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NRCS 635 Vegetated Treatment Area Standard Team
MEETING NOTES

Wednesday, July 5, 2023 ▲ 9:00am – 12:00pm ▲

Online Meeting

9:00 **Welcome** (Kate, Team)

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

Absent: None
Guests: None

Notes Review (Kate & Team)
Goal: Review and approve 6/7/23 draft meeting notes.

Draft meeting notes from 6/7 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.

No team comments or questions raised on these notes; Kate will finalize and post online.

Refining Setbacks (Bernie)
Goal: Discuss setbacks that had substantial team input and decide on vertical and horizontal setbacks.

The team spent time at the past 2 meetings understanding more about the history and regulatory requirements for some of the current setbacks. Some proposed adjustments were emailed to the Team for input and a few key setback features are discussed:

- Setbacks are distances off the end (not side).
- Setbacks aren't intended to take into account improper usage or a violation type of activity.
- Setbacks for subsurface drain tiles – Initially there were greater setbacks for larger VTAs for all the conduits to groundwater since the larger size was perceived to have greater risk.
    - Team discusses that the standard requires appropriate VTA sizing that takes into account the drainage area, so the setback shouldn't need to have extra measure of safety.
    - Subsurface drain setback - Drain tile design uses lateral effect tables using soil types, tile depth, tile size so not something team could just average—setback ranges in WI from 22' to 500'. Drain tile design setbacks are generally around 40' in clay, 50' is silts & loams, 100" for sands.

  - Subsurface drain setback changed to be a general criteria rather than shifting distances by size.

- Term definitions in the Glossary will clarify the terms to allow for grouping of like features. Some are defined by state. For example, "conduits to groundwater" used in previous standard is not just sinkholes, includes things like fractured bedrock.
- Ponds referenced in this standard would be the agricultural ponds (NRCS CPS 378).
- Team comes up with consolidated and simplified surface water categories and distances, including:
  - Wetlands and artificial ponds at 100'
  - Streams, rivers, gullies (classic, not ephemeral), surface inlets at 200'
  - Nav. lakes and flowages (add definition of flowage vs stream) at 500'
- Property lines: Add setback for flowpath end of VTA to right-of-way. Property boundaries are not really addressed in other NRCS standards.
- No setback differentiation by size for channelized flow or subsurface drains.
- CAFOs will be included in the standard, with different setbacks due to the zero discharge requirement.
  - There will just be CAFO compliant or not CAFO compliant approach.
  - Details for CAFOs will be based on information from Adam's WinSRFR modeling.

Bernie will clean up the setbacks table with team discussion, remove the comments, and send to Kate and Steve.

Future team topic: Team to confirm inclusion of the first flush collection system and possible changes from current standard. Discovery Farms has done research on this topic, including P and N concentrations, which Adam has for use in modeling.

WinSRFR Modeling (Adam)
Goal: Review infiltration/runoff results for a variety of VTA scenarios.

Adam previously showed some treatment scenarios and preliminary testing of the WinSRFR hydraulic model. He emailed around a spreadsheet of his scenario calculations to the Team. He shows the team modeling for the 10 specific scenarios.

A summary of the models:

- Adam truncated the hydrographs (3-hour time frame) at beginning and end to make it work with the # of timesteps allowed in the model.
- 25-year storm event used in modeling.
- Model shows distribution of runoff, root zone, and deep percolation—animation, tabulated details and summary charts.
- The model assumes uniform flow which can be problematic in reality as VTAs get larger.
- There's also nitrogen to consider, which isn't part of this modeling. N is more mobile than P and doesn't bind with the soil so it heads to groundwater more quickly. After the initial modeling complete, could calculate N using the mass balance.

- Applied the model for mass balance and the P is front loaded. The concentration of P modelled running off the end is a proportion of the total runoff.
    - Model uses mass balance; assumes no uptake of P by vegetation.
    - Discovery Farms study of feed storage areas found there were higher concentrations in the beginning of the storm event, and at the tail end. Peak flow wasn't clean, but lower.
    - APLE-Lots gives total P. Discovery Farms study showed feed storage area were about 50% dissolved fraction of P.
    - One possible adjustment to the model would be to scrap fertigation and assume a percentage of the runoff is P to come up with a load, regardless of timing of when the load is lesser or greater for each storm. Take runoff volume of a storm along with the loading from APLE-Lots, then use the volume % discharge at the end and apply the mass.
    - The hydrograph can be adjusted to match the load.
- Next steps (for **Adam**)
    - Scenario adjustments:
        - Feedlot – Current standard allows a VTA for a max 10,000 sf feedlot. 1 acre was EFH2 minimum but this can be skipped now. Adam will model a smaller feedlot scenario of ¼ acre.
        - Feed storage – he'll shift away from the maximum and use 1, 2 and 5 acres.
        - Slope adjustments – current national has range of 0.3 to 6%. 1% is more common and less is harder to construct and maintain.
    - For each scenario, run the 2-year hydrograph and adjust VTA sizing to have full infiltration without deep percolation. This 2-year storm has a 50% chance of occurrence so fairly frequent and that would be less likely to have rain reach then end of the VTA.
    - Then use those sizes from a 2-yr storm, and model again with dosing for the 25-year storm. How much total volume ran off the end and how much is deep percolation?
    - For P he'll use the average annual P load, and then calculate the P load that came off the end in the 25-year storm.
    - Feedlot modelling will remove the first flush. From current WI standard "Collect all leachate and the initial runoff volume of 0.20 inches from each rain event in a Reception Structure designed in accordance with the criteria contained in WI CPS, Waste Transfer (Code 634). This leachate and runoff shall not be applied to the VTA."
    - NRCS's life expectancy for VTAs is 10 years of operation. The soil would accumulate P during that time and the modelling of 2-yr and 25-yr can help understand the mass of P that would accumulate.

  - It could be valuable to evaluate loading of an even smaller rainfall event. This may be concentrating nutrient impact to the upper soil.
  - **Adam** will check in with Ed Hopkins at state climate office to see if they could summarize statewide historic rainfall data (e.g., median rainfall depth, or annual volume). If this isn't available, the 1-year storm would be useful.

- WinSRFR doesn't incorporate direct precipitation on the VTA, only runoff received from the tributary area. Could take this into account by adding another tributary area which would have even spreading (i.e. not loaded on upper slope).
- Another model consideration is the percent moisture and water holding capacity of the soil. A larger storm can saturate the VTA before any runoff is received. Different soil types have different water holding capacity, and we can't assume the entire soil profile is dry.
- In practice, VTAs often have other practices at the front end, like settling basin to remove some solids.
- Deep percolation levels can help inform the setback for bedrock. Groundwater mounding may also be considered, as it is in urban stormwater modeling.

Break as needed

Plan of Action (Kate, Steve)
Goal: Identify topics and goals for the next team meeting. Review Action Items.

Next meeting is August 2 meeting and will be remote 9-noon. It was initially going to be in person but with current status of team we need another virtual meeting before this would be a productive time for in person meeting. Emily will be absent from August meeting. Change to plan: Sept. 6 will now be **in person** as a full day meeting. **Kate** will change calendar entries.

Agenda will include Adam presenting revised model results. Steve will also develop other agenda items from parked topics and looking at the pre-team survey results. Some topics previously parked:

- Reviewing and refining technical details like uniform flow and leveling systems.
- How/whether to include CAFOs – If included, there will need to be separate section for CAFO setbacks and other design elements like end berm usage.
- What level to treat to? For example, should we design for full infiltration without deep perc for 1 yr event (modest treatment on 25-yr storm)? Or full infiltration without deep percolation for 25-yr storm?
- Sizing adjustments, such as:
  - Adjustments for removing collected/stored volumes before runoff hits VTA (first flush collection).
  - Adjustments for amount of feed being stored.
  - Adjustments for runoff from tarped (clean) vs untarped (leachate) feed.
- Other federal standard requirements that are different from current WI standard?

Action Items developed today:

1. **Adam** will run some revised models based on suggestions developed during the meeting.
2. **Adam** will check in with Ed Hopkins at state climate office to see if they could summarize statewide historic rainfall data (e.g., median rainfall depth, or annual volume) for more refined modeling.
3. **Bernie** will clean up the setbacks table with team discussion, remove the comments, and send to Kate and Steve.
4. **Kate** will prepare draft meeting notes, then reviewed by full **Team**.
5. **Kate** and **Steve** will prepare agenda for Aug 2. Kate will send to the full team at least 1 week in advance.
6. **Kate** will update calendar entries for Aug. 2 (now virtual 9:00-noon) and Sept. 6 (now in person 9:00-2:30).

12:00 **End** - Meeting ends at 11:45