VERMONT

Overview of VSMM Volume 1 Working Outline

Vermont Stormwater Management Manual Update, Meeting #5

Central Vermont Chamber of Commerce, Berlin

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STONE ENVIRONMENTAL INC

Horsley Witten Group
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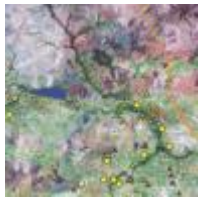




Overview Outline

1 Overall goals

2 Runoff Reduction “Strawman” and its integration into VSMM

3 Draft Volume 1 Table of Contents

- “Big picture”, then section-by-section

ANR's Goals (Sept. 2013)

Vegetated swale. Image credit www.vtwaterquality.org/stormwater/htm/sw_gi_bmp_vegetatedswales.htm

- Preserve what works but use collective expertise wisely to target updates
- Add approaches/practices known to be missing (esp. LID, GSI)
- Balance benefits of changing practices against cost of implementing changes
- Complete revised VSMM in a reasonable, timely fashion
- Be responsive to concerns from EPA that treatment practices currently in VSMM may not be sufficient to meet the Lake Champlain Phosphorus TMDL nutrient reduction goals

ANR and Stakeholder Goals for VSMM's Proposed Standards (December 2013)

- Mimic predevelopment hydrology
- Maximize the use of non-structural practices
- Promote infiltration and evapotranspiration
- Practical and economical to apply and administer

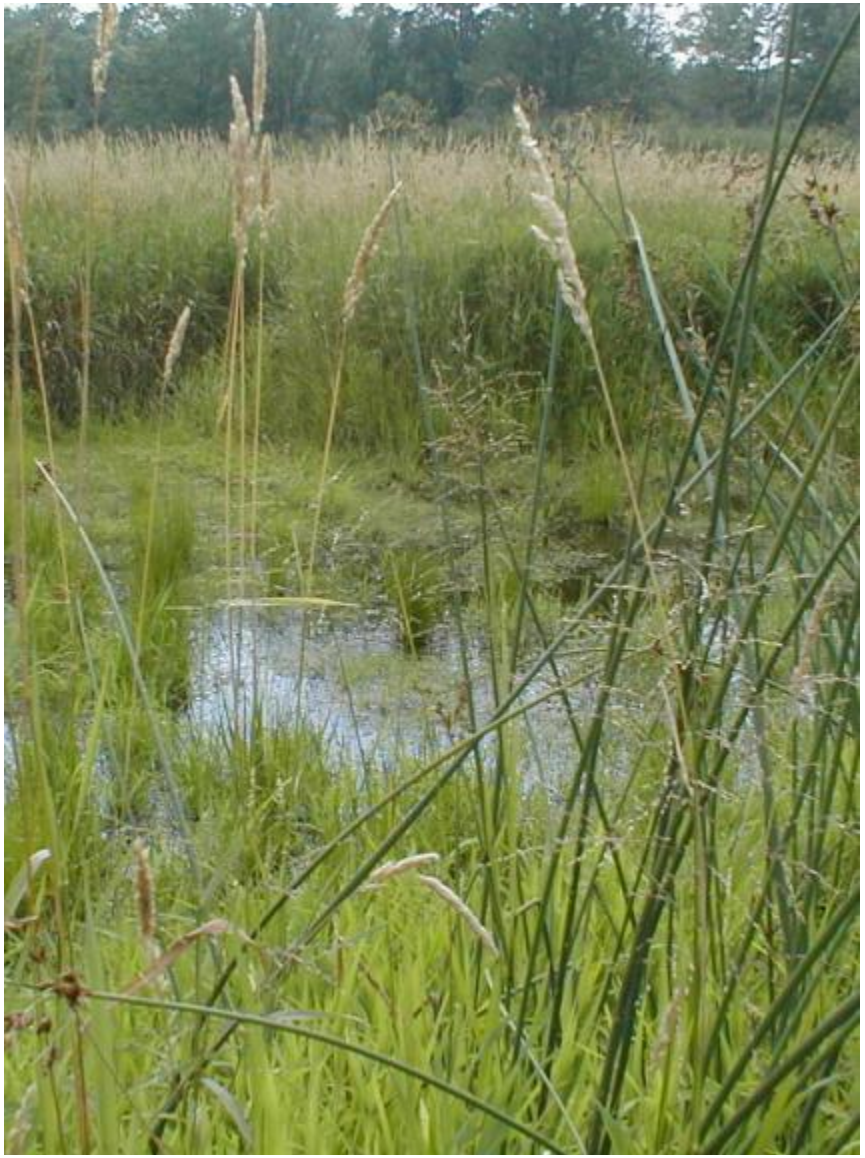
Standards and Framework: "Strawmen" in Meetings 2, 3, and 4

- Draw from relevant approaches in other states
- Find standards and processes that incentivize applicants to meet goals without extensive accounting requirements or design "do-loops"

Standards and Framework: Meeting 4 “Strawman” Process Steps

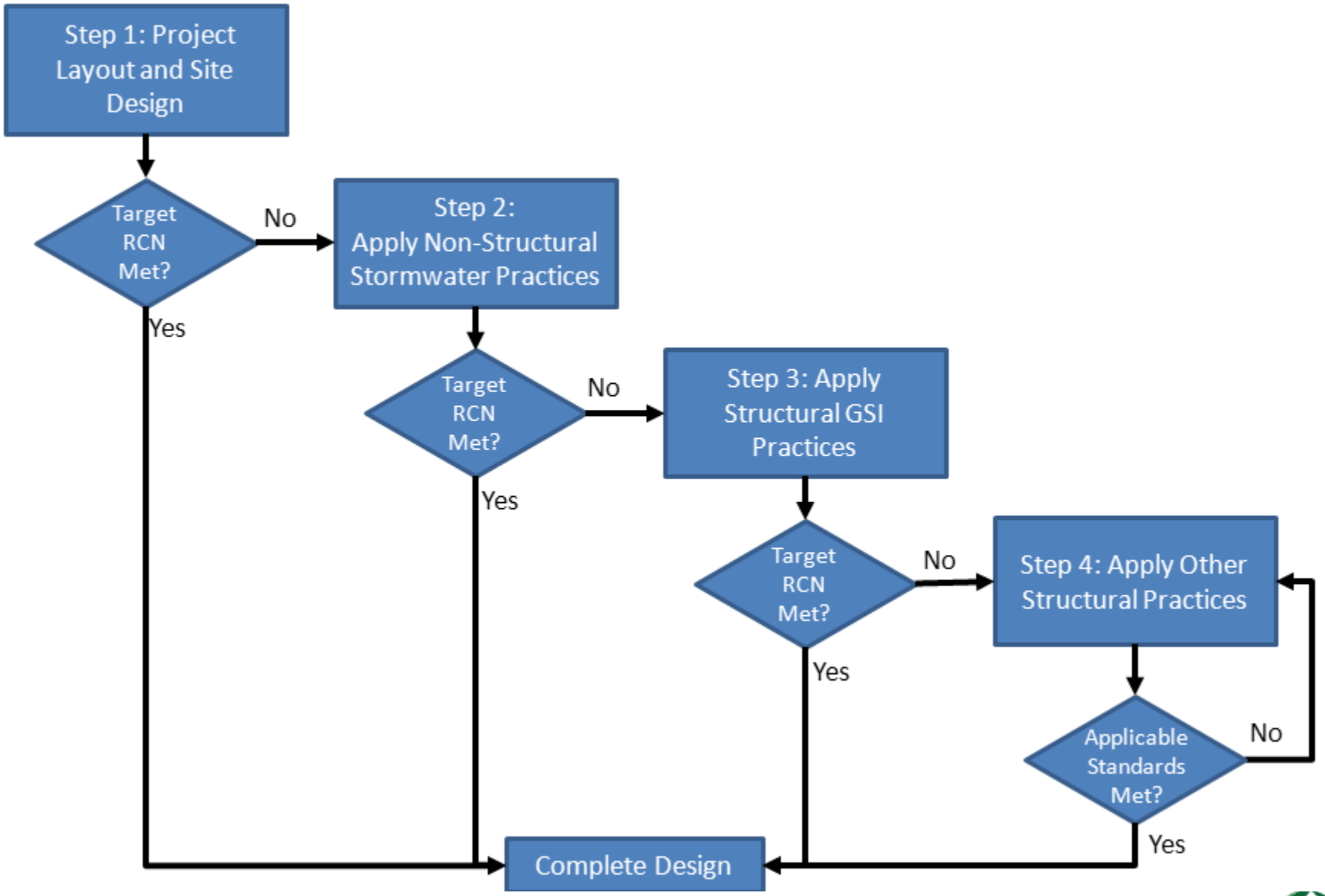
- Step 1: Project Layout and Site Design
- Step 2: Apply Non-Structural Practices
- Step 3: Apply Structural GSI Practices
- Step 4: Apply Other Structural Practices

Integration of the “Runoff Reduction” Strawman into VSMM



- Proposed Volume 1 re-organization follows same flow as the Jan. 2014 “strawman” proposal
- Flowchart illustrates the order in which site planning and design principles are proposed to be applied
- If all applicable treatment standards are met, the project does not need to progress to the next “step” but can instead proceed to design.

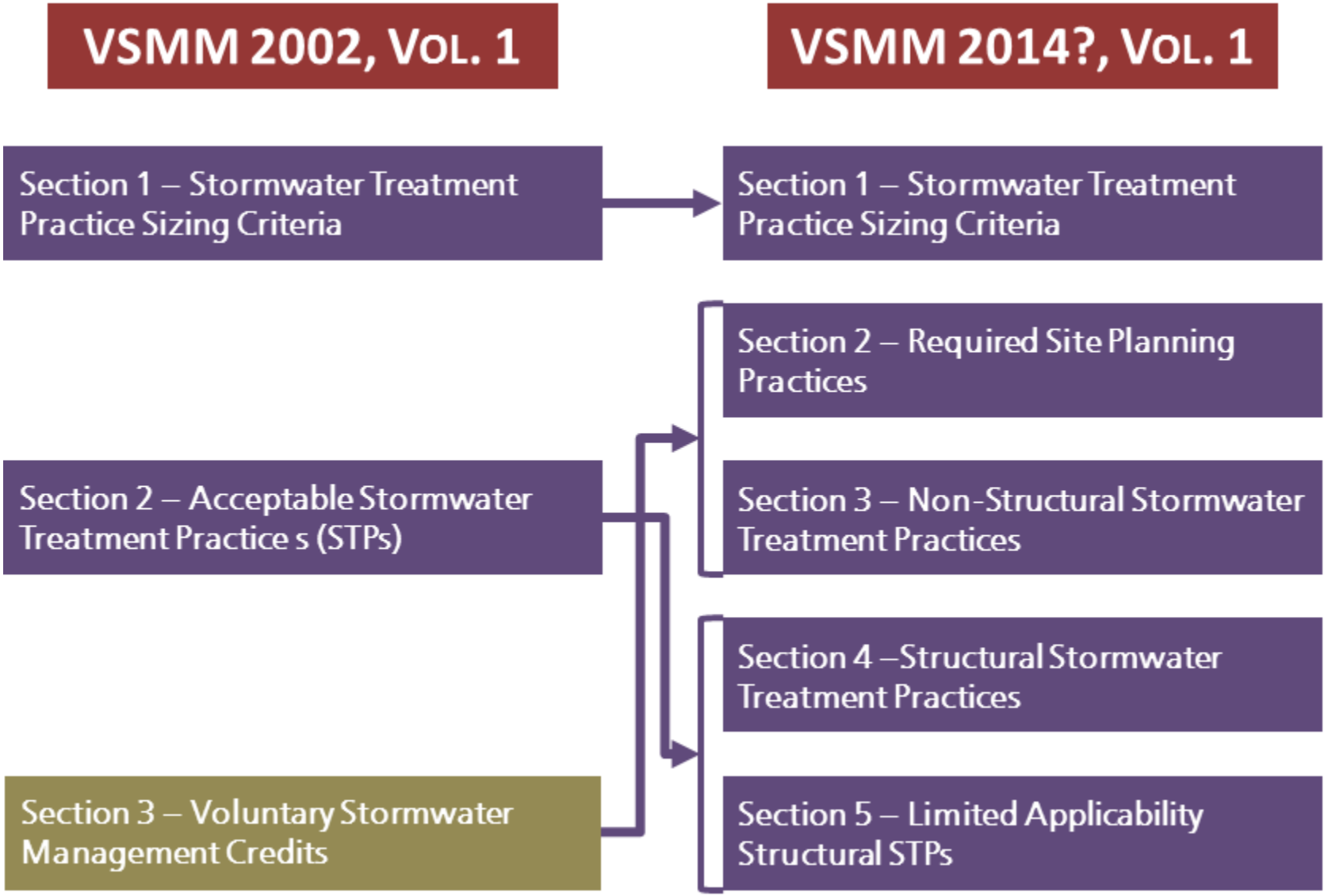
Integration of the "Runoff Reduction" Strawman into VSMM



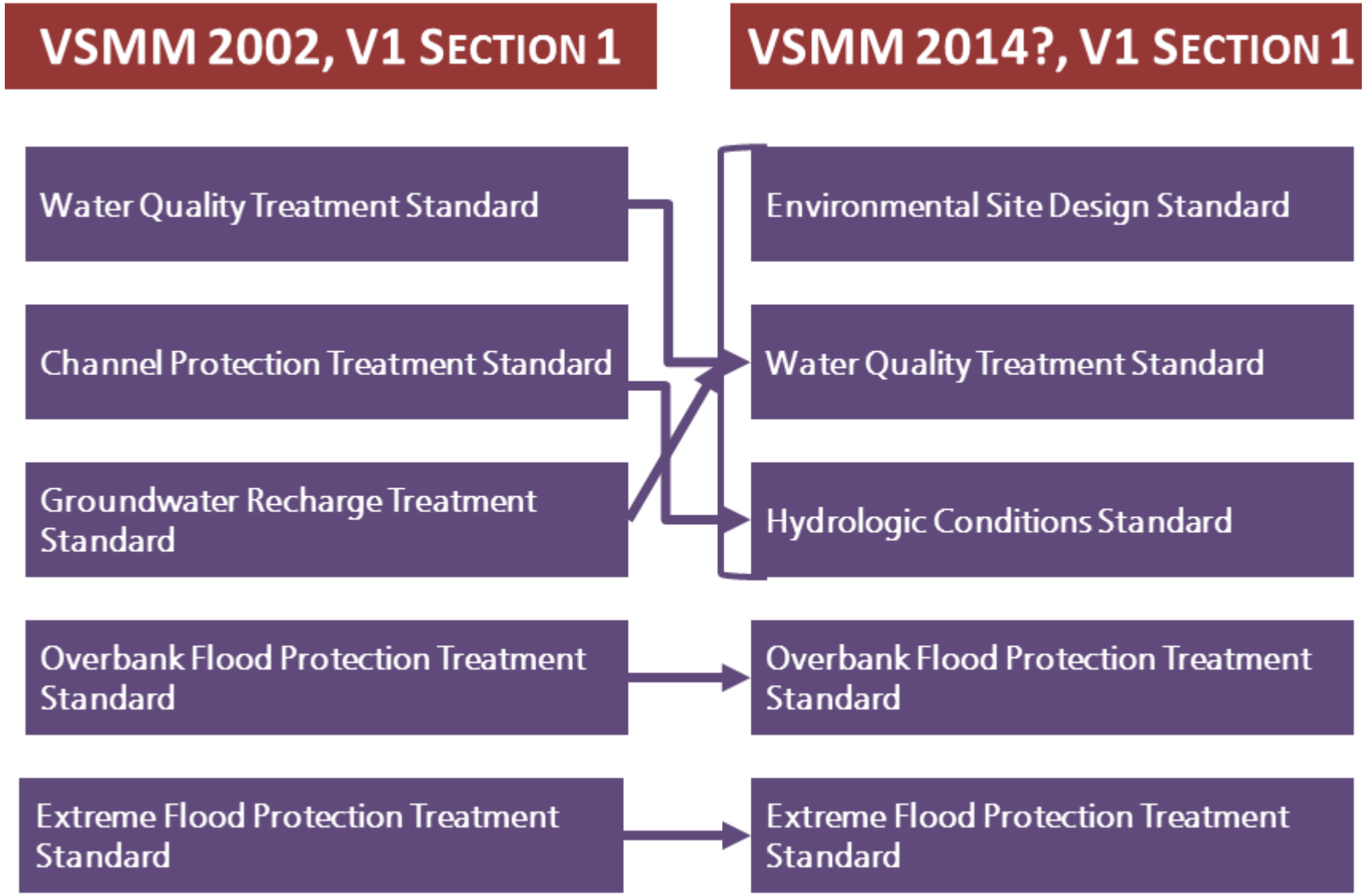
Draft Volume 1 Table of Contents

- First effort to integrate the framework and standards discussed during previous stakeholder meetings into the structure of the existing manual
- Reflects key changes in treatment standards projects may be required to meet, including enhanced attention to importance of site design and non-structural practices in minimizing stormwater runoff volumes
- Retains applicable portions of the 2002 VSMM (like design criteria for acceptable structural STPs and water quantity sizing and treatment standards for higher-magnitude storms)

Draft Volume 1 Table of Contents



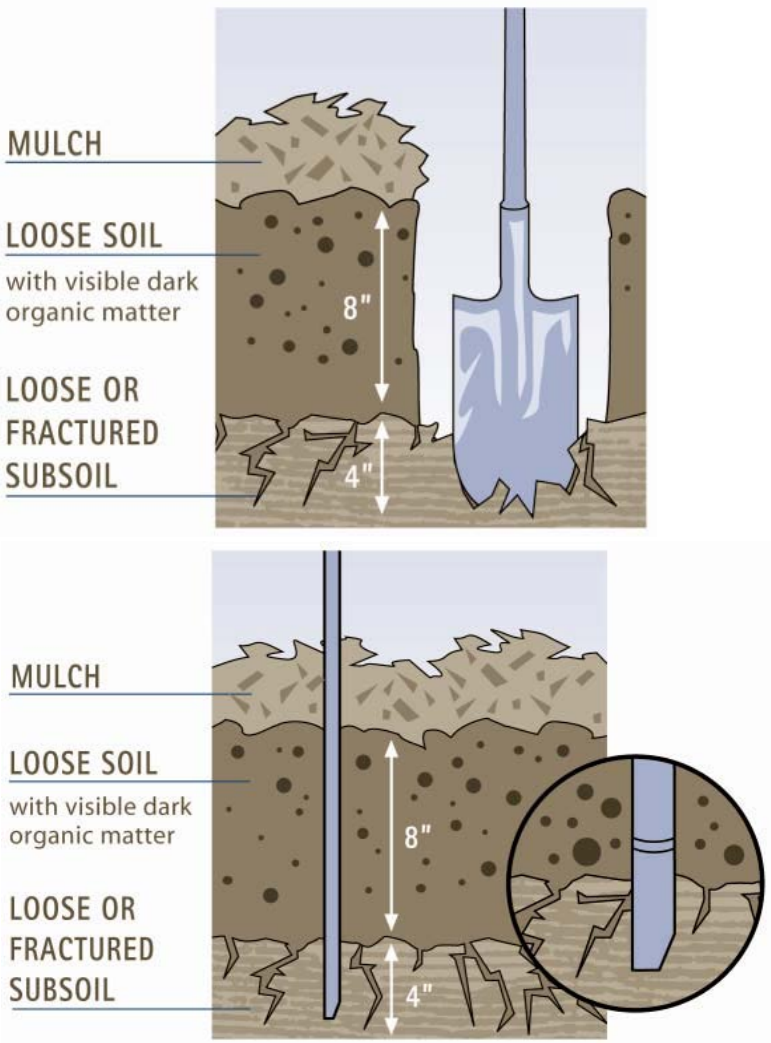
Draft Section 1 - Stormwater Treatment Practice Sizing Criteria



Draft Section 1 – Environmental Site Design Standard

- Encourages key project layout and site design concepts in an effort to avoid the impacts associated with stormwater runoff.
- Site Planning (natural area conservation, buffer / floodplain protection, and limited site clearing / grading)
- Post-Construction Soil Depth and Quality

Draft Section 1 – Environmental Site Design Standard



Illustrations of how to test for compliance with Washington State's Soil Quality and Depth BMP T5.13. Source: http://www.soilsforsalmon.org/pdf/Field_Verification_Guide.pdf

- Post-Construction Soil Depth and Quality
  - Based on State of Washington's and other standards discussed at January 2014 stakeholder meeting
  - Retain undisturbed soils OR re-establish minimum depth of topsoil to meet organic matter, pH, depth standards on cleared/graded land that remains open
  - Meeting this standard will be required, with multiple options for complying
  - Certified with construction completion, not anticipated to be annually inspected

Draft Section 1 – Water Quality Treatment Standard

- Target rainfall used to size practices based on a rainfall depth of 1.0 inch, rather than 0.9 inches
- "First inch" required to be managed using non-structural and structural GSI practices
- Will meet the goals of and therefore subsume the existing Groundwater Recharge Treatment Standard

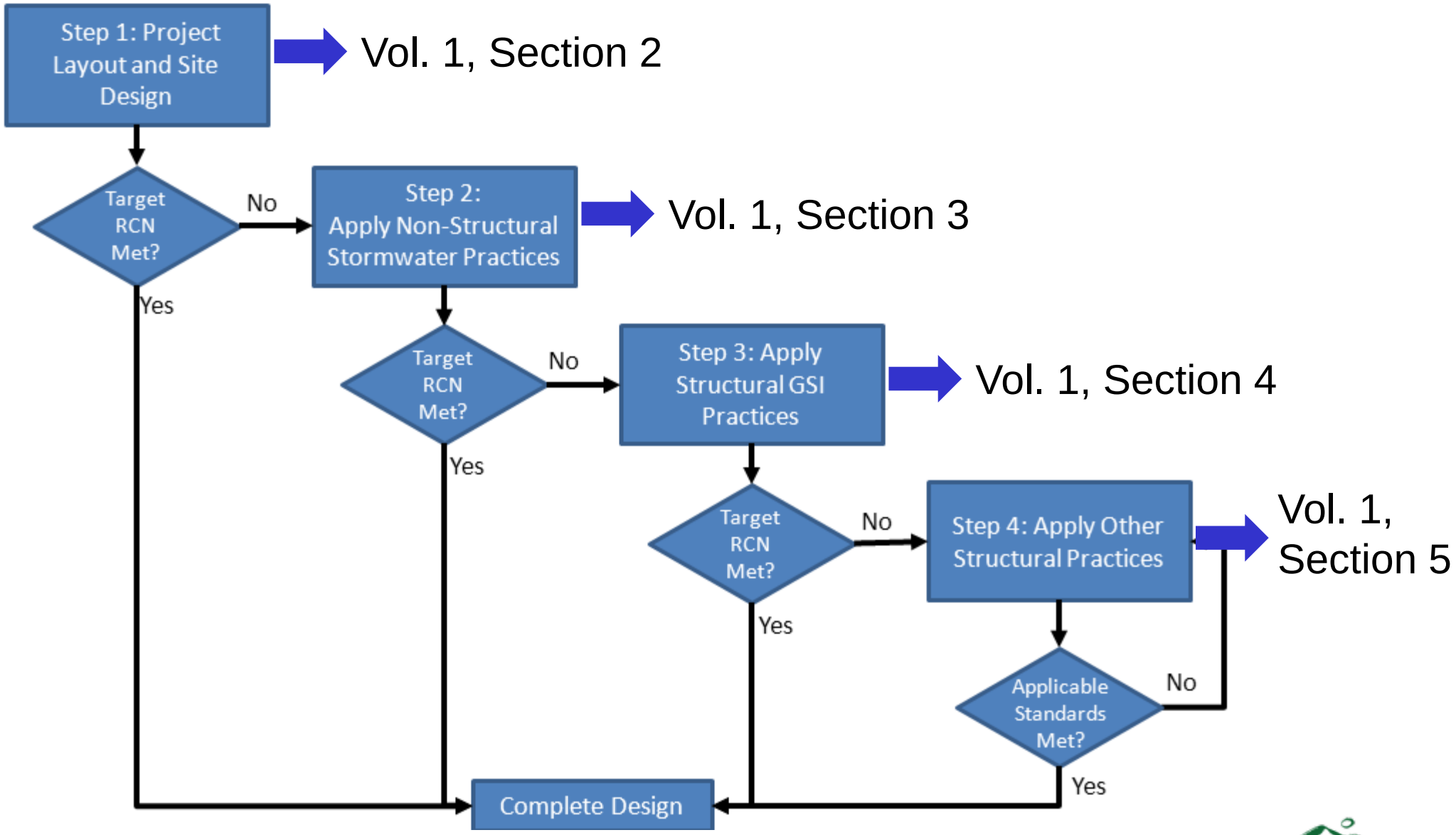
Draft Section 1 – Hydrologic Conditions Standard

- Target P_E (rainfall used to size practices) determined using site soils and proposed imperviousness; goal is to mimic “woods or meadow in good condition”
- If non-structural and structural GSI practices are used to demonstrate that the project’s post-development runoff curve number (RCN) is equivalent to the pre-development woods/meadow in “good condition”, then the equivalent of the current WQv and CPv requirements will be met.
- If target is not met, a reduced RCN reflecting non-structural and structural GSI practices that will be implemented is applied to Hydrologic Conditions calculations.

Draft Section 1 – Overbank and Extreme Flood Protection Treatment Standards

- No changes to the criteria (except to check rainfall depths against more recent datasets)
- Reduced RCN reflecting the non-structural and structural GSI practices that will be implemented is applied to the calculations for Q10 and Q100

Integration of the "Runoff Reduction" Strawman into VSMM



Jan. 2014 “Strawman” Steps and Goals

Step 1: Project Layout and Site Design

- Avoid disturbance of vegetation and soil on steep slopes and near surface waters and other sensitive environmental areas
- Avoid mass clearing and grading; limit clearing and grading to the minimum needed to construct the development and associated infrastructure; minimize impacts to historically undisturbed vegetation and native trees
- Build on the least porous soils; limit construction activities to previously disturbed soils; minimize soil compaction

New Section 2:
Required Site Planning Practices

2.1	Site Planning
2.1.1	Natural Area Conservation
2.1.2	Buffer/Floodplain Protection
2.1.3	Limit Site Clearing/Grading
2.2	Post-Construction Soil Depth and Quality

- Will contain requirements and details for each of the required site planning elements.
- These elements must be considered and applied before proceeding to non-structural or structural practices.
- Post-construction soil depth and quality standard must be met for all pervious surfaces.

Jan. 2014 “Strawman” Steps and Goals

Step 2: Apply Non-Structural Practices

- Maximize the use of non-structural practices to capture the WQv and CPv
- Enhance ability of background land cover to reduce runoff through practices such as soil amendment and planned reforestation
- Manage stormwater close to the source and redirect it back into the ground using practices like rooftop and non-rooftop runoff disconnection, sheet flow to undisturbed natural/conservation areas and vegetated filter strips, and grassed channels

New/Revised Section 3: Non-Structural Stormwater Treatment Practices

3.1	Reforestation
3.2	Disconnection of Rooftop Runoff
3.3	Disconnection of Non-Rooftop Runoff
3.4	Filter Strips and Vegetated Buffers

- Will contain design requirements and details for each acceptable non-structural element
- These must be applied before moving on to the structural GSI practices, but no individual practice is specifically required on a site

Jan. 2014 “Strawman” Steps and Goals

Step 3: Apply Structural GSI Practices

- Maintain predevelopment runoff characteristics
- Maximize the use of GSI practices for the treatment and control for WQv and CPv; if the reduced RCN for a drainage area with structural GSI practices reflects “woods in good condition” or “meadow in good condition”, then CPv is assumed to have been met.

New/Revised Section 4: Structural Stormwater Treatment Practices

4.1	Pre-treatment Practices
4.2	Alternative Surfaces
4.2.1	Green Roofs
4.2.2	Permeable Pavements
4.2.3	Reinforced Turf
4.3	Rainwater Harvesting
4.4	Stormwater Treatment Wetlands
4.4.1	Submerged Gravel Wetlands
4.5	Bioretention Areas & Rain Gardens
4.6	Grass Swales and Bio-swales
4.7	Infiltration Trenches/Basins

- Will contain design requirements and details for each of the acceptable GSI structural elements
- These must be applied as appropriate before moving on to the other structural practices, but again, no individual practice is specifically required on a site
- Alternative surfaces (green roofs, permeable pavement, etc.) and rainwater harvesting will be added; bioretention will be expanded; details and criteria for other well-established GSI practices will be updated.

Jan. 2014 “Strawman” Steps and Goals

Step 4: Apply Other Structural Practices

- Use “other” structural practices to meet peak flow control requirements only after use of GSI practices has been maximized.

Revised Section 5: Limited Applicability Structural Stormwater Treatment Practices

5.1	Pre-treatment Practices
5.2	Practices that Meet the Water Quality Treatment Performance Standard
5.3	Practices that Meet Water Quantity Requirements
5.4	Proprietary and Alternative STP Designs

- Will contain design requirements and details for each of the other structural elements
- Can only be utilized after non-structural practices and structural GSI practices
- No individual practice specifically required
- Filtering variants that do not infiltrate (e.g. sand filters F-1 through F-3, organic filter F-4) fall under 5.2 Water Quality, with updated details/criteria
- Ponds (P-1 through P-5) and surface flow wetlands (shallow wetland W-1, ED shallow wetland W-2, pond/wetland system W-3) fall under 5.3 Water Quantity, with updated details/criteria

Questions?