TETRA TECH

Chesapeake Bay Expert Panel on Onsite Wastewater Treatment BMPs – Stakeholder Meeting

April 27, 2016

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Agenda

- **1:00 – 1:10 pm Roll Call/Introductions**
- **1:10 - 1:30 am Background for Stakeholders**
  - CBPO Introduction (Ning/David)
  - Technical Overview (Marcia/Vic)
- **1:30 – 2:30 pm Stakeholder Presentations**
  - Anua Presentation (Colin Bishop)
  - Geomatrix Presentation (David Potts)
- **2:30 – 2:55 pm Open Discussion (all)**
- **2:55 – 3:00 pm Call wrap up and next steps (Vic)**

Panel Members

At Large

- Kathryn Lowe, Colorado School of Mines
- Larry Hepner, Delaware Valley College
- David Lindbo, USDA-NRCS
- Sarah Heger, University of Minnesota
- John Buchanan, University of Tennessee
- Steven Berkowitz, North Carolina Onsite Water Protection
- Robert Goo, EPA-OWOW

Bay States

- Dave Schepens – DNREC
- Jack Hayes – DNREC
- Scott Eichholz – DNREC
- Jason Baumgartner – DNREC
- Jay Prager – Maryland DEP
- Tom Boekeloo – New York State DEC
- John Diehl – PA DEP
- Eric Severson – VDH
- Jay Conta – VDH
- Marcia Degen (Chair) – VDH
- Dave Montali – WV DEP

Review of Previous and Ongoing Panels

- Onsite Wastewater Nitrogen Removal BMP Panel
  - Addressed suite of BMPs to reduce nitrogen loading versus baseline
  - Report accepted 2014
- Onsite Wastewater Nutrient Attenuation Panel
  - Evaluating baseline nutrient load reductions between drainfield and surface waters
  - Report in progress – to be finalized in summer/fall 2016

OWTS Panel Charge

- Initially convened in January 2012
- Review available science on the nitrogen removal performance of treatment practices
- Provide concise definitions and percent reductions for nitrogen load reduction practices
- Provide a definition for each treatment practice and the qualifying conditions under which credits can be received
- Only address TN reduction in treatment technologies, not in the soil between edge-of-system and edge-of-stream (“attenuation”)

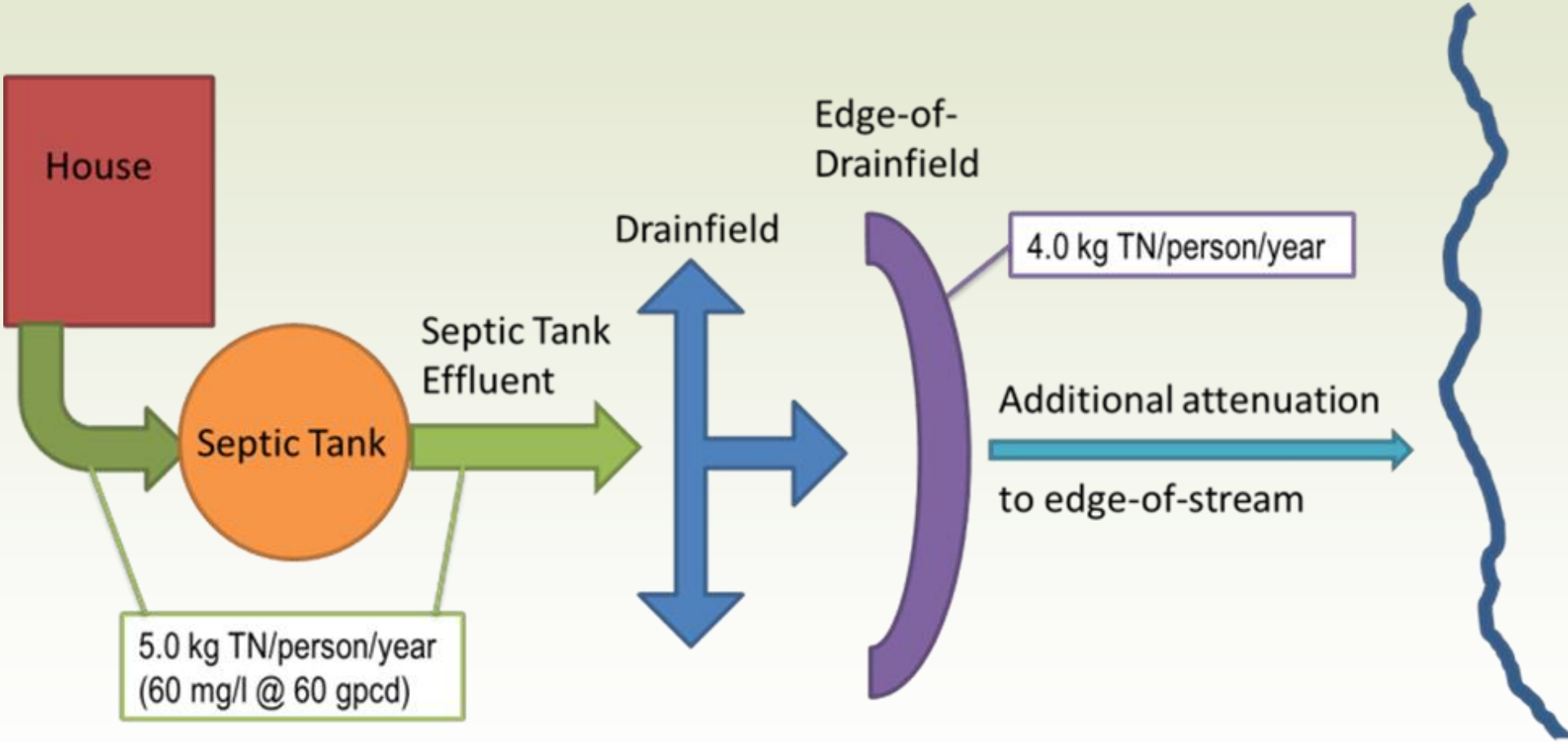
Baseline Load – Current Model

- 4 kg TN/person/year at edge-of-drainfield
  - Assumed flow of 75 gpcpd
  - TN concentration of 39 mg/L in septic tank effluent (STE)
- 60 percent attenuation between drainfield and edge-of-stream
- Three BMPs
  - Connection to central sewer (100 percent reduction from on-site sector)
  - 50 percent denitrification system (50 percent reduction)
  - Routine septic tank pump-out (5 percent reduction)

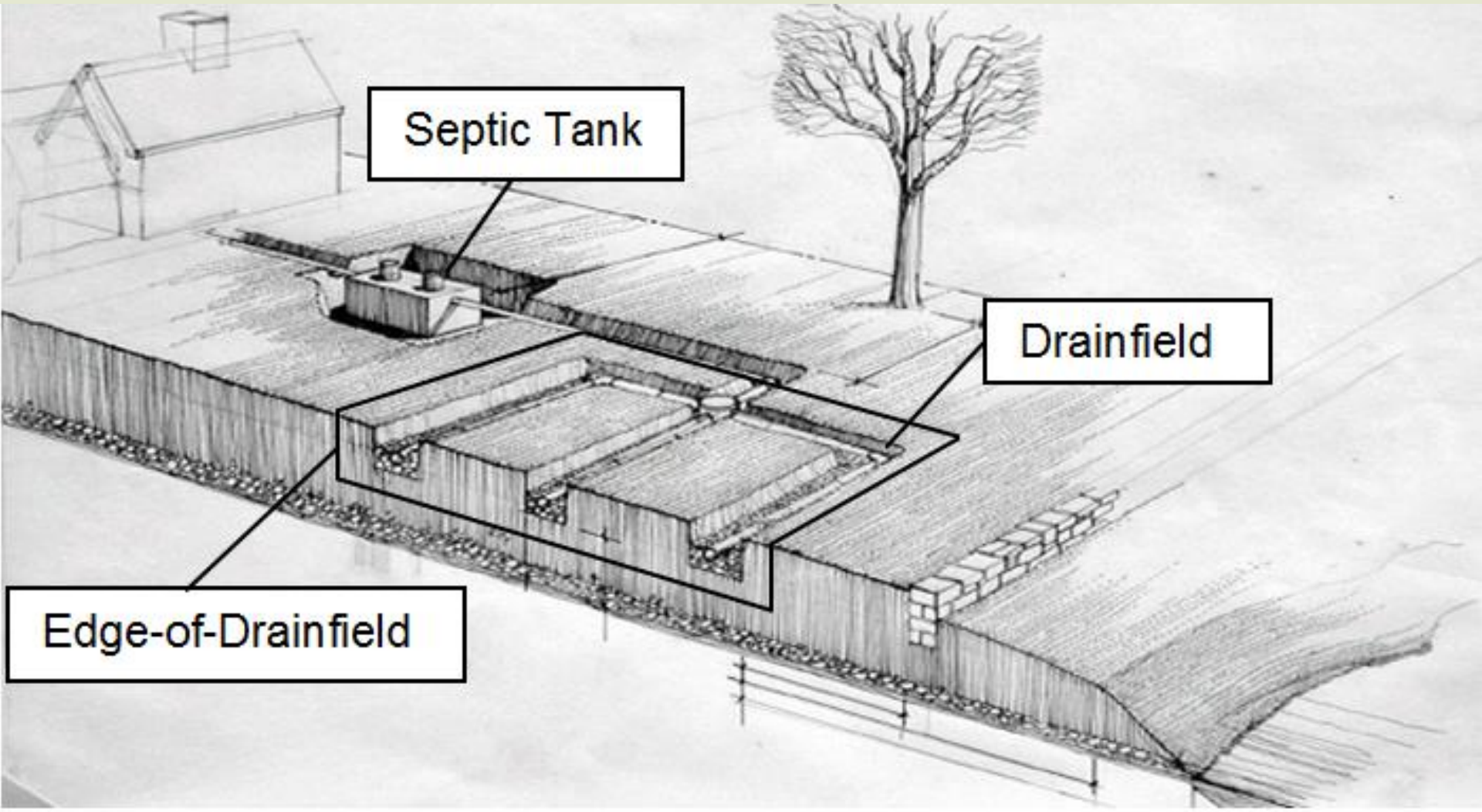
Baseline Load Recommendations

- 5 kg TN/person/year in raw wastewater and STE
  - Assumed flow of 60 gpcpd
  - TN concentration of 60 mg/L in septic tank effluent (STE)
- 4 kg TN/person/year at edge-of-drainfield
  - 20 percent reduction in drainfield, average
- No attenuation recommendation

Baseline Load Recommendations



Baseline System



Source: Joubert et al. (2005)

Systems with BMPs

- *Exsitu* BMP
  - BMP efficiency assessed at end of process prior to soil application
  - Reduction based on baseline effluent TN of 5 kg/person/year
- *Insitu* BMP
  - Reduction based on TN removal beyond baseline 20 percent reduction or 4 kg/person/year at edge-of-drainfield
- Combined *Insitu* and *Exsitu* BMPs
  - Reduction based on TN of 4 kg/person/year at edge-of-drainfield
  - Assume consistent TN reduction across the soil treatment system, regardless of *exsitu* effluent characteristics

Best Management Practices

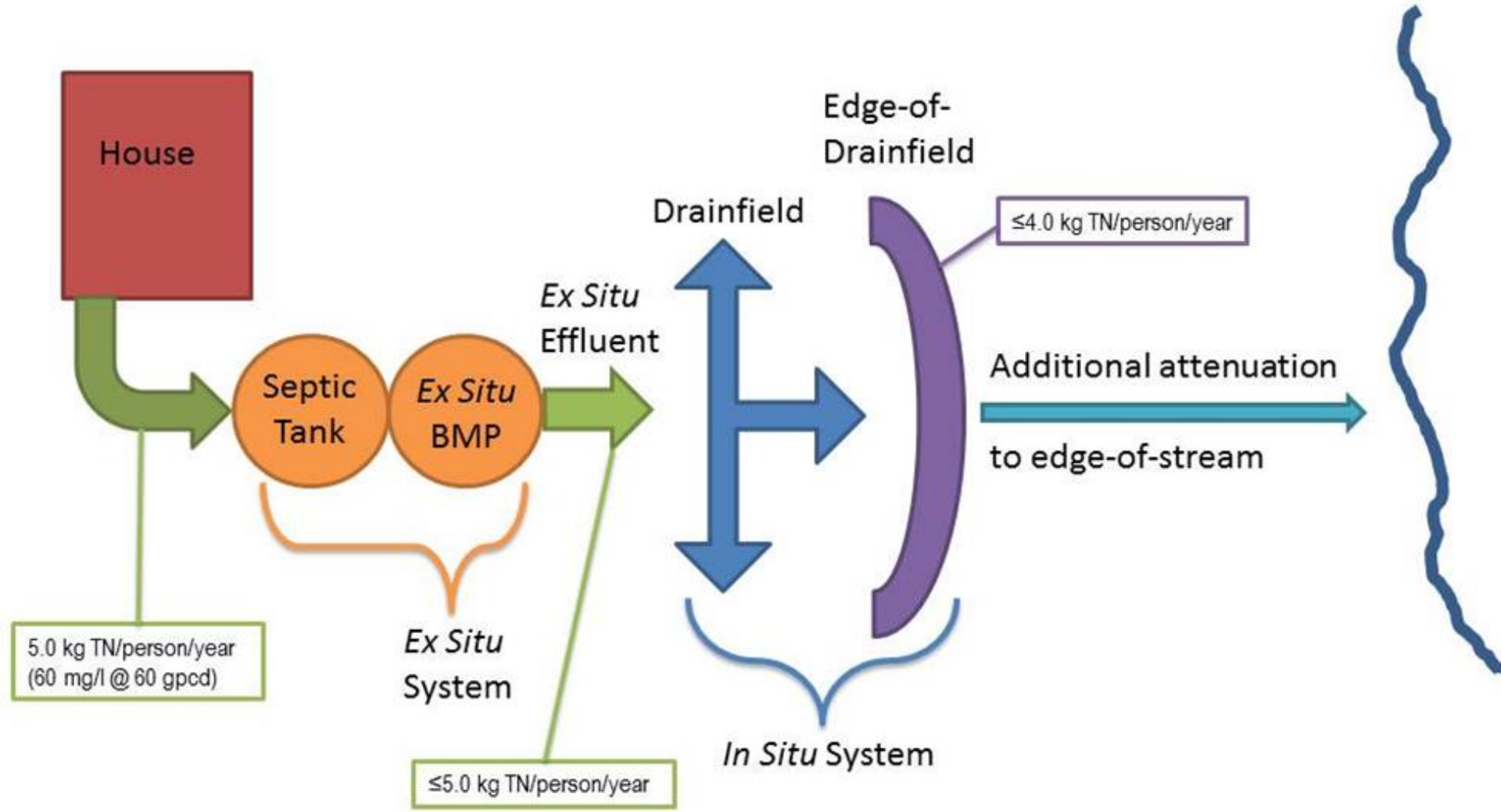
Exsitu (or pretreatment) system components

- NSF Standard 40 Class I secondary systems
- Intermittent (single-pass) media filters
- Constructed wetlands (vegetated submerged beds)
- Recirculating media filters (RMFs)
- Anne Arundel County Integrated Fixed-Film Activated Sludge (IFAS)
- Proprietary *ex situ* treatment systems

Insitu (soil treatment) system components

- Shallow-placed, pressure-dosed dispersal
- Elevated sand mounds
- Permeable reactive barriers

Residential System with BMP

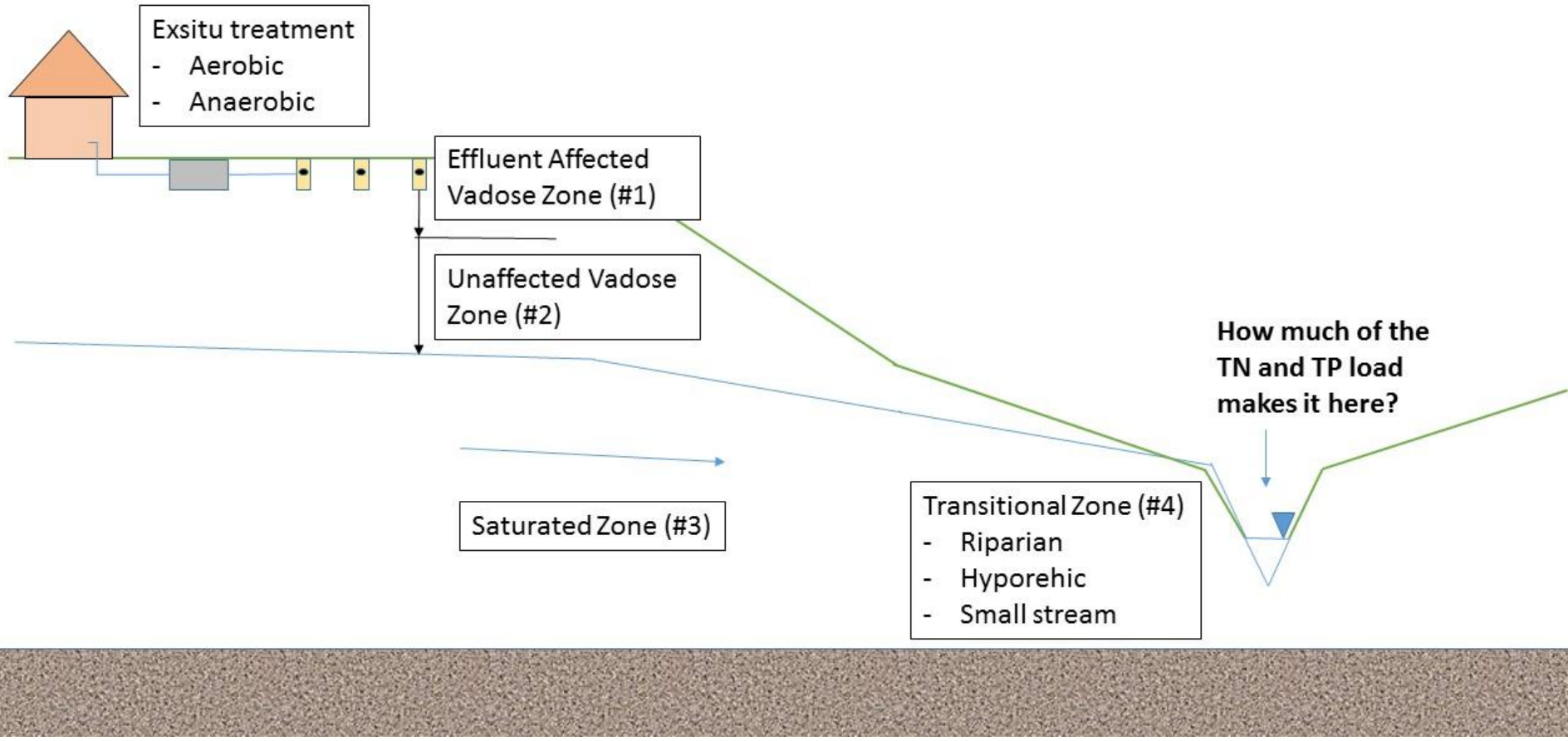


Combined *Exsitu* and *Insitu* BMPs

Ex Situ Practice \ *In Situ* Practice	Conventional Baseline	Shallow, Pressure Dosed	Elevated Mound
Septic tank baseline	4.0 kg/p/yr (0%)	2.5 kg/p/yr (38%)	2.5 kg/p/yr (38%)
NSF 40 Class I Secondary Systems	3.2 kg/p/yr (20%)	2.0 kg/p/yr (50%)	2.0 kg/p/yr (50%)
Intermittent Media Filter	3.2 kg/p/yr (20%)	2.0 kg/p/yr (50%)	2.0 kg/p/yr (50%)
Vegetated Submerged Bed	3.2 kg/p/yr (20%)	2.0 kg/p/yr (50%)	2.0 kg/p/yr (50%)
Anne Arundel Co. IFAS	2.0 kg/p/yr (50%)	1.25 kg/p/yr (69%)	1.25 kg/p/yr (69%)
Recirculating Media Filter	2.0 kg/p/yr (50%)	1.25 kg/p/yr (69%)	1.25 kg/p/yr (69%)

Attenuation Conceptual Framework

Assume: residential wastewater, 5 kg TN/cap/year



Review of Draft Panel Charge

- *Review available science on the pollutant removal performance of two new proposed BMPs for the onsite wastewater treatment sector in order to derive nutrient removal rates for individual practices*
  - Generic approval for peat system technologies
  - Revision of shallow placed, pressurized BMP
  - Define each practice and qualifying conditions for credits
  - Also:
    - Procedures for reporting, tracking and verifying credits
    - Unintended consequences