Interpreting and Using the RI Site Specific Soil Mapping Standards and Procedures

Using the New Rhode Island Site Specific Soil Mapping Guide

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Acknowledgments

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Nonpoint Education for Municipal Officials

RI NEMO provides training and technical support to local decision makers in evaluating and managing impacts of land use on local water resources.

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Topics

Why use site soil specific (SSS) mapping?

Where is SSS mapping most useful?

How to interpret and display results?
RI Soil Survey

- Designed for planning.
- Line error plus or minus 40 ft.
- Minimum map unit ¼ acre.
- One soil unit may include several types – complexes and inclusions.
- Urban / filled soils not mapped.

Created at 1:15,840

1” = 1,320 ft.

1” = ¼ mile
Soil mapping is required for local land development applications.

RI Soil survey maps commonly used with site plans at 1” = 40 ft or larger.
Why use Site Specific Soil Mapping

- Soil properties and characteristics can be accurately mapped.
- Provides evidence town officials, developers, land owners need to evaluate suitability for development.
  - Improve communication among all parties.
  - Protects project designers by documenting site planning decisions.
- Standard method ensures fairness and consistency.
Site Specific Soil Mapping applications

- Comprehensive assessment of a parcel for planning and initial site design.
- Siting onsite wastewater treatment systems and stormwater facilities.
- Selection of test sites for more costly and disruptive field investigations.
- Provides better data local board members need to document decisions and prepare findings of fact for difficult sites.
Topics

Why use site soil specific (SSS) mapping?

Where is SSS mapping most useful?

How to interpret and display results?
Where is SSS mapping most useful?

New Applications:

Flexible design to select building sites and promote compact development.

Stormwater management using “low impact” nonstructural methods.

Local needs to avoid or minimize impact in critical areas/marginal sites.
“Conservation Development is a creative land use technique that allows a community to guide growth to the most appropriate areas within a parcel of land to avoid impacts to the environment and to protect the character-defining features of the property.” RIDEM, 2003. The RI Conservation Development Manual
The Design process:

1. Analyze the site
2. Designate conservation areas.
3. Locate areas for development.
4. Locate house sites, layout roads, draw lot lines.
The design process emphasizes early site assessment to identify conservation areas.

- Non-buildable areas – wetlands, regulated buffers, hydric soils, etc.
- Partially Constrained - high water tables < 3.5 ft, impermeable layers, slopes > 15%.

Conservation Development Manual
Design of compact development projects.

New village center

Rural conservation development
Site specific mapping for Stormwater Management using Low Impact Development methods
Low impact development (LID) “a stormwater management and land development strategy applied at the parcel and subdivision scale that emphasizes conservation and use of on-site natural site features integrated with engineered, small-scale hydrologic controls to more closely mimic predevelopment hydrologic functions.” *LID Technical Guidance Manual for Puget Sound.* 2005.
Step 1 – Site analysis
Comprehensive inventory and assessment of on-site and adjacent off-site conditions are the initial steps for implementing low impact development.

Soil Analysis
“LID requires detailed understanding of site soils…for two primary reasons:
1) LID emphasizes evaporation, storage and infiltration of stormwater in smaller scale facilities distributed throughout the site; and
2) on sites with mixed soil types, the LID site plan should locate … less permeable soils and preserve and utilize permeable soils for infiltration.
Jordan Cove Traditional subdivision

Conventional lot layout, standard frontage and setbacks.

Closed drainage system discharges to large detention basin.
“Low impact” stormwater design

Cluster layout with small lots, preserved open space

Bioretention cul-de-sac

Grassed swales

Rain gardens

Pervious roadway

Shared driveways

Jordan Cove LID Subdivision. Dr. Michael Dietz, CT NEMO
Jordan Cove
BMP Cluster Subdivision

- Bioretention area in turnaround
- Shared, Pervious driveways
- Concrete grid lined grass swale
- Rain gardens
Hydrologic group definition: “soils having similar runoff potential under similar storm and cover conditions. Soil properties that influence runoff potential ...are depth to a seasonally high water table, and saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Classified as A, B, C, or D.

Need for Soil Hydrologic group data


RIDEM 2006 Draft updated manual specifies:
• “Use of soil surveys to determine site soil types”
• “Delineate hydrologic soil types on concept site plans to guide site layout and the placement of buildings and impervious surfaces”
Where is SSS mapping most useful?
New Applications:

Flexible design to select building sites and promote compact development.

Stormwater management using “low impact” nonstructural methods.

Local needs to avoid or minimize impact in critical areas/marginal sites.
Municipal requirements for site assessment and impact avoidance may exceed state minimum standards, particularly on marginal sites and in environmentally critical areas.
Hydrological Soil Group & Water Table Depth

- **A**: Very Rapid, >6'
- **B**: Moderate, >6'
- **B**: Moderate, 1.5 - 3.5'
- **C**: Slow, >6'
- **C**: Slow, 1.5 - 3.5'
- **C/D**: Slow/Wetland, 0 - 1.5'
- Variable/No Data

Jamestown Source Water Assessment. 2003. URI Cooperative Extension
The Town of Jamestown

High Groundwater Ordinance

Adopted in 2003 to provide local jurisdiction over development on lots with water table < 3 ft. Amended in 2004, 2005 and 2007. Main Focus:
• Protect groundwater by denitrification, pathogen or microbiological treatment
• Reduce Impervious surface coverage
• Provide adequate stormwater controls
• Protect wetlands and their buffers
• Not to impede groundwater flow

Development of lots within subdistrict “A” (water table less than 18”) requires a special use permit application to include Site specific soils map of the property.

Additional soil test pits may be required on individual lots.

Town of Jamestown website
The Town of South Kingstown
Zoning Section 504
Prohibits location of OWTS within 150 of wetland, except where special use permit is approved. Application requires use of advanced wastewater treatment system and submittal of a Site Specific Soils survey.
The **Towns of North Kingstown and Narragansett**
Establish zoning overlay districts based on soils type and associated limitations.

The **Town of North Smithfield**
has drafted a proposed Zoning Section 6.12 OWTS Setback from wetlands and waterbodies. This requires a special use permit for activities within wetland buffers, to include a development plan with a:

“Site specific soils map of the property prepared by a professional soil scientist recognized by the Soil Science Society, Southern New England Chapter, or ARCPAC certified.”
Elsewhere in New England...

Site-Specific Soil Mapping Standards have been used in New Hampshire and Vermont since 1999.

In Maine Soil survey report must be prepared by a certified soil scientist. Soil surveys must comply with the Maine Association of Professional Soil Scientists’ Standards for Soil Surveys. 
Section 11.
Topics

Why use site soil specific (SSS) mapping?

Where is SSS mapping most useful?

How to interpret and display results?
Goal: Interpret soil mapping units and display visually in useful format for local land use decisions.

Use combination of soil hydrogroups and water table depth as key features for stormwater and wastewater management.

<table>
<thead>
<tr>
<th>Hydrologic Soil Group</th>
<th>Water Table Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Very Rapid</td>
</tr>
<tr>
<td></td>
<td>&gt;6'</td>
</tr>
<tr>
<td>B</td>
<td>Moderate</td>
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<tr>
<td></td>
<td>&gt;6'</td>
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<tr>
<td></td>
<td>Variable/No Data</td>
</tr>
</tbody>
</table>

- Surface Water
- Wellhead Protection Area
- Reservoir Watershed
Hydrologic Soil Group & Water Table Depth

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Jamestown Source Water Assessment. 2003. URI Cooperative Extension
Soil Hydro Group and Water Table Depth (URI)

Current soil mapping available at DEM interactive map server
Slope Categories may be mapped using site specific contours.

Example slope map developed from USGS topography, Source: Paul Jordan RI DEM, interactive map server
Table 7. Classification matrix for soil parent material, wetness, and restrictive layer classes.

<table>
<thead>
<tr>
<th>Depth to Restrictive Layer</th>
<th>Depth to the SHWT</th>
<th>0” – 12” (0)</th>
<th>&gt;12 – 24” (1)</th>
<th>&gt;24 – 36” (2)</th>
<th>&gt;36 – 48” (3)</th>
<th>&gt;48” (4)</th>
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<tbody>
<tr>
<td>Outwash (1)</td>
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<td>111</td>
<td>121</td>
<td>131</td>
<td>141</td>
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</tr>
<tr>
<td>24– 48” (2)</td>
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<td>112</td>
<td>122</td>
<td>132</td>
<td>142</td>
<td></td>
</tr>
<tr>
<td>&gt;48” (3)</td>
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<td>113</td>
<td>123</td>
<td>133</td>
<td>143</td>
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<tr>
<td>Ice Contact Stratified Deposits (2)</td>
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<td>&lt;24” (1)</td>
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<tr>
<td>24– 48” (2)</td>
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<td>222</td>
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<tr>
<td>Dense Till (3)</td>
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</tr>
<tr>
<td>24 – 48” (2)</td>
<td>302</td>
<td>312</td>
<td>322</td>
<td>332</td>
<td>342</td>
<td></td>
</tr>
<tr>
<td>&gt;48” (3)</td>
<td>303</td>
<td>313</td>
<td>323</td>
<td>333</td>
<td>343</td>
<td></td>
</tr>
</tbody>
</table>

Next step – evaluate soil map units and organize into logical rankings.
Next Steps

1. URI will accept comments on SSS mapping standards and procedures.

2. Prepare interpretation guide for local officials, planners, other land use decision makers.

3. Conduct additional training and outreach on manual.

4. Revise as necessary based on comments received.
Questions to address in your workshop survey and open discussion

• Do you see applications for SSS mapping?

• In what type of projects or site conditions would SSS mapping would be most useful?

• What are pros / cons of SSS mapping in your work?

• How should we proceed with this?
Thank you for your attention!

www.uri.edu/ce/wq/

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