PA521A. POND SEALING OR LINING – FLEXIBLE MEMBRANE

DESIGN AND CHECK DATA REQUIREMENTS

The following items must be addressed in the design folder for pond sealing or lining with a flexible membrane. This can be part of the design folder for the pond design.

Table of Contents

List key pages found in the design.

Listed below are specific items that are required in the design.

Soils and Foundation Data

Document compliance with PA One-Call before digging?

Written soils description for test pits and site specific comments are included?

Reference pit locations to site contour map.

Design Data

Important data recorded and consistent with the appropriate standard (e.g. PA378, PA313), including but not limited to:

- PA One-Call documentation
- Address slope stability, shear stress between liner materials and soil base, removal of over sized material, rock excavation, drainage, isolation from open foundation rock and groundwater drainage system, and anchor trench backfill material as needed.
- Soils lab data with seepage estimates and liner calculations
- Sealing/liner alternatives considered
- Cost estimates

Construction Specifications

Enclose Specification PA521A and other applicable specifications (e.g. PA313, PA606).

Include any “additional conditions” or items that are site specific or must be defined to supplement the standard specification. (See instructions for use of Specification PA521A.)

Add any special or "by-others" specifications.

Engineering Drawings

A flexible membrane liner design requires approval by a person with the appropriate Engineering job approval authority. If the liner is part of a Waste Storage Facility (PA313) is must be approved by a registered Professional Engineer or an Engineer with NRCS Engineering job approval authority for Waste Storage Facilities. If a DEP permit is required, additional details may be needed.

Include any standard drawings made by NRCS or designed by others and concurred in by NRCS that are needed, and include them in the drawing index on the cover sheet.

Listed are items that should be included:

<u>TITLE BLOCKS (each sheet)</u>
Operator’s name
Type of operation
Designer, drafter, checker
Engineer or Record approval (cover sheet only)
County

<u>COVER SHEET</u>
Site location
Index of drawings
Job Class
Certification Statement
Signature Block
Reference to specific Standard Drawings

<u>PLAN VIEW SHEET(S)</u>
North arrow
Utilities/roads
Bench mark(s)
Scale
Legend
Access
Existing structures
X-section locations
Construction limits
Leak detection system & outlet location

Foundation drainage & outlet locations
Borrow and Spoil areas

SITE CONTOUR SHEET
(Preferably same as Plan View Sheet)
North arrow
Bench mark(s)
Scale
Soils test pit location
Existing structures
Contour lines
Property lines
Water well and spring location(s)
Water courses
Known sinkhole locations
Legend
Fencing and safety features

CROSS-SECTION SHEET(S)
Two sections, minimum
Scale(s)
Soil test pit profile(s)
Loading structure/pipe
Unloading structure/pipe
Slopes
Leak detection system
Drainage configuration
Reference to detail drawings

DETAIL SHEET(S): Sufficient details to install the liner and underlying cushion; e.g. soil limits and type, mixing depths, geotextile requirements.

SAFETY:
Utility items
Excavation safety items
PA One-Call documentation
OSHA references as appropriate
Safety features such as signs, grates, gates, fencing, etc.

CONSTRUCTION SEQUENCE:
E&S control
Lining installation
Special considerations:
- Special equipment
- Special joints or seams

Vegetative requirements
Spoil and borrow areas
Fencing and safety features
References to specific standards and drawings

Erosion and Sediment Control Plan

See DEP's Erosion and Sediment Pollution Control Program Manual.

Quality Assurance Plan

What specific items need inspection and when?

Who will do the actual inspection?

Is any testing equipment required for the inspection?

Documentation

The following documents need to be assembled and maintained in the office for the life of the facility:

1. A full set of as-built drawings with:
   a. Items installed as designed; changes shall be recorded in a manner that the As-Built information is obvious, such as in bold and red.
   b. Notes describing the changes will be recorded on all sheets where changes occurred, including initials.
   c. Document the actual foundation and ground water conditions encountered if they differ from the site investigation and design assumptions.
   d. The certification statement, signature and date by a person with construction job approval; however a P.E. must certify the completion of all storage facilities.
2. Design Folder.
3. Survey check notes with final elevations shown in red.
4. Material certifications, etc.
5. Contractor's certification of conformance
6. Photographs, if applicable
7. Records of site visits and significant discussions
8. Other applicable construction records.

Operation and Maintenance Plan

Is it clearly indicated what precautions are to be taken to avoid damage to the flexible membrane during normal operation?

What are the recommended liner repair procedures?

If the liner is to be covered with soil, are there drawdown restrictions to assure slope stability?

Define the procedure for repairing or replacing cover soil.

Explain any monitoring requirements for leak detection systems under waste storage ponds and treatment lagoons.

Describe the emergency action plans for containing and controlling discharge from leak detection systems.