



FUSS & O'NEILL
Disciplines to Deliver

Presentation to
**Connecticut Dept of
Energy and
Environmental Protection**

**LID and Stormwater General Permit
Evaluation**

August 2, 2011

Agenda

1. Opening (*2 minutes*)
2. Project Overview (*2 minutes*)
3. Role of Stormwater Utilities (*5 minutes*)
4. Investigation of Alternatives (*10 minutes*)
 - a. *Background Data—Identification*
 - b. *General Consensus Building*
 - c. *Advantages and Disadvantages*
 - d. *Debating Alternatives*
5. Selecting Alternatives (Dot Voting) (*2 minutes*)
6. Identifying Preferred Policy Structure (*2 minutes*)
7. Implementation by Partners (*2 minutes*)
8. Discussion
9. Adjourn



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Project Overview

Project Purpose



- Build low-impact development (LID) into stormwater general permits (SGPs or GPs) and policy:
 - *Connecticut Stormwater Quality Manual*
 - *Connecticut Guidelines for Soil Erosion and Sediment Control*
- Partner-driven process, we want to begin to gather ideas at the start of the project



Project Specific Objectives

- Establish LID approach for SGP
- Incorporate performance goals and criteria in SGPs
- Identify mechanisms to give LID priority attention

Elements of a Policy Framework

- Runoff volume as an indicator
- Relationship between runoff volume and pollution control
- Permit limits relative to storm size
- Guidance with performance criteria
- Stormwater utilities

Meeting Schedule

Meeting	Topics	Date
Partner Workshop 1	<ul style="list-style-type: none"> • Project Initiation • Criteria for alternatives selection • Summary of information gathered from other states • Summary of information gathered from the Partners • Webpage 	May 26, 2010
Partner Workshop 2	<ul style="list-style-type: none"> • Summary of the role stormwater utilities • Partner consensus on alternatives for further consideration under Task 4 	July 1, 2010
Partner Workshop 3	<ul style="list-style-type: none"> • Summary of alternative scenarios 	August 31, 2010
Partner Workshop 4	<ul style="list-style-type: none"> • Write-up of draft LID standards 	October 20, 2010
Partner Workshop 5	<ul style="list-style-type: none"> • Draft Final Report • Partner Involvement in Implementation 	December 15, 2010

- Partner Workshop 6 on July 28 was added to review the final draft guidance documents

Partners

Potential Partner	Contacts
Connecticut Stormwater Program	Chris Stone Nisha Patel
Nonpoint Source Program	MaryAnn Nusom Haverstock Chris Malik Jessica Morgan
Aquifer Protection	Rob Hust
Office of Long Island Sound Program	Cheryl Chase Marybeth Hart
EPA	Steve Winnett Mark Tedesco Thelma Murphy
CT Business Industries Association	Eric Brown Chris Ecsedy
CT Construction Industries Association	Matt Halsey
Marine Trades Association	Ted Sailer Greg Sharp
CT Fund for the Environment	Leah Schmaltz Roger Reynolds
Farmington MLUE/LID grant recipient municipalities	Kim Barbieri (Torrington) Marty Connor (Colebrook) Hiram Peck (Simsbury) Mark Devoe (Plainville)
Additional Municipalities	Pat Sesto (Wilton)
Tolland, CT	Linda Farmer
Greenwich, CT	Denise Savigeau
Norwalk, CT	Mike Yeosock Alexis Cheritchetti
Fairfield, CT	Bill Hurley
South Central Regional Water Authority	John Hudak
MDC	Louise Guarnaccia Sally Nyron Brian Roach (Aquarion)
Connecticut Conference of Municipalities	Kachina Walsh-Weaver

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CT Fund for the Environment	Leah Schmaltz Roger Reynolds
Rivers Alliance	Margret Miner
The Nature Conservancy	Sally Harold Shelly Green
Green Valley Institute	Susan Westa
CT Chapter of American Planners Assn. CCAPA	John Pagini

Partners

Potential Partner	Contacts
COG Central Naugatuck Valley	Virginia Mason
Litchfield Hills Council of Elected Officials	Rick Lynn
Housatonic Valley CEO	Jon Chew
Southeastern Connecticut Council of Government	James Butler
CT Regional Council of Governments	Lia Huang
SW CT Regional Planning Agency	Floyd Lapp Nicole Davis

Webpage to Transmit Information

http://www.ct.gov/dep/cwp/view.asp?a=2719&q=459488&depNav_GID=1654

Or Google

“CTDEEP stormwater LID evaluation”

The screenshot shows the header of the CTDEEP website. On the left is the 'CT.gov' logo with 'STATE OF CONNECTICUT' below it. In the center is the text 'DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION ENVIRONMENTAL PROTECTION'. On the right is the 'CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION' logo. Below the header is a navigation menu with links: 'ABOUT US', 'PROGRAMS AND SERVICES', 'PUBLICATIONS', 'FORMS', 'CONTACT US', and 'HOME'. A search bar is located below the navigation menu. The main content area has a title 'Stormwater General Permits and Incorporation of Low Impact Development Evaluation' and a sub-header 'WATER'. The text describes the DEP's process of evaluating the incorporation of Low Impact Development principles into Stormwater General Permits. A list of bullet points follows: 'Discussion of project including general purpose, goals and objectives', 'Project partner work plan', 'Partner workshop schedule, agendas, workshop summaries, and workshop materials', 'Partner technical documents such as technical memoranda', 'Project-related links', and 'Contact information'. A sidebar on the left lists various water-related topics: 'WATER RESOURCES', 'WATER QUALITY', 'WATER QUANTITY', 'WATERSHED MANAGEMENT', 'WETLANDS', and 'REGULATING WATER USAGE AND WATER DISCHARGES'.

#1 May 26, 2010: documents

- [Agenda](#)
- [CT Partner Interviews Summary Report](#)
- [Other States' Summary Report](#)
- [Summary of Workshop #1 Including Results of "Criteria" Cardstorming](#)
- [Workshop #1 Presentation: Introduction](#)
- [Workshop #1 Presentation: LID Overview](#)
- [Workshop #1 Presentation: Summary of Partner Interviews](#)

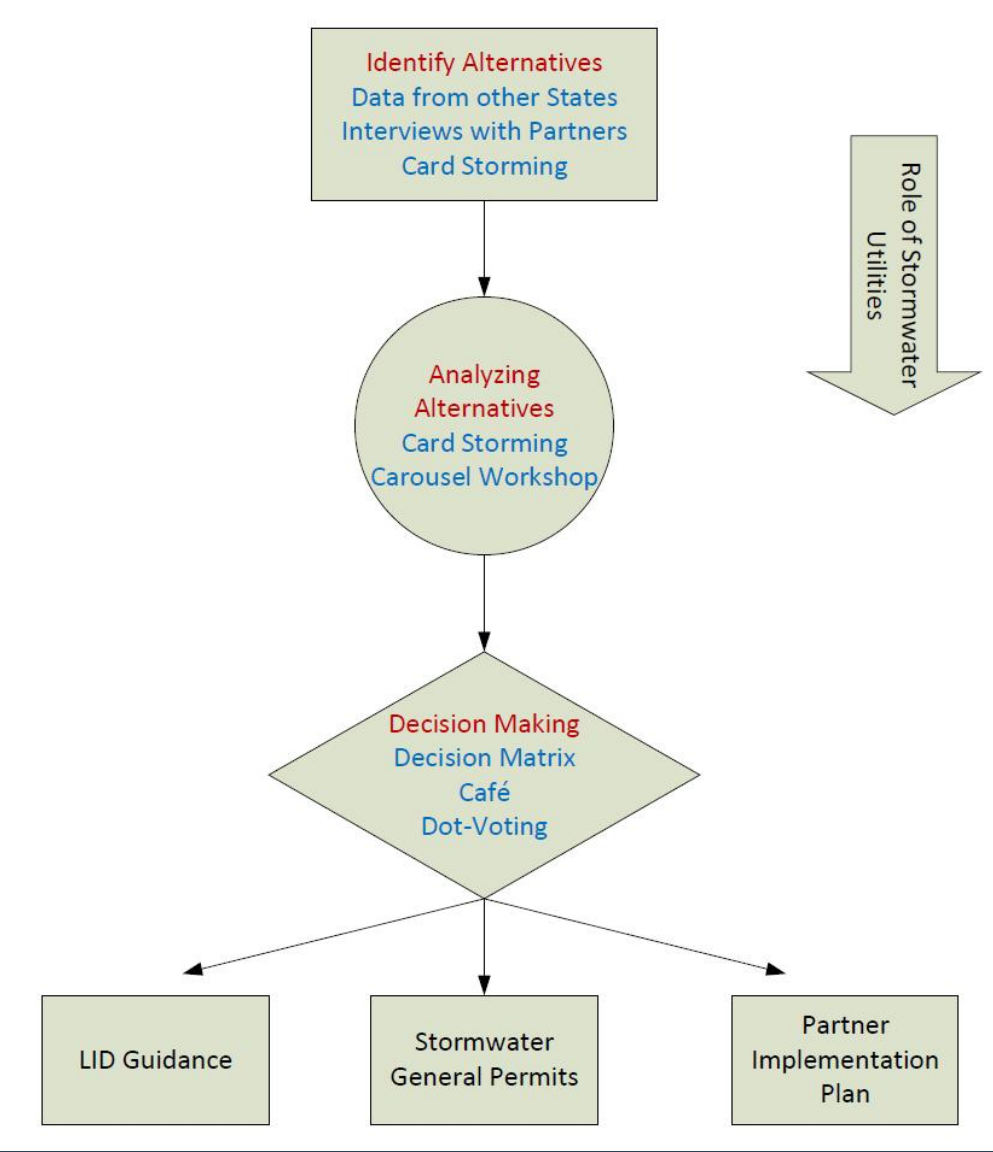
#2 July 1, 2010

- [Agenda](#)
- [Potential Low Impact Development Implementation Alternatives](#)
- [Evaluating the Role of Stormwater Utility Districts in the Implementation of Low Impact Development](#)
- [Carousel Workshop presentation](#)
- [Summary of Workshop #2](#)

#3 August 31, 2010

- [Agenda](#)
- [Technical Memorandum #1: Identification of Approaches for Including Low Impact Development and Pollution Prevention In General Permits](#)
- [Technical Memorandum #2: Evaluating the Role of Stormwater Utility Districts in the Implementation of Low Impact Development](#)
- [Summary #4: Rationale for Selection of Two Alternative Scenarios for Implementation](#)
- [Workshop #3 Presentation: Introductions, Meetings, and the Webpage](#)
- [Workshop #3 Presentation: Introduction to Cafe Workshop Dot voting](#)
- [Workshop #3 Summary of the Meeting](#)

Project Flow Chart





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Role of Stormwater Utilities

Background and Purpose

- Stormwater Utilities:
 - *Create a regular source of funding*
 - *Encourage regional (i.e., watershed-based) management*
 - *LID is site by site in nature*
- Potential Benefits and Concerns
- Practicability of Stormwater Utilities



Stormwater Utilities in Other States

Table 1
Features of Seven Stormwater Utility Districts

	Operation & Maintenance	Capital Improvement (e.g., Retrofits)	Watershed Management & TMDLs	Design Review	Phase 2 Implementation	Technical Assistance	Demonstration Projects	Public Education	Flood Management
Alexandria, VA	•	•	•	•	•			•	•
Northeast, OH	•	•	•		•	•	•	•	•
Volusia County, FL	•	•		•					•
Peachtree City, GA	•	•							
Symrna, TN		•	•		•			•	•
Newton, MA	•	•						•	•
S. Burlington, VT	•	•		•	•	•			•

Regionalization

- Why Regionalize?
 - *Economies of scale—Share programs, labor and equipment*
 - *Watershed as a unit of management*

Stormwater Utilities and LID

- How could Stormwater Utilities Enhance LID?
 - *Facilitate O&M*
 - *Fund maintenance services*
 - *Ensure proper design and placement*
 - *Locally based technical assistance programs*
 - *Retrofits for water quality improvement*

Partner Concerns about Stormwater Utilities

- Commonly Cited Concerns
 - *Bureaucracy*
 - *New fees look like taxes*
 - *Controversial basis for fees*
 - *Politically untenable*
 - *Public campaign may be needed for support*



Identifying Alternatives Background Data

Methods of Data Collection

- Two Basic Methods:
 - *Web searches and webpage mining*
 - *Interviews with stormwater managers and partners*

State Information & Interviews

We Collected Information from the Following States:

- Alaska
- Arizona
- California
- Florida
- Idaho
- Maine
- Massachusetts
- Minnesota
- Nevada
- New Mexico
- New Hampshire
- New York
- Oklahoma
- Oregon
- Pennsylvania
- Rhode Island
- Vermont
- Washington
- West Virginia
- Wisconsin

Findings—Performance Stnds

What Types of Performance Standard are used?

Type of Standard	Examples
Runoff Volume	<ul style="list-style-type: none">• WQV (1", 0.5", 25%, etc.); require or encourage LID
Pollution Reduction (linked to volume)	<ul style="list-style-type: none">• 80 or 90% TSS• Turbidity• Nutrients• Sensitive sites
Performance standard	<ul style="list-style-type: none">• Area set-aside for LID• MEP and narrative• Imperviousness reduction

Findings—Giving LID Priority

What Types of Standards are used to Establish Priority?

Type of Standard	Examples
Runoff Volume	<ul style="list-style-type: none">• Percentage or Fraction of WQV
Performance standard	<ul style="list-style-type: none">• MEP and narrative• Imperviousness reduction requirements• Area set-aside for LID

Telephone Interviews

- Interviewed 27 partners
- Fuss & O'Neill placed calls
- Interviews were loosely based on an interview questionnaire
- Significant Divergence of Opinion





Consensus Workshop

Identifying Alternatives and Decision Criteria

Consensus Workshop

Context

- Purpose
- Workshop Question
- Process
- Warm-up

•10 minutes

Brainstorm

- Your list
- Team list
- Pass up first round

15 minutes

Clustering

- 4 – 6 pairs
- Pass up round two
- Tag clusters
- Pass up remaining cards

10 - 15 minutes

Naming

- Discuss largest cluster
- 3 – 5 word name
- Remaining clusters

10 - 20 minutes

Resolution

- Discuss consensus
- Create a matrix
- Discuss implications
- 10 minutes

Card Storming Results

ATTACHMENT 1 RESULTS OF CARD STORMING FROM JULY 1, 2010 (WORKSHOP 2)


Card Storming Question:
What are the features of good LID policy?

Objective Card Storming Aim:
Identify criteria [for determining alternatives]


Experiential Card Storming Aim:
Identify similarities [in participants ideas of good LID policy]

 **Economic Market Viability**


- Cost effective options, not regulations
- Enough incentive to achieve success
- Recognize market demands for different development types (LID may not be for all)
- Funding for implementation
- Market/demand sensitivity
- Effectiveness can be verified and maintenance is not cost prohibitive

 **Education**


- Education component
- Knowledgeable design engineers training, train
- Use good science and knowledgeable people to make decisions
- Public acceptance—meaning willingness to act a local/residential scale
- Greatest behavior change Promote policies (regulatory and/or voluntary) that result in greatest behavior change

 **Clear and Understandable**


- Clarity
- Uniform statewide (standardized)
- Make any guidance and/or standards simple. Make process certain.
- LID policy at the local level to adopt, enforce, implement

 **Practicability-Flexibility**

- Practical to implement and maintain
- Not burdensome to individuals, easy to comply with
- Maintenance required
- Flexible
 - Consider site constraints
 - Consider project type
- Flexible
- Room for innovation
- Performance based (about objective, not technique)
- Bottom-up site specific approach, not top down.

 **Legal Administrable**

- Easy to administer
- Aligning municipal zoning subdivision regulations (with LID)
- Encouragement TPZ, conservation subdivision regulations
- Available support structure mechanism for contractors/homeowners implementing LID
- Compatible with other regulations and goals that are necessary i.e., ADA, mosquito control, public safety, public health
- Legal
- Oversight from local and state agencies
- Enforceability
- Treats stormwater runoff with the same strict criteria that are required of on-site septic systems
- Quantifiable-measurable for other permit requirements that might duplicate
- Should be expected and standard operating procedure not as the exception

 **Environmental Benefit**

- Manages soil erosion
- Reduction of impervious materials
- Remediate already built areas
- Promotes GW recharge
- Water quality & water quantity (groundwater recharge) (in-stream flow techniques)
- Reduces runoff
- Minimize impervious cover
- Fix impairment
- Resource based design (e.g., soils)
- Allow soil microorganisms to work
- Shift focus from engineering to conservation



Carousel Workshop

Identifying Advantages and Disadvantages of Alternatives

Carousel Workshop

Performance Standards

Pollution Reduction Standards

Stormwater Utilities

Nonregulatory



Regulatory



Additional Alternatives



Station Setup

Name of Alternative



<i>Strengths</i>	<i>Benefits</i>
<i>Weaknesses</i>	<i>Dangers</i>

Low Impact Development and Stormwater General Permit Evaluation

1. REGULATORY

STRENGTHS	BENEFITS
<ul style="list-style-type: none"> •Experience •No free-rider/fairness •Effectiveness •People know clarity/uniformity (consistent standard) [Fix what you have] •Helps municipalities to justify requiring LID •Mandatory 	<ul style="list-style-type: none"> •Invest in LID where you get the most benefit to fix the biggest problem •Ensure most LID use •Quantifiable (e.g., drainage calculations, apply to flood management) •Avoids externalizing costs •Public health – flood mitigation •Accountability •Transparency •Quick goal attainment •It will get LID implemented
WEAKNESSES	DANGERS
<ul style="list-style-type: none"> •Lack of experience •Flexibility for industry/towns •Problems for implementation at existing facilities (Retrofitting Qs) •Enforcement (staff) is a weakness •Difficult to be uniform – urban, suburban •How ensure compliance at local level? •Mandatory •Bureaucracy/cost •Not market viable 	<ul style="list-style-type: none"> •State/municipal conflict ✓ •Municipal ability to implement/knowledge •If permit – applicant knowledge •Carved into marble •Hard to modify if flaws identified •Limited enforcement •If not enough flexibility, will get resistance ✓ •Not applicable on every site

2. NON REGULATORY

STRENGTHS	BENEFITS
<ul style="list-style-type: none"> •Behavioral change •Politically palatable •Flexibility*, Financial Benefit for small contractor/operator •Keeps options open •Educates public and encourages voluntary buy-in •Flexible •Larger buy-in across the board 	<ul style="list-style-type: none"> •Training and education •Demo projects •CT should fund demo projects and cost •Variable funding sources •Proper guidance will lead to good design and environmental benefits will follow •Economic development •Experimentation •With strong incentives, this approach could work
WEAKNESSES	DANGERS
<ul style="list-style-type: none"> •Non regulatory may not be implemented (Staff and resources) •Funding is difficult/wouldn't be priority as non regulated •Provides no incentive for LID in meeting other regulatory requirements (e.g., FMC) •Costs can be externalized (people have choice to opt out and costs are paid by others) •Causes uncertainty for local boards/commissions •Failure to comply with CWA •Non-measurable or predictable •No consistent application of LID •At odds with current regulations 	<ul style="list-style-type: none"> •Political process •Consistency •Need for incentives for developers •Becomes a low priority •Free-rider •Status quo – what we have now •Failure to comply

3. PERFORMANCE STANDARDS

STRENGTHS	BENEFITS
<ul style="list-style-type: none"> •Flexible design •Using simple performance standards works well (i.e., 1" GW recharge) •If you met the standard, you meet it •Backed up by science •Uniform •Measurability •Quantifiable 	<ul style="list-style-type: none"> •Could be regulatory or non-regulatory •Flexible menu ** (menu of options to meet standards) •BMPs can be fine-tuned (cost-effective) •Enforceable/achievable •Easy to monitor (volume-based standard)
WEAKNESSES	DANGERS
<ul style="list-style-type: none"> •Not clear - Inconsistent application of BMPs •Implementation needs to be simple or costs rise quickly •Timeline – What's long term enforcement •How to set the standard •Municipal staff/time training •Administrative burden •Site-specific design •Lack of data on performance in practice •Measurability 	<ul style="list-style-type: none"> •Ultra-conservative; may add unnecessary expense •Failure of BMPs •Avoid one size fits all •Conflicts with best engineering judgment •Discourages innovation

4. POLLUTION REDUCTION

STRENGTHS	BENEFITS
<ul style="list-style-type: none"> •Measurability •Quantifiable *# •Pollution reduction •Measureable results •Flexible with how to reduce pollution 	<ul style="list-style-type: none"> •Environmental (ecological/public health) •Achieves pollution reduction •Need consensus on p.r. [pollution reduction] standards •Improves sustainability •Protects resources •Reduces runoff volume
WEAKNESSES	DANGERS
<ul style="list-style-type: none"> •Measurability •One size does not fit all •Need responsible monitoring entity (not homeowner) •Top down approach •Costly/enforcement evaluation – regulation •Control specific pollutants •80% overly simplistic, not trustworthy 	<ul style="list-style-type: none"> •Pollution transfer to other media •Not having flexibility to meet standards •Determine accurate standards (80% reduction of what?) •Discounts volume •Doesn't address other forms of degradation

5. STORMWATER UTILITIES

STRENGTHS	BENEFITS
<ul style="list-style-type: none"> •Watershed based ✓ •Effectiveness •Regional partnerships •Can work if there's an existing organization/group to piggyback on •Removes stormwater from politics •May work for already regionalized water and sewer authorities , e.g., MDC 	<ul style="list-style-type: none"> •Dedicated "funding" stream for projects •Reduction of IC [impervious cover] •Could adapt to local geographical conditions •Education •Businesses/owners working together •Accountability •Comprehensive approach to water management; interrelationship •Raises revue, funds •Taxpayer expectations
WEAKNESSES	DANGERS
<ul style="list-style-type: none"> •Cost to towns •Legal framework •How measure success? •Cost to regulated community ✓ and municipality •Existing IC may have a disproportionate cost •Political will to accept regionalization ✓ •Removes public input •Regional/town conflicts 	<ul style="list-style-type: none"> •Political conflicts •Public perception – tax** •Overlapping authorities – Need to coordinate authorities •CT legislature won't add a new tax •Is it voluntary for towns or required that every town join/have one? •Who sets fee and how?

6. ADDITIONAL ALTERNATIVES

<ul style="list-style-type: none"> •Hybrid of "5" alternatives – current approach does not translate to local level (similar to how wetlands) Bottom up- driven by town. •Compliance with water quality standards •Public participation •Mandating retrofits •Educational component/program (officials, public) •Other non-structural controls (e.g., street sweeping) •Stricter enforcement •Make all P+Z [planning and zoning] follow same rules for stormwater management •IC [impervious cover] cap and trade •Incentivize water reuse (i.e., on water bill)
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Combined Card Storming-Carousel Results

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	<u>Weaknesses</u> Nonmeasurable/predictable	<u>Weaknesses</u> May not be implementable (staff and resources)		

Combined Card Storming-Carousel Results

Type of Approach	Economically Viable	Knowledge-Based, Behavioral Change	Clear and Understandable	Practicable and Flexible	Administrable	Environmentally Beneficial	Other
			boards and commissions No consistent application of LID		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 Becomes a low priority	<u>Dangers</u> Consistency Free-rider	<u>Dangers</u> Status quo	<u>Dangers</u> Need incentives for 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?		



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Debating Alternatives

Purpose of the Workshop

- Examine your own ideas about how alternatives work together
- Have an open dialog about alternatives
- Leverage collective knowledge
- Lead to innovation and good decision making





Dot Voting

Selecting Consensus Alternatives

Purpose of Dot Voting

- Identify alternatives for immediate development
- Determine how alternatives compare with criteria
- Determine how alternatives fit best together when considering criteria



Dot-Voting Results

Table 2
Results of Dot-Voting

Type of Alternative	Alternative	Economically Viable	Knowledge-Based, Behavioral Change	Clear And Understandable	Practicable And Flexible	Administrable	Environmentally Beneficial	
Regulatory	Update the Manual/Guidelines							
	Incorporating Standards into the SGP							
	Designer licensing	3	9		1	4		17
	Impervious surface cap and trade						2	2
	Adjusted standards for areas of special concern	6	3		14	3	5	31
Nonregulatory	Training program	4	11	7	5	2	6	35
	Financial incentives	18			2		6	26
	Technical assistance	6	2	2	17	2	8	37
	Public education	4	15	10	2		4	35
Stormwater Utility	Stormwater Utility Subcommittee	15	1				6	22
	Guidance document	1	3	14	3	2	8	31
	Technical and financial assistance program	6	4			2	6	18
	Public outreach and awareness toolbox	2	9	6	7		2	26
	Delegation of regulatory authority	1			4	1		6
New Alternatives as of Workshop 3	LID Cert./Award	3	8		2	2		15
	Municipal Cert.	3	11	4			1	19
		72	76	43	57	18	54	

Observations

- Strong interest in nonregulatory alternatives.
- Compliment of regulatory and nonregulatory alternatives; and alternatives within the nonregulatory category.
- Need enabling legislation for the stormwater utility guidance document to work.
- Adjusted standards could be part of the LID manual and SGP.



Workshop 2

Preferred LID Policy Structure

Context for Discussion

- Consider Five “Design” Scenarios
 - *Redevelopment or a highly urbanized setting*
 - *New residential development*
 - *New industrial or commercial development*
 - *Development in a sensitive area*
 - *Roadway projects*

Topics for Discussion

1. Form of the LID Manual?
 - *Stand-alone manual*
 - *Appendix to Stormwater Manual and Soil Erosion Guidelines*
 - *Full rewrite of the Stormwater Manual and Soil Erosion Guidelines*
2. Giving LID Priority?
 - *Require a fraction of runoff is managed using LID*
 - *Require a set-aside area*
 - *Maximum extent practicable*
 - *Another idea?*
3. Incorporating Performance Goals and Criteria in General Permits?
 - *LID manual referenced in SGP*
 - *Incorporate specific LID standards into SGP*
 - *Incorporate manual reference and LID standards in SGP*
 - *LID manual, but no reference or standards in SGP*
4. Adjusted Standards for Areas of Concern?
 - *Redevelopment*
 - *Sensitive areas*

Consensus Based on Show-of-Hands

Topic and options for implementation	Consensus from Attendees
<i>Incorporating Performance Goals</i>	
LID Manual referenced in SGP	0
Incorporate Specific LID standards in SGP	0
LID Manual reference and standards in SGP (Performance)	16 (all)
LID Manual, but no reference in SGP	0
<i>Adjusted standards for areas of concern</i>	
Redevelopment	7
Sensitive Areas	15
DOT	8
<i>Form of Manual</i>	
Stand alone	0
Appendices	2
Full rewrite	4
Two-step approach(start with stand-alone manual, then prepare a full update of the full Stormwater Quality Manual at a later time)	12
<i>Giving LID Priority</i>	
Require a fraction of runoff as LID	7
Require a set aside	0
Use LID to the maximum extent practicable	10
Effective Impervious	5

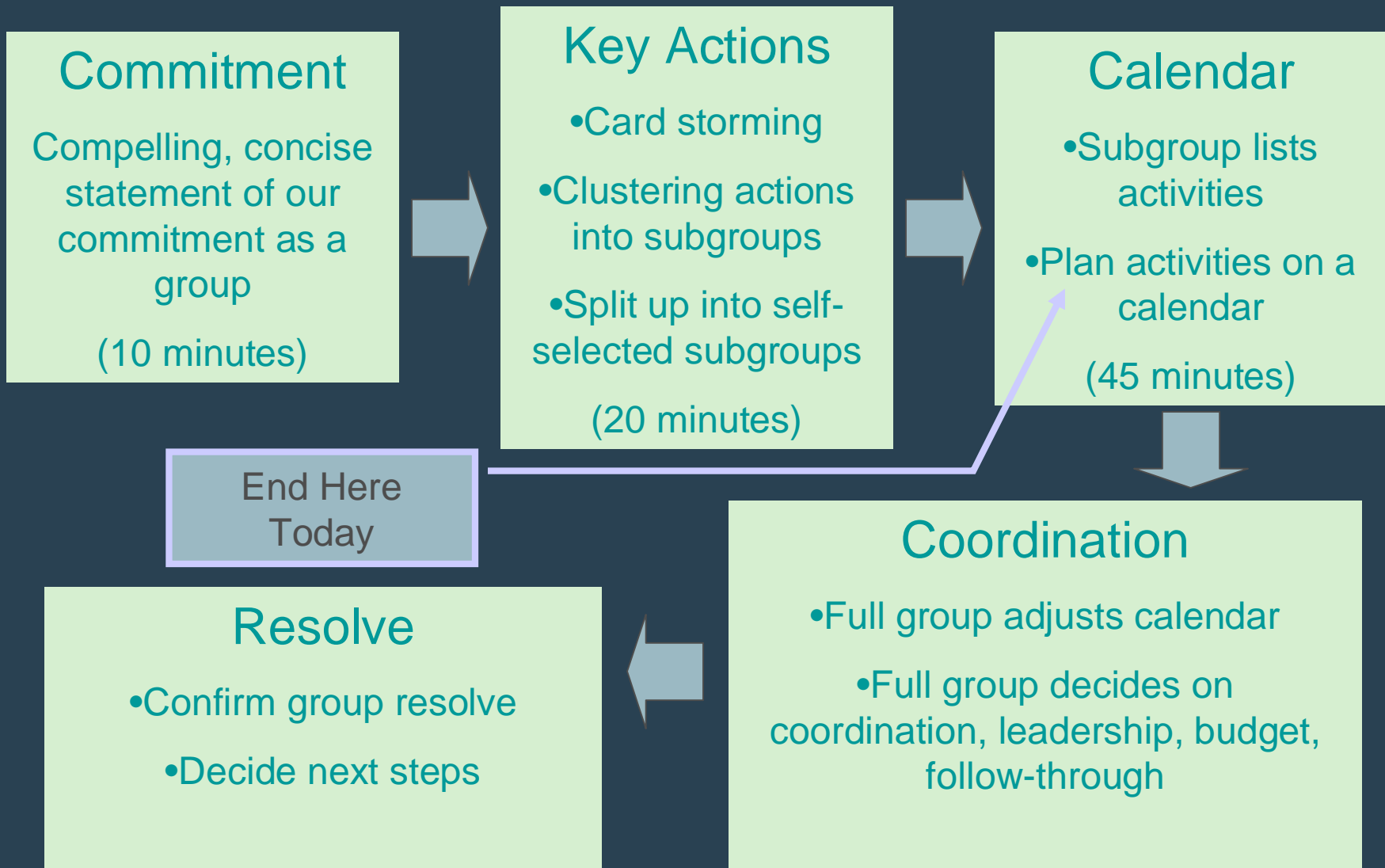


Action Planning Partner Involvement in Implementation

Partner Involvement in Implementation

- Commit to scope and outcome
- Key actions
- Calendar
- Coordination
- Resolve

Action Planning Workshop—LID Standards and SGP



Public Education

Item	Who	Time Frame
Public Education		
Develop a 1-hour public access program using a meteorologist/weather forecaster to explain the basics of stormwater pollution, who is involved, and what we can do. Focus on Connecticut examples and successes		ASAP
Focus on "What I can do at home" and "What I can do in my community"		ASAP
Develop school curriculum for multiple levels.		ASAP
Use Existing Long Island Sound Study/NEMO information	Connecticut Conservation Districts	ASAP
Public outreach articles in local newspapers	Connecticut Conference of Municipalities, Connecticut Bar Association	ASAP
Outreach to: <ul style="list-style-type: none"> • Sportsman groups • Local land trusts • Local chambers of commerce • Technical and professional societies 		ASAP
Develop general information for libraries, land trusts, utilities, etc. to disseminate (Simple language)		ASAP
Work with water quality retailers to promote LID, etc.		ASAP
Provide power point templates incorporating LID for use by municipalities in educating public on LID measures to be incorporated in regulations.		ASAP
Target to homeowner? Work with commercial/retailers <ul style="list-style-type: none"> • Rain garden installation – easy • Native plants • Pavers 		ASAP

Technical Assistance

Technical Assistance		
Identify key people to provide technical assistance and what that assistance will be.	DEP Conservation Districts NECS CLEAR/NEMO/UConn RPAs USGS DOT	January 2011
Form workgroup – Refine today's [Workshop 5] recommendations; Identify what exists and gaps; evaluate LID practices.	DEP/Conservation Districts	February/March 2011

Training

Identify existing resources for training		
Update EPA on status/needs		Tie in with Permits
Identify funding sources (federal/state/local)		
Identify target audiences		
Identify existing training programs that need update/retrofit (e.g., Inland wetlands)		
Develop programs for various target audiences		
Implement/evaluate programs		

Stormwater Utilities

Stormwater Utilities		
Enabling legislation	Legislature, Stakeholders	ASAP (2 nd)
Public education and outreach to municipalities:		
<ul style="list-style-type: none"> • Move pilot programs forward 	New Haven, etc. (Public)	ASAP (1 st)
<ul style="list-style-type: none"> • Engage combined sewer overflow communities with LID and stormwater utilities. 	Hartford, Bridgeport, New Haven, etc. (Public)	
<ul style="list-style-type: none"> • Identifying best/most feasible communities 	Towns, Public	
<ul style="list-style-type: none"> • Successful stormwater utilities around the country – Educate on success stories 	DEP, Stakeholders	
Use as means to comply with regulatory obligations Different types and levels of guidance	DEP	

Results and Next Steps

Action Item	Approximate Completion Timeframe
Regulatory	
<ul style="list-style-type: none"> Develop a LID guidance for inclusion as an appendix to the existing Stormwater Quality Manual and Soil Erosion and Sediment Control Guideline. 	March 2011
<ul style="list-style-type: none"> Step 2—Develop a Full update to the <i>Stormwater Quality Manual</i> and <i>Soil Erosion and Sediment Control Guideline</i>. 	2014
<ul style="list-style-type: none"> Establish adjusted management standards for areas of special concern. 	March 2011
Nonregulatory	
<ul style="list-style-type: none"> Develop a program to provide training, technical assistance, and public education for implementing LID alternatives. <ul style="list-style-type: none"> Training programs Technical assistance program Public education 	TBD
	TBD
	TBD
	TBD
Stormwater Utilities	
<ul style="list-style-type: none"> Conduct legal research to determine legal feasibility of establishing stormwater utility districts through existing regional authorities such as water utilities, wastewater authorities, fire districts, etc. 	TBD
<ul style="list-style-type: none"> Establish a subcommittee to oversee development of enabling legislation and a stormwater utility district guidance document. 	TBD
<ul style="list-style-type: none"> Draft stormwater utility district enabling legislation 	TBD
<ul style="list-style-type: none"> Develop a model stormwater utility district ordinance and guidance manual for utility district development and implementation in Connecticut. <ul style="list-style-type: none"> Establish fee setting structure. Establish bureaucratic and administrative structure. Establish process to build public understanding and acceptance. 	TBD
	TBD
	TBD
	TBD



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Presentation to
**Connecticut Dept of
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LID Guidelines

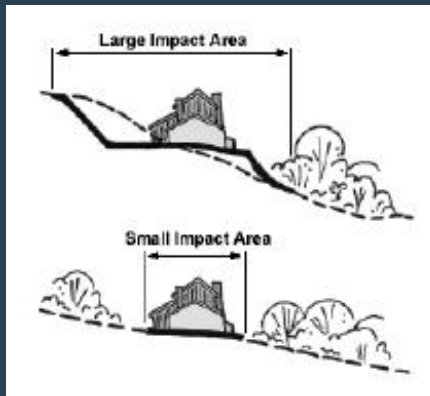
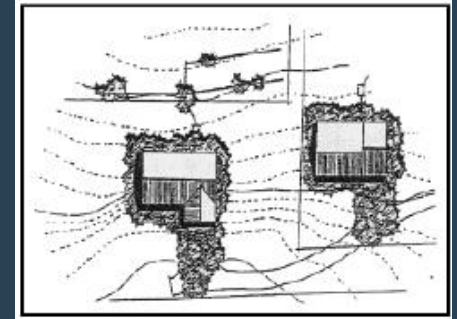
August 2, 2011

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Approaches that Optimize Conservation

- Limits of Clearing and Grading
- Preserving Natural Areas
- Avoid Disturbing Long, Steep Slopes
- Minimize Siting on Porous and Erodible Soils

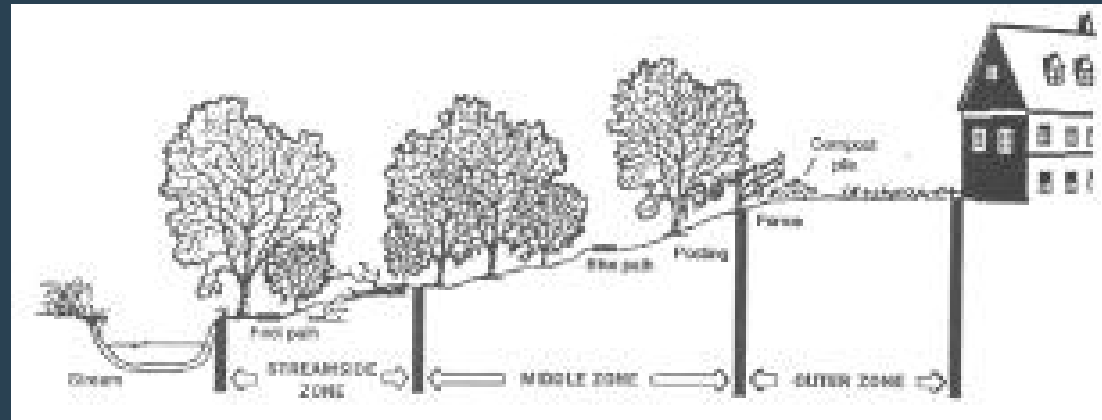


Limits of Clearing and Grading



- Area of building pad and utilities (septic systems and wells) plus 25 feet.
- Area of roadbed and shoulder plus 9 feet.

Preserving Natural Areas Preserving Natural Areas

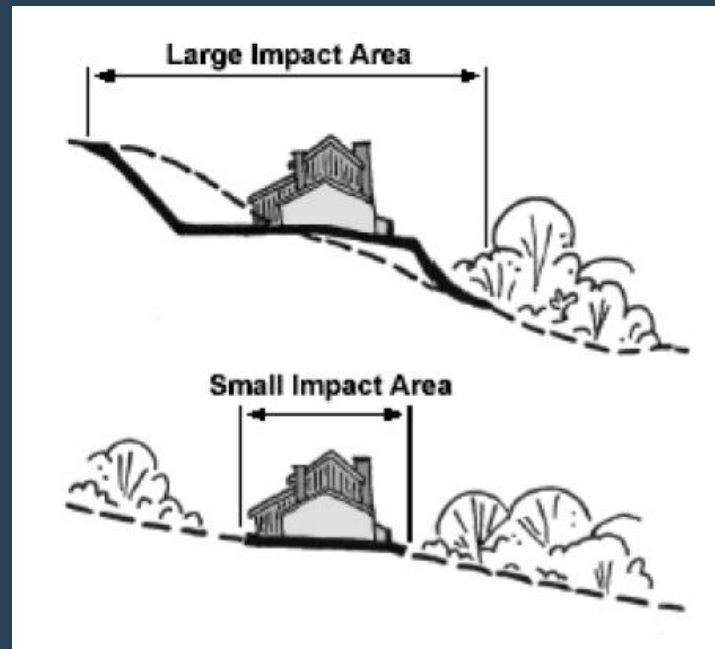


- No disturbance to preservation areas.
- Clearly show limits of disturbance.
- Preservation areas must be in an easement.
- Preservation area min 10,000 sqft and 50-foot setback from wetlands.
- Create sheet flow, bypass higher flows.
- Maintain in natural unmanaged condition accept for debris removal.

Riparian Buffers

- Jurisdiction setback plus 50 feet.
- Max length of contributing runoff should be no more than 150 feet for pervious areas and 75 feet for impervious areas.
- Minimum length should be not more than 20 feet.

Avoid Disturbing Long, Steep Slopes



Grade

0% - 7%
7% - 15%
over 15%

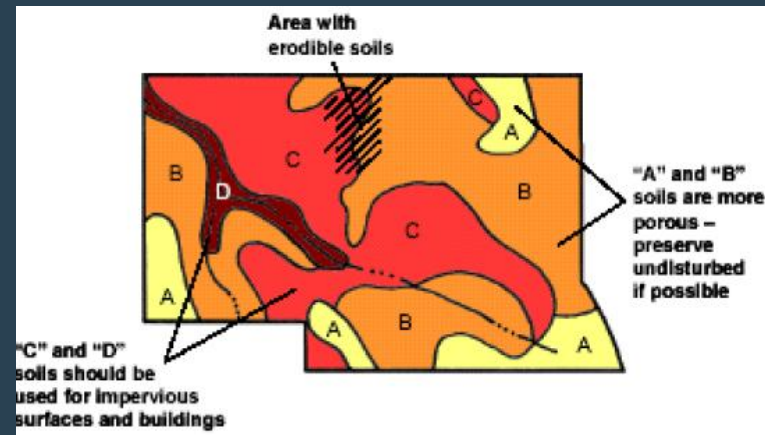
Slope Length

300 feet
150 feet
75 feet

Avoid Disturbing Long, Steep Slopes

- No stripping of vegetation on slopes greater than 25%, except for roads/utilities.
- Avoid unnecessary grading on all slopes.
- Avoid inverting cut soils.

Minimize Siting on Porous and Erodible Soils



- Use soil surveys to determine soil types
- Delineate HSG types on site plans
- Whenever possible leave more porous soils (e.g., HSG A and B) undisturbed.
- Locate buildings and impervious surfaces on the least pervious soils.

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Mimic Natural Water Balance



Standards

Time of Concentration

The postdevelopment time of concentration (T_c) should approximate the predevelopment T_c .

Travel Time

The travel time (T_t) throughout individual lots and areas should be approximately constant.

Flow Velocity

Flow velocity in areas that are graded to natural drainage patterns should be kept as low as possible to avoid soil erosion.

Minimizing and Disconnecting Impervious Surface Roadways

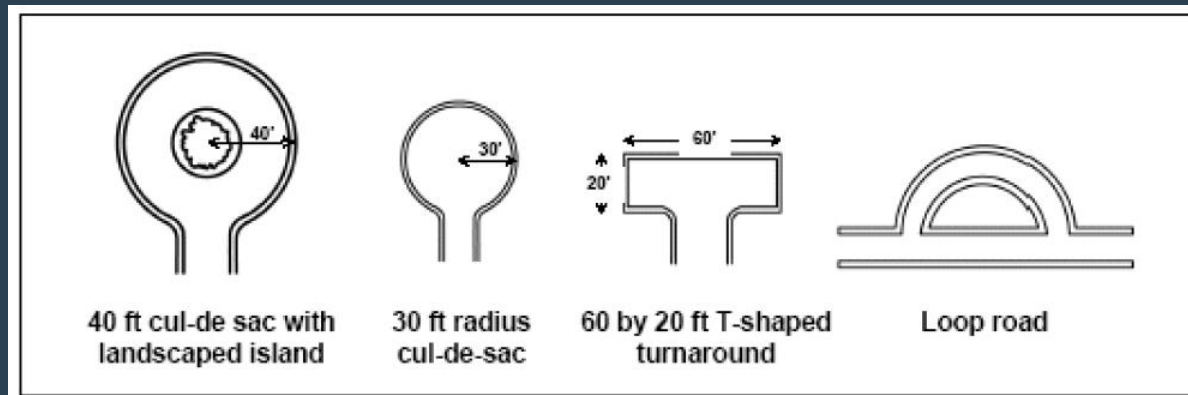


Table 4.2
Roadway Design Standards for Five Street Types

Design Factor	Lane	Access	Standard Street	Dense Street	Collector
ADT	Less than 100	100 - 500	500 - 1,000	100 - 1,000 @ 4 dwell units/acre	1,000 - 3,000
Width (feet)	16	20	26	32	22 - 28
Extra ROW (feet)	8 - 16	8 - 24	20	20	22 - 28
Off-Street Parking	None	One lane	One lane	Two lane	Emergency shoulders
Drainage	Swale	Swale or curb/gutter	Curb/gutter	Curb/gutter	Swale or shoulder
Design Speed (MPH)	15	20	25	25	25
Sidewalks	None	One side	One or two side	Two side	One side
Frontage Lots	Yes	Yes	Yes	Yes	No

Buildings



- Reduce building setbacks to 20 – 30 feet and driveways to 18 feet wide.
- Reduce frontages to 60 feet.

Parking Footprints

Table 4.3
Recommended Maximum Number of Parking Spaces for Certain Land Uses

Land Use	Maximum Parking Spaces
Single Family House	2 per DU ^a
Shopping Center	5 per 1000 ft ² GFA ^b
Convenience Store	3.3 per 1000 ft ² GFA
Industrial	1 per 1000 ft ² GFA
Medical Dental	5.7 per 1000 ft ² GFA

- Minimize parking stall size.
- Use parking decks.
- Encourage shared parking.



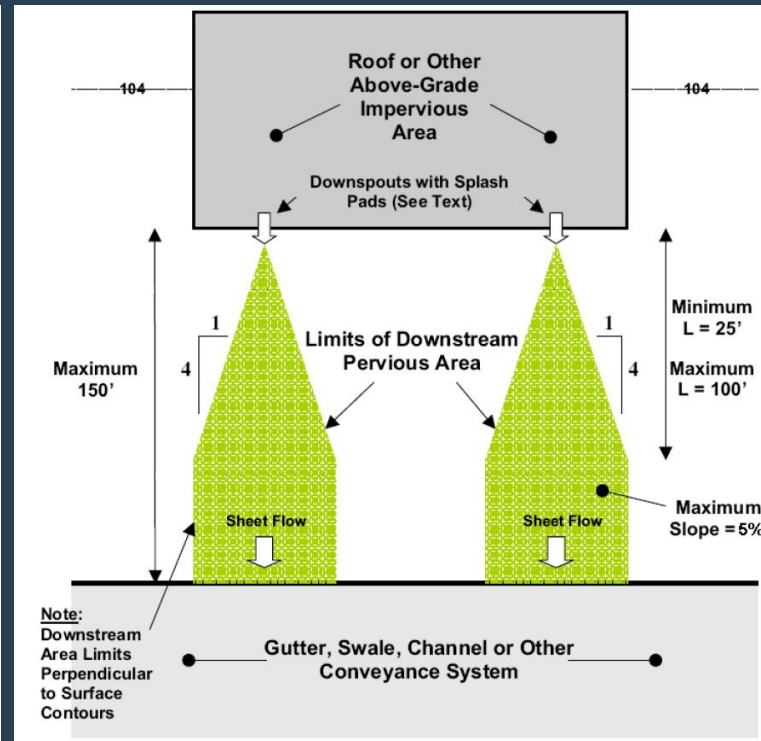
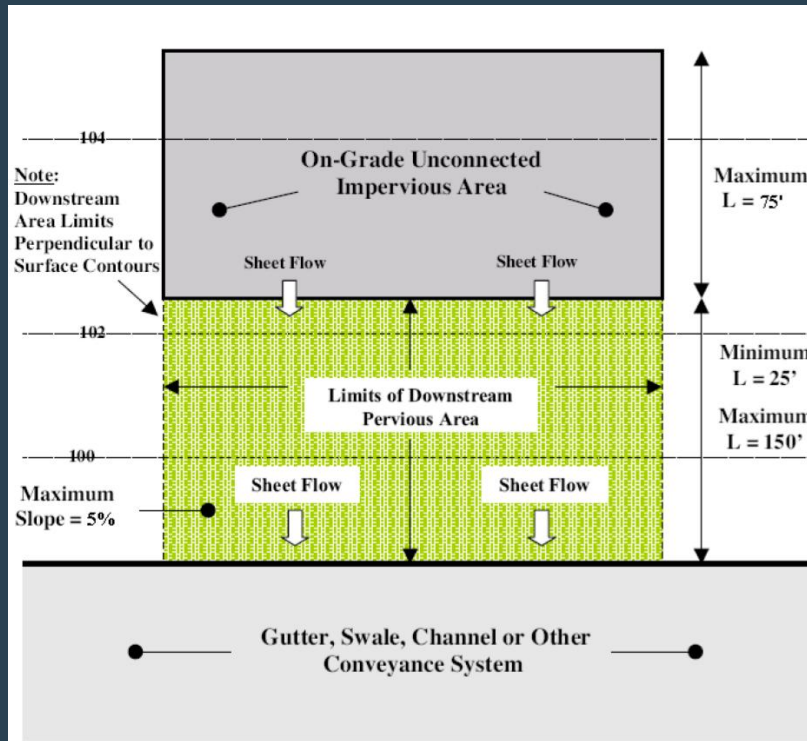
Parking Lot Island



Parking lot islands should:

- a) Be at least 8 feet wide.
- b) Be constructed with sub-surface drainage.
- c) Incorporate compaction resistant soil.

Disconnecting Impervious Surface



Standards

General

- Disconnect impervious surfaces to the extent practicable.
- Up to the first inch of runoff from an impervious surface may be disconnected to a pervious surface such as a lawn.

Other Management Practices

- Standards refer back to Chapter 4 and Chapter 11.
- Management practices include:
 - *Permeable pavement*
 - *Vegetated filter strips*
 - *Natural and vegetated drainage ways*
 - *Green roofs and facades*
 - *Cisterns and rain barrels*
 - *Dry wells*
 - *Bioretention and rain gardens*
 - *Infiltration trenches*