U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
NEW YORK CONSERVATION PRACTICE GUIDELINE

WASTE STORAGE STRUCTURE

EARTHEN POND

CODE 313

REFERENCE

National Handbook of Conservation Practices – Code 313 Waste Storage Facility.

Commonly Associated Practices or Processes

The following conservation practices are commonly used in conjunction with this practice to address natural resource concerns and opportunities in New York. This does not imply that any or all of the listed practices must be included or that others may not be included in a conservation management system (CMS). Consult Section III of the Field Office Technical Guide for assistance in developing CMS.

Note: To determine whether a National or New York Conservation Standard applies to this and any other associated practices, check the following website: **www.ny.nrcs.usda.gov**. Click on the Technical Resources button, and look in the left-hand column for "eFOTG" on the next screen. Next, click on the "eFOTG" link, and look for the Conservation Standards in Section IV.

Table A: Commonly Associated Processes or Practices

Number	Name	Job/Engineering Sheets
NY312	Waste Management System	
342	Critical Area Seeding	
362	Diversion	NY ENG 22 and 23
361	Heavy Use Area Protection	
382	Fence	
560	Access Road	
590	Nutrient Management	
620	Underground Outlet	
633	Waste Utilization	
634	Manure Transfer	
NY748	Record Keeping	

OTHER REFERENCES

Agricultural Waste Management Field Handbook. http://www.ftw.nrcs.usda.gov/awmfh.html

New York Supplements to the Agricultural Waste Management Field Handbook. **www.ny.nrcs.usda.gov**.

Guideline for Dairy Manure Management from Barn to Storage, NRAES-108, NRAES, Cooperative Extension, 152 Riley-Robb Hall, Ithaca, New York, 14853-5701.

Earthen Manure Storage Design Considerations, NRAES-109, NRAES, Cooperative Extension, 152 Riley-Robb Hall, Ithaca, NY 14853-5701.

Animal Waste Management Software, AWM.
http://www.wcc.nrcs.usda.gov/water/quality/common/wastemgmt/awm.html

Site/operation specific Comprehensive Nutrient Management Plan.

Engineering Field Handbook Chapters 2, Estimating Runoff and Peak Discharges, 4, Elementary Soils Engineering.

Current Soil Survey Data.

Confined Spaces. U.S. Department of Labor – Occupational Safety and Health Administration.
http://www.osha.gov/SLTC/confinedspaces/index.html.

NYS Consolidated Laws, Environmental Conservation Title 10, Water Pollution Control, Section 17-0803, SPDES Permits; Application.

Article 17 Environmental Conservation Law, 6NYCRR, Part 750, State Pollution Discharge Elimination System (SPDES).

http://www.dec.state.ny.us/website/dow/PhaseII.html

CULTURAL RESOURCES

Cultural resource reviews will be conducted for all ground disturbing practices, components, or other activities, as per the State Level Agreement between NRCS and the New York State Historic Preservation Officer.

PERMITS AND NOTIFICATIONS

All permits, easements, and rights-of-way are the responsibility of the landowner. **Dig Safely NY** (formerly the Underground Facilities Protection Organization, or UFPO) and non-member local utilities will be contacted according to the time required before construction to mark all applicable facilities in the construction area. This is the responsibility of the excavator.

Identification and the location of all other farmstead underground or overhead facilities is the responsibility of the landowner.

INVENTORY AND EVALUATION

1. From the current CNMP, and in consultation with the CNMP Planner and the producer, confirm:

    - The type of farming operation and planned manure, waste management, and runoff handling system(s) and the producers management level;
    - That the type of animals, herd size, average animal weight, average weight gain/milk production (if applicable), source, quantity and consistency of waste to be stored, bedding material, and volume of waste water (including any silage leachate, milkhouse waste, and other contaminated water or liquids that will be directed into the structure) are accurately accounted for in the Agricultural Waste Management Plan.

- That the planned storage site location is feasible, giving consideration to manure transfer systems for the loading and unloading. Give consideration to existing buildings, future expansion, access routes, traffic patterns, drainage, utilities, equipment capabilities, safety, neighbors, possible odor problems, siting, and appearances. Utilize current soil survey information to evaluate map units and potential inclusions for project compatibility on the site.

2. Determine the waste storage volume using the storage period from the unloading and spreading schedule from the CNMP. Select an approximate length, width, and depth.
3. A geologic site investigation shall be conducted by a qualified individual to determine if the soils are suitable for an earthen waste storage pond. Consideration should be given to soil permeability, stability, foundation, seepage, and location of water table and bedrock. Investigation of multiple locations may be required to obtain a site with suitable soil and geologic conditions.
4. Once a potential site is located, obtain representative soil samples for testing by a certified soils lab. Soil should be classified and tested for permeability at the compactive effort to be achieved during construction. The initial permeability test shall be conducted on soil samples compacted to the anticipated *in situ* soil density condition. In the event that unsuitable soil test or permeability test results are returned, consider alternative siting, structure type, and/or the employment of a liner.
5. Survey and prepare a topographic map of the site. Include buildings, utilities, access routes, test pit locations, manure transfer pipeline locations, agitation and pump out ramps, existing and potential outlets for milkhouse waste, silage leachate, and other drains, etc.

DESIGN PROCEDURE

1. Prior to beginning the design procedure, verify that the waste storage volume from the CNMP is current and correct.
2. Record the required waste storage volume in the design folder.
3. Determine any additional contributions to the waste storage pond's required volume from the farm. These may include but may not be limited to:
   - The direct runoff from the 25 year/24 hour storm event over the contributing area,
   - Runoff from precipitation from the contributing watershed area over the storage period,
   - Milkhouse waste (if any), and,
   - Any other waste or wastewater from agricultural sources on the farm that will be directed to or deposited in the waste storage pond.
4. In addition, consider the volume of storage that will be taken by accumulated solids over time. (Compute the required storage for accumulated solids. Use a minimum of 6 inches of depth over the bottom of the waste storage pond, unless a pump out basin is installed.)
5. The minimum waste storage volume requirement is the sum of all volumes from #2, #3 & #4 above.
6. Select a maximum depth for the storage pond. Determine precipitation depth *minus* the evaporation for the storage period. Subtract the resultant depth from the selected maximum depth. Subtract the depth for the 25 year/24 hour storm event, and subtract the depth for freeboard (one foot minimum), to determine the waste storage depth.

This design procedure requires an iterative process of selecting a bottom width and length, which is then used with the determined waste storage depth to calculate the minimum waste storage volume. The resulting bottom width and length is placed at a selected site cut depth to determine the earth fill and excavation volume balance desired.

7. Considering the site conditions, select an acceptable bottom width, length and side slopes. Using that selected bottom width, length, and waste storage depth, use the prismoidal formula to calculate pond volume. Recalculate the bottom width and length until the computed result is equal to or is slightly greater than the minimum waste storage volume from item 5, above. In the event of a circular storage pond, substitute the diameter for the length and width. Use the conical formula to calculate the storage volume. For irregular shapes, use the standard procedures for stage-storage relationships.
8. Using the design template, establish the storage pond bottom elevation at the site. Calculate the earth fill and excavation volumes. If needed, select a new storage pond bottom elevation until a reasonable balance of cut and fill volumes are obtained. The goal is to have a greater excavation volume than is required for the fill component. Caution: Do not lower the storage pond bottom elevation to less than two feet above the acceptable soil conditions as found during the geologic investigation.
9. Design the collection and conveyance system(s) for outside clean water exclusion. Refer to the appropriate conservation practice standards, as applicable. If there are any outside contaminated or polluted water sources that will not be included in the waste storage pond, then the polluted water will be treated separately from the clean water using the appropriate conservation practices.
10. Using the soil test pit information, design the subsurface interceptor drainage system.
11. Develop the details for the manure transfer system.
12. Size and locate the components for the agitation and unloading facilities.
13. Prepare drawings that include the plan view, profiles, cross-sections, construction notes, test pit logs and estimated quantities. Also include detailed drawings of appurtenances such as manure transfer systems, concrete floors, loading pad, pump basins, ramps, depth markers, gates, etc. Details for safety fencing and signage, as required shall be included. Drawing quality must be adequate to produce legible copies.
14. Select an appropriate seeding mix and rate for the embankment and disturbed areas based on soil type. Select seeding mixture from Plant Materials Technical Reference #11, "A Guide to Conservation Plantings on Critical Areas".
15. Prepare appropriate construction specifications with items of work and construction details for the project.
16. Compute the material quantities for inclusion in the construction drawings.
17. Any site disturbance over one acre in size requires a Storm Water Pollution Prevention Plan. Additionally, the site may require a formal Erosion and Sediment Control Plan with construction details.
18. Develop the cost estimate, erosion and sediment control plan for the construction site, the inspection plan, and O & M plan. Note that the CNMP Emergency Action Plan may need to be reviewed and updated to reflect any changes as a result of the design process.

19. Review the construction drawings, specifications, cost estimate, O & M plan and a design summary with the producer. Include a discussion of required and optional appurtenances such as ramps, docks, diversions, loading pads, vegetative screening and etc. Revise drawings and specifications to reflect any changes.
20. A statement requiring the excavator to notify **Dig Safely NY** and non-member utilities for proper utility notification is **REQUIRED** on the drawings.
21. Determine your level of Job Approval Authority for the design class of this project, obtain approval from appropriate individual, if not qualified.
22. Assemble a complete final construction package.

PRE-CONSTRUCTION ACTIVITIES

1. Provide copies of the construction drawings and specifications to the landowner. Explain all aspects of the job including the contracting process. Additionally, it is suggested that a landowner seek multiple quotes (may be a requirement, dependent upon funding sources and amounts) for the project before a contractor is secured. Review the O&M plan with the landowner, to assure proper maintenance of the completed practice.
2. Schedule a pre-construction meeting to thoroughly review the job, including the inspection plan with the landowner and contractor prior to the start of construction. Coordination of all staking and construction timing with the contractor and landowner can assure an efficient use of manpower. Additionally, coordinate the stages of construction with any required farm operations, such as barn cleanout, lane access, etc. Plan the start of construction such that the completion time will permit optimal establishment of vegetative cover. Review all material specifications and quantities with the contractor. Confirm that all necessary permits, easements, and rights-of-way have been secured for the project by the landowner. In addition, review any jobsite safety issues that are pertinent to the project, such as trench reinforcement, use of personal safety equipment, etc. Insure that all utilities applicable to the job site have been notified and are marked prior to construction.
3. Set toe stakes for the embankment and mark fill heights with consideration for overbuild.
4. Set cut stakes with cuts marked for required excavations.
5. Set grade for top of embankment and bottom of excavations for finish grading.
6. As earthwork progresses, set slope stakes as necessary to assure construction to line, grade, and elevation.
7. Set stakes for alignment and grade for appurtenances, as required.

CONSTRUCTION INSPECTION

1. Visit the site as frequently as necessary to assure that the pond is being constructed according to the construction drawings and specifications. Any changes from the approved construction drawings and specifications will need to be reviewed and approved by the Approving Official. Make sufficient progress checks to prevent gross errors. The key inspection checks will document the following:
    - Any required erosion and sediment control measures must be installed according to the plan, PRIOR to any construction activities taking place.
    - Site preparation, including stripping of topsoil and removal of structures or debris.
    - Observe any excavations and determine and record final depth(s).
    - Periodically observe fill material, moisture content and compaction procedures to assure adequate embankment construction according to specification requirements. Check proper inclusion of topsoil in embankments.

- Check concrete installation including grades, forms, steel, construction joints, mix design, placing, consolidation and curing. Perform slump, air, and strength tests of concrete when called for by inspection plan. Be certain to obtain the concrete batch tickets.
- The type, size, quality and quantity of the construction materials brought to the site PRIOR to installation.
- The installation of the manure transfer systems, and other structures and materials for size, location, grade, elevation, joint tightness and other design factors.
- Document finished elevations, dimensions and side slopes of embankments.

2. Prior to the completion of construction, schedule and complete a final construction check with the landowner, contractor, and the Approving Official present. During this final construction check, assure that the:

- Cut slopes are inspected for seepage and evaluate the need for any additional interceptor sub-surface drainage;
- Construction spoil and debris are properly disposed of;
- Required depth markers or gauges, fencing, safety gates, and signage is installed according to the construction drawings and specifications, and,
- Final seeding requirements have been installed in accordance with the seeding plan.

Document the progress of the construction in the Cooperator Assistance Notes (NRCS-CPA-6/6A) or a similar job log as required. In addition, photographs documenting construction progress are useful and will be taken.

FINAL DOCUMENTATION REQUIREMENTS

All properly planned, designed, and installed conservation practices require documentation in the appropriate case file. Documentation must be sufficient to show:

1. The design conforms to the applicable standard;
2. The prepared construction drawings and specifications accurately reflect the design;
3. The installed practice meets the requirements of the construction drawings and specifications; and;
4. The documented drawings are to be marked "As Built", with changes shown in red.

When required, the completed project shall bear the final approval of and signature of the appropriate Approving Official.

REPORTING

Enter all documentation on the Conservation Plan (NRCS-CPA-68), Conservation Assistance Notes (NRCS-CPA-6/6A), and contract document (NRCS-LTP-11), if applicable.

Report the practice and applicable components in the NRCS progress reporting system. Be certain to report benefits for all applicable resources and resource concerns as allowed in the NRCS progress reporting system.

OPERATION AND MAINTENANCE

Facilities, structures, and practices must be operated and maintained to ensure proper function and longevity. Periodic follow-up with the landowner is essential to ensure that all operation and maintenance (O&M) requirements are understood and followed.