flow rates following a disturbance to be less than or equal to 80% of pre-development conditions) then in-lieu fees and a credit program could be considered to satisfy the more restrictive requirements imposed by municipalities. Likewise, if municipalities extent stormwater mitigation requirements to properties with disturbances that are less than one acre in size, then in-lieu fees and credit banking programs could be used, in combination with on-site mitigation, to satisfy these requirements self-imposed by the municipalities. Since the developer will not be able to obtain a SPEDES permit for, and the Pool Communities will not be able to approve a proposal, which exceeds the current standards for permissible runoff, the current proposal for the Pool Communities to be able to offer a developer the ability to purchase credits or pay in-lieu fees instead of on-site mitigation is viable if the Pool Communities' standards are more restrictive than an individual municipality. For guidance on these limitations, please see the SPDES permits for the Pool Communities and, as an example, the City of Albany's Stormwater Management and Erosion Control plan, Chapter 133 of the Code of the City of Albany, *et seq.*

C. Albany County – source Stormwater Coalition of Albany County.

Albany County provides the following reference and guidance with regard to stormwater management:

i. The Federal Clean Water Act establishes standards for surface water and makes it unlawful to discharge pollutants into the Waters of the United States, unless permitted. Embedded within this Act and administered by the United States Environmental Protection Agency (EPA) is the National Pollutant Discharge and Elimination (NPDES) permit program which establishes rules and procedures related to the permitting process.

In New York State, the NPDES program is administered by the New York State Department of Conservation (NYSDEC). Called the State Pollutant Discharge and Elimination System (SPDES) permit program, it is known conversationally as the "Speedies program". Failure to apply for permit coverage or failure to implement permit requirements can result in fines of $37,500 per violation, per day, along with criminal, civil and administrative penalties. Penalties

are embedded in Federal law and both EPA and NYSDEC can take action against a polluter. Triggers for enforcement action vary, with observed pollution often the starting point for legal action.

Stormwater Permits

While the content of all SPDES permits includes standard language as required by the CWA, depending on the type of regulated facility and pollutants to be addressed, permits vary one to another.

The stormwater permits focus on stormwater runoff, which is water from rain or melting snow that doesn't soak into the ground, but runs off into waterways picking up pollutants as it flows from rooftops, over paved areas, through sloped lawns, and over bare soil. They are general permits which cover a large number of similar dischargers, specifically runoff from industrial facilities (Multi-Sector Permit); discharges from municipal separate storm sewer systems in urbanized areas (MS4 Permit); and discharges related to construction activity disturbing one or more acres of land (Construction Activity Permit).

The MS4 Permit and Construction Activity Permits are of particular interest to regulated municipalities as they are intertwined, with each permit pointing to a mandated task in the other permit. Below is a short summary of each permit; however the permits are best understood by reading each permit carefully.

MS4 Permit

The NYSDEC SPDES General Permit for Stormwater Discharges from Municipal Separated Storm Sewer System (MS4) Permit No. GP-0-10-002 includes six minimum control measures:

1. public education and outreach;
2. public involvement/participation;
3. illicit discharge detection and elimination (IDDE);
4. construction site stormwater runoff control;
5. post-construction stormwater management; and
6. pollution prevention/good housekeeping for municipal operations.

Regulated entities, often referred to as "MS4s", need to develop and implement a program which addresses each of those control measures. While there is some program flexibility, there are also specific tasks listed in the permit.

Regulated "municipalities" reside within census designated urbanized areas and include a range of public sector entities; some familiar, such as towns, cities, and villages, others less familiar and seemingly not a "municipality". They include counties, public universities, public schools, highway authorities, state agencies, such as the Department of Transportation. For the Albany

Pool Communities, each Municipality has its own MS4 permit. See the attached maps and list of regulated entities for Albany County.

Public participation is a key element of the MS4 Permit and as such certain documents are made available for public review. They include an annual report which is submitted to NYSDEC by June 1 and stormwater management program goals and related program implementation documents.

a. **ANALYSIS:** Based upon the foregoing permits and regulations, if the Pool Communities adopt a program which in more restrictive that the current requirements of the above statutes, regulations and permits, the credit banking and in-lieu fee program is feasible.

Construction Activity Permit

The NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity Permit No. GP-0-10-001 requires owner-operators of sites disturbing one or more acres of land to develop a Storm Water Pollution Prevention Plan (SWPPP). SWPPPs describe how storm water runoff will be managed during and post construction. Typically they include site plan drawings; a narrative describing which stormwater practices will be used, when and why; operation and maintenance information pertaining to built stormwater management practices; and other items specific to the site.

Construction site stormwater control must conform to the New York Standards and Specifications for Erosion and Sediment Control, or "Blue Book"; while post-construction practices must conform to a suite of acceptable practices described in the New York State Stormwater Management Design Manual. In 2010, revisions to the Design Manual included runoff reduction requirements to be addressed using listed green infrastructure practices.

Additional permit requirements relate to legal accountability, training, and inspection procedures. The purpose of the permit is to avoid a water quality violation, and a visible standard is described in the permit.

Chapter 133 of the Code of the City of Albany adopts this standard.

a. **ANALYSIS:** Based upon the foregoing permits and regulations, if the Pool Communities adopt a program which in more restrictive that the current requirements of the above statutes, regulations and permits, the credit banking and in-lieu fee program is feasible.

Construction Activity, MS4 SWPPP Acceptance Form, and Local Laws

While construction activity permit requirements are national in scope and required of any site disturbing one or more acre of land, construction activity in a regulated town, village, or city requires an added level of review, as mandated in both the Construction Activity and MS4 permit.

Specifically, owner-operators seeking permit coverage must first obtain an MS4 Permit SWPPP Acceptance Form stating that the municipality has reviewed and accepts the SWPPP. The municipalities, in turn, as stated in their MS4 Permit need to adopt local laws giving municipal officials the authority to review and accept these SWPPPs, thus providing a full vetting of the SWPPP and an informed sign off on the MS4 Permit SWPPP Acceptance Form. The local laws too include enforcement action should the site generate a water quality violation.

Essentially the local law and other MS4 Permit requirements empower and require that local municipalities administer the Construction Activity Permit, providing front-line oversight of Construction Activity Permit requirements. Regulated municipalities disturbing more than one acre of their own land must all obtain Construction Activity Permit coverage.

Another local law, also adopted my municipalities as required by the MS4 permit, empowers a municipality to take legal action should a person discharge pollution into a catch basin, closed pipe, drainage ditch, or other stormwater related infrastructure owned and operated by the municipality.

This law, known as the illicit discharge detection and elimination (IDDE) law applies to all persons, and types of activities, with sediment laden runoff from construction sites consider non-stormwater and subject to enforcement action. This law, however considers a variety of activities and types of discharges as tracked to the stormwater infrastructure.

Chapter 133 of the Code of the City of Albany adopts this standard.

a. **ANALYSIS:** Based upon the foregoing permits and regulations, if the Pool Communities adopt a program which in more restrictive that the current requirements of the above statutes, regulations and permits, the credit banking and in-lieu fee program is feasible.

Clean Water Act Consequences

If a municipality fails to adopt any of these local laws and fails to administer related MS4 Permit requirements, they are in violation of their own SPDES permit and subject to Clean Water Act enforcement action. Thus the legal accountability for MS4/municipalities is multi-layered, as is the legal accountability for individuals engaged in construction activity.

Recently, NYSDEC released Technical Operational Guidance Series 1.4.2 regarding Compliance and Enforcement of SPDES Permits, which makes explicit the consequences of non-compliance for all SPDES Permits, not just the MS4 and Construction Activity Permit.

Local SPDES Permits

Here in Albany County, as of 2011, there are 477 active SPDES Permits, and of these 319 focus on stormwater discharges. The remaining permits address discharges from factories, sewage treatment plants, sanitary sewer overflows, and combined sewer overflow systems. This compares with 25 SPDES Permits in 1980 with all but 4 of those focusing on point discharges from factories and publicly owned sewage treatment plants. (See Table of Albany County SPDES Permits).

This 19 fold increase in regulatory responsibilities represents both an expansion into stormwater related permits and a more informed understanding of what causes our waterways to be polluted. While these SPDES Permits are challenging and often overwhelming, the purpose is to protect the drinking water, fisheries, recreational beaches, and aquatic ecosystems found in our own communities. With this goal in mind, each permit holder has a part to play.

For informational purposes:

Members of the Albany County Stormwater Coalition:

Albany County; University at Albany-
SUNY Uptown Campus; City of Albany; Village of Altamont; Town of Bethlehem; City of Co hoes; Town of Colonie; Village of Colonie; Town of Guilderland; Village of Green Island; Vill age of Menands; Town of New Scotland; City of Watervliet

Albany County Joint Stormwater Management Plan for 2015-2017.

In 2012, members of the Stormwater Coalition of Albany County committed to collaboratively

developing a Stormwater Management Program (SWMP) document which fit the SWMP definit ion in the NYSDEC SPDES General Permit for Stormwater Discharges form Municipal Separat ed Storm Sewer Systems (MS4s) Permit No. GP-0-10-002.

That definition states that a SWMP should:

1) Describe the Best Management Practice (BMP)/measurable goal
2) Identify time lines/schedules and milestones for development and implementation
3) Include quantifiable goals to assess progress over time; and
4) Describe how the covered entity will address pollutants of concern (POCs).

ANALYSIS: Albany County's emphasis on requiring SPDES permits for and supervising commercial and industrial development is an indication that it will be receptive to the proposal for the in-lieu and credit banking plans, provided the above-referenced regulations and permits are not violated. Increasingly, due to the complexity of these SPDES permits and need to address targeted pollution removal goals, the management of these many permits strongly argues for a watershed approach. Such a strategy is strongly supported by EPA and an understanding of local watershed boundaries (see map) is helpful in that regard. Clearly, the Stormwater Coalition of Albany County is committed to an ongoing, program based upon inter-municipal cooperation.

D. City of Albany

i. City of Albany has a stormwater management site which after providing general information refers you to the Albany County Coalition site above.
See:
http://www.albanyny.org/Government/Departments/WaterAndWaterSupply/StormWaterManagement.aspx

Additionally, see Code of the City of Albany, Chapter 133, *et seq.* for the codification of the City's Stormwater Management and Erosion Control Plan.

a. **ANALYSIS:** For members of the Pool Community which have specific statutes and exemptions regarding stormwater/wastewater management, such as Section 133-104 of the Code of the City of Albany, Exemptions, these statutes will need to be amended to provide for the proposed credit banking and in-lieu fee program. Alternatively, each municipality may which to enact a separate Chapter of its Code to regulate the program.

ii. Planning and Economic Development Department, City of Albany.

In terms of implementing and supervising a credit banking and in-lieu fee program, this Department, in conjunction with the Building department would most likely oversee the programs.

Mayor's office of the City of Albany :

From the Mayor's website on Energy and Sustainability. The scientific consensus around climate change is clear, and Albany is responding strongly to become more sustainable, environmentally conscientious and prepared. It began in 2005, when Albany signed the U.S. Conference of Mayors Climate Protection Agreement--pledging to reduce greenhouse gas emissions and to become a more energy efficient City. Moving forward to 2015, Albany

reaffirmed its commitment by joining the Compact of Mayors, one of the largest coalition of city leaders that are addressing climate change.

The Mayor's Office of Energy & Sustainability (MOE&S) was established to implement our conservation strategies, drive our sustainable agenda forward, and to help track Albany's progress. In coordination with local and regional partners (e.g., Albany County, NYSERDA, NYPA, NYSDEC), MOE&S designs and implements projects that will reduce our emissions, enhance and protect our environment, improve water quality, and make "green" urban concepts mainstream in our community. With the support of fellow City Departments (Planning & Development, General Services, and Water Supply), MOE&S has already begun to reduce energy use and consumer waste--promoting sustainable and conservation efforts--both in our City buildings and throughout our general community.

a. ANALYSIS: Based upon the above excerpt from the website for the City of Albany, the City appears to be receptive to the proposed program for credit banking and in-lieu fees to enhance and promote its conservation strategies and sustainable agenda.

3. **Regulation implications for Stormwater Credit Banking and In-Lieu Fees.**

a. The Albany Pool Communities entered into an Inter-Municipal Agreement to prepare and submit to NYSDEC an LTCP pursuant to the EPA's CSO Control Policy. Based upon the foregoing statutes and a review of the various municipal codes, there do not appear to be any statutory restrictions for the members to enter into a similar Agreement to implement the proposed credit banking and in-lieu fee programs. Given the existing structure, we do not believe that the creation of a separate governmental body or agency is necessary and would most likely be too cumbersome. A well drafted sharing/inter-municipal agreement should address the management and fee/credit distribution issues. However, each member's governing body would need to, at minimum, pass a resolution authorizing the inter-municipal agreement and then enact legislation allowing these programs to be implemented, in conjunction with their existing stormwater management plans MS4's and SPDES permits.

b. Strict compliance with all Federal, State and Local laws will need to be insured and monitored before a mitigation fee or credit can be issued. In other words, the mitigation fee is not a free pass to exceed existing regulations.

c. The regulatory implications for buying and selling credits across water and sewer sheds and MS4 areas present a significant challenge. At a minimum, NYS DEC would need to approve the process and the potential for an unbalanced distribution between these areas and communities may put a quick end to this proposal.

d. As is set forth in paragraph c, above, selling credits across water and sewer sheds and MS4 areas present a significant challenge. If the communities are within the same shed or MS4 area, DEC approval would still be required as well as an inter-municipal agreement, similar

to water services or EMS services. At this stage, we have only reviewed the feasibility for the City of Albany and will update this section further.

e. At this stage, we have not found any gaps which currently exist between the respective Codes for the members of the Albany Pool Community.

4. Feasibility and Implementation Considerations

a. For the reasons set forth above, and the lack of any stator prohibition, at this time, we believe that the Credit Banking and In-Lieu fee programs are feasible for the members of the Albany Pool Community. A copy of a similar program from Albany, GA, for greenspace in-lieu fees is attached hereto for reference.

b. With regard to the implementation of these plans, we do not believe that a regional authority needs to be implemented but that the programs can be put in place through an inter-municipal agreement. The cost of funding a regional authority or separate entity may be prohibitive as well. However, if this course of action is chosen, each member's code has the authority to add the cost to its budget.

c. There are no legal limitations *per se* in having the communities jointly develop and implement an inter-municipal agreement for these programs, in fact an LCTP program, which was incorporated into a DEC consent Order currently exits. However, Federal, State and local statues and permits must be complied with in order for the communities to have a valid joint agreement.

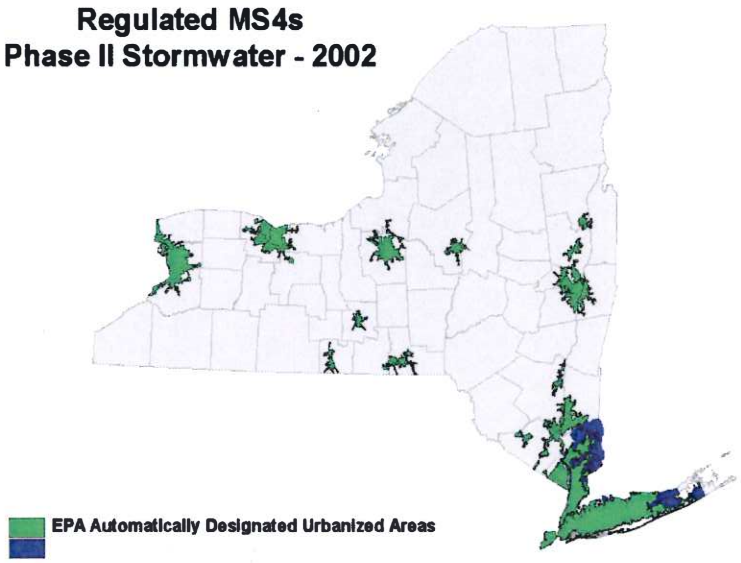
d. Enforcement considerations: You will not be able to compel state or federal agencies to participate in the program due to state and federal sovereign immunity. However, if a state or federal agency violates an agreement, the agreement should provide for enforcement. Violations of state or federal law would need to be pursued with the DEC or EPA respectively.

5. Conclusions and Findings

At this preliminary stage, we have not identified any legal factors which prohibit the implementation of the credit banking and in-lieu fee programs, so long as these programs do not result in a runoff or discharge which violates the above-referenced statutes.

MS4 PERMIT

Who's an "MS4"?



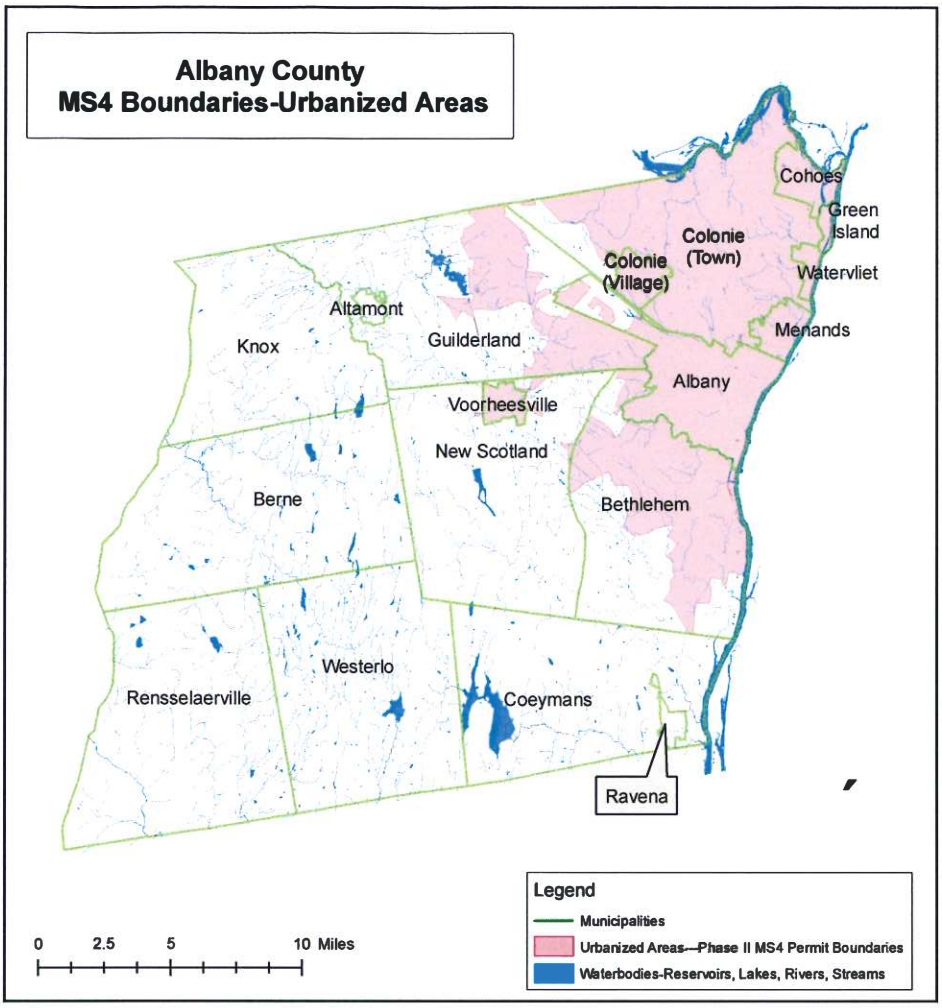
Since March, 2003

~500 MS4 Permits

(Statewide)

"MS4"---Owner-operator of a **M**unicipal **S**eparated **S**tormwater **S**ewer **S**ystem. Municipal is used generically to describe a publicly owned entity.

Designation based on population density. Areas with a stormwater sewer system = Urbanized area=1,000 people per square mile or more.



REGULATED MS4s

Cities:
Cohoes
Watervliet
Albany

Towns:
Colonie
Guilderland
Bethlehem
New Scotland

Villages:
Colonie
Green Island
Menands
Voorheesville

County:
Albany

Non-Traditional:
SUNY-Albany
Public Schools
NYS DOT
Thruway Authority

	ALBANY COUNTY SPDES PERMITS (1980 and 2011)							
Catogories	**INDIVIDUAL**				**GENERAL**			
Description	Factories; Sewage Treatment Plants		SSO Sanitary Sewer Overflows Sanitary	CSO Combined Sewer Overflow Sanitary + Storm	CAFO Concentrated Animal Feeding Operation (Livestock) Stormwater	MS4 Municipal Separated Storm Sewer Systm Stormwater	Construction Activity Land disturbance > 1 acre; During and Post Construction SW Mgmt	Multi-Sector (Industrial) Industrial Stormwater
Primary Pollutants of Concern (POCs)	Variable; Depends on Type of Facility		Bacteria	Bacteria and Urban Runoff (Multiple POCs)	Nutrients	Urban Runoff (Multiple POCs), Flow	Sediment; Phosphorus, Nitrogen, Flow	Variable, Depends On Type of Facility or Sector, as defined in Permit
# of SPDES Permits in Albany County	EPA Major (Classes 03, 05) State Significant Minor (Classes 01, 07, 09)	State Non-Significant Minor (Classes 02, 04)						
1980 (Total=25)	21	no data	1	3	0	0	0	0
2011 (Total=477)	53	100	1	4	3	15	252 (active); 251 (terminated)	49 (active), 22 (no exposure); 19 (terminated)
Permit "Owner-Operator"	Factory Owner; Sewage Treatment Plant Owner (Public and Private Sector)	Factory Owner; Sewage Treatment Plant Owner (Private Sector)	Owner of Sanitary System	Municipality Where CSO is Located	Owner of Livestock Operation	Owner of Public Storm System (Municipality; County; Public University; Community College; Authority; State Roads; Mandated Oversight of Construction Activity Permit	Anyone disurbing > 1 acre of land (ex. developer; County/Town/Village/State road project; homeowner additions to house, etc.)	Anyone who owns a facility which qualifies as a regulated sector as described in the Permit
County or Local Municipality Enforcement Action and Fines	NA						MS4 will take enforcement in the areas under MS4 authority.	NA
NYS Environmental Conservation Law Enforcement Action and Fines	**The enforcement action take depends on the violation. The procedure for enforcement is described in the NYSDEC TOGS 1.4.2 Compliance and Enforcement of State Pollutant Discharge Elimination System (SPDES) Permits. Standard Permit Conditions: Failure of the covered entity, its contractors, sub-contractors, agents and/or assigns to strictly adhere to any of the SPDES General Permit requirements contained herein shall constitute a permit violation. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense. (All SPDES Permits have this language)**							
Federal Clean Water Act- Enforcement Action and Fines	Depends on violation and EPA's enforcement procedures for a given program. Penalties are not calculated until compliance is achieved.							

Note: Data compiled by NYSDEC Region 4 staff for the Stormwater Coalition of Albany County (December 9, 2011)

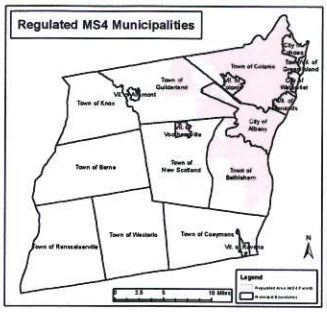
Albany County Watersheds

Stormwater Program Implementation

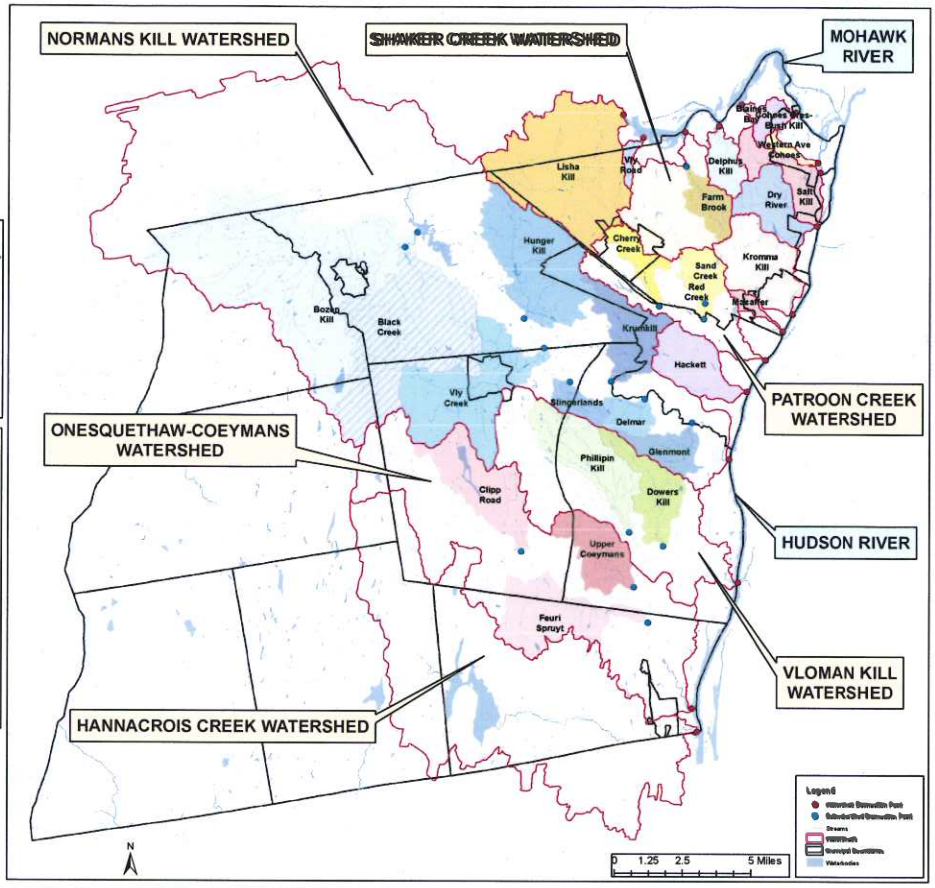
NYS SPDES MS4 Permit No. GP-0-10-002

Watershed Diagram

Regulated MS4 Municipalities



Map Notes: The watershed and subwatershed delineations were created using an online mapping system designed by USGS called StreamStats. The delineation points represent drainage of all stormwater within each subwatershed to its confluence with a larger watershed, based on topography.



Stormwater Coalition of Albany County
Albany County, City of Albany, Town of Bethlehem, City of Cohoes, Town of Colonie, Village of Colonie, Village of Green Island, Town of Guilderland, Village of Menands, Town of New Scotland, Village of Voorheesville, City of Watervliet, SUNY Albany

Prepared by the Stormwater Coalition of Albany County
Date: March 2011
File Name: Albany County Watersheds-Stormwater Program Implementation.mxd

Amending the Zoning Regulations by adding Section 5.17, Required Greenspace, as follows:

5.17 Greenspace Required

A. Findings:

(1) Greenspace provides a recognizable and substantial benefit to the residents of new developments and contributes to the overall quality of life in the unincorporated county. Greenspace encourages conservation of land and the preservation of Greenspace, wildlife habitat, environmental resources, and the enjoyment of private community facilities.

(2) The Board of Commissioners determines that the creation and establishment of permanent Greenspace discourages the premature and unnecessary conversion of Greenspace lands to urban uses and protects against the resultant adverse impacts, such as air, noise and water pollution, traffic congestion, destruction of scenic beauty, disturbance of the ecology and environment, hazards related to geology, fire and flood, and other demonstrated consequences of urban sprawl. Furthermore, Greenspace and greenways add value to neighboring houses and adjacent properties.

B. Purpose:

(1) To provide a requirement for private Greenspace amenities to developments, and alternatively a payment in-lieu for smaller size dedications.

(2) To preserve approximately twenty percent (20%) of the total site acreage as meaningful Greenspace. Developments having densities greater than two dwelling units per acre shall be required to provide additional Greenspace.

C. Definitions:

(1) A larger common plan of development or sale: means a contiguous area where multiple separate and distinct construction activities are occurring under one plan of development or sale. For the purposes of this definition, "plan" means an announcement; piece of documentation such as a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, or computer design; or physical demarcation

such as boundary signs, lot stakes, or surveyor markings, indicating that construction activities may occur on a specific plot.

(2) Buffer: means as an open space, landscaped area, fence, wall, berm, or any combination thereof used to physically separate or screen one use or property from another so as to visually shield or block noise, lights, other uses or nuisances.

(3) Development: means a subdivision plan, rezoning application, conditional use application, building permit, or land use permit.

(4) Greenspace: shall be set aside on a separate parcel or tract of land and may include the following:

(a) Permanently protected land, including agricultural and forestry land whose development rights have been severed from the property, that is in its undeveloped, natural state;

(b) Outdoor improved recreation, including but not limited to any amenity package, which may include but not be limited to a swimming pool, tot lot, playground, clubhouse, tennis, handball, volleyball, basketball, sidewalks, bike and pedestrian paths and benches, areas which include fields for competitive sports, golf courses, amphitheaters, and capital improvements needed to support such facilities;

(c) Outdoor unimproved recreation, including but not limited to areas of outstanding scenic, historic and cultural value, areas particularly suited for park and recreation purposes, including boating, hiking, camping, fishing, hunting, running, jogging, biking, walking, skating, birding, riding horses, observing or photographing nature, picnicking, playing non-organized sports and access to lakeshores, beaches, and rivers and streams; and areas which serve as links between major recreation and greenway corridors;

(d) A greenway corridor that connects separate parcels of wildlife habitat, between which some species could not travel unless the greenway remains intact;

(e) A private park that features scenic views;

(f) Water bodies, land located within the 100-year floodplain, stream buffers, and utility easements may be used to partially fulfill Greenspace requirements, however any overall credit received from such water and floodplain type lands, stream buffers, and utility easements shall be reduced by 50%; by way of example, and not being limited to the foregoing, one acre of floodplain shall be credited as 0.50 acres of Greenspace; furthermore, such water, floodplain type lands, and utility easements shall not exceed fifty (50%) percent of the required Greenspace for the development unless the proposed Greenspace provides exceptional recreational and/or environmental benefit by virtue of its location, connectivity to other Greenspace or other exceptional qualities; or

(g) Parking areas, road right-of-ways, impervious surfaces, retention ponds and yards with dwellings may not be included in determining Greenspace, unless the Greenspace contains features that demonstrate an exceptional recreational and/or environmental benefit by virtue of its location, connectivity to other Greenspace or other exceptional qualities.

D. Application and Exemptions:

(1) Application: Development that is equal to or greater than five acres shall comply with this section. However, development that consists of less than five acres shall comply with this section where the development is a part of a larger common plan of development or sale.

(2) Exemptions: Development in an Agricultural zoning district having a lot or parcel size equal to or greater than five (5) acres and development within a PUD zoning district shall not be required to comply with this section.

(3) Payment in-lieu: Where the total Greenspace of a development contains equal to or less than three (3) acres, the applicant may seek to provide, and the County may accept, a payment in-lieu of providing private Greenspace.

E. Greenspace Requirements: Unless modified by the Board of Commissioners for a specified public purpose, the dedication of Greenspace acreage shall be required according to Table 1, entitled Required Greenspace.

TABLE 1 – REQUIRED GREENSPACE

Density (Houses/Acre)	Required Greenspace (acres)/ Dwelling Unit
0.1	N/A
0.15	N/A
0.2	N/A
0.211	1
0.2125	0.95
0.225	0.9
0.2375	0.85
0.25	0.8
0.3	0.75
0.35	0.68
0.4	0.615
0.45	0.55
0.5	0.485
0.55	0.42
0.6	0.398
0.65	0.376
0.7	0.354
0.75	0.332
0.8	0.31
0.85	0.288
0.9	0.266
0.95	0.244
1	0.222
1.05	0.2
1.1	0.1975
1.15	0.195
1.2	0.1925
1.25	0.19
1.3	0.1875
1.35	0.185
1.4	0.1825
1.45	0.18
1.5	0.1775
1.55	0.175

1.6	0.1725
1.65	0.17
1.7	0.1675
1.75	0.165
1.8	0.1625
1.85	0.16
1.9	0.1575
1.95	0.155
2	0.1525

F. Common Ownership: Greenspace shall be commonly owned and maintained. The means to permanently protect and preserve the Greenspace, such as covenants, restrictions, and other methods, shall be governed by the Carroll County Subdivision Ordinance. Unless specifically approved by the Board of Commissioners as a condition to the development, the Carroll County Subdivision Ordinance shall regulate the design, construction, and maintenance of the Greenspace. The applicant shall demonstrate that all Greenspace of the development will be maintained in an approved manner.

G. Form of Greenspace:

(1) Greenspace shall form sizable contiguous blocks of land that are accessible to residents of the development and, where possible, shall be designated as one separate parcel of land

(2) Buffers: Buffers protect the county's rural character and in shielding a development from incompatible adjacent uses.

(a) Lands in the form of thin buffers (e.g., thin ribbons), around the development are strongly discouraged. Buffers serve a different (but important) function than Greenspace.

(b) Any strip of land that measures twenty (20) feet or less shall constitute a buffer.

(c) Applicants may count only ten (10) percent of a buffer area toward the development's overall Greenspace amount, provided that the buffer is placed in a separate parcel.

H. Cash Payment in-lieu of Land Dedication:

(1) If the total Greenspace falls below three (3) acres, the County may allow the payment of a fee in-lieu of dedication of land based on the appraised value of the land being platted and the amount of land required to be dedicated, if, in the judgment of the County, the quantity of land to be subdivided is of a size or configuration that dedication of Greenspace:

(a) is not feasible or practical; or

(b) will not create a parcel suitable for Greenspace purposes listed herein, as defined in 5.17C(4).

(2) The fee shall be paid at the time of final platting.

(3) Appraisal Requirements: The developer shall furnish an appraisal of land value for the purpose of determining the cash payment due in-lieu of land dedication. The appraisal shall determine fair market value based upon an appraisal methodology consistent with the Uniform Standards of Professional Appraisals or other real estate valuation techniques approved and used the State of Georgia when expending state funds for land acquisition. The appraisal shall be prepared by a certified appraiser and shall indicate the fair market value of all lands within the proposed subdivision as rezoned and platted by the County. The Director of Community Development is authorized to consider and, if appropriate, approve other methods of appraisal for determining a payment in lieu where the development involves one lot or parcel that is not part of a larger common plan of development or sale.

(4) The County authorizes the Director of Community Development, or his designee, to determine the fee to be paid to the County as a payment in-lieu based upon the standards set forth herein

(5) All fees in-lieu of dedication payments shall be deposited in a separate fund established by the Board of Commissioners, and such funds and the interest thereon shall be used only for the purchase and development of public Greenspace.

I. Resubdividing Greenspace; Certain Resubdivisions Prohibited: All lands subdivided after adoption of this section shall comply with the requirements set

forth herein. Where any development, which has previously complied with this section by dedicating or providing a cash payment in-lieu of land dedication, recombines or combines lawfully platted lots so as to create a smaller number of resultant lots by resubdivision, the subdivider shall not receive a credit for Greenspace previously dedicated or a refund for cash payment made in-lieu of land dedication. In no instance will lands dedicated, or cash payments made in-lieu of land dedication, be returned to the applicant as a result of resubdivsion.

J. Previously Approved Greenspace:

(1) Where a development, which has previously received zoning approval from the Board of Commissioners, was approved with a zoning condition or stipulation that requires the applicant, owner, or subdivider to set aside or dedicate a certain percentage or acreage for Greenspace, and the zoning condition or stipulation is contained in (i.e., spread upon), the official minutes of the Board of Commissioners, the applicant, owner, or subdivider shall be required to set aside or dedicate said Greenspace that may be identified in a development plan.

(2) If the percentage or acreage for Greenspace is more than that percentage required by this section, the greater percentage (i.e., that approved by the Board of Commissioners), shall apply.

(3) If the percentage or acreage for Greenspace is less restrictive or no requirement was provided, the requirements set forth in 5.17E, the requirements as set forth in 5.17E shall apply.

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