Checklist

Screening Tool for Evaluating the Need for a Agricultural Waste Storage Facility

(Factors to consider before changing from daily spreading to storage)

Although this tool is to be used to fulfill requirements set forth through the Request for Proposals for the Agricultural Nonpoint Source Abatement and Control Grant Program, the tool may also be useful in determining need for a waste storage facility in any situation.

Purpose of the Screening Tool:
The screening tool can be used as part of a progressive planning approach with the farmer to determine the need for a waste storage facility on farms prior to development of a full CNMP. (Note: *This level of planning once completed will be equivalent to an AEM Tier 3A Conservation Plan*.) The plan if developed following the steps below should provide a realistic estimate of the size, type, and cost of storage system needed prior to applying for conservation program funds. The plan should address the conservation needs of the fields receiving winter manure applications that have high runoff or leaching potential. The plan would set the stage for eventual development of a CNMP on the farm and would identify the logical sequence for implementation of BMPs needed to address that farm's priority waste management concerns. The plan should document that the farmer fully understands their responsibility in the operation and management of a waste storage facility if State or Federal funds are eventually provided to construct the system for their farm. This approach should result in the farmer actually following their CNMP after the storage is constructed and enhance the farmer's understanding of why a full CNMP will be required. Finally this approach should identify the critical components of a CNMP for the farm.

Planning Steps (check the box to certify that the item and sub-items have been completed):

1. ☐ Obtain and review FSA Common Land Unit map, NRCS soil map and USGS topographic map for the farm.
2. ☐ Review and update AEM Tiers 1 and 2 to identify and assess critical issues related to waste management. Complete Part 2 of the Watershed Site Evaluation worksheet if not previously done. Prepare updated Tier 2 Summary.
3. ☐ Verify farmer's agricultural waste management objectives.
4. ☐ Begin to assess the feasibility of continuing daily spreading as a manure management option by determining:
   - ♦ Current animal density (animal units per tillable acres).
     Note: Look at page 3 of the AEM Tier 2 Worksheet "Manure Management: Nutrient Management, Field Application and Storage", do calculation
   - ♦ Quantity of manure and wastewater produced annually.
   - ♦ Identify fields used for winter spreading and determine acres currently used for winter spreading verses acres actually available for winter spreading considering distance from the barn and winter accessibility.
   - ♦ Determine manure management/export options if very high animal density currently exists (1.5 animal units per tillable acre if corn-legume crop rotation, 2.25 if corn-grass rotation, 2.5 if grass) or will exist if expansion occurs within the next 5 years. Assuming the producer does not plan to reduce animal numbers, if animal density is very high a CNMP and waste storage facility won't be effective unless the farmer agrees to address excess nutrients by some combination of exporting manure or obtaining more land to spread on.

5. ☐ Determine approximate hydrologic sensitivity for fields used for winter spreading using Attachment 1. Review with the farmer required set backs if spreading on fields adjacent to water bodies and/or wells, or fields with concentrated flows.

6. ☐ Flag fields that are winter spread that have a high risk for P loss by reviewing soil test P results with the farmer. If current soil tests are unavailable assume soil test P is at least high, or very high if spreading is extensive, or obtain current soil tests on those fields.

7. ☐ Determine whether storage system is needed by evaluating whether fields are suitable for winter spreading by running Phosphorus Runoff Index on fields that receive manure every winter. Also run Nitrogen Leaching Index for fields fall or winter spread that contain soils that are:
   - ♦ Glacial outwash or well drained alluvial soils over sand or gravel deposits,
   - ♦ Are less than 20" to fractured bedrock,
   - ♦ Less than 40" deep over limestone, and/or
   - ♦ Adjacent to/or above farm's water supply

8. ☐ Identify additional conservation practices and management activities on fields with hydrologically sensitive areas identified in step 4 that are needed to reduce the potential of phosphorus movement and nitrogen leaching.

9. ☐ Determine the size and type of storage needed, and also consider if temporary manure pile area(s) might be a viable option to a permanent waste storage facility, based on quantity of manure to be stored now and in the future (use a 5-year planning horizon), precipitation and whether barnyard runoff, process waste water, and/or silage leachate should be included in the storage system or whether these issues would be more efficiently addressed as stand alone practices.

10. ☐ If there is an existing earthen waste storage facility that will be expanded or continue to be used to store manure as part of the farm's 312 Waste Management System:
    - ♦ determine whether it meets NRCS standards, if not
    - ♦ determine whether as currently constructed it poses an environmental hazard by utilizing NRCS Guideline – "Evaluation of Undesigned Waste Storage Facility – Earthen Pond Type (313),
    - ♦ if there is no feasible way to prevent the earthen storage from being a potential pollution problem the existing storage should be permanently closed utilizing NRCS Standard 360 Closure of Waste Impoundments.

11. ☐ Identify potential neighbor relations/odor management/air quality/air emission issues in relation to possible storage location and future regulations. Factors to consider:
    - ♦ closeness of clusters of homes, schools or other public building to storage site,
    - ♦ prevailing wind direction from storage and fields
    - ♦ visibility of proposed storage from road and neighboring property,
    - ♦ probability of future (next 5 years) housing development near farmstead,
    - ♦ history of and sensitivity to stored manure odor complaints in the community,
    - ♦ the farm's public image/reputation, etc.

12. ☐ Review with the farmer the additional time and equipment required to empty the storage and properly apply the manure according to the CNMP requirements to adequately manage the manure once the storage is built such as:
    - ♦ Development of CNMP, using the services of a certified planner, that will involve:
        - record keeping (field identification, number of loads spread, date applied, and manure source – dairy, heifer etc.),
        - manure analysis (annually) to determine nutrient availability in the manure,
        - manure spreader calibration,
        - regular soil testing (every 3 years) of all fields to receive manure,
        - use of manure as a primary nutrient source for crops,
        - spreading on appropriate fields at appropriate amount at appropriate time
        - emergency spill response plan for the storage.
        - planning for additional time to empty storage and potential impact on forage production (precipitation into the storage increases volume of manure to be spread by 1/3)
        - and identifying additional equipment and horsepower needed to agitate, pump, haul and incorporate manure or potential cost if custom applicators used. *Note: The moisture content of manure changes from 12-13% fresh to 6-8% when stored resulting in a need for a change in manure handling equipment.*
    - ♦ Update of CNMP annually based on
        - change land base
        - change manure/wastewater volume
        - change spreading equipment
        - change crop rotations
        - current soil test and/or manure analysis results
        - change type of crops grown
        - change spreading schedule,
        - change in P or N index or change in CNMP requirements due to change in regulations, etc.

    Note: Provide farmer with a copy of AEM "CNMP Fact Sheet"

13. ☐ Use AEM Tier 2 Feed Nutrient Management worksheet to discuss the future need for involving CCE or an agricultural consultant to evaluate the adequacy of the farm's feeding program considering:
    - ♦ phosphorus and protein levels in rations
    - ♦ quality of home grown and purchased forages,
    - ♦ need for ration balancing, monitoring of animal production efficiency, and
    - ♦ development of crop rotations for the farm to provide as much of the dry matter feed requirements as possible.

14. ☐ If after all the factors above have been considered and manure storage is needed, and the farmer understands the operation and maintenance requirements of the structure and the need to follow the CNMP and keep it up-to-date, conduct test pits to determine:
    - ♦ soil permeability,
    - ♦ depth to bedrock,
    - ♦ apparent water table depth,
    - ♦ potential seeps, etc.

    Note: A soil investigation is used to determine the location, type of storage and appurtenances needed and estimated cost.

Farmer Review & Certification

Date Reviewed _____ Conservation Planner_____

Representing (List Agency or Consulting Firm) _____

Farm Name _____

AEM Farm ID# _____

I have reviewed the information provided above and understand what will be required to successfully implement and maintain a waste storage system for my farm including preparing and implementing a Comprehensive Nutrient Management Plan (CNMP) for my farm that will also require periodic evaluation and updating.

Signature _____ Date _____

Attachment 1: Determining Hydrologically Sensitive Areas

Glossary

Aquifer: Water bearing soil or rock formation that is capable of yielding usable amounts of water.

Best Management Practice (BMP): Methods, measures or practices determined to be the most practical and effective in preventing or reducing the impact of pollutants generated by nonpoint sources. BMPs can be applied before, during or after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters.

Concentrated Flow: The rapid flow of water through a field that may result in the formation of gullies.

Contamination: Alteration of a water resource by the introduction of a chemical or other substance or the raising of water temperature so that the water resource is unfit for a specified use.

Erosion: Detachment and movement of soil caused by rain or surface water runoff.

Ground Water Source: Primary or principal aquifer, wellhead or spring.

Hardpan: Also referred to as fragipan, is a dense and brittle layer in soils that owe their hardness mainly to extreme density or compactness rather than high clay content or cementation. Removed fragments are friable, but the material in place is so dense that roots cannot penetrate and water moves through it very slowly.

Highly Erodible Land (HEL): Land containing soils with a high susceptibility to erosion when cultivated based on soil erodibily, slope, slope length and rainfall factors.

Hydrologic Soil Group: Refers to soils grouped according to their runoff and leaching characteristics.

Hydrologic Unit Code (HUC): A numerical designation for cataloging watersheds nationwide used by the U.S. Geological Service and the USDA Natural Resources Conservation Service.

Land Capability Class: Shows in a general way suitability of soils for growing crops. Capability classes are designated by Roman numerals I – VIII. The numerals indicate progressively greater limitations. The subclass "w" indicates that water in or near the soil interferes with plant growth or cultivation.

Leaching Potential: Estimate of the possibility for the downward movement, through the soil, of chemical substances dissolved in water.

Nonpoint Source Pollution: Pollution arising from a non-defined and diffuse source, such as runoff from cultivated fields, pastures or urban areas.

Pathogens: Disease-producing organisms. Examples are E.coli (toxigenic) and salmonella, which can infect any livestock; and Giardia or Cryptosporidium, which are intestinal parasites sometimes found in the feces of young livestock.

Primary Aquifer: Highly productive aquifers (yields greater than 50 gallons per minute, thickness of saturated deposit greater than 20 feet, or area of aquifer 5 to 10 square miles).

Principal Aquifers: Potential sources of public drinking water with yields greater than 10 gallons per minute that are not presently being used intensively as a water source by a major municipal system.

Runoff: That portion of precipitation; such as rain, snowmelt or irrigation water; that flows over the land surface.

Sinkhole: A natural depression in a land surface that connects with a subterranean passage. Sinkholes usually occur in limestone regions and are formed by solution or collapse of a cavern roof.

Soil Map: A map showing where various soil types are distributed in a given area (most often published in a county report).

Waterbody: A lake, pond, stream, river, reservoir, wetland or bay.

Watercourse: Water flowing over a non-vegetated channel to a waterbody.

Watershed: The geographic region within which water drains to a particular river, stream, or body of water. Large watersheds may be composed of several sub-watersheds.

Soil Hydrology

Soils vary in their ability to transmit water. The potential for surface runoff or leaching can be assessed for different hydrologic soil groups by using soil survey information in your County Soil Survey Report, available from the USDA Natural Resources Conservation Service or your County Soil & Water Conservation District.

Hydrologically Sensitive Areas

Land areas with a high potential for transporting pollutants to water bodies are classified as **hydrologically sensitive areas.** There are two categories of hydrologically sensitive areas: those land areas that contribute surface water runoff to rivers, lakes and reservoirs (such as flood prone areas, saturated soils and highly erodible lands near water bodies), and land areas which contribute subsurface water flow to recharge areas for significant aquifers (such as sinkholes and deep, well-drained, permeable soils).

Surface water runoff and subsurface flow can vary over time: for example, the volume of surface water runoff changes quickly during a storm. Some hydrologically sensitive areas change with the seasons: for example, river flats that flood in the spring.

The implementation of soil and water conservation practices on farms can also affect whether an area is hydrologically sensitive. For example, the presence of drainage tile may increase the flow of contaminants into surface water bodies. A diversion ditch, depending on where it is installed in a field, can reduce the hydrologic sensitivity of the area by reducing runoff from the field.

Critical Management Zones

Agricultural practices with a high potential water quality concern, such as manure spreading or pesticide applications, should be carefully planned and carried out if conducted in hydrologically sensitive areas. Hydrologically sensitive areas where agricultural activities are conducted that have a high potential for affecting water quality are considered to be **critical management zones**. The potential water quality impact for the same practice may be reduced if the activity is conducted on land with a low hydrologic sensitivity. Understanding the relationship between hydrologically sensitive areas and agricultural practices helps to determine the need for Best Management Practices during the planning process. This understanding can also help determine the priority for implementing the BMPs needed.

Identification of Hydrologically Sensitive Areas and Critical Management Zones

Use Table 1 to make a preliminary identification of hydrologically sensitive areas and potential critical management zones on your farm. The identification of hydrologically sensitive areas is an ongoing process. A walk through your barnyards and fields will allow you to verify the hydrologically sensitive areas identified by using this worksheet, as well as help identify additional hydrologically sensitive areas on the farm. Potential critical management zones should be verified using the appropriate Tier 2 worksheets.

Table 1: **Preliminary Identification of Hydrologically Sensitive Areas and Critical Management Zones**					
Part 1: Surface Water Runoff Concerns					
Field Characteristic	**Are these hydrologically sensitive areas present on your farm? (yes or no).**	**Field numbers or locations; land use (cropland, pasture etc).**	**Estimated distance of field to nearest waterbody.**	**Are these fields potential critical management zones based on information from Part 1? (yes or no)**	**Comments**
1. Are there existing water management practices (e.g. subsurface drainage, tile, waterways, etc) that outlet directly to a waterbody?					
2a. Is the field in a floodplain?					
2b. If 2a is yes, what is frequency of flooding – rare, occasional, frequent?					
3a. Are there streams or other concentrated surface flows?					

Table 1 Continued: **Preliminary Identification of Hydrologically Sensitive Areas and Critical Management Zones**					
Part 1 Continued: Surface Water Runoff Concerns					
Field Characteristic	**Are these hydrologically sensitive areas present on your farm? (yes or no).**	**Field numbers or locations; land use (cropland, pasture etc).**	**Estimated distance of field to nearest waterbody.**	**Are these fields potential critical management zones based on information from Part 1? (yes or no)**	**Comments**
3b. If 3a is yes do any of these streams lack riparian buffers?					
4a. Are there seasonal concentrated flows (e.g. natural draw, gully or swale)?					
4b. If 4a is yes, what seasons do they flow?					
5. Are there standing surface waters (e.g. wetlands, ponds with outlets, etc.) that border active farmland?					

Table 1 Continued: **Preliminary Identification of Hydrologically Sensitive Areas and Critical Management Zones**					
Part 1 Continued: Surface Water Runoff Concerns					
Field Characteristic	**Are these hydrologically sensitive areas present on your farm? (yes or no).**	**Field numbers or locations; land use (cropland, pasture etc).**	**Estimated distance of field to nearest waterbody.**	**Are these fields potential critical management zones based on information from Part 1? (yes or no)**	**Comments**
6. Are there any saturated soils; e.g. soils with land capability class 2W or wetter (hydric soils))?					
7. Are there any highly erodible (HEL) soils without erosion control practices that will contribute sediment to a waterbody?					
8. Are there any relatively impervious areas (e.g. paved or compacted soils), such as barnyards, shallow-to-bedrock soils, or farm roads that cross streams?					

Table 1 Continued: **Preliminary Identification of Hydrologically Sensitive Areas and Critical Management Zones**					
Part 2: Groundwater Infiltration Concerns					
Field Characteristic	**Are these hydrologically sensitive areas present on your farm? (yes or no).**	**Field numbers or locations; land use (cropland, pasture etc).**	**Estimated distance of field to nearest waterbody.**	**Are these fields potential critical management zones based on information from Part 1? (yes or no)**	**Comments**
1. Any wells, spring, or seeps?					
2. Any sinkholes or fractured bedrock near the surface?					
3a. Any deep, well-drained, permeable soils (hydrologic soil group A)?					
3b. If 3a is yes, are these soils underlain by an unconfined aquifer?					