

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

**CNMP - BARNYARD WATER MANAGEMENT SYSTEM**

**REFERENCES**

**Commonly Associated Practices or Procedures**

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 a CMS.

To determine whether a Conservation Practice Standard applies to this and any other associated practices in New York, check the following website: [http://efotg.nrcs.usda.gov/efotg\\_locator.aspx?map=NY](http://efotg.nrcs.usda.gov/efotg_locator.aspx?map=NY). Select a County. On the eFOTG main screen, in the menu pane on the left side of the screen, open the Section IV folder to find the Conservation Practices for use in New York. Also included under Section IV are New York Construction Specifications, Engineering Job Sheets, Guidelines and/or Procedures relevant to the Practice Standards.

**Table A: Commonly Associated Practice Standards or Procedures**

<b>Number</b>	<b>Name</b>
CNMP	Comprehensive Nutrient Management Plan
NY312	Waste Management System
EFH-2	Estimating Runoff
313	Waste Storage Facility
342	Critical Area Planting
356	Dike
362	Diversion
367	Waste Facility Cover
382	Fence
393	Filter Strip
412	Grassed Waterway
468	Lined Waterway or Outlet
558	Roof Runoff Structure
560	Access Road
561	Heavy Use Area Protection
575	Animal Trails and Walkways
587	Structure for Water Control
590	Nutrient Management
606	Subsurface Drainage
620	Underground Outlet
633	Waste Utilization
635	Wastewater Treatment Strip
638	Water and Sediment Control Basin

## OTHER REFERENCES

The following references can be accessed from: <http://policy.nrcs.usda.gov>

- NRCS National Agronomy Manual
- NRCS National Biology Manual
- NRCS National Biology Handbook
- NRCS National Planning Procedures Handbook (NPPH)
- NRCS National Environmental Compliance Handbook (NEPA)

NRCS Engineering Field Handbook (NEH 650)

<http://www.info.usda.gov/CED/Default.cfm?xSbj=53&xAud=24>

NRCS Agricultural Waste Management Field Handbook (NEH Part 651)

<http://www.info.usda.gov/CED/Default.cfm?xSbj=51&xAud=24>

Agricultural Environmental Management Handbook:

<http://www.agmkt.state.ny.us/soilwater/aem/index.html>

New York NRCS Plant Materials Technical Reference No. 11: A Guide To: Conservation Plantings on Critical Areas For New York

American Society of Agricultural Engineers (ASAE), Engineering Practice 342.2, Safety for Electrically Heated Livestock Waterers (for sites with equipotential plane installations)

Beef Housing and Equipment Handbook, MidWest Plan Service, MWPS-6

Livestock Waste Facilities Handbook, MidWest Plan Service, MWPS-18

Protecting Water Quality While Raising Heifers Outside, Wright, Peter E.; Proceedings from Calves, Heifers and Dairy Profitability: Facilities, Nutrition and Health National Conference; Northeast Regional Engineering Service, NRAES-74. 1996.

Vegetative Practice Design Application (VegSpec): <http://vegspec.nrcs.usda.gov/vegSpec/index.jsp>

New York Cost Estimator:

[http://www.ny.nrcs.usda.gov/technical/engineering/tools/ny\\_cost\\_estimator.html](http://www.ny.nrcs.usda.gov/technical/engineering/tools/ny_cost_estimator.html)

Barnyard Wastewater Treatment Strip N-Loading Calculator:

[http://efotg.nrcs.usda.gov/references/public/NY/WW\\_treatment\\_strip.XLS](http://efotg.nrcs.usda.gov/references/public/NY/WW_treatment_strip.XLS)

## NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) –

Determine that an Environmental Evaluation (EE) has been completed. Results of the EE must be documented on an NRCS CPA-52. Based on the EE results determine if the project can proceed.

## 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.

## Threatened and Endangered (T&E) –

Species review will be conducted for all projects as a part of the NEPA process. This review will include an assessment of the most current NYS Natural Heritage Program Database records documenting the current or historical presence of T&E species within or adjacent to the project area. If a T&E species is or was historically present on or adjacent to the site, as indicated by the NYS Natural Heritage Program Database or field observation, document findings on the NRCS-CPA-52 form and contact a NRCS Biologist for guidance on how to proceed with the project.

## **EROSION AND SEDIMENT CONTROL**

An erosion and sediment control plan shall be developed for all ground-disturbing activities. For disturbed areas greater than one acre, the erosion and sediment control plan shall meet the planning, installation, and maintenance requirements of NYS Pollutant Discharge Elimination System General Permit for Stormwater Discharges. All erosion and sediment control structures and measures shall be installed prior to earth disturbing activities unless otherwise directed in the construction drawings and specifications.

## **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 underground or overhead facilities is the responsibility of the landowner.

## **DECISION MAKER INVOLVEMENT AND PLAN REVIEW**

Involve the decision maker at all stages of inventory and design. Review the conservation plan or CNMP. All landowner decisions need to be documented. Ensure an operation and maintenance plan is provided to and reviewed with the decision maker.

## **INVENTORY AND EVALUATION**

1. Determine landowner/operator objectives for the barnyard area and livestock management.
2. Compile and review all relevant resource inventory maps. These include but are not limited to soils maps, topographic maps, and wetland maps. Obtain the appropriate aerial imagery that will allow the planner to document the alternatives and final decisions.
3. Determine an appropriate system of practices that will address the resource concern. A barnyard water management system must reduce and treat polluted runoff, collect and transfer polluted runoff, or eliminate polluted runoff.
4. Review all potential sites to determine if the proposed project meets the “Conditions Where Practice Applies” statement within the applicable conservation practice standards.
5. Determine land use of proposed project area and all areas adjoining. Document land use on plan map. Label tract, field, and acreage. Be cognizant of property boundaries, other land easement boundaries, wells, water bodies, overhead power lines, and underground utilities.
6. Based on field observation identify and label existing conservation practices within the proposed project area. Identify sources of outside clean water. Include practices that are adjacent to the project area that could have an impact on the project.
7. Evaluate if relocation, size reduction, roofing, or complete elimination of the barnyard are feasible alternatives.
8. Consider the use of an intensive rotational grazing system to reduce or eliminate large barnyards.
9. Consider livestock containment needs and traffic patterns.
10. Evaluate the purpose for the barnyard and size according to Table 1 below:

**TABLE 1 - BARNYARD SIZES (square feet/animal)**

Purpose	Cows1,400 lbs.	Cows 1,000 lbs.	Heifers 500 lbs.
Holding	15	12	8
Feeding	30	24	18
Resting	50	35	25
Heat Detection & Exercise	70	55	45

11. Determine sources of runoff coming into the barnyard. All of the following shall be conveyed to an appropriate outlet:
  - a. All drainage areas outside of the barnyard
  - b. Roof water runoff
  - c. Groundwater seepage
  - d. High water table
  - e. Other water sources (i.e., overflow from waterers or milking center cooling water)
12. Determine the appropriate means of outside water exclusion including: diversions, grading and shaping , dikes, drop inlets with underground outlets, roof gutters and drip trenches and drainage systems.
13. When a watercourse flows through the barnyard, determine the best practice(s) for improvement and protection of the water quality. If the watercourse cannot be controlled through the barnyard, consider reconfiguration of the barnyard.
14. When a stream is adjacent to the barnyard:
  - a. Perform a hydraulic analysis of the stream (EFH 2, TR20, TR55, or site-specific survey of high water marks) to determine the water elevation expected during a 25-year runoff event. Where possible, all components in the system should be planned outside of the 25-year flood plain. Check discharge permits for requirements that are more stringent.
  - b. If practices must be installed within a flood prone area, ensure that the practices will be protected and/or potential flooding impacts are mitigated (berms, dikes, curbs, concrete retaining walls, etc.).
  - c. Determine the need for stream crossings (drive through crossing, culvert, bridge, stone ford, etc.). Include provisions for the 25-year runoff event.
  - d. Determine the need for alternative water supply system(s) if the stream is the sole source of water for livestock.
15. Determine the best heavy use area surface treatment for the barnyard. Treatment may consist of concrete, asphalt, compacted gravel or other suitable material. Paving will increase the amount of runoff that must be stored or treated.
16. Consider a roof to eliminate polluted runoff.
17. If polluted runoff cannot be eliminated, determine where to direct runoff for collection and transfer to a vegetated treatment area or storage.
18. When a treatment area is required, determine that a suitable land area is available. Ensure location meets setback requirements for all sensitive areas.
19. Designed treatment area size will be based upon daily length of use and manure removal frequency. These criteria must be discussed with and agreed upon by the landowner as critical operation and maintenance items that affect the design.
20. A clean barnyard reduces the polluted runoff potential from large storms, therefore reducing the required size of the treatment system.

21. Determine the need for additional components to facilitate operation and maintenance of the system.
  - a. Fence, curbs, buck wall, and low flow collection.
  - b. Plan for gates, curbing and curb bumps (rolled curbs) based on access points and travel patterns for livestock and equipment.
  - c. Determine the curb purpose and height. Refer to Table 2 below for curb height guidance.

**Table 2**

<b>Curb Purpose</b>	<b>Minimum Height (inches)</b>
Runoff Control	4
Scraping	8
Bump Wall	18
Runoff Storage	25 year storm event

22. Summarize the inventory and evaluation process in a Benchmark Plan Narrative and provide a detailed sketch of the proposed project area.

**DESIGN**

Barnyard Water Management Systems will be designed using a combination of practices that when implemented will combine to provide a treatment level meeting required quality criteria.

1. A final design shall not be provided to the landowner or contractor prior to the development of a waste utilization or comprehensive nutrient management plan.
2. A plan view or topographic plan map will be prepared. A topographic plan map of a barnyard area is required for projects that are more complex and when several practices may be necessary to address problems. This will allow practices to be planned and designed so that they function as a system. This is also necessary to confirm that all planned practices are feasible for the site. If the project includes a simple diversion for surface water control and an underground outlet for roof gutters, then a plan view drawing and a profile survey will be sufficient.
3. System components are designed according to the standards for the practice being proposed. A 25-year runoff event will be the design criteria used for all barnyard water management system practices.
4. If the design includes electrical components, they shall be installed and inspected by a qualified electrician. An equipotential plane shall be installed when an electrically heated waterer, an electrically operated conveyor for outside feed bunks, or similar electrical equipment is positioned on or adjacent to a barnyard pad that may be accessed by an animal. The equipotential plane shall bond all reinforcing and embedded metal objects that may be energized, and shall be grounded to the electric source grounding system. See American Society of Agricultural Engineers (ASAE), Engineering Practice 342.2, Safety for Electrically Heated Livestock Waterers for equipotential plane installations.
5. An erosion and sediment control plan shall be developed for all ground-disturbing practices.
6. Compile all design information in an appropriate design folder.
7. Develop construction drawings and specifications for the project. Include locations of known utilities within the project area. Include profiles, grades, suitable construction materials, et cetera, as applicable.
8. Compute material quantities for each item of work.
9. Develop a cost estimate, and an inspection plan for the project. Review these and the completed construction drawings and specifications with the landowner.
10. Develop a detailed O & M Plan for the entire system. The O & M plan should include but is not limited to:
  - a. maximum allowable time for livestock to be on barnyard surface
  - b. scraping interval
  - c. collection and treatment requirements

- d. fence maintenance
  - e. land application of animal waste
  - f. regrading and resurfacing of gravel barnyards and laneways
  - g. outlet functionality.
11. A statement requiring the excavator to notify Dig Safely NY and non-member utilities for proper utility notification is **REQUIRED** on the drawings.
  12. Determine your level of Job Approval Authority for the design class of this project, obtain approval from appropriate individual, if not qualified.
  13. Assemble a complete final construction package.

## **INSTALLATION**

The construction and inspection will be in accordance with the practice(s) being installed.

1. Provide copies of the construction specifications and drawings to the landowner. Explain all aspects of the job before a contractor is secured. Review the O&M plan with the landowner to assure proper maintenance of the completed practice.
2. Review the job with landowner and contractor(s) prior to construction/installation. Ensure that all utilities applicable to the job site have been notified and marked prior to construction.
3. Schedule the construction start with the landowner and contractor(s). Coordination of all staking and construction timing with the contractor and landowner can assure an efficient use of manpower.
4. Inspect all component practices to ensure they are installed in the proper sequence, according to the design. Refer to respective guidelines as needed.
5. Erosion and sediment control structures will be checked periodically and after every major runoff event until the disturbed area is fully protected.

## **CHECK OUT**

All 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, specifications, plan maps, and/or job sheets accurately reflect the design;
3. The installed practice meets the requirements of the construction drawings, specifications, and practice standard; and
4. The "As Built" condition of the practice. Write "As Built" in red on drawings. Record all changes made during implementation in red. Practices not requiring drawings will have the "As Built" condition documented on plan maps, job sheets, and/or with narrative.

## **REPORTING**

Enter all documentation in the Conservation Plan (Toolkit), contract document (Protracts) and Conservation Assistance Notes (NRCS-CPA-6/6A).

Report the practice and applicable components in the NRCS Progress Reporting System (PRS). 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.