



Standards Oversight Council (SOC)

Developing effective technical standards that protect Wisconsin's natural resources

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NRCS 635 Vegetated Treatment Area Standard Team

MEETING NOTES

Wednesday, November 1, 2023 ▲ 9:00am – 12:00pm ▲

Online Meeting

9:00 Welcome (Kate, Team)

Attendance: Kate Brunner, Steve Becker, Justin White, Travis Buckley, Bernard Michaud, Adam Moris, Emily Micolich, Chase Brouillette

Absent: Eric Young

Guests: Andrew Craig (Watershed Bureau Nonpoint Source Program at DNR)

9:05 Notes Review (Kate & Team)

Goal: Review and approve 9/6/23 draft meeting notes.

Draft meeting notes from 9/6 meeting were emailed to the team for review. There were some action items, completed as part of topics expected to be discussed later in the meeting or are ongoing. No team comments or questions raised on the notes; Kate will finalize and post online.

9:10 WinSRFR Modeling (Adam)

Goal: Review WinSRFR models with adjustments related to depth and discharge rates.

At previous meetings, Adam went through variations of the WinSRFR hydraulic model.

At last meeting Team discussed some variations in modelling to use constant flow rate (this terminology will be used, as opposed to “managed flow”) to hit a larger flow depth and optimize water applied. Adam presents a tabulation of modeling results to the team. Key points of updated modeling results and team discussions:

- Initial sensitivity analysis showed VTA size jumps up quite a bit to increase flow depth from optimized infiltration to a target flow depth of 2” (e.g. from 160’ to 260’ long in silt loam, 160’ to 310’ in clay loam). Model confirms that water arriving faster results in a much larger area.
- Assuming the optimized infiltration modeling approach, to maximize efficiency of infiltration, he modelled different drainage areas and sizes to compare VTA sizing by soil texture.
 - This VTA modelling comparison table (“WinSRFR VTA Modeling Summary AJM (10-17-23).pdf”) was emailed to team with the meeting agenda.

- Application rates are different in latest modeling comparison to optimize infiltration rates for different soil types. The soil type would effectively change settling basin design size because of infiltration differences by soil type.
- The hope was that a table like this would reveal a pattern or cutoff; however, there are a lot of variables and controlling too many variables restricts designs for farmstead flexibility.
- Alternate option proposed is to include WinSRFR with outside boundary conditions in the draft standard. Scale has a role in VTA effectiveness.
- Adam shows a few of the updated model simulations.
- Alternate option proposed is to include WinSRFR with outside boundary conditions in the draft standard. WinSRFR was developed by USDA Agricultural Research Service (ARS) for ag applications. It's been peer reviewed and is already used in other states for irrigation for >20 yrs. Software is in the public domain and user interface is simple. Even with modelling required, the standard would include some "boundary conditions" like max length and width as sideboards for the VTA design.
- Bernie had some real world VTA failures that he had Adam model in WinSRFR to check the model accuracy. Model looked different from actuality, though complicating factors like previous moisture, uneven flow, very large contributing areas, and VTA sizing/proportions not optimal.
- Modelling 1-year storm event, which is the majority of storms (~90%?). Doesn't include antecedent moisture

9:30 Nutrient Balance (Adam and Steve)

Goal: Review draft table summarizing nutrient balance (runoff to yield).

As homework from the Sept meeting, Adam and Eric worked together and created a VTA-nutrient balance table similar to Montana NRCS, which was emailed to team with the meeting agenda (see "MT NRCS VTA Nitrogen Balance Check AJM (10-17-23).pdf"). The table calculated the N removed from plant uptake based on different yields.

A 2006 guidance document was also emailed to the team for background (see file "Section 5 Excerpt (Koelsch et al 2006).pdf") on the plant-available nitrogen for different animals. This guidance document was used in conjunction with the balance check table to come up with the proposed draft language in the standard. Some questions on this data:

1. This research showed that 5% of excreted nitrogen ends up in feedlot runoff, that 50% of N delivered to the settling basin continues to the VTA, and that 50% of N that enters the VTA is plant-available (i.e. 1.25% of excreted N becomes plant available). Not sure if this 95% is because of scraping the lots or not.
2. How is it managed before it gets to the VTA—assumptions for scraping, source control, clean water diversions, etc.?

Team reviews the proposed standard language for Additional Criteria for Nutrient Balance together on-screen and discusses.

- What does it look like with Wisconsin values?

- Some state-specific data would be more appropriate. The 590 team recently heard a presentation from and UW researcher on manure characteristics; Kate can share the slides from that presentation.
- Animal density numbers look appropriate.
- APLE lots includes work by Laura Good and Pete Vadas related to manure production (mass, not N) by animal types and may provide data on Wisconsin specific data. Laura would be a good resource to update and confirm the manure production and nutrient balance details for the standard.
- Yield of the vegetation may also vary from MT to WI so this will need some evaluation to possibly adjust for Wisconsin.
- Use of “growing season” may need to be adjusted. Also consider what is being done in the off-season (e.g. # animals on the lot, vegetation).
- The national standard has a consideration regarding splitting the waste stream in sensitive areas. Two strips vs 1 would provide for clearer intent on minimizing loading in one area to maintain better nutrient balance (like total redundancy in the strips).
- Nutrient loading won’t be balanced for update. Standard should include source control options to reduce loading.
- Settling basin – removal of nutrients as maintenance. When removed, this should be considered a source for land application under a nutrient management plan (add 590 reference).
- Plant species – The research paper studied alfalfa hay which wouldn’t survive wet conditions very long. Different species should be considered for nutrient update but also both warm and cool season plants that will also withstand frequent saturation.
- Water quality trading and taking credit for VTAs for P reductions – this standard could help clarify design aspects and facilitate better designed VTAs that could provide P reductions but this standard does not include P reduction specifically. Sites eligible for trading have limitations as well that wouldn’t be included in this standard. Vegetation doesn’t meaningfully remove P though settling basin helps.
- Andrew is available for further input and review of the text when the time comes.
- Adam will forward the full 2006 report to Andrew.

10:45 Break

11:00 Group Discussion (Steve)

Goals:

- Discuss technical details for uniform flow and leveling systems;
- Discuss whether/how to include CAFOs;
- Discuss the design storm and evaluate the VTA performance expectations;
- Develop a feedlot area to VTA ratio for Phosphorous;
- Develop a feed storage area to VTA ratio for diluted leachate runoff.

Draft technical standard was emailed to the team before this meeting (see file “Draft CPS 635 (10-24-23).pdf”). Black text is national language and yellow highlighted text is proposed new language. Team reviews on screen together.

- The VTA would not be a replacement for a pond, which is more appropriate for larger areas/volumes.

- Max tributary area (paved feedlots/feed storage areas up to 0.66 acre and earthen feedlots up to 1.0 acre) proposed in the standard based on checking a lot of sizes to see what proportionality modelled as reasonable maximums.
- CAFOs excluded from using a VTA. A permitted CAFO may have a satellite farm that may want to use a VTA though it would then need to be set up for 25-year storm and all the considerations that would go with that complicate writing. Team also doesn't want to open door to "workarounds" and prefers generalized language. Outside review may reveal wider perspective on this.
- Team also discusses prohibiting multiple VTAs lined up next to each other. Wording can be clarified as Team looks at the body of the standard text.
- National standard includes language to design for 25-yr 24-hr storm, but VTA doesn't need to treat all of it which can be confusing to apply. The modelling and drafted text is for 1-year storm design with some other details to prevent overtopping (e.g. end block, settling basin, rerouting?). Team discussed options for the volume >1 year storm so there isn't VTA blowout on larger storms.
 - Could keep storing until you can treat it (like current standard) but more clarity is needed.
 - "Unless discharge permitted" part of national text may need adjustment. They will be held to the DNR significant discharge language and cannot allow damage, though this federal language could be more explicit.
 - A settling basin could have capacity for the extra volume not treated by the VTA.
 - If desire is for keeping the larger magnitude event OUT of the VTA, then design would need something like an auxiliary spillway.
 - Team may consider striking the entire paragraph about treating 25-year storm; and will return to editing this after reviewing the more detailed design criteria.
- Additional Criteria for Site Suitability includes the
 - Sampling – Ensure there are locations at upper and lower ends of the proposed VTA, language changed to sample every 100 feet with minimum of 2 samples.
 - No VTAs in sand or sandy loam.
 - Reference added to FEMA map to exclude siting in 100-year floodplain. Team had discussed possibly using the 25-year floodplain though map is not readily available and this was a hurdle to design. Team doesn't want to adjust language but acknowledges that other standards (e.g. compost) have language to allow within the 25-year boundary with extra protection.
 - Separation distances were as previously discussed in team meetings.
 - Setbacks will be clarified to be from all sides (drain tile) or off the end of the VTA (most others).
 - NR 812 citation is for the well definition and not the distances.
 - Team acknowledges the setbacks don't address when there is deep percolation though other aspects of design.

- WinSRFR incorporated into the standard, with sideboards. It's readily available and easy to use. Adam is also available to assist. Job approval authority will be simple to allow for wide use.
- Parameters for sizing are specific to min and max for both length and width. A ratio is proposed but will be removed. Scaling them up in size are less effective at distribution and infiltration
- Team discusses options for multiple VTAs.
 - If they are designed correctly, then having more than one should not present an issue.
 - Any failure would be compounded, though design sideboards are so there is not failure. Nitrogen uptake and infiltration would be additive if there are multiple VTAs next to each other so the impact is greater.
 - Team will wait on public comments and see what wider input is.
- Slope restrictions changed to be allowable within 0.5 to 3.0% based on modeling steeper slopes.
- Sample runoff calculations are reviewed, though Team thinks they are overwhelming and unnecessary. The spreadsheet to come up with runoff depths is available and more simple than a calculation. Right now, the pond spreadsheet won't give a correct depth with a CN>95; NRCS will correct this.
- If it ends up being necessary, there could be a companion document, which could include things like detailed calculations and WinSRFR screen shots.
- The meeting end time arrives before all the proposed edits are reviewed. Team will try to make progress before the next meeting by reviewing and commenting on the text via shared file.
 - Some agencies have access issues with cloud file sharing. **Kate** will look into an option that will work for DNR, DATCP and NRCS.
 - **Adam and Steve** will make edits to text based on discussions in the meeting today.
 - When complete, **Kate** will forward updated file for Team to review. **Team** members should each provide comments before the next team meeting and then the next agenda will focus on topics that show team discussion is warranted (as opposed to editorial type of comments).

11:50 Review Action Items and Next Steps (Kate)

Next meeting will be December 6 as a remote meeting from 9:00 to noon. Agenda will include:

- Final discussion on draft standard, focusing on topics with substantive Team comments.
- Selection of experts for the Initial Review. Team should think about who they'd recommend as a reviewer and the team will then come up with the final list.

Action Items developed today:

1. **Kate** will share the slides from a recent Joel Peterson presentation on manure characteristics for Team to consider updating the state-specific data in the nutrient balance section.
2. **Adam** will forward the 2006 Koelsch report to Andrew, not just the excerpt.
3. **Kate** will look into a file sharing/commenting option that will work for DNR, DATCP and NRCS.
4. Preparing standard text:
 - a. **Adam and Steve** will make edits to text based on discussions in the meeting today.
 - b. When complete, **Kate** will forward updated file for Team to review.
 - c. **Team** members should each provide comments before the Dec. team meeting.
5. **Team** should think about who they would recommend for Initial Reviewers. This will be discussed at a future meeting (likely December).
6. **Kate** will prepare draft meeting notes from today, then reviewed by full **Team**.
7. **Kate and Steve** will prepare agenda for December 6. Kate will send to the full team about 1 week in advance along with any reading materials.

12:00 Meeting End