

**Summary 4:
Rationale for Selection of Two Alternative
Scenarios for Implementation**

**Partners for the Connecticut
Low Impact Development and Stormwater
General Permit Evaluation**

Connecticut

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1 Background and Purpose

1.1 Background

The Connecticut Department of Environmental Protection (DEP) has initiated a project to explore inclusion of low impact development (LID) into its four stormwater general permits (SGPs)—construction, municipal separate storm sewer systems (MS4s), industrial, and commercial—as well as the *Soil Erosion and Sediment Control Guideline* and the *Stormwater Quality Manual*.

Under Technical Memorandum 1¹ information was gathered from:

- Research on state stormwater general permit programs.
- Interviews conducted with project Partners.

This work was further supported by two workshops held on May 26, 2010 and July 1, 2010 and resulted in the identification of several alternatives for implementation, which were initially discussed in Technical Memorandum 1.

1.2 Purpose

This report, Summary 4, builds on the alternatives described in Technical Memorandum 1 and additionally discusses:

- How the alternatives can be most effectively incorporated into the DEP's SGPs.
- Mechanisms for incorporating LID into the SGPs for priority attention such as giving LID priority over end-of pipe BMPs.
- A decision making approach for selecting two scenarios for full development. This is intended to provide a rationale for selection and will be based on the criteria identified by the Partners in Workshop 1 and Workshop 2.

Workshop 3 will include a review of the alternative scenarios. It will also provide the Partners an opportunity to discuss the alternatives, adjust the alternatives to better meet the criteria, and select two alternatives for full development. After incorporation of comments from Partner Workshop 3, Technical Memorandum 3² will be developed based on this summary document (Summary 4). In addition to updating the information provided in Summary 4, Technical Memorandum 3 will also address:

- Expanding the selected alternatives to include industrial, commercial and MS4 general permits.

¹ Technical Memorandum 1 is a compilation of Summary 1 and Summary 2.

² Technical Memorandum 2 addresses the potential role of stormwater utility districts in Connecticut as a separate part of DEP's overall project.

- A method for measuring the success of the project relating to improved permit compliance or environmental benefits.

2 Summary of Alternatives

2.1 Methods Used to Incorporate LID and Pollution Prevention

The following subsections discuss alternatives that could be used to incorporate low impact development and pollution prevention into Connecticut's stormwater general permits. These alternatives are based on the information gathered during research on state programs, Partner interviews, and activities conducted during workshops 1 and 2.

2.1.1 Regulatory Alternatives

The approaches described below involve changes to regulatory policy. Prior to the start of this project DEP identified two regulatory alternatives for implementation. These two alternatives are:

- Incorporating LID through updates to the *Stormwater Quality Manual* and *Soil Erosion and Sediment Control Guidelines*.
- Establishing standards in the Stormwater General Permit.

Sections 2.1.1.1 and 2.1.1.2 present options for incorporating LID policy and standards into the manual, guideline, and SGP. Although these alternatives have been identified for implementation by DEP, DEP would like the form of the implementation to be determined by the project Partners.

Other regulatory alternatives presented are optional and may be included, discarded, or adjusted as determined by the Partners.

2.1.1.1 Incorporating LID through Updates to the Stormwater Quality Manual and Soil and Erosion Guidelines

As part of this project, DEP intends to incorporate LID updates made to the *Stormwater Quality Manual* and the *Soil Erosion and Sediment Control Guidelines* into the SGP. Initially, this will be as a write-up under Summary 5 and Technical Memorandum 4. Generally speaking, the write-up will address the following topics:

- Advantages of managing stormwater using LID.
- Four basic tenets of LID.
 - Examples of BMPs for Minimizing Site Disturbance.
 - Working with Site Hydrology.
 - Examples of BMPs for Minimizing and Disconnecting Impervious Surface.

- Applying Small-Scale BMPs at the Source.

Through workshops, interviews, and general discussion, the Partners have already identified a number of features of good LID policy and implementation that could be included in the update. Some examples include:

- LID and pollution prevention performance standards.
- Standards for runoff management.
- Groundwater recharge standard.
- A design process for LID.
- Maintenance requirements.
- Soil based standards.
- Process for innovation.

The write-up of the standards could take one of three forms:

- Standalone document that focuses on the LID process and LID standards.
- Appendix to the existing *Stormwater Quality Manual* and *Soil Erosion and Sediment Control Guideline*.
- Full update to the *Stormwater Quality Manual* and *Soil Erosion and Sediment Control Guideline*.

Partners will be offered an opportunity to make a preliminary decision on the form of the write-up during Workshop 3. This preliminary decision will help to inform Summary 5, which will focus on LID standards. Workshop 4 will be used to solidify the preliminary decision.

In general, the advantage of a standalone document or an appendix is that either can be developed fairly quickly and with a pure focus on LID. Updates of both the manual and guidelines will necessitate a more involved process of fitting LID into the structure of the existing documents. This will take substantially longer.

2.1.1.2 *Establishing Standards in the Stormwater General Permits*

Prior to the start of this project, DEP had determined that the *Stormwater Quality Manual* and *Soil Erosion and Sediment Control Guidelines* should be updated to include LID and that the manual and guidelines or LID standards established in the manual and guidelines should be incorporated into the SGP. Three basic approaches have been identified to accomplish this:

- Reference Manual/Guidelines as a Requirement in the Stormwater General Permits

One fairly straightforward way to incorporate LID into Connecticut's SGP is to update the manual and guidelines with LID standards and design processes; and then reference the manual and guidelines in the SGP as a required standard. This approach simplifies regulatory policy by separating it from the relatively lengthy description of the LID design process that is needed to provide appropriate theory and flexibility. This approach also provides a relatively clear and certain standard. However, requiring the

use of a specific process may constrain designers and regulators as it limits the process of innovation and professional judgment in atypical circumstances. (The policy of no other state, which was reviewed for Technical Memorandum 1, makes an outright requirement to strictly follow a specific manual or design process.)

To compensate for this apparent shortcoming, the manual and guidelines could be written to include both a relatively strict design process as well as a process for innovation that relies on conservative performance standards. The choice of the “strict” or “innovative” process could be dictated by the permittee or, in applicable circumstances, special site conditions (e.g., presence of approved total maximum daily loads).

- Reference Manual/Guidelines as Guidance in the Stormwater General Permit

As an alternative to a strict requirement in the SGP to use the *Stormwater Quality Manual* and *Soil Erosion and Sediment Control Guidelines*, DEP could reference the manual and guidelines as guidance documents for permitting purposes. This approach is used by a number of states around the country as discussed in Technical Memorandum 1 (see *Section 2.4*). This approach has the advantage of allowing for some flexibility in application of standard; however, it also creates some uncertainty and indirectly creates the question—if the manual and guidelines are not required, what is the requirement?

- Write Specific Standards from the Manual/Guidelines into the Stormwater General Permit

One way to incorporate LID into state policy without citing the *Stormwater Quality Manual* or *Soil Erosion and Sediment Control Guidelines* is to codify the standard in the SGP. However, because LID essentially employs a *process*, the LID approach is not readily translated into discrete design standards. That said, the designed treatment capacity of LID integrated management practices³ (IMPs) can be quantified and used as a measure of treatment effectiveness. Research on approaches used by other states revealed two approaches that could be adapted for use in Connecticut.

Establish a Water Quality Volume (WQV) Standard – Most states use WQV as a method to measure stormwater treatment effectiveness. States that have incorporated LID typically link treatment provided by LID to WQV either directly or indirectly (e.g., through a “credit” system).

A common method used by other states to demonstrate incorporation of LID is to require that a fraction or percentage of the WQV is managed with LID. For example, the San Francisco Regional Water Quality Control Board (RWQCB) has developed a municipal regional stormwater Permit / Order that mandates water quality goals to be

³ LID uses the term integrated management practice to refer to small-scale, structural BMPs installed at multiple locations throughout a site. The term IMP is comes from the idea that the management practices are “integrated” into natural hydrologic low points of the landscape. Application of IMPs is one of four tenets of LID. IMPs are generally employed to support stormwater treatment after the available capacity of other LID approaches (e.g., disconnection, minimizing site disturbance, etc.) is exhausted.

“accomplished primarily through the implementation of low impact development (LID) techniques.” The permit specifies that LID must be used for 100% of the water quality volume treatment. Connecticut could establish a LID-incorporation standard, which could be set between 1 – 100%. Setting of the standard could be based on a variety of factors such as economics, site-specific environmental concerns, general ability of the regulated community to implement, etc.

Set-Aside for LID – Wisconsin has established a set-aside requirement for infiltration. Under this approach 1 - 2% of any land included in a development project must be reserved for infiltration practices. Connecticut could develop a similar approach for LID with adjustment for local soils.

Partners will be offered an opportunity to make a preliminary decision on the form of the standard in the SGP during Workshop 3. Later workshops will be used to solidify this decision.

2.1.1.3 Designer Licensing

Designer licensing refers to a process that extends certain privileges to designers who maintain good standing under a licensing program. In Rhode Island, the Department of Environmental Management has developed a designer licensing program for septic system designers and installers. The program allows these professionals to use an abbreviated permitting review process provided that they attend classes, pass a test, and maintain a certain quality of work as determined by spot review of application materials.

Connecticut could establish a LID designer licensing or certification process for design professionals and developers. Under this approach, specific standards would be set and designers would be trusted to meet the standards without regulatory review. To ensure that the designers stay current, the certification could include a requirement for periodic renewal (e.g., every five years). Training could be offered through an institute of higher learning such as the University of Connecticut. Essentially, a continuing education process such as this would allow stormwater program managers to ensure the appropriateness of information provided to developers using LID in Connecticut. Such a program could be incentivized by allowing certified/licensed designers to submit designs under a GP that provides extra flexibility and limits regulatory oversight. Behavior change (i.e., the appropriate use of LID in designs) could be measured before and after the implementation of the training program through spot review of permit applications.

Designer licensing was not specifically suggested during workshops or by Partners, but is an approach that would maintain high design standards, allow for application of a flexible permitting process, while reducing time required for the permitting process. Design licensing could also reduce the administrative burden on regulators and allow them to redirect their energies.

2.1.1.4 Impervious Cover Cap and Trade

Impervious cover cap and trade was suggested during the carousel activity of Workshop 2. Based on our research it has not been implemented in other Phase 2 Stormwater jurisdictions

(e.g., other states); however, a similar approach is used to govern air emissions. To implement the approach, Connecticut could place a cap on the amount of impervious cover allowed in a regulated area or industrial sector and apportion units of impervious surface to entities (i.e., land owners) within the area or sector. The state could set a unit value (e.g., \$50,000 an impervious acre) or allow the market to self-set a unit value through trading. Trading could be allowed between entities with oversight provided by the state. Adding to the approach, the state could allow applicants to “purchase” additional units of impervious cover based on the market value with proceeds deposited in a remediation bank. An official trading certificate could be used to demonstrate number of units used or traded as part of a development permit.

2.1.1.5 Adjusted Standards for Areas or Circumstances of Special Concern

A number of states include flexibility in their stormwater management standards to address atypical circumstances. In some cases, adjusted standards are intended to be more highly protective of sensitive resources. In other cases, the standards are relaxed to encourage infill development or to reduce the burden of stormwater management in areas where it yields diminishing return. Some examples of adjusted management standards include:

- Standards designed to achieve pollutant load reductions for impaired water resources.
- Nitrogen management requirements for nitrogen-sensitive resources such as Long Island Sound or drinking water aquifers.
- Relaxed impervious cover allowances in highly urbanized settings.
- Graduated recharge requirements based on hydrologic soil group.

2.1.2 Nonregulatory Alternatives

The following section discusses nonregulatory approaches, which could be used to help implement LID policy. These approaches could be used as a standalone implementation or could be used in conjunction with other initiatives such as regulatory approaches.

2.1.2.1 Training Program

A training program could be voluntary or mandatory and, therefore, could be considered as either a regulatory or nonregulatory approach. This report discusses implementation of training programs through both regulatory (i.e., designer licensing, see *Section 2.1.2.4*) and nonregulatory approaches.

Training, education, and behavior change were raised as important aspects of implementation during both the Partner interviews and workshop activities. Training could be provided on an *ad hoc* basis through occasional workshops and conferences. Training could also be structured into a series of classes, curriculum, certification, or licensure with a continuing education requirement. Target audiences for training and education might include homeowners, municipal officials, designers, contractors or other members of the regulated community. A grant or other financial allocation could be used to develop a training program or educational series. Training program development may best be run through a college or university as such

institutions already possess many of the resources needed to implement and assess the cost-benefit of a training program.

2.1.2.2 Financial Incentives

During the Partner interviews as well as workshops 1 and 2, several participants specifically identified incentives, funding and other support for the regulated community as important elements of implementation of LID policy. Previously, Connecticut has offered some grants for LID projects (e.g., Farmington River Enhancement Grant Municipal Land Use Evaluation Project for Village Center and Low Impact Development Guidelines and Regulations). Connecticut could structure LID grants to create a pilot program for statewide LID implementation. Additional incentives for LID implementation at the local level could include technical assistance, delegation of authority from state to local programs, and reduced regulatory oversight at the state level for effective local programs.

2.1.2.3 Technical Assistance

Program implementation tends to be more effective when technical assistance is offered by oversight agencies to implementing agencies. A number of Partner responses during interviews and workshops suggested the need and desire for assistance from the state to municipalities, designers, installers, and landowners. Technical assistance could take the form of assistance in policy review and analysis, support in developing technical standards through research projects, educational and training programs, BMP demonstrations, and experts-on-hand for questions. For maximum benefit, technical assistance could be coupled with guidance materials and financial assistance.

2.1.2.4 Public Education

For effective implementation of LID to take place, members of the regulated community (i.e., designers and installers), government, and landowners (consumers) must all cooperate. The regulated community must provide proper design and installation services. Government must provide an appropriate regulatory framework. Consumers must demand quality goods and services and must properly operate and maintain installed BMPs. Consumers will need to be made aware of their role and then behave according to it. Public education is, therefore, important to raise awareness of the consumer public. Public education may take a variety of forms:

- Fact sheets and brochures
- Public service announcements
- Workshops and classes
- Grassroots outreach

Education may also be provided through a variety of outlets:

- Government agencies
- Service providers

- Nongovernmental organizations
- Educational institutions

A public education program could be developed to work through a variety of forms and media and could be delivered through a variety of outlets. Stormwater public education programs have been developed for a number of states and cities. San Diego's Think Blue Program for stormwater—which includes public service announcements, an adaptable program template, and measurement of behavior change—makes a good example. Similar approaches could be created for LID and could be structured to include behavior-change elements and measurement.

2.1.3 Stormwater Utility Districts

As part of this project to evaluate the incorporation of LID into the SGP, DEP has included consideration of stormwater utilities. To date, no stormwater utilities have been implemented in Connecticut; however, in other states stormwater utilities are generally used to provide a revenue stream at the local level and may be established on a regional (e.g., watershed) basis. A full discussion on the potential use of stormwater utilities in Connecticut has been provided as part of Technical Memorandum 2.

2.1.3.1 Stormwater Utility Subcommittee

Implementation of stormwater utility districts in Connecticut will necessitate development of significant new policy, programs, and administrative structures. To make new policy, programs, and administrative structures efficient and service oriented, proponents from different levels of government and interested municipalities may wish to meet in a subcommittee to identify opportunities to cooperate in developing common approaches.

2.1.3.2 Guidance Document

Prior to pursuing stormwater utility districts at any governmental level, an approach to fee-setting and bureaucratic structure should be considered. It may be helpful to develop a model stormwater utility district ordinance and guidance manual for utility district development and implementation in Connecticut. To ensure usefulness, guidance materials should be vetted through a test group of likely users of the guidance document. A subcommittee, such as the one described in *Section 2.1.4.1*, would make a good test group.

2.1.3.3 Technical and Financial Assistance Program

Starting new programs, such as stormwater utility districts, creates a draw on resources and requires development of technical expertise at the point of implementation. This is typically made easier with technical and financial assistance from an oversight organization or agency. An assistance program could be established for entities interested in developing or enhancing stormwater utility districts. If a stormwater utility subcommittee is developed (see *Section 2.1.4.1*), the technical and financial assistance program could be developed in consultation with the subcommittee to ensure a comprehensive input.

2.1.3.4 *Public Outreach and Awareness Toolbox*

Research on stormwater utility districts around the country shows that public awareness and support are critical issues in establishing successful stormwater utility districts. How will municipalities know if they have the level of public acceptance necessary to establish a stormwater utility district? What is the most effective way to educate the general public about the nature and benefits of stormwater utility districts? A program of public education and outreach could be designed and developed to assist local governments in developing stormwater utility districts. If a stormwater utility subcommittee is developed (see *Section 2.1.4.1*), the public outreach and awareness toolbox could be developed in consultation with the subcommittee to ensure a comprehensive input.

2.1.3.5 *Delegation of Regulatory Authority*

In Connecticut, permitting related to stormwater management for land-use development occurs at both local and state government levels. However, multiagency permitting can create unintentional conflict and local governments may feel constrained to adhere strictly to state decision making. Because stormwater utility districts can provide a greater and more consistent level of resources than general taxation (the typical source of stormwater management funding at the municipal level), a utility district may make full stormwater permitting and management possible on the local level. This may make it practicable for DEP to delegate state permitting authority to local agents.

2.1.4 Hybrid Option

A “hybrid” approach (i.e., combination of alternatives) was suggested in the carousel activity as part of Workshop 2. A hybrid option could involve parallel initiatives to:

- Revise the *Connecticut Stormwater Quality Manual* and *Connecticut Soil Erosion Sediment Control Guidelines* to include LID.
- Update the SGP with a variety of new LID policy.
- Build a nonregulatory support system for LID implementation.
- Enable and encourage stormwater utility districts.

To maximize the benefits and allow flexibility, the state could institute a multitrack permitting process. Such an approach could be implemented at either the state or local level through delegation of authority. Many possible multitrack configurations exist and a specific approach may be somewhat difficult to envision. To illustrate the general idea of a hybrid option, one hypothetical example for the construction general permit, which combines designer licensing, cap and trade, specific performance standards for LID, and adjusted standards for TMDLs, is presented below.

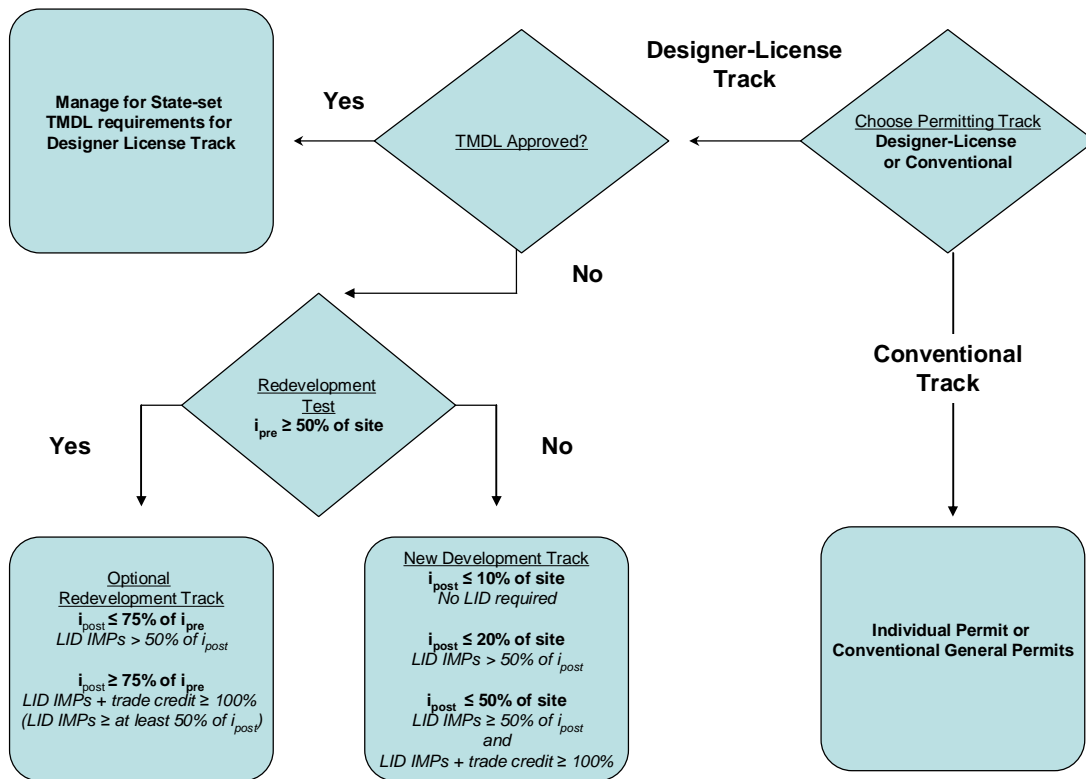


Figure 1—Flow diagram of a hypothetical hybrid option including designer licensing, special requirements for TMDLs, redevelopment standards, and graduated permitting standards.

This hypothetical approach includes the following features:

- Applicants may choose to use conventional approaches such as an individual permit or other general permit.
- Applicant’s plans and notices of intent must be signed and stamped by a designer with a designer license.
- DEP may establish special LID requirements in TMDLs for the designer license track.
- Designer licensing is used for both new development and redevelopment. A threshold of the pre-existing impervious surface (i_{pre}) is used to test for whether a site is considered a development or redevelopment site. For the purpose of example, this threshold is set at 50 percent. To use the redevelopment general permit, applicants must take one of two approaches:
 - Removal of 25% of preexisting impervious surface and 50% of the post-development impervious surface (i_{post}) must be managed with LID IMPs; or
 - Manage at least 50% of the impervious surface with LID IMPs and manage the remaining 50% with IMPs and LID trading credits.
 - A hypothetical set of impervious surface limits is used to set graduated requirements for the new development track:

- Sites developed at less than 10% impervious are not required to use LID. This does not preclude the use of LID. Ten percent was selected because national studies show that development of watersheds at less than 10% impervious creates no measureable deleterious effect on water quality.
- For sites newly developed at up to 20% impervious, at least 50% of post-development impervious surface must be managed with LID.
- For sites newly developed at up to 50% impervious, LID IMPs must be used onsite to manage at least 50% of postdevelopment impervious surface and the remaining impervious surface must be managed with either LID on site or through trading LID management of impervious surface from another site.

While a multitrack process improves flexibility and allows for graduated standards, it adds complexity to the process. Partners should consider whether the benefits of flexibility outweigh potential issues associated with a more complex approach.

2.2 Incorporating LID Performance Goals and Criteria in General Permits

Performance goals could be incorporated into general permits in a wide variety of ways. There is really no single correct or ideal way to do this. Thus the actual method selected will ultimately be a matter of best judgment and stakeholder preference. Thus far in this project, research on methods of incorporating LID performance goals and criteria in general permits has followed a three-pronged approach:

- Partner interviews
- Web research and interviews to determine approaches used by other states
- Interactive workshop activities

The process of making this selection should also reflect the approach chosen to incorporate LID standards into state stormwater policy. As the LID incorporation approach is yet to be determined, the precise method to incorporate performance is also undecided. Therefore, the remainder of this section provides our findings to date.

2.2.1 Partner Interviews

As a first step to determine preference, Partners were asked for their ideas as part of telephone interviews. The interview process is described in *Section 3.2.3.3* of Technical Memorandum 1. During each interview with Partners, the following questions were asked:

How do you think they [LID practices] should be incorporated into DEP policy?

- a. By reference to a document*
- b. Specific standards*

- i. Narrative standard*
- ii. Prescriptive design standard*

- iii. *Numeric standard*
- iv. *Performance standard*
- c. *Other methods*

Responses provided no clear consensus on an implementation approach. In fact, many respondents specifically stated that they were unsure, unqualified to answer, or needed to give the matter further consideration; however, generally speaking, interviewees that provided a specific response seemed to be calling for flexibility by indicating preference for guidance (26% of respondents) and performance standards (26%). Responses were essentially split on whether or not to regulate, with no regulation being preferred by five respondents and regulation being preferred by six respondents.

2.2.2 Approaches Used by Other States

A desire to establish clear standards and maintain flexibility appears to be common in other states, as most states that include LID in regulation have established hybrid approaches that involve flexible regulation, guidance and performance standards. Findings from state reviews indicate other regulatory agencies use one or a combination of these methods.

- A LID manual established as guidance only. In Connecticut, a LID stormwater document could lay out a LID process as well as discuss best management practices and performance criteria for implementation. State GPs could reference the LID manual as a guidance document.
- As an alternative to the bullet above, Connecticut could develop a LID manual but opt to not reference it in the State GPs.
- Incorporate LID directly into State GPs or into regulation or policy. Performance goals and criteria could be established in the State GPs or regulation. Flexibility could be incorporated into this method by either requiring or encouraging LID. Several states have taken similar approaches in combination with a design manual.

2.2.3 Findings from Interactive Workshop Activities

Two workshops with Partners have been held to date. Activities in these workshops have included card storming and a carousel activity. These activities are fully described in the Workshop 1 and Workshop 2 meeting summaries. Through workshop activities, Partners have indicated that the standard should be a uniform, statewide policy that is adopted at both the state and local levels and that standards implemented should translate across multiple permitting programs. Additional features of such policy should include:

- Water quality standards.
- Soil erosion standards.
- Groundwater recharge standards.
- Runoff reduction standards.
- Impervious reduction standards.
- Maintenance requirements.

- Process for verifying effectiveness.
- Process for considering innovation.

2.3 Methods for Giving LID Priority in Stormwater General Permits

In interviews conducted with Partners,⁴ most interviewees (18 of 27) expressed a desire to include LID as BMPs of choice versus end-of-pipe BMPs. A number of respondents pointed out that such a requirement should include flexibility to address situational issues.

Standards used by other states⁵ to establish priority LID over end-of-pipe controls include:

- Requiring that a percentage of runoff volume is managed using LID.
- Requiring set-aside of an area of a site for LID (e.g., Using a related approach, Wisconsin requires set-aside of 1 - 2% of each development site for infiltration).

Impervious surface reduction could be required at redevelopment sites to reduce the need for end-of-pipe BMPs. This approach is currently being used in several other states. The standards could be written to address other situational issues such as soil type and specific water quality concerns.

Two basic approaches have been identified to incorporate LID priority into the general permits:

- One or more specific standards requiring LID, such as the two discussed above, could be written into the SGPs.
- Specific standards or a LID design process could be written into the Connecticut Stormwater Manual or a supporting document. The Connecticut Stormwater Manual or supporting document could then be referenced in the SGPs as a required design standard.

These alternatives imply a tradeoff. If LID-priority standards are written into the SGP, the standards are clearly established for the regulated community. Referencing the Connecticut Stormwater Manual creates an indirect standard, which is by its nature somewhat less clearly anchored in policy. On the other hand, a LID-priority standard, which is written into the SGP, will need to be fairly concise. LID, however, is a process-oriented approach, which is generally better suited to the flexibility of a guidance manual.

3 Rationale for Selection of two Alternatives

In part, this project has been designed to result in Partner identification of five or more alternatives to incorporate LID into the Connecticut SGP and then selection of two alternatives, using a rational process, for further development. To date research, interactive

⁴ Refer to Summary 1 and Technical Memorandum 1 for further discussion of the interviews with Partners.

⁵ Refer to Summary 2 and Technical Memorandum 1 for further discussion of standards used by other states.

workshops, and interviews with Partners have resulted in the identification of a number of alternatives grouped into three general implementation approaches; a set of six selection criteria; and a list of strengths, benefits, weaknesses, and dangers of each of the three general implementation approaches. This section of Summary 4 compiles this information and discusses next steps in the selection of two alternatives for further development and consideration.

3.1 Candidate Alternatives for Selection

Alternatives are listed below categorized into groups by type of implementation approach. Each of the alternatives is described above in *Section 2.1* of this summary document.

Regulatory

Update the Manual/Guidelines

- Standalone LID update

- Appendix to the Manual/Guidelines

- Direct incorporation into the SGP

Incorporating Standards into the SGP

- Reference the Manual/Guidelines in the SGP as requirement

- Reference the Manual/Guidelines in the SGP as guidance

- Write specific standards from the Manual/Guidelines into the SGP

Designer licensing

- Impervious surface cap and trade

- Adjusted standards for areas of special concern

Nonregulatory

- Training program

- Financial incentives

- Technical assistance

- Public education

Stormwater Utility Districts

- Stormwater Utility Subcommittee

- Guidance document

- Technical and financial assistance program

- Public outreach and awareness toolbox

- Delegation of regulatory authority

Hybrid Option

3.2 Selection Criteria

The six selection criteria were adapted from a card storming exercise conducted in workshops 1 and 2. The full results of this process are provided in Technical Memorandum 1. Generally, this exercise indicates that the implementation approach should be:

Economically Viable—Meaning cost effective and sensitive to market demand.

Knowledge-Based—Meaning based on good science, implemented by knowledgeable people, acceptable to the public, and focused on behavior change.

Clear and Understandable—Meaning simple and uniform statewide approach that is easy to administer and enforce at the local level.

Practicable and Flexible—Meaning not burdensome to comply with, sensitive to site constraints and project type, leaving room for innovation and being performance based.

Administrable—Meaning compatible with other state regulations, allowing for alignment of municipal policy with state LID policy, supportive of contractors and homeowners, enforceable, measurable, certain, and strict.

Environmentally Beneficial—Meaning focused on impervious surface reduction, soils, water quality and quantity, groundwater recharge, fixing impairments and conservation.

3.3 Comparing Candidate Alternatives Using Selection Criteria and Workshop Data

During Workshop 2 Partners participated in a carousel activity that was used to explore the strengths, benefits, weaknesses, and dangers of implementation approaches. A full description of this workshop is provided in Workshop 2 Summary. The table below aligns the results of the carousel workshop with the criteria identified through card storming and presented in *Section 3.2* (above). This tabular summary allows for the comparison of the advantages and disadvantages of the three general types of implementation approaches; however, the hybrid alternative is not included as it is not as well defined at this point.

**Table 1
Summary of General Alternatives and Criteria for Decision Making**

Type of Approach	Economically Viable	Knowledge-Based, Behavioral Change	Clear and Understandable	Practicable and Flexible	Administrable	Environmentally Beneficial	Other
Regulatory		<u>Strengths</u> Experience People know... Mandatory	<u>Strengths</u> Clarity/uniformity		<u>Strengths</u> No free rider/fairness Helps municipalities justify		
	<u>Benefits</u> Avoids externalizing costs	<u>Benefits</u> Will get LID implemented Ensures most use of LID	<u>Benefits</u> Transparency Consistent standard		<u>Benefits</u> Quick goal attainment	<u>Benefits</u> Public health-flood mitigation Fixes biggest problems	
	<u>Weaknesses</u> Bureaucracy/cost Not market viable	<u>Weakness</u> Lack of experience	<u>Weaknesses</u> Difficult to be uniform	<u>Weakness</u> Mandatory Flexibility of industry/towns Compliance at local level Problem to implement at existing facilities Bureaucracy	<u>Weaknesses</u> Enforcement (staff) Municipal ability to implement		
		<u>Dangers</u> Municipal knowledge Applicant knowledge	<u>Dangers</u> State/municipal conflict	<u>Dangers</u> Not enough flexibility Carved into marble Hard to modify flaws Not applicable on every site	<u>Dangers</u> Limited enforcement State/municipal conflict Municipal ability to implement		
Nonregulatory	<u>Strengths</u> Financial benefit for small contractor/operator	<u>Strengths</u> Behavior change Politically palatable Educates the public and encourages voluntary buy-in Larger buy-in across the board		<u>Strengths</u> Keeps options open Flexible			
	<u>Benefits</u> Economic development	<u>Benefits</u> Training and education		<u>Benefits</u> Experimentation Demonstration projects		<u>Benefits</u> ...Environmental benefits will follow	<u>Benefits</u> Variable funding sources
		<u>Weakness</u> Might not be a priority	<u>Weakness</u> People have a choice to opt out Uncertainty for local boards and commissions No consistent application of LID	<u>Weaknesses</u> Nonmeasureable/predictable	<u>Weaknesses</u> May not be implementable (staff and resources) Funding may be difficult Provides no incentive for meeting regulatory requirements Fails to comply with CWA At odds with current regulations		
		<u>Dangers</u> Political process	<u>Dangers</u> Consistency	<u>Dangers</u> Status quo	<u>Dangers</u> Need incentives for		

		Becomes a low priority	Free-rider		developers		
Stormwater Utility Districts			<u>Strengths</u> Local authority and control		<u>Strengths</u> Piggyback on existing regional groups (e.g., water and sewer authorities like MDC) Removes stormwater from politics	<u>Strengths</u> Watershed based	<u>Strengths</u> Regional Partnerships
		<u>Benefits</u> Education Taxpayer expectations	<u>Benefits</u> Local authority and control	<u>Benefits</u> Could adapt to local geographical conditions	<u>Benefits</u> Dedicated funding stream Accountability Raises revenues, funds	<u>Benefits</u> Reduction of impervious cover Comprehensive approach to water management; interrelationship	<u>Benefits</u> Businesses/owners working together
	<u>Weaknesses</u> Cost to towns Cost to regulated community Existing IC may have disproportionate cost	<u>Weaknesses</u> Political will to accept regionalization Removes public input			<u>Weaknesses</u> Legal framework How to measure success? Regional/town conflicts		
		<u>Dangers</u> Political conflicts Public perception "tax" CT legislature won't add new tax	<u>Dangers</u> Voluntary or required that every town have/join one?		<u>Dangers</u> Overlapping authorities need to coordinate Who sets the fee and how?		

3.4 Next Steps in the Selection of Alternatives

Now that implementation alternatives, selection criteria, and strengths, benefits, weaknesses and dangers have been identified, it is possible to compare alternatives, make adjustments to alternatives so that they better address the selection criteria, select an appropriate alternative or set of alternatives for implementation, and plan a course of action. These next steps will be explored through Workshop 3. As these decisions are intended to be Partner based, this summary intentionally stops short of making observations or judgments on the collected data. Notwithstanding, Partners may wish to prepare for the next workshop by considering the following questions:

- Is there a single alternative or general alternative type that can clearly meet all the selection criteria?
- Is there a combination of alternatives that could be used to clearly meet all the selection criteria?
- Are there adjustments that could be made to the proposed alternatives to make them more effectively meet the selection criteria?
- Are there alternatives that have yet to be considered that could better address the selection criteria?

Partners should also consider the form that LID standards should take relative to the *Stormwater Quality Manual* and *Soil Erosion and Sediment Control Guidelines* as well as the SGP. Current alternatives include:

Manual/Guidelines

- Standalone LID documents.
- Appendix to the Manual/Guidelines.
- Full update of the Manual/Guidelines.

SGP

- Reference to the Manual/Guidelines in the SGP as a requirement.
- Reference to the Manual/Guidelines in the SGP as a guidance document.
- A specific written standard in the SGP.