

## Assessment of Collaboration in the Stormwater Incentives in Lake Erie Basin Project

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*"I was happy and honored to be part of [the CLG]. I felt really engaged with everyone, and thought we all learned something [from the project]."*

*– Engineer & CLG member*

*"I've really enjoyed the process – I've learned a lot, and have tried to share everything I've learned with my [community and colleagues]. This included key things to look for that make the difference between success and failure [on a project]. [BMP installations] are costly, and we want all success."*

*– Regulator & CLG member*

### I. Executive Summary

This report contains feedback and reflections on the collaborative part of the "Implementing Credits and Incentives for Innovative Stormwater Project in Ohio." It is based on input from conversations with 15 people involved in the project, a review of project reports and evaluations over the past few years, and observations by the author. It was written by Ona Ferguson of the Consensus Building Institute who, with Heather Elmer and Frank Lopez, was the collaboration co-lead for the project.

The goal of this report is to capture participant views on the collaboration aspects of the project, in particular what worked well and challenges or opportunities for improvement. As this multi-year project comes to an end, the project team leading the effort wanted to reflect on what we've done and what we've learned by working together. This document will be shared with the many people involved in the project and will be submitted as part of the final grant report. It will also inform future collaborative stormwater efforts in Ohio.

Overall, the collaborative structure worked very well. A Project Team carried out the work with regular and intensive engagement with a wider group of stormwater professionals. This larger group met several times a year to offer advice, ask questions and discuss project results. The synergy that developed from bringing people with diverse areas of expertise together to work respectfully led to robust project results of wide interest to the stormwater community in northern Ohio.

### II. Project Introduction and Methods

#### The Project

This project promoted the implementation of low impact development (LID) stormwater control measures (SCMs) that reduce the impacts of stormwater runoff on Ohio's coastal communities and Lake Erie and worked to improve state and local stormwater policies. The project team

included the Chagrin River Watershed Partners (CRWP), Old Woman Creek National Estuarine Research Reserve (OWC NERR), Ohio Department of Natural Resources Division of Soil and Water Resources (ODNR-DSWR), Erie Soil and Water Conservation District (Erie SWCD), the Consensus Building Institute (CBI), and North Carolina State University (NCSU). The National Estuarine Research Reserve System Science Collaborative (NERRS SC) funded the project.

The project team worked with stormwater professionals in northern Ohio to generate credible and locally verified information about the performance of innovative LID stormwater systems. A collaborative learning approach was used to engage a group of interested experts. The collaborative learning group (CLG) of stormwater engineers, regulators, stormwater utility managers, and watershed organizations provided iterative guidance and feedback to the project team on the design, construction, and monitoring of six SCM sites. The collaborative learning process also enabled group members to share a broad range of knowledge, concerns, and ideas for addressing complex stormwater challenges in northern Ohio.

The project team collected monitoring data to evaluate hydrologic performance of SCMs and validate models to predict SCM effectiveness under projected climate scenarios. Information generated from this project is now being used to improve local and state stormwater regulations.

One integral component of this project was its deeply collaborative nature. The intent was to ensure that technical research done on stormwater control measures (SCMs) addressed topics of real importance to those designing, installing and permitting these practices, as well as to build knowledge among all of the people participating. Participants indicated their commitment to use project results, given a high level of trust in the way the results were produced and given the many shared lessons.

The project's various groups working collaboratively were:

- *The Project Team* – This group of about eight people at any given time managed the project and was responsible, with some subcontractors, for getting most of the work done. The team included representatives from the Old Woman Creek National Estuarine Research Reserve, Chagrin River Watershed Partners (CRWP), the Ohio Department of Natural Resources (ODNR), North Carolina State University, the Consensus Building Institute (CBI), and the Erie Soil and Water Conservation District. The Project Team talked as a group at least once a month and met several times a year in person. They tracked all project progress, oversaw all aspects of the initiative, and planned and led the Collaborative Learning Group.
- *The Collaborative Learning Group (CLG)* – This group of approximately 20 individuals represented a suite of people interested in stormwater in northeast Ohio; state and local regulators and design engineers. They met three times a year for full-day meetings to give input on project components and to help the Project Team ensure project activities were relevant to end user needs.
- *Site Project Teams* – Collaboration also occurred among site owners, designers, contractors, and members of the Project Team working at each monitoring site.

## **Assessment Methodology**

This assessment is a book-end that matches an assessment completed by the Consensus Building Institute at the project's start. As in that situation, the bulk of the information contained here is based on confidential conversations, mostly carried out by phone, to hear how participants felt the project went and what they learned. The interviews were carried out in February and March 2015, and they generally took about half an hour. The list of interviewees is included in Appendix A. Participants were asked to speak honestly and were told responses would not be attributed to specific individuals. The conversations were loosely guided by an interview protocol, which can be found in Appendix B.

The report also contains some feedback collected through semi-annual surveys with CLG members and by reviewing summaries from CLG and Project Team meetings.

This report contains, for the most part, opinions and observations. These are by definition subjective and are, in some cases, conflicting. We have not sought to judge or evaluate the opinions, but have sought instead to capture and share them. In addition, because this report was written by one of the collaboration leads, it cannot truly be neutral. That said, I have attempted to honestly represent the feedback that I heard.

The sections of the report contain observations on what we did, reflections on how it went, and lessons for next time. We hope this summary will be helpful to others embarking on similar projects. For more on the project overall and on project results, please see: [crwp.org/index.php/projects/research-projects/nerrs-sciences-collaborative](http://crwp.org/index.php/projects/research-projects/nerrs-sciences-collaborative)

## **III. Review of Project Meeting Summaries & Evaluations**

In the Pre-Project Assessment, dated February 2012, a variety of points were raised that the Project Team sought to address or build on. The report identified several barriers to highest level performance in Ohio stormwater management circles, including that newness causes discomfort (so this project worked to make certain practices less “new”), that behavior change is difficult (so this project sought to provide technical assistance, assist in finding funding, and spend lots of time exploring and discussing to support people as they did new things), and that efforts were not yet well coordinated (so this project sought to create a forum where people could discuss these SCMs across state and local jurisdictional levels as well as across professional groups).

That same assessment includes the following paragraph about who should work together on this project: “Several people mentioned that it is imperative that engineers be involved in any stormwater project, especially if engineers are one of the intended audiences for the research results. People said that involving contractors in this effort would show whether it is truly possible to install SCMs, get them approved, and keep costs low. And one person mentioned that it would be great to have contractors and installers involved in any demonstration site, as they would be able to describe concretely how a particular SCM works on the ground. Finally, someone mentioned that it would be nice to have coordinated or standardized data collection systems so that different stormwater data sets can be compared.” The Project Team took all of this to heart and tried to use this guidance in how the project was structured. Finally, the last sentence in that report predicted a major component of the project: “The collaborative nature

of this project means it has built in checks and balances that encourage those we interviewed to trust project results.”

Many of the expectations for the CLG are laid out in notes from the very first CLG meeting, which was held on January 26, 2012. The project followed through on these for the most part, with a few adjustments. We said that “The [CLG] will provide input on all aspects of the project, helping to shape the research itself and implementation tools developed.” This was indeed the case. We then said we’d ask CLG members to participate in a training module on collaborative learning, which we then determined would likely not be a good use of time for all of them (though several of them did come to the training when it was held). We made an early commitment to track lessons learned and make course corrections through surveys, which we did. We expected the group would meet quarterly, and then at their request (during CLG meeting #3) we shifted that to three times a year. And, at the end of that meeting, “Several [CLG] members noted that they appreciate the opportunity to work together, learn, and provide input. ... and some were already thinking about how to sustain this collaboration beyond the three-year grant timeline.”

At the second CLG meeting, on April 4, 2012, we consciously sought to foster collaborative awareness within the CLG by providing training. Ona shared the negotiation distinction between positions and interests, and then discussed some ideas about how different modes of communication work, from Leigh Thompson’s *The Mind and Heart of the Negotiator*. It was at the second meeting that a CLG member asked the Project Team to communicate very sparingly via email between meetings, and to point people towards materials they might want to know more about, rather than sending a lot of different emails.

At the third CLG meeting, on July 17, 2012, participants said how much they appreciated the site visits and hearing about design challenges and solutions. CLG members also gave input on how they would like to be engaged on the project, including via virtual site tours (something the Project Team never took on due to various limitations in capacity), being provided regular updates on progress (which we provided), and being given the opportunity to review plans and provide feedback by commenting (which we provided).

After that CLG meeting in July, survey responses from 13 participants indicated that 76% of respondents had already learned things from the project that they would apply in their work and most agreed it was a good use of their time and had increased their knowledge of stormwater and SCM monitoring and performance.

At the fourth CLG meeting, in October 2012, CLG members requested that the project try to implement winter monitoring of our sites, and CLG members raised questions about how well porous asphalt products work in the context of Ohio’s temperature range. In the survey shortly after this, 91% of respondents said participating was a good use of their time, and someone wrote, “I think the CLG provide[s] a great forum to learn and ask questions.”

Then the meeting notes and surveys show mid-project progress (including the April 24, 2013 CLG meeting, the September 18, 2013 CLG meeting and the September 2013 CLG survey). They are very focused on content. They show thoughtful back and forth discussion, with participants raising questions about how work is going to be done, what it will show, whether it will be used in certain ways, and indicating their preferences. Because of the extensive expertise in the room, many questions about whether something was doable or had been done elsewhere could

be answered immediately. CLG members raised questions about clogging and maintenance of permeable pavement and gave recommendations on what content the Project Team should include the case studies about each site.

The September 2013 CLG survey shows everyone who responded (14 people) agreed participating was a good use of their time, they all said the project has increased their knowledge of stormwater a great deal, and they had learned something they would apply in their work. Some comments noted appreciation for hearing the range of views of people who don't usually talk or work together. In the May 2014 survey, people noted their increasing comfort with LID practices and said they frequently recommend them. When asked what aspects of the project they've found most useful, their comments included:

- Almost all that was done/discussed was useful.
- See[ing] data that's based on local conditions.
- Sharing the lessons learned by the project team in regards to "real world" implementation issues.
- All of it. Couldn't pick one thing above the other.

By the August 20, 2014 CLG meeting, significant progress had been made in the research results. The team had learned many lessons, done a lot of monitoring on our various sites, and the Project Team thought we were holding our last CLG meeting (as CLG members would be invited to other project results roll-outs the following spring). To the surprise of the Project Team, participants at that meeting essentially refused to be told it was the last CLG meeting and asked to be given another opportunity to come together to hear final results before they were shared with the public. Discussion at that meeting focused largely on the need for user-friendly products once all the research was complete in order to ensure that the results from the project have an impact.

In the CLG survey following that meeting, participants had all sorts of compelling statements about the importance of the project. "My approach to every design project has changed. I know what LID practices can benefit a site much better now, and how to implement them." Broadly summarized, what people found most useful about the project included the collaborative approach, site visits with the SCMs, seeing projects from design through construction, hearing lessons learned, reading case studies, participating in and seeing the design work, and frequent interactions with the Project Team.

"This process was valuable in that it lasted a long enough period of time, included the appropriate people (agencies, townships, etc.), and was facilitated extremely well to get good discussion and results. The fact that so many people showed up at the last meeting and that another meeting is desired speaks to the high quality of the experience. Also, enough sites were observed through the construction period that many lessons were learned." – Old Woman Creek Reserve staff member

The last CLG meeting was held on April 15, 2015. It was packed with presentations on monitoring and modeling results, as well as various other project products. Members had good discussions about how the results would be interpreted by the stormwater community, how to best present results at the May Ohio stormwater conference and June project trainings, and provided feedback on draft stormwater codes. One of the participants made

an elaborate cake (with several SCM’s depicted on the frosting!) to celebrate the completion of the project, and participants went out for social hour after the meeting wrapped up.

## IV. Collaborative Learning Group Membership

### Our Plan

We sought to form a CLG that would be a manageable size (15-20 people). Participants would come together with the Project Team every few months over the three years of the project to give input on and learn from the project. We intended to have participation from the following types of stormwater professionals: state stormwater regulators (ODNR, Ohio EPA), local stormwater regulators (including city and county engineers, soil and water conservation districts, sewer district staff), developers, and design engineers. There was some money set aside to help people participate who needed to be paid for their time.

CLG MEMBERS		
Dan	Bogoevski	Ohio EPA Northeast District Office
Jane	Cullen	City of Sandusky-Project Engineer
Justin	Czekaj	City of Aurora
Eric	Dodrill	Perkins Township
Alexander	Etchill	John Hancock & Associates, Inc.
John	Farschmann	Erie County
Ken	Fortney	Erie County Engineer’s Office
Lynette	Hablitzel	Ohio EPA
Clyde	Hadden	CT Consultants, Inc.
John	Hancock	John Hancock & Associates, Inc.
Philip	Kiefer	CT Consultants, Inc.
William	Sanderson	Forest City Land Group
Leonardo	Sferra	GPD Group
Rachel	Webb	Northeast Ohio Regional Sewer District
Betsy	Yingling	Northeast Ohio Regional Sewer District

### What Happened

We did have an active and committed CLG with approximately 10-12 members attending most meetings in addition to Project Team members, with a bit of fluctuation in attendance. They did represent a range of perspectives, and we had very consistent participation from the state regulators, members from a sewer district using green and grey infrastructure to address its combined sewer overflow problems, and a few engineers. However, it was sometimes hard to get the consulting engineers and others who work under a billable model to attend. We did issue participants certificates for Continuing Education Credits at the end of each calendar year so they could, if they felt it was appropriate, submit for credit for those hours of our CLG meetings when they were learning.

In reflecting on the process, some noted there was good government representation at all levels, and they wished we had more engineers participating. Others said they wished we had had more construction or contractor perspectives attending to share their experiences of how things work in the field. Ideas for how to do this include: paying them (offering to pay for people’s

time partway through the process, not just early on when everyone declined), scheduling CLG meetings to synch up with engineering review meetings for particular sites, and considering options for enabling participation via webinar or phone to reduce travel time and time away from the office.

Others expressed how important it was that ODNR and Ohio EPA were committed participants. Their support for the project made a big difference to the participants, who were reassured that those who develop/enforce regulations and requirements for stormwater management in Ohio were in the room and paying attention.

In some cases, notably at the Perkins project site, we had several of the people involved in designing and constructing one of the sites also participating in the CLG and Project Team. In that instance, the site owner's representative (Eric Dodrill), designer (Alex Etchill) and staff from the Erie Soil and Water Conservation District (Bre Hohman and Crystal Dymond) were all participants. So, as they learned from CLG meetings and from their real world experience, they could act as conduits for those lessons to other CLG members and to their colleagues working at the Perkins Township site. This was a powerful model for jointly learning from a real world situation.

## **V. Collaborative Learning Group Process & Meetings**

### **Our Plan**

We expected the CLG to meet four times a year for a half day, and we intended to hold meetings in different locations so the same participants would not always be burdened by significant travel. Note that the project area for this project is large – the team worked in three watersheds and driving from one project area to another could take over an hour. We hoped to design meetings that offered a combination of experiences including site visits, lots of discussion, informal time for people to get to know each other, and rich presentations on the work being done. Because there were different types of research managed under the project, we knew not all topics would be of interest to all people, but our goal was to make all topics compelling enough for people to be willing to work with us even on those subjects they weren't naturally enthusiastic about. We assumed many of the topics we brought to the CLG would be of deep interest to the participants given their individual stormwater-related expertise and roles.

We intended to invite CLG members to participate in smaller group working sessions on various components of the project between the larger CLG meetings, so people who wanted to know more about a particular topic or contribute to some aspect of the research could do so.

### **What Happened**

Based on feedback from the CLG at one of the first meetings, we shifted to a schedule of three longer meetings per year. Our meetings generally ran from 9:00am to 3:00pm and included a site visit in addition to seated meeting time with presentations and discussion. We served coffee and a light breakfast and lunch at every meeting, thanks to the Friends of Old Woman Creek NERR, which contributed significantly to create enjoyable down time and comfortable CLG members. We did move meetings between the east and west side of the project to distribute the burden of travel times, which worked reasonably well. We met in all kinds of facilities (at

OWC Reserve, at public libraries, at metropark buildings, at municipal buildings), often near or adjacent to sites where we were working.

Between meetings, based on CLG member recommendations and preferences, we sent only a small number of group emails to the CLG. There was generally one project update that went out between meetings with quick summaries of progress since the last CLG meeting and links to new reports or products. These updates also asked for CLG input on particular timely aspects of the work, whether reviewing a site design or a case study or inviting them to attend a meeting about a particular component of the project.

### **Feedback about the Process Overall**

The following were the key messages from the interviews about the collaborative process as a whole related to the CLG.

- It was good to learn together. Because the Project Team and the CLG worked together from the conception of the project (many CLG members were consulted in advance of the formation of the CLG), through design and installation to maintenance and monitoring on our sites, we all learned what worked and what did not. We saw how standard projects and engineering and design practices worked or needed to be modified for green infrastructure. The model of being together through the full duration of the initiative worked well and everyone involved learned things they would not have known or thought of on their own.
- It worked to make some decisions during the project. While most research projects are pre-formulated, with research questions and strategies laid out prior to a project beginning, in this model, some of the decisions were made as the project unfolded by the Project Team and the CLG. For example, CLG members asked how SCMs perform during winter months, so the Project Team installed equipment to try to answer this question. The effort failed to produce results because the equipment froze and was covered with snow, answering the question of why this is not done in Ohio. CLG members said they wanted water quality monitoring, which the Project Team sought to do, and gathered some data on. CLG members provided extensive input on how project results should be translated and shared with the broader stormwater community through trainings, design guidance and other technical resources. Finally, CLG members provided feedback on draft changes to model codes for stormwater management.
- This was a good use of CLG members' time. Those CLG members that filled out the surveys the Project Team circulated every six months said time and time again that the project was a good use of their time.

### **Feedback about CLG Meetings**

The following summarizes the feedback about the in-person CLG meetings.

- Most people enjoyed the meetings, with a few people sounding neutral about them. When asked to reflect on the CLG, many people immediately commented that they had enjoyed the meetings. Most people didn't offer suggestions for how they would improve the meetings, likely in part because the Project Team made adjustments to how the meetings were run over the course of the project to respond to comments and suggestions as they arose.



- The meeting agendas and structure worked. People appreciated the variety of meeting components, including the format of presentations with discussions and site visits. This worked well.
- The frequency of meetings was right. People liked being able to track the project research as it evolved and being able to learn gradually about the many topics addressed.
- Presentations were good. People enjoyed having the researchers present their work in person, and found their enthusiasm contagious (CLG members noted that the presenters' excitement made it easier for the CLG members to stay focused on what was sometimes dense content). Some noted presentations were occasionally dry or more detailed than they needed to be, while we heard different CLG members enjoyed different topics best, so it seems we more or less hit the right balance of topics.
- Discussions were good. The Project Team sought to build in a lot of time for discussions after almost every presentation, and CLG members noted that these sessions were good. Discussions were respectful, and people shared their experiences and learned from one another.
- The site visits were essential. People loved the field experience. Most CLG meetings began with 45 minutes on one of the sites where an LID practice was being designed, constructed, or monitored. These site visits began with an overview of the goals of that particular project, then key individuals involved with the site led the CLG onto the site, and CLG members got to discuss the project with them and ask questions. People said the real world experience on site, and seeing practices being built then learning about their performance was one of the most helpful parts of the project. They said the site visits helped them understand the subject matter and tied the meeting content together.
- Food fostered collegiality. A few people mentioned that it was nice having lunch provided so people didn't need to scatter at lunchtime to buy lunch. They said having down time together built camaraderie among the group.
- Facilitated discussion worked well. Several CLG members mentioned that they liked the structured discussion, time keeping, and organization of having a facilitator manage the meeting, including the use of having participants place their name placards on end to get in the queue to speak during Q&A sessions.
- Membership and meeting participation could have been tightened. There were often a few additional people at our meetings, and we let people bring others they thought would be interested. This sometimes altered the group dynamics, and in retrospect we might reconsider this approach.

### **Feedback about Between-Meeting Contact**

We asked CLG members what they thought about the level of communication the Project Team had with CLG members between in-person meetings. This communication was, as noted above, a few emails including a project update with access to reports and work in progress, as well as occasional emails about opportunities to participate in a meeting or review and information about the next CLG meeting.

Regarding the project update, which took the Project Team some time to prepare, a few people noted they thought they were useful, easy to read and understand. Others said they couldn't find time to read them (and that email is only somewhat effective generally as people are swamped). Overall, in terms of the number of times the Project Team reached out, CLG

members said it was about right. They said there were materials available for those who wanted to see them, and the invitations to attend smaller project-related meetings let CLG members be as involved as they wanted to be. Project Team members noted that they wished they had had more time to distill interim results for the CLG updates between CLG meetings, and that some of these updates apparently got caught in spam-filters, meaning that the Constant Contact technology we used might not have been effective.

Other notes from CLG members interviewed:

- Meeting scheduling and RSVPing was easy, with the agenda provided in advance so CLG members could decide whether to attend based on meeting content.
- One or two people wished there had been more communication inviting them to engineering site meetings.
- Several people said they wished they had been more present during site-based design discussions to learn in real time.
- One person noted appreciation for the opportunity to give feedback during bi-annual surveys sent to the CLG.

### **Overall CLG Successes**

The following are things CLG and Project Team members named as successes of the process.

- We had a varied group of professional stakeholders working together constructively – People on our CLG may encounter one another in their work, but don't often get a chance to work together across disciplines as a team. There were a lot of participants representing varied perspectives in the room at one time, and there was significant engagement by everyone who attended. There was also broad geographic representation.
- People learned from each other – People shared their thoughts honestly and respectfully, and the dialogue was fruitful and focused. People enjoyed hearing about the experiences of others on the CLG who have different perspectives, learning other people's challenges and ideas for solutions. People also noted that the presentations from Project Team members Ryan Winston and Jay Dorsey were very valuable. People said the entire group was great, and people got along, sometimes agreed to disagree, and found a lot of common ground through discussions and time together.
- Relationships were created or strengthened – Those who already knew most of the other participants said their relationships were strengthened, and those who met other participants for the first time developed relationships with them. The deepest relationships were formed among those who worked on particular site design, construction, or monitoring projects together. Everyone said they expect to run into CLG members in other places, so the relationships will help with future work. Participants also noted they now know individuals in a range of different positions to turn to with stormwater-related questions or problems.
- The process was right for the situation – People said the open-endedness of the project, the level of engagement, and the structure of the CLG meetings worked well together. Collaborative, stakeholder-led research was a new type of approach for many participants, and they noted it ended up working well. People said the frequency of CLG meetings and the facilitation to keep things on track, focused and calm were all appropriate.

- The project achieved results – People expressed pride that the work the CLG and Project Team did together accomplished real results. One CLG member said, “It was great to be part of the CLG because we did a lot of talking, but we also acted and got something done – it felt really good to be part of the group. It changed something [on the ground]. It made me feel good.” Another said, “It felt like we were trying to do something productive together, it wasn’t talk for talk’s sake.”
- Other successes named included:
  - We learned a lot from failures, e.g. sediment clogging the permeable pavers at one site.
  - Appreciation for the project taking input from the CLG. For example, someone remembered when the CLG generated a list of types of SCM practices of interest to them, then voted/narrowed them to choose SCM practices that would be designed, constructed and monitored for the project.
  - CLG members who were involved in site work said they had an especially productive experience, learned a lot, and had their organizations’ support for participating in the CLG.
  - CLG members appreciated the depth of analysis, long-time engagement, and motivation and enthusiasm of people involved in the project.

### **CLG Challenges and Ideas for Future Collaboration**

The following are suggestions people had for what they would change about the CLG, or what could be addressed in future similar projects.

- The extended geographic reach of the project demanded a lot from participants – Many CLG and Project Team members mentioned the challenge of a project that covered several watersheds that were an hour or more apart. Meetings alternated between the different regions, but, depending on peoples’ home locations, that meant that at all meetings some attendees were driving 90 minutes each way. That time commitment, sometimes during rush hour, was a burden for CLG members. This meant that location had a strong influence on participation at a given meeting, and likewise, some of the CLG members didn’t provide as much guidance for sites that were further from them, which was a loss to the project. People suggested addressing this by:
  - having smaller groups meet in each region and coming together occasionally
  - making it possible to participate via webinar or conference call
  - having shorter meetings, so people didn’t have to give up a full day of work
- The modeling component of the project was especially difficult – Some CLG members mentioned that the sessions of CLG meetings dedicated to the modeling effort were sometimes difficult to participate in or seemed repetitive. They were as a group less interested in participating in the modeling work than in other portions of the project, but they did want the modeling results, which they expected to be useful. Several people said they would do the modeling process differently, including changing the process for finding and working with appropriate experts. Project Team members said it was difficult to distill the modeling information effectively to make it relevant for the full audience.
- The CLG meeting agendas could have been tweaked – Though as noted above, people were generally satisfied with how the meetings were organized and structured, some then offered specific suggestions. These included several people suggesting we could

- have done more small group work to enable quiet people or people who were nervous about speaking up to participate more actively, a suggestion that sometimes the meeting agendas were too packed which made both presentations and discussions rushed, and a comment that some of the technical discussions were hard for everyone to follow and went a little long. Alternately, we heard from people who would have been glad to have even more technical and engineering discussions. One suggestion from a Project Team member during this review was that we could have involved one or two CLG members in the planning of CLG meetings.
- Producing meeting summaries takes a lot of time and attention – We had a rotating cast of people taking notes at the CLG meetings and producing the first drafts of the meeting summary due to the lack of a budget to cover this role. This meant the task of producing a tight, well-written summary with a standard format the Project Team felt good about took more time than it otherwise would have. Often, one Project Team member ended up focused on typing at the CLG meetings, rather than participating, and various Project Team members spent a lot of time writing and editing the summaries, as we were committed to having good records of our CLG meetings.
  - Some CLG members did not participate fully – Finding the time to attend full-day meetings was difficult for some CLG members, especially those who have clients or use a consulting model (engineers were noted a few times as relatively less likely to attend meetings than some other members). As noted above, this was especially true in cases where the meeting was further away geographically. One suggestion was to offer to pay for people’s time, which one interviewee said would have made a difference. The Project Team did offer to pay participants early on in the project, and no one indicated that they needed payment. A few Project Team members also noted they would have liked more of the CLG engineers to attend the smaller site-focused design meetings to give their input.
  - Not all venues were just right – One person mentioned that some of the meeting venues were not ideal, such as an especially small room the group met in several times.
  - Unclear end products - As of a few months before the end of the project, one CLG member noted he was not entirely sure how all the project components would wrap up into clear outcomes. He indicated he was still hoping the project would produce model codes, simple calculators and guidance so people can make calculations.

## **VI. Project Team Process**

### **Our Plan**

Building on two years of planning for this effort, and on experiences from other projects by two of the collaboration leads (Heather Elmer and Ona Ferguson), we had a general outline for how our Project Team would work. We intended to talk regularly via conference call and meet occasionally. Our goals included ensuring each interrelated component of the project was connected to the others, helping Project Team members translate work for people in other areas of expertise, and building strong, shared understanding of the questions, activities, and findings of the project.

## **What Happened**

We operated basically as anticipated. Getting going took longer than we expected, given how much time we had spent planning for the project. Just bringing the Project Team to a shared understanding of the different project components, who was in charge of what, and the timeline for completing different tasks took a full day together in front of a giant white board sketching everything out. That resulted in a graphic of the project that we produced and shared with the CLG.

The Project Team of about eight people faced numerous staffing challenges over the course of the project and, miraculously, managed to keep on track and on target for completion. Among the changes were:

- Our Principle Investigator changed jobs, stepping out of the project about halfway through.
- One of our Collaboration Leads left her job, luckily shifting from one organization involved in the project to another, so we got to continue to have her on the team.
- For various reasons, including four pregnancies and five births (one set of twins!), there were several leaves of absences among project team members that shifted significant workload to other team members.
- In a positive change, we added our engineering / monitoring contractor, Ryan Winston from NCSU, to the Project Team and he became an integral member of the team.

## **Project Team Strengths and Successes**

Project Team members named the following aspects of their collaboration as successful:

- *Strong Relationships & Communication* – Project Team members built very strong relationships, and learned a lot about how to work together productively. Project Team work was very respectful, despite some challenging periods and subjects. The group got good at communicating, with everyone working hard to err on the side of more communication and clarifications on team calls, in emails, and in individual calls or meetings. Note-taking at all meetings helped keep the group on track and remind Project Team members what they had discussed and decided.
- *Effective Process* – The process, with somewhat messy decision-making and largely shared authority, worked and got answers to the questions asked. Some Project Team members mentioned they found it interesting to work on a project where the questions were guided by the Project Team and CLG to ensure the results really mattered. They learned you can undertake a project where all the tasks are, intentionally, not thought out in perfect detail in advance. The Project Team had meetings over the phone (monthly or more often) and in-person meetings (a few times a year). The group initially intended only to do one kick off in-person meeting, but then decided meeting together at least annually was important to be sure we were all on the same page. We think the balance of phone and in-person meetings was right for this team and project.
- *Good Documentation & Materials* - The documentation of our process was good. We have meeting summaries from all Project Team meetings and from our CLG meetings. We also have case study write-ups for each site we worked with and sought to record lessons learned as we went. Several graduate student interns helped to compile

information, draft the case studies, and assist with planning and logistics for CLG meetings.

- *Strong Facilitation* – Having two primary facilitators, Heather Elmer and Ona Ferguson, kept discussions on track because of their diplomacy and willingness to push gently on topics that can be difficult. The facilitation was seen as a gift to the project, enabling people to really work constructively both in the Project Team and with the CLG. The facilitation also ensured that Project Team meetings were well-structured and discussions kept moving forwards when participants could sometimes get awfully far into the details of a given piece of research. Some had skepticism of the outside facilitator at first, but noted they thought it worked well. In addition, engaging an experienced outside facilitator as a team member and coach for the collaboration lead increased Old Woman Creek NERR's capacity to manage collaborative work and contributed to the development of additional successful grant funded projects. (Note that one of the facilitators was doing these interviews, so this a subject area where people may not have felt they could speak freely.)
- *The Right Team with Complementary and Overlapping Skills* - The members of the Project Team had a diverse set of skills that worked well. Some were more detail oriented, some more big picture. Project Team members thought that having redundancy or duplication of skill on the Project Team made a huge difference and allowed the Project Team and project work to be more resilient to staff changes and other challenges. Having Ryan Winston join Jay Dorsey as a Project Team engineer meant Jay didn't have to be the only one contributing that perspective. Having Heather and Ona co-facilitating the project meant when one of them couldn't attend a meeting, the meeting could go on. This duplication of skill was especially important because of the project's long timeframe and the unexpected staffing changes noted above.
- *Good Luck* – Finally, several Project Team members said they thought we also had a few strokes of good fortune. Despite various challenges over the duration of the project, the team held together and got the work done, building relationships as they did so.

### **Challenges & Lessons for Next Time**

- Conference calling technology was difficult – We had some very frustrating difficulties with technology on our regular Project Team conference calls where people couldn't hear well, or were getting echoes. That was a distraction and wasted time and effort.
- The modeling work was especially difficult – The modeling work didn't take a significant place in the project until the last few months. This is because of a number of reasons, among them that ODNR was not able to hire an employee (the planned approach for getting this work done), the modeling contractor initially selected did not work out, results were significantly delayed with another modeling contractor, and we didn't have a full-time modeler on our Project Team. This piece of the project was especially difficult for the Project Team to manage well.
- Staffing inconsistencies meant burdens were shifting continually between Project Team members – As described above, over the three years of the project we had various Project Team members in and out of the project for a range of reasons. This meant we were sometimes missing key perspectives or people in important roles. These changes were unplanned and often meant additional work coordinating or covering for others.
- Planning CLG meetings took a lot of work. Planning CLG meetings, which included developing agendas, coordinating site visits, sending out announcements, coordinating

venue and other logistics, developing registration and tracking RSVPs, and creating detailed presentations and annotated agendas for internal use, took a lot of time. The goal was to prepare behind the scenes to ensure the team was all in synch, presentations were tailored to share the aspects of the research or project the Project Team felt needed to be featured, and discussions were productive. We aimed to have seamless CLG meetings, and the Project Team members said the results were ultimately worth the pain of planning the meetings.

- Coordination of multiple research projects is herding cats – There were times when the project seemed to stall for one reason or another and it became hard to move things forward. Sometimes this was because everyone in charge of doing work was very busy on other projects, sometimes it was because our progress was linked to things like external grant cycles to support our site work, sometimes it was due to weather. (You can't monitor LID practices during winter months in Ohio, as we proved by trying to do it, and you can't monitor runoff reduction when there are no rain events.)
- Varied levels of engagement can be awkward – Not all Project Team members were involved at, or expected to participate at, the same level. This made sense given project needs as well as the other professional commitments of certain Project Team members, however it meant that a few of the Project Team members sometimes weren't as fully engaged in what was going on, and that could be disheartening to other team members. We could have organized more of our Project Team calls so that the in-depth technical topics were scheduled to involve only those who were needed for those particular discussions.
- It can be difficult to track so many action items – Each Project Team call was followed with a list of notes and next steps people committed to, but the Project Team did not always refer back to those commitments, and it was often difficult for Project Team members to follow through on their commitments in the timeframes they indicated.

## VII. Research Topics / Results

We learned a variety of things from this project. In many cases, these lessons were unexpected. We learned about infiltration rates, and that bioretention and permeable pavement can make a difference in poorly draining Ohio soils. But we also learned about construction practices and challenges and maintenance of these SCMs, and about improving communication to get to better outcomes. Following are the various research results our interviewees described:

### **Research Results**

*The practices work to reduce water quantity!* – While all these practices look good on paper, the research proves they work here, in Ohio, with its site conditions and soils. These practices do a pretty good job reducing overall volume of runoff from development. The research substantiates the volume reduction from these practices under these conditions. It was great to compare our models and expectations with reality. These practices can be used to meet a threshold volume and can have water quality benefits. The fact that we now know they can be useful in soils with poor drainage could be paradigm-shifting, according to some interviewees.

*Site conditions matter* - Interviewees were very glad to have had this real world research. They valued especially that it was done under imperfect (real-world) conditions. We learned that while the practices will work most anywhere, the site conditions must be very carefully factored in, and levels of performance relate to what is possible at a particular site. Infiltration testing at

each site was essential in order to understand what might be possible once LID practices were installed.

*Design and construction are challenging* - We also learned that designing and installing new types of stormwater practices correctly is challenging and that communication is one of the most important elements of a successful outcome. At each site, there was some breakdown or challenge in the process, and we achieved good outcomes because of team discussions to ensure people were on the same page. The project shone a harsh light on these real-world situations. These challenges arise regardless of the level of experience of the professional involved because each site is unique. They could be related to bureaucracy, budgets, timing, expertise in design, and more. The Project Team learned the need to be explicit in bid packages and design drawings, as well as with the contractors and engineers. They learned about the need for oversight from several perspectives throughout the design and construction phase. One interviewee said he had had little a-ha moments throughout the project, and gave the example of Orange Village, where “the contractor brought in river rock for the aggregate under the permeable pavement. Seeing how it rolls over itself was eye opening. The standards call for crushed gravel because it is angular and holds its position. The river rock has rounded edges. Under pavers, where pressure can be on a very small footprint, that can cause the pavers to roll, which means you get wavy pavement over time. We had heard that, but then we saw it on site and tried to walk on it, the gravel is shooting out from your feet... this was real reinforcement [of the need for that crushed gravel as specified].”

*Maintenance matters* - Pervious pavement requires a lot of maintenance when located in a place likely to see debris from overhead trees or too much runoff from other paved or unpaved areas. All stormwater practices require some maintenance, but land owners need to be aware of the particular maintenance needs of new practices, as these differ from the maintenance needs of traditional stormwater management systems.

*Costs of LID practices* – The Project Team sought to track the cost of design and installation of the LID practices at our sites and make that information available. A few people mentioned they have referred to those numbers and it is helpful having this information.

We asked our interviewees if they would have excluded anything from the project. Several people noted that the CLG did not need to participate in site selection, which slowed the site work as the project was getting underway. Someone suggested that getting one site underway immediately would have taught the Project Team and CLG some early lessons that might have been useful for the other projects. Someone mentioned she doesn't think case studies and other documents are likely to be read, so she wasn't sure developing those was a good use of time. For the most part, though, looking over the project in its entirety, interviewees said there were not any parts of the project they would cut.

## **Using the Results**

What are the results of all of this work? What do these results enable people to do now? Interviewees said with the data generated from this project they have the information they need to make a reasonable argument about the value of using these practices here in Ohio. The data will help the designers and engineers talk intelligently with elected officials and others about how these practices worked and what we learned.



Permitters noted that these results might enable them to give some communities more leeway to be creative and try new approaches that could do better at particular sites. They also noted that they were awaiting the modeling results to get a sense of overall implications.

Designers and engineers said that they are better equipped to design these practices. One said, “Now when I look at a new development, I have an arsenal of weapons I can use to design them in a low impact way that I didn’t have before. Previously, I was afraid to suggest these because I didn’t know costs or how to run the calculations. This opened my eyes to other green options. Those options I knew how to design [previously], I now know how to design better.” Another noted that when he gets stuck on a project, he now knows who to call and expects colleagues from this project to take his call and give him time and attention they might not have otherwise given. Participants appreciate having all the background on which aspects in design and construction of SCMs are most important, including particular details worth focusing on to ensure the practice will be effective.

## VIII. Additional Stormwater Management Research Needs for Ohio

Interviewees described the following stormwater management research needs as ideas for useful future work in Ohio:

1. Monitor more sites and more SCMs – People want to know about other SCMs beyond permeable pavement and bioretention. They want to monitor more sites (including more permeable pavement and bioretention sites) and more types of SCMs. They asked for information on runoff reduction credits for swales, dry detention basins, filter strips, etc. What designs of these treatments will help improve water quality and reduce pollutant load? What treatments work best under what conditions?
2. Study soil health – Can we allot credit for the ways soils are graded (e.g. in filter strips, swales and dry detention ponds)? What benefits are we getting from these SCMs? Can we enhance them in a meaningful way? What should we know about soil health, and could we build on work being done in Washington to protect and enhance soils to get the right vegetative growth at the end of construction? Quantify how much hydrologic function we lose in the development process in the way we treat soils and if this can be recovered. What are we doing to the soils? What policy changes could help?
3. Learn more about construction management and oversight – What leads to good SCM construction? Is it oversight, or background on the practices, or requiring quality assurance plans, or OSHA style trainings of construction workers?
4. Monitor and model runoff and retrofits in a suburban landscape – Many people mentioned the need to learn more about runoff on large-scale hardened landscapes like parking lots in malls that are several acres in size. Someone suggested there is a need to install some SCMs at sites that are not public to facilitate larger-scale projects with different loads of pollutants (such as shopping center parking lots). Participants also noted the need for information on how to most efficiently retrofit these types of areas to improve stormwater management. How do you take a multi-acre parking lot and slow its runoff? Is there a way to affordably convert that to a pervious surface? Older

cities in Ohio all have this same problem of old industrial sites or abandoned sites with old concrete or parking lots on abandoned sites.

5. Determine the essential aspects of SCM construction – Because many SCMs may end up being installed incorrectly once they are finally widely adopted, someone suggested it would be good to learn how SCMs perform when they are not installed as precisely as would be ideal. Do they still perform? At what level? What aspects of design and construction are essential to SCM functioning, and which are less so?
6. Study impacts to water quality – This project began to look into impacts to water quality of SCMs, but much more research is needed about pollutant load reduction. Figure out how much credit can be assigned to each SCM for runoff reduction linked to TMDLs and use this information to create micro-scale implementation plans to address impairments identified in TMDLs.
7. Learn about the long-term costs of SCMs – What are the costs over time, including replacement, maintenance, etc.? What are the cradle-to-grave costs?
8. Study the life-cycle performance of SCMs – Monitor SCMs over the long term. For example, what happens to bioretention over time, with and without maintenance? Do metals build up? Does functionality increase or decrease over the years? What maintenance issues arise? Do they get clogged, or are they still functioning? Do bioswales get more effective as time goes on? Does permeable pavement get less effective?
9. Study evapotranspiration linked to stormwater management – Try to get a handle on urban evapotranspiration (ET) and plants (in stormwater management). We don't know what is happening. Anything unaccounted for in the water budget we assume is ET. What are the implications?
10. Study combined sewer overflows (CSOs) and stormwater – Investigate how CSOs that send sewage into the lake and stormwater management are connected. Figure out whether LID practices can impact CSO scenarios by quantifying the reduction of the volume and number of overflows. This case hasn't been made yet, but could be compelling.
11. Study sanitary sewer overflows (SSOs) – There are a huge number of sanitary sewer overflows happening, according to one interviewee. Could we research how SCMs could help with this issue? This could be a game-changer in terms of water quality. CSOs have long-term controls in place, but many SSOs do not.
12. Model Frost Depth – If there were more information on frost depth, stormwater LID practices might be less expensive. For example, this information could reduce the cost of pervious concrete if the designers didn't have to be so conservative about frost depth, which causes systems to be designed with a greater section depth, driving up costs. This information could go into the ODNR policy in the Rainwater manual. It would be good to be able to model frost depth to determine how much aggregate is needed.
13. Look into groundwater recharge – One participant suggested investigating injecting rainwater back into the water table, noting Ohioans don't necessarily think of water as a valuable commodity but it should perhaps be treated as such.
14. Develop more accurate rainfall predictions – Consider whether there's a way to use storm predictions to help with water management. For example, if you had 70% confidence that a storm was coming, valves on rainwater harvesting systems could be opened in advance to reduce stormwater. Could this time-release idea be helpful for managing flooding?

15. Permit rainwater use at Old Woman Creek – Getting the permit approved to use the stormwater from under the permeable pavers at Old Woman Creek would be helpful as a learning process.

We asked people for feedback on whether studying stormwater at a subwatershed (larger than one site, smaller than a full watershed) scale would be useful. For the most part, people's answers were tentative, indicating yes such results could be very useful. Their uncertainty in their answers primarily had to do with whether they could imagine this being possible to accomplish effectively. They made a range of comments to clarify the need for certainty that such a study would generate results in order for it to be worthwhile. They would want the study to be long-term enough to show results, and be able to effectively measure results, teasing out the myriad factors in a large area to show cause and result (which many people indicated could be very difficult). Someone suggested doing paired sub-watershed studies to show results. Someone else suggested studying an area with a problem (a stream out of attainment) and trying to find solutions. Another person said this would need to begin with a review of who would use the resulting information and work backwards. Overall, people raised a lot of red flags, saying this idea sounded ambitious and very difficult.

Potential results of working at a subwatershed scale could be to see what types of pollutant loads could be removed, to figure out how to apply stormwater management principles to agricultural land, to clarify what results wider implementation of LID would produce in terms of water quality benefits, economic costs, and volume reduction, and to figure out if LID practices in different parts of a watershed perform differently. Some were interested in learning if LID practices can reduce the impacts of development on streams, fish, and macroinvertebrates. Others said this would help people understand how to best do long-term watershed management by figuring out what types of resilience can be built into a watershed (where should water pond when it rains? Where should it infiltrate?).

We also asked people if they needed any additional information related to climate resilience, and most interviewees didn't say much about this. A couple of people said it is essential to have precipitation projections and storm predictions so designers can design appropriately for the small, frequent storms that compose 80 to 85% of annual rainfall events.

In addition to these research ideas, people offered some suggestions for action that they thought would help move stormwater management forward after this project:

- Because this series of interviews was done before the very end of the project, several people mentioned they are very much hoping for final modeling information and for getting guidance into the Rainwater manual. They indicated the need for the revised runoff reduction method and critical storm method.
- Link this research to EPA's Stormwater Pollution Prevention Plans (SWPPPs).
- Track whether the first phase of this project influences actual LID SCM implementation on the ground.
- Find out what else Ohio EPA needs in terms of research to more fully incorporate LID SCMs into the practices they encourage. Have Project Team members meet with Ohio EPA and a group from ODNR to share results, provide assistance and internal education (especially since Ohio EPA doesn't have its own research arm). With more data, participants said they thought the permit language for NPDES and construction permit language and MS4 permit language could all be changed.

## IX. Facilitator Thoughts

I have run many processes on topics other than stormwater, in places other than Ohio, some of them using a similar collaborative research structure to the one used in this process. Yet all projects are entirely unique, including this project filled with committed people trying hard to collaboratively improve the world of stormwater management in Ohio. Many of my observations on this process were shared by others and are described above. And it is worth noting I am not a neutral observer.

Overall, I thought this was a very good project – well designed, with the right participants, the right (ambitious but, for the most part, achievable) objectives, and important questions steering everyone’s attention and activity. We did our best to learn as we went, adjusting course and figuring out how to make a multi-year, multi-stakeholder, multi-discipline research project stay on track and stay relevant.

There were times when we lost steam or other life or work commitments got in the way for various members of either the Project Team or the CLG. There were times when work slowed to a creep and we felt stuck, unable to figure out how to solve a thorny practice problem (how exactly do we define the scope of a modeling contract? What do we do when our various participants see the value of a particular practice differently? How do we convince contractors or site owners to go the extra step with us?). In these situations, we did a combination of things. We were flexible, with the project managers and Project Team members communicating often and openly about what should be happening and revising deadlines and confirming expectations again and again. We sometimes looked for other solutions. And we usually stuck with the problems until we got through them.

The commitment to the end goal of improving stormwater management in Ohio, in a context with few opportunities for research like this, created a vibrancy and enthusiasm to the work. Because the Project Team met in person and via phone often, because we worked together intensively, and because of a lot of good will and good intentions, the relationships on the team became very strong. I have worked on long-term projects before where I didn’t get to know my clients and colleagues nearly as well. In this case, one of the contractors stayed in the home of another team member when he visited. Project Team members traveled far to have dinner with each other in the evenings between working days, and there was often happy hour after a long day of work well done. The group got to know and respect each other, which enabled us to better help each other when the project hit rough patches.

A few general observations, many of which echo what is written elsewhere in this document:

- The wisdom of the CLG members is so interwoven into the project that it has been very hard to go back and figure out what ideas they contributed particularly at what point. Many things emerged slowly as important topics (such as the importance of maintenance of these practices, and stormwater management systems won’t get built to be as effective as possible without extensive oversight.) In all the CLG meetings, there were great discussions and people were continually offering thoughts and suggestions about what questions the project ought to answer and what could make the results the most useful.
- Skepticism turned fairly quickly to understanding. At the beginning of the project, many CLG participants were skeptical that LID stormwater control measures would work in

Ohio soils, but as they engaged fully in discussions about the design, heard lessons from construction, saw changes made based on particular site needs, and saw the monitoring results and data, that changed.

- The make up of the CLG gradually shifted and settled. We had more people on our membership list than attended, but not many, and for the length of the project commitment, I think we had very good, engaged CLG participation. Those who filled out the (anonymous) bi-annual surveys, which I imagine was the people who came to meetings, consistently said the project was worth their while, and their ranking of the utility they found in the project slowly rose until they were very high.
- The members of both the CLG and the Project Team were very respectful of each other. There was very little anger or frustration directed at others in the room. At the beginning of the project, before it was clear that collegial tone would be the standard everyone became accustomed to, we thought we would want to do a different collaboration-building activity at each meeting. After one or two sessions' worth of activities, we took it off the agenda and never went back.
- There are a few pieces of feedback from the interviews I did for this report that I wish we had heard during the project. At the top of that list are peoples' desire for occasional small group work at CLG meetings, which we did only a handful of times, and peoples' challenges with the distance between watersheds. I am sorry I didn't know people wanted to talk in smaller groups – that would have been easy to address. The challenge with the travel distance is harder to solve, but we might have held some half-day meetings with parallel content in the two regions occasionally to reduce peoples' drive times and potentially get slightly higher participation. I also wish we had gone back via phone to the non-participating CLG members partway through to ask, again, whether we could pay them for their time if they were having a hard time committing. I'm not sure they would have accepted us at that point, but I regret not asking, as numerous interviewees said they wish there had been more engineers and consultant designers in the room.
- The Project Team did a great job finding the balance of how much to engage the CLG. They consistently sought to give CLG members a chance to comment on documents, see things in draft form, and weigh in on what was happening. There were some times when nobody on the CLG took them up on this, which I know could be frustrating to Project Team members, but many other times when CLG members did jump in to help out or share their thoughts. To me, this indicates a project finding the right balance of engagement – sometimes trying to engage a little too much, sometimes engaging a little too little. Sometimes the Project Team expected too much of the CLG, and the CLG would let the Project Team know they weren't available or interested in engaging on a particular subject, but trusted the Project Team to move forward on it.
- It took many, many hours for us to plan great CLG meetings, which included figuring out what topics ought to get a brief overview and which we would explore in depth, designing good conversations with the right questions, preparing slides then editing them to fit within available time, and writing detailed and concise summaries.
- We asked the CLG throughout about final products they'd like to see, and they gave very clear advice about simple, easy to understand and access products. They also gave very specific feedback on what types of trainings they thought would be most useful. The Project Team is now producing those trainings.

- CLG members consistently said the project had changed how they view these practices, the depth of their comfort with them, and their ability to talk about and advocate for LID stormwater control measures like bioretention and permeable pavement.

#### Observations on collaboration within the Project Team, and with contractors

- *Intense communication to build SCMs right* - One of the big lessons about collaboration was about getting SCMs correctly installed. A huge amount of collaboration, discussion, and planning was needed among all the people working on a particular site. Eventually, our team developed a workplan flow with timing of meetings, including the need to articulate different peoples' goals and objectives. There was more checking in and on-site visiting needed than we had first assumed, when it was tempting to think that the design documents would communicate everything important to the construction crew.
- *Group work takes ongoing facilitation* – We were sometimes so in the weeds of various project activities that we got off our Project Team call agendas. There was a lot to discuss, but this could be frustrating to Project Team members.
- *Basecamp worked for holding materials* – We used Basecamp as the online host to store various versions of the many project-related documents we created. Initially we considered using it for communication and tracking deadlines as well, but in the end we found it worked as a repository for updated drafts of presentation slides and reports, but only for that. We definitely benefitted from having one place where all our materials were kept that could be accessed by anyone on the Project Team.
- *Creating a framework* - It takes significant coordination and effort for the people involved in various types of work to maintain clarity on how all the pieces of a project like this fit together. It took a lot of upfront time to sketch out the many strands of the effort in a way that we could make sense of it and share it with everyone engaged in the project.
- *Institutionalizing knowledge is essential* - There are staffing changes during a long-term project, so content knowledge needs to be both distributed across numerous people and written down so it is accessible to newer staff who step in.
- *Project management challenges* – Keeping a substantial project with so many sub-components going and in synch requires significant management and communication. We feel we did a good job, as a result of
  - Two Principal Investigators (one after the other) dedicating significant time to keeping everything going
  - Some protocols for how to work at sites so individual Project Team members didn't get out ahead of others with site design and construction teams
  - Regular Project Team calls to keep channels of communication open, flag barriers, raise questions, and track timelines
  - Occasional in-person meetings to build our personal relationships

The Project Team members will continue to use the CLG's input as they wrap up the final project deliverables, offer trainings, and share research outcomes at conferences and through reports and papers.

## **Appendix A: People Interviewed**

### CLG Members

Dan Bogoevski, Stormwater Program Coordinator, Ohio EPA, Northeast District Office  
Eric Dodrill, District Director, Erie Soil and Water Conservation District (formerly Highway Superintendent, Perkins Township)  
Alexander B. Etchill, Associate Engineer Surveyor, John Hancock and Associates, Inc.  
Ken Fortney, Drainage Manager, Erie County Engineers Office  
Lynette Hablitzel, Stormwater Coordinator, Ohio EPA, Northwest District Office  
Clyde Hadden, Stormwater Department Head, CT Consultants, and Village Engineer, Kirtland Hills, Ohio  
Leonardo Sferra, Site Development Project Manager, GPD Group  
Rachel Webb, Watershed Team Leader, Northeast Ohio Regional Sewer District  
Betsy Yingling, Manager of Watershed Technical Support Northeast Ohio Regional Sewer District

### Project Team Former and Current Members

Amy Brennan, Lake Erie Conservation Director, The Nature Conservancy (former Principal Investigator and Project Team member, and staff member of Chagrin River Watershed Partners for the first half of the project)  
Keely Davidson-Bennett, Principal Investigator, Program Associate, Chagrin River Watershed Partners  
Jay Dorsey, Water Resources Engineer, Ohio Department of Natural Resources Division of Soil and Water Resources  
Heather Elmer, Director, Chagrin River Watershed Partners (was an employee of Old Woman Creek National Estuarine Research Reserve for the first half of the project)  
Ona Ferguson, Senior Associate, the Consensus Building Institute  
Bre Hohman, Assistant Director, Erie Soil and Water Conservation District  
Frank Lopez, Reserve Manager, Old Woman Creek National Estuarine Research Reserve  
Ryan Winston, P.E., Extension Associate and Ph.D. student, North Carolina State University

## **Appendix B: Interview Protocol**

The following list of questions was used as an interview guide.

### CLG Process

1. What has worked well about the collaborative components of the project – in particular related to the CLG?
2. What would you change about the collaborative components of the project – in particular related to the CLG?
3. Did you enjoy CLG meetings?
4. What would you change about CLG meetings?
5. How do you feel about the communication on the project between CLG meetings, and do you have any suggestions?
6. Did you build relationships with other people participating in the project?
7. [For PT members only] What has worked well and what would you change about the collaborative components of the project related to the Project Team?
8. [For PT members only] What surprised you about this project in terms of group dynamics and working together?
9. If the project team is able to secure another significant grant to study other SCMs, would you want to continue on the CLG?
10. Any other thoughts on the CLG and collaborative part of this project?

### Content

11. What are the most significant results of this research from your perspective?
12. For policy makers: Are you planning any changes to your policies or regulations as a result of this project? Please explain.
13. For designers & engineers: How has this project changed how you do your work? And, if so, how?
14. What research or aspects of the project might you not have the team undertake if we were doing it again?
15. Anything else on the content of the project to date that you'd like to share?

### Forward Looking Input

16. Policy/permitting: Are there policy changes you would make if you had more data, and what data would you need?
17. Sub-watershed scale – Would studying SCMs at a larger scale (sub-watershed, up to about 5 square miles) be any more useful to you than the site studies we have been doing?
18. Any other thoughts on future research needs for this region?
  - a. Prompt: Climate – Is there anything we could research related to SCMs that would help you in your work related to planning for flooding & extreme storms?