KLEINFELDER
Bright People. Right Solutions.

MEMORANDUM

TO: File
CC: Julie Wood, Heather Miller, Jennie Moonan, Stephanie Alimena
FROM: Betsy Frederick, Kleinfelder
DATE: June 30, 2021
SUBJECT: Opportunities for Regional Collaboration – Phosphorus Reduction

1 BACKGROUND

The distinct characteristics of the upper and lower Charles River Watersheds, and the communities within them, offer a variety of regional collaboration opportunities for the protection and enhancement of water quality within the Charles River and its tributaries. Working through regional organizations such as the Charles River Watershed Association (CRWA) and the Charles River Municipal Stormwater Collaborative (CRMSC), may provide communities opportunities to implement initiatives to improve stormwater management and ultimately water quality across the watershed. CRWA currently manages the Charles River Climate Compact, a group working collaboratively to achieve local and regional climate resilience through information sharing and joint initiatives. In this manner, communal actions may allow multiple communities to simultaneously achieve desirable water quality outcomes and build climate resilience. Through this Massachusetts Department of Environmental Protection Grant, CRWA and the CRMSC are committed to identifying actions that will achieve positive outcomes sooner and more efficiently through cross-community coordination.

In 2018, multiple communities in the watershed participated in an Upper Charles River Regional Stormwater Grant to explore the feasibility of resource sharing across communities to support stormwater functions and responsibilities. This group identified several near-term priorities and opportunities for improved efficiency, including education and outreach; system mapping; bylaw and regulation support; and inspection, maintenance, and repair of drainage infrastructure. Similar evaluations of regional implementation opportunities are underway at the Resilient Mystic Collaborative and Neponset Stormwater Collaborative, which have also provided evidence that collaboration across communities can lead to cost-savings and more effective outcomes with regards to both water quality and flood risk reduction.

The purpose of this memorandum is to help identify future opportunities for collaboration to achieve MS4 permit compliance, particularly with respect to implementing phosphorus control plans.

KLEINFELDER One Beacon Street, Suite 8100, Boston, MA 02108 p | 617.497.7800 f | 617.498.4630

2 OPPORTUNITIES ANALYSIS

2.1 DATA LEVERAGING

The MS4 program obligates operators to develop and manage considerable amounts of data with respect to infrastructure, land use, operations and outcomes. Typically, this data resides within individual communities. Some communities, such as members of the Central Massachusetts Stormwater Coalition (www.centralmastormwater.org) have already begun to share or maintain data on common platforms that may allow for planning and/or operational efficiencies. Resiliency planning initiatives by watershed groups and other entities have also worked to either aggregate locally-sourced data, or develop watershed-scale (or larger) datasets for analysis of regional flood/hazard mitigation opportunities. CRWA and the Nature Conservancy developed a Charles River module as part of a resilience mapping tool (https://maps.coastalresilience.org/massachusetts/) which includes initial site opportunity investigation for water quality and pollutant reduction opportunities. This module could be expanded with additional data layers to make it more useful to communities.

The Charles River Climate Compact recently completed a climate resilience project. That project assessed the flood mitigation benefits of scaling up green infrastructure (GI) solutions, but clearly the co-benefits of green infrastructure on water quality are an important consideration. The approach to this effort depended upon the voluntary collaboration of fifteen communities within that watershed to identify and assess optimal GI opportunities based on benefits to the watershed as a whole, rather than a single community. These regional models provide a potential platform for data analysis of pollutant reduction opportunities.

The results of the Charles River Flood model indicate that many of the measures communities will take to comply with the MS4 permit will also have regional flood benefits. For example, if communities store 2” of stormwater runoff from half of the impervious cover in the watershed, it will protect hundreds of acres from flooding in a 2070 10-yr storm event. The model also demonstrated that roughly 32,000 acres of new green stormwater infrastructure treatment systems across the watershed would similarly protect hundreds of acres from becoming flooded and reduce the depth of flooding in other areas. Finally, the model also looked at the regional impact of unchecked development. If half of the remaining undeveloped and unprotected land in the watershed were to be developed without adequately addressing the stormwater generated from this new development, over 1700 additional acres of the watershed will flood, demonstrating the critical importance of controlling stormwater in new development and the benefit of land conservation.

A regional resilience study of the Mystic River watershed involved demonstration of the complementary value of reducing directly connected impervious areas (DCIA) for both flood mitigation and water quality protection. That project was focused primarily on flood mitigation and modeled multiple scenarios involving distributed stormwater storage throughout the watershed (primarily large-scale wetlands construction). Results showed that while constructed stormwater wetlands (and other flood storage strategies) have a multitude of water quality, recreation and other co-benefits, there is not enough non-developed space to fully manage stormwater flooding via wetlands alone. A 30% reduction of DCIA, however, contributed significantly to mitigating flood impacts. A coordinated effort to implement consistent local land development policies with respect to creation of new DCIA, and incentivizing the elimination of DCIA across the entire watershed, would provide significant hazard mitigation as well as water quality benefits. Development and adoption of a template policy, guidelines, or regulations to provide to communities may catalyze local responses with a regional benefit.

Governance frameworks in Massachusetts have occasionally hindered intermunicipal resource management cooperation. Development of regional coalitions or collaboratives around issues of hazard mitigation to address evolving climate change impacts may also allow greater collaboration around issues of water quality protection and pollutant reduction. Looking at these issues holistically through a watershed-scale will also have benefits in the event that nutrient trading or similar approach can be advanced in the watershed (see discussion below).

A few other key lessons learned from regional studies include:

- Institutional, regulatory or administrative barriers clearly exist that can negatively impact long-term strategies for implementing nature-based solutions. Examples from the Mystic project include issues such as the fact that many low-quality wetland areas, both from hydrologic and ecological perspective, often have local protections or State protections, such as deed restrictions, Article 97, and/or specific Wetland Protection Act protections. These can be significant roadblocks to permitting or implementation of projects. These are important protections generally, however re-evaluation of such restrictions may be necessary if larger-scale projects are envisioned. Changes to state regulations would require a collaborative effort among communities demonstrating wide-scale support for such measures across municipal boundaries.
- Communities can recognize localized benefits from nature-based projects, such as nutrient reduction and ecological restoration. For urbanized watersheds like both the Mystic and Charles River, a wider lens with respect to all values a project may impart (e.g., flood storage, nutrient reductions, wildlife habitat, passive recreation, temperature moderation) should be employed. The pollutant reduction outcomes associated with these projects may be a significant contributor to

achieving MS4 permit requirements, but the co-benefits of such projects to the region may make implementation more attractive.

- Local personnel and their institutional knowledge is an important resource to leverage. In particular, the Mystic project recognized the value of engaging municipal conservation staff early in the project. Often technical analyses fall within the purview of engineering staff; however, the identification of opportunities for large-scale nature-based solutions and GI requires a watershed perspective and knowledge of natural lands that many conservation staff can readily contribute. Such knowledge can greatly supplement top-down processes, such as those using GIS methods and aerial imagery, and save substantial effort in identifying target opportunities.
- Adapting to climate change will require considerable investment, likely investment well beyond what is required by the MS4 permit. Collectively, we will likely need to evolve our thinking on what is considered feasible. If we continue to make investments in our infrastructure or changes to our landscape based on traditional stormwater management operations and practices, we will likely miss an opportunity to build real climate resilience.
- Developing a stormwater model at the watershed scale likely saved millions of dollars compared to each community investing in their own municipal scale model which would not properly interact with upstream and downstream community stormwater systems. In the Charles River watershed, fifteen communities were able to leverage roughly $50,000 in matching funds into approximately $250,000 to develop the initial model which can be updated and expanded over time to increase the level of detail available in each community. Some municipal scale models cost far in excess of $300,000. In the projects cited above (Mystic and Charles flood mitigation models), the watershed model was able to integrate and build upon data and models produced by individual communities. The value of the resulting model in terms of functionality and scenario development certainly accrued to all of the contributing communities. It allowed them to improve upon their understanding of their local infrastructure and hydrology as well as better understand the dynamic between their own situation and that of their neighbors in the watershed.

2.2 NUTRIENT TRADING

The concept of nutrient (primarily phosphorus) trading has regularly come up against the governance barriers cited previously, as well as challenges based on lack of an administrative framework and ambiguous regulatory incentives. In 2014 CRWA established and enhanced the Blue Cities Exchange (BCE), an on-line phosphorus trading tool (advanced to a conceptual level), through a grant funded program. In a follow up study, CRWA and Industrial Economics, Inc. determined that cost differentials for stormwater treatment implementation across the watershed are likely significant enough

to encourage a local trading market. Programs such as this have significant potential for incentivizing watershed-scale structural controls if the administrative and regulatory infrastructure to allow efficient trading and tracking are further developed. Since all communities covered under the MS4 program are obligated to identify and prioritize suitable structural control opportunities, using a watershed-scale screening approach such as employed for the flood hazard planning projects cited may identify advantageous stormwater treatment system installation sites that can optimize pollutant load reductions. Demand for trading credits may also depend, in part, on whether EPA proceeds with a Residual Designation Permit for private property owners which could significantly increase the market for such a trading system. This is a longer-term collaborative effort that will require commitment from EPA to fund and resource the necessary administrative capacity at the regulatory level, and the commitment of regional organizations that can organize municipal response to program development challenges.

2.3 OTHER REPORTS

A recent 319 grant funded (2018) joint effort by the communities of Milford, Franklin and Medway sought specifically to identify mutual aid or collaborative efforts that could legally and practically be conducted on a regional or joint basis. The recommendations were provided in multiple areas, including:

- Administration
- Regulation and Enforcement
- Engineering and Master Planning
- Operations and Implementation
- Monitoring
- Capital Projects

Some of the recommendations have been taken up in part by some regional entities, such as the Central Massachusetts Stormwater Coalition. The most widely adopted regional efforts have typically included those elements that do not impose significant cost or loss of autonomy for individual communities, including things like joint public education and involvement plans. Other recommendations, such as development of template documents and consistent rules have been advanced, including development of the current PCP template provided under this grant scope of work. Other recommendations of the report included:

Administration:
1. Joint public education and involvement plans (written) to meet MS4 permit requirements.
2. Consistent branding and sharing of stormwater education materials for distribution.
3. Regular stormwater program management meetings to collaborate and share

information.
4. Annual review of Stormwater Management Plans and preparation of annual reports.
5. A la carte menu of subcontractor services and resources for assistance.
6. Online "warehouse of resources" for stormwater management and permit compliance, including project construction and O&M costs, and ideally cost per lb removed.
7. Annual reviews of budget and assets.
8. Tracking of activities and periodic review of MS4 permit compliance.

Regulation/Enforcement:
1. Joint training programs for inspectors and contractors.
2. Legal assistance.

Engineering and Master Planning:
1. Consistent rules and regulations for stormwater management design, including typical designs, etc.
2. Consolidated engineering assistance (in-house or contracted). Could be shared staff or a common contract mechanism.
3. Integrated Pest Management Programs to minimize or eliminate application of fertilizers and pesticides.
4. Development of joint projects, grant applications, etc. Many state grant programs favor or require regional collaboration.
5. Sharing of survey equipment, GPS units, and data collection/storage methods (e.g., tablets for data collection).
6. Sharing of GIS applications/approaches for data management and planning evaluations.
7. Regional/coordinated, written plans for: Stormwater Management Plans, Illicit Discharge Detection and Elimination Plans; and Phosphorous Control Plans.
8. Regional BMP retrofit inventories and prioritization approach with standardized retrofits.
9. Mapping and storm drain inspection services.
10. Development of Stormwater Pollution Prevention Plans for municipal facilities.

Operations and Implementation:
1. Development of Standard Operating Procedures (SOPs) for maintenance of the storm drain infrastructure.
2. Consistent approach and SOPs to optimize operations for street sweeping, catch basin cleaning, winter deicing activities, etc.
3. Long-term solutions for management of street sweepings and catch basin cleanings (e.g., regional Beneficial Use Determination).
4. Sharing of high-cost capital equipment (e.g., vac truck, high-efficiency sweepers).
5. Training of municipal staff.

Monitoring:

1. Development of SOPs for dry and wet weather monitoring activities.
2. Regional training programs for staff and volunteers.
3. Sharing of monitoring equipment (e.g., instruments, sampling equipment, field test kits), staff resources, and a pool of volunteers.
4. Surface water quality monitoring program for Charles River and major tributaries in each community.
5. Purchase and sharing of CCTV equipment for investigations.

Capital Projects:
1. Shared funding and credits for phosphorous reduction across communities where BMPs are most cost-effective (e.g., good soils, available land, planned redevelopment).
2. Public/private partnerships to construct stormwater treatment system retrofits.
3. Award of stormwater funding on a regional basis for private entities.

These and other opportunities can become the basis for regional collaboratives, such as CRMSC, to plan and execute further cooperative efforts.

KLEINFELDER One Beacon Street, Suite 8100, Boston, MA 02108 p | 617.497.7800 f | 617.498.4630