Review, Feedback, and Plan to Update

Chapter 2: Strategies for Local Governments
Chapter 3: Site Assessment and Design for Low Impact Development

Break Out Group 10:30 am to 12 pm

A Low Impact Development Manual for Coastal South Carolina
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Charleston, SC

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Objectives

- Understand site design recommendations that will contribute to LID
- Understand how communities can incorporate the manual recommendations into new or existing policy
- LID project team record feedback and coordinate feedback input for the manual
How to accomplish our objectives today

• Add productive comments and conversation
  • What changes are needed?
  • How can we improve the content?
    • Specific content, people to contact, etc.
• Form decision points
• Make action items and timelines
Outline for Today’s Work

1. Your feedback
   - Major discussion points
   - Unclear areas, additions needed, deletions needed
   - Beefs

2. Review the manual sections

3. Gather feedback

4. Develop an action plan and timeline
Chapter 2: Strategies for Local Governments

This Chapter outlines the current federal, state, and local stormwater regulations. Then, the planning and regulatory strategies needed for coastal SC LID implementation are presented.

Index

2.1 Getting Ready for Low Impact Development
2.2 Applicable Regulations and Requirements for Stormwater and LID
2.3 Planning Strategies
2.4 Regulatory Strategies
2.5 References
Chapter 2: Strategies for Local Governments

2.2 Applicable Regulations and Requirements for Stormwater and LID
- Federal and State Stormwater Regulations
- Local Regulations and Ordinances

2.3 Planning Strategies
- Code and Ordinance Checklist
  - Better Site Design Code and Ordinance Worksheet
  - US EPA Water Quality Scorecard
  - Eight Tools of Watershed Protection Audit
  - Coastal Community Watershed Management Checklist
Chapter 2: Strategies for Local Governments

2.3 Planning Strategies (continued)

- Planned Unit Development
  - Planned development districts (PDDs) was codified into SC law (SC 6-29-740)
  - Allow for flexibility in the development process

2.4 Regulatory Strategies

- Site Plan Review
- Tracking, Inspection, and Verification
- Enforcement
Chapter 2: Strategies for Local Governments

- What changes are needed?
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Revisit the Objectives

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Chapter 3: Site Assessment and Design for Low Impact Development

<table>
<thead>
<tr>
<th>Index</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Introduction to Site Assessment and Design</td>
</tr>
<tr>
<td>3.2</td>
<td>Conservation Principles for Coastal SC</td>
</tr>
<tr>
<td>3.3</td>
<td>Neighborhood Site Design Considerations for Coastal SC</td>
</tr>
<tr>
<td>3.4</td>
<td>LID Roadway Design</td>
</tr>
<tr>
<td>3.5</td>
<td>LID Parking Guidance</td>
</tr>
<tr>
<td>3.6</td>
<td>Incorporating LiD into Existing Development</td>
</tr>
<tr>
<td>3.7</td>
<td>LID Landscaping</td>
</tr>
<tr>
<td>3.8</td>
<td>References</td>
</tr>
</tbody>
</table>

Site assessment and design for LID seeks to create less impervious cover, conserve more natural areas, and use pervious areas more effectively to treat storm water runoff.
3.1 Introduction to Site Assessment and Design

**Better Site Design**

- Development projects can be planned and designed to reduce their impact on coastal aquatic and terrestrial resources, particularly when an effort is made to protect and conserve natural areas, reduce impervious cover, and integrate stormwater management with site design.
3.2 Conservation Principles for Coastal SC

Key conservation principles for coastal SC include conserving land; protecting critical resources, open space, and tree canopies; preserving native vegetation, soils and buffers; reducing impervious cover; and planning for future development. These conservation principles are part of an overall watershed approach to stormwater management.

Conservation principles are detailed here and include available science, policy recommendations, and examples.
Chapter 3: Site Assessment and Design for Low Impact Development

3.2 Conservation Principles for Coastal SC

Land Conservation
- Prioritize areas, use local data, and assess $ value
- Local gov’t control land development and can fill in state/federal gaps

Preserve and Maintain Open Space
- Critical to maintaining water quality at the regional level
- Transfer Development Rights & Purchase Development Rights
Chapter 3: Site Assessment and Design for Low Impact Development

3.2 Conservation Principles for Coastal SC

Protect Forests and Wetlands

- Wetland loss is a problem
  - SC wetland loss 28% (4.6 million acres) since 1780 (Yarrow, 2009)
- Wetland role in stormwater
- SC DNR BMP for Wildlife in Maritime Forest Developments resource
3.2 Conservation Principles for Coastal SC

*Protect Forests and Wetlands*

- Clemson Extension’s Yarrow (2009) provided the following three basic wetland management plan considerations:
  - Inventory, Management Considerations, and Management Goals
- Resources provided
3.2 Conservation Principles for Coastal SC

Promote Buffers

- SC has several buffer guidance documents that provide buffer definitions, examples, case studies, and recommendations.
  - SC Task Force for Forested Riparian Buffers report recommended 100 to 300 foot riparian buffers (SCTFFBR, 2000);
3.2 Conservation Principles for Coastal SC (continued)

Promote Buffers

- SCDHEC “Vegetated Riparian Buffers and Buffer Ordinances” that recommends at least a 50 to 100 foot buffers (SCDHEC–OCRM);

- SCDHEC “Backyard Buffers for the South Carolina Lowcountry” provided guidance for buffer implementation and maintenance to homeowners (SCDHEC); and

- Critical Buffer Ordinance report provided an overview for buffer intent, buffer implementation, and provided case studies in the City of Charleston and the Town of Mount Pleasant (Halfacre–Hitchcock and Hitchcock, no date).

- SC Construction General Permit requires a 40 foot buffer during construction
Chapter 3: Site Assessment and Design for Low Impact Development

3.2 Conservation Principles for Coastal SC

Protect Tree Canopy
- Stormwater and other value
- Landscape community to promote, maintain, & educate
- Need SC tree canopy goal example

Reduce Impervious Cover
- Managing IC is critical because increased IC is linked to impacts on water quality, wildlife, and human health through degraded water quality impacts (e.g., bacteria) (Mallin, 2000; Mallin et al., 2001; Holland et al., 2004; Schueler et al., 2009).
3.2 Conservation Principles for Coastal SC

Planning for Future Growth Conditions and Patterns

- More sustainable growth patterns
- Promote LID, reduce IC, preserve natural areas

Conservation, Land Use, and Stormwater Management Incentives

- Incentives will support the manual’s recommended actions
- Conservation incentive case study – Laurel Oak Grove, JI
I think....

My experience is....

How can I implement this....
Chapter 3: Site Assessment and Design for Low Impact Development

3.3 Neighborhood Site Design Considerations for Coastal SC

To improve stormwater management use innovative community and subdivision designs that significantly reduce the impact on water quality and required municipal services.

**LID and Compact Development**

- Upstate Forever and Clemson University found that compact development has half the sediment and nutrients from typical development (Privette, et al. 2011)
3.4 LID Roadway Design

Reduce the IC with less wide roads, sidewalks, and streets. Improve stormwater function by allowing flexibility for the materials, design, and promoting stormwater management.

- Streets constitute 40 to 50% of IC in traditional residential developments
- Narrower streets can reduce IC by 5 to 20%
- Common width is 32 to 40 ft
- Recommended width 18 to 16 ft
### 3.4 LID Roadway Design

**Street Widths**

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Residential Street Width</th>
<th>Maximum Trips</th>
<th>Average Daily Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaufort County, SC</td>
<td>20’ local residential&lt;br&gt;26’ local residential (1 parking lane)&lt;br&gt;34’ local residential (2 parking lanes)&lt;br&gt;28’ local nonresidential&lt;br&gt;22’ residential collector</td>
<td>240 (max peak hour volume)&lt;br&gt;240 (max peak hour volume)&lt;br&gt;240 (max peak hour volume)&lt;br&gt;1,000 (max peak hour volume)&lt;br&gt;800 (max peak hour volume)</td>
<td></td>
</tr>
<tr>
<td>Dorchester County, SC</td>
<td>22’ collector&lt;br&gt;21’ drive&lt;br&gt;19.5’ court&lt;br&gt;17.5’ residential alley&lt;br&gt;22’ commercial alley</td>
<td>&gt;3,000&lt;br&gt;1,000-3,000&lt;br&gt;&lt;1,000&lt;br&gt;&lt;250&lt;br&gt;&lt;500</td>
<td></td>
</tr>
<tr>
<td>State of New Jersey</td>
<td>20’ (no parking)&lt;br&gt;20’ (one side parking)</td>
<td>0 - 3,500&lt;br&gt;0 - 3,500</td>
<td></td>
</tr>
<tr>
<td>Bucks County, PA</td>
<td>12’ (alley)&lt;br&gt;16 – 18’ (no parking)&lt;br&gt;20’ – 22’ (no parking)&lt;br&gt;26’ (one side)&lt;br&gt;28’ (one side)</td>
<td>--&lt;br&gt;200&lt;br&gt;200 – 1000&lt;br&gt;200&lt;br&gt;200 – 1,000</td>
<td></td>
</tr>
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</table>
3.4 LID Roadway Design

Right-of-Way Width

- SC DOT, the ROW refers to “the land secured and reserved by the Department for the construction, improvement, and maintenance of the highway (SC DOT 2007).”

- The Institute of Traffic Engineers (ITE) guidelines recommend a minimum ROW width of 50 feet for low density development and 60 feet for medium and high-density developments (ITE, 1997).
Chapter 3: Site Assessment and Design for Low Impact Development

3.4 LID Roadway Design

*Cul-De-Sacs and Alternate Turnarounds*

- 50 to 60 ft or more in radius often required
- High pavement results
  - ~11,000 square feet
- Recommend 30 to 40 ft
- Small reduction in bulb radius leads to a significant reduction in impervious cover
- Allow stormwater management

*Intersection Geometry*

- Minimize size
Curb Requirements
- How can curb requirements be achieved?
- What works to reduce curbs and increase stormwater management?
- Reduce curbs where possible
- Direct IC to vegetation/LID

Sidewalks
- Reduce width
- Allow on one side of street
- Grade to vegetation/LID
- Direct to vegetation and/or LID
- Allow alternative materials
Chapter 3: Site Assessment and Design for Low Impact Development

3.4 LID Roadway Design

**Driveways**

- Typical single is 10 to 12 ft wide and double is 18 to 20 ft wide
- Recommend single < 9 ft wide and double < 18 ft
- Use shared driveway
- Allow alternative materials

**Summary**

- Stormwater, watershed, and community benefits for reducing impervious cover and increasing the water runoff management
3.5 LID Parking Guidance

- Parking is a necessity but parking lots are often designed to be overly large and local codes can be a barrier.
- This chapter discusses the essential regulatory strategies that emphasize parking efficiency and provides suggestions for reducing impervious cover.
3.5 LID Parking Guidance

Alternative Parking Surfaces & Shared Offsite Parking

- Allow

Parking Ratios

- Base on average daily demand; do not base on projected peak demand
- Typically based on minimum number of spaces needed to accommodate the highest hourly parking during the peak season at the site
- Use maximums not minimum requirement
- See Table 3-15
3.5 LID Parking Guidance

Based on the findings from the study, the City of Greenville adjusted its parking requirements.

Minimizing Parking Case Study: City of Greenville, SC

Smaller lots make better use of available land, improve water quality, and save money. Upstate Forever, Furman University and the City of Greenville conducted a study of commercial parking lots to determine the optimal number of parking spaces for different uses. Researchers used aerial photography and on-the-ground monitoring of 120 commercial parking lots during peak and non-peak hours. The study concluded that there was an excess of off-street parking. A major research finding was that up to 65% of parking spaces were empty during peak hours.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Peak Parking Occupancy</th>
<th>Excess Parking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grocery Stores</td>
<td>35%</td>
<td>65%</td>
</tr>
<tr>
<td>Other Restaurants</td>
<td>39%</td>
<td>61%</td>
</tr>
<tr>
<td>Discount/Dept. Store</td>
<td>45%</td>
<td>55%</td>
</tr>
<tr>
<td>Pharmacies</td>
<td>45%</td>
<td>55%</td>
</tr>
<tr>
<td>Medical Facilities</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Offices</td>
<td>58%</td>
<td>42%</td>
</tr>
<tr>
<td>Drive-thru Restaurants</td>
<td>58%</td>
<td>42%</td>
</tr>
<tr>
<td>Shopping Centers</td>
<td>63%</td>
<td>37%</td>
</tr>
<tr>
<td>Health Clubs</td>
<td>74%</td>
<td>26%</td>
</tr>
</tbody>
</table>
LID Parking Lot Case Study: 15 George Street Charleston, SC
3.5 LID Parking Guidance

**Stall and Aisle Geometry**

- Typical stall is 10 ft wide and 20 ft long
- Recommend 9 ft wide and 18 ft long

*Figure 3-5: Angled Parking Design Options (RI DEM 2011)*
Chapter 3: Site Assessment and Design for Low Impact Development

3.5 LID Parking Guidance

*Parking Lot Landscaping*

- Use landscaping to support stormwater management
3.6 Incorporating LID into Existing Development

Developments that occurred with no stormwater management controls or with outdated stormwater management controls, represent an opportunity to capture and treat stormwater runoff. Assessing the site for potential to capture and treat stormwater is an opportunity to provide additional water quality and stream channel protection to the community.
Chapter 3: Site Assessment and Design for Low Impact Development

3.6 Incorporating LID into Existing Development

*Retrofitting*
Structural stormwater management practices that can be used to address existing stormwater management problems in a watershed.

*Infill Development*
An excellent opportunity for LID stormwater management. Horry County, SC, has open space advisory boards that are in the process of preparing a plan to promote infill as a prioritization tool (Wood, pers. comm., 2013).
Both hardscaping and vegetation choices affect stormwater quantity and quality

- **Soil Preparation**: avoid compaction, stockpile topsoil
- **Mulching**: use organic material; depth and type dependent on landscape use
- **Vegetation**: use natives, reduce lawn cover
- **Maintenance**: soil testing, irrigation, pruning, etc.
Landscaping Misconceptions

- Native Plants are not available
- Many landscaping contractors are less familiar with planting strategies
- Some property owners prefer a more manicured appearance
- Many property owners desire lush green lawn areas and large expanses of turf
- Vegetative systems require a long-term commitment to maintenance
Revisit the Objectives

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Action Items and Timeline

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2. Review the manual sections

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The End
Thanks!

Charleston, SC
Wadmalaw Island