



Amanda E. Beal
Commissioner

Randy Charette
Deputy Commissioner

Nancy McBrady
Deputy Commissioner

18 Elkins Lane
Augusta, ME 04333

(207) 287-3200
maine.gov/dacf



High Tunnels and Greenhouses - A Guide for Municipalities

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For more information: alexander.redfield@maine.gov

Overview

Much in the same way historic wooden barns have dotted the Maine agricultural landscape for decades, greenhouses, high tunnels, and similar plastic-covered structures (referred to generally as “tunnels” in this document) are now commonly seen on farms across the state. Maine farmers have turned to the construction of tunnels and greenhouses to extend the growing season and maximize crop production or as cost-effective livestock housing or equipment storage on the farm. These structures are valuable tools to farmers looking to protect their crops from an increasingly unpredictable climate and a short growing season and can dramatically increase yields and cropping options throughout the year. Additionally, the construction of these tunnels serves as a resource conservation mechanism – the USDA’s Natural Resource Conservation Service has funded the construction of 126 high tunnels in Maine between 2018 and 2021 alone in an effort to protect valuable soils from erosion or degradation.

The proliferation of these structures in recent years has surfaced tension between farmers looking for affordable, effective solutions and municipal code that has not been updated to reflect the unique nature of these buildings.

This bulletin is designed to provide farmers and municipal officials with a basic understanding of the utility of high tunnels, a common set of vocabulary and definitions, resources for farmers planning to build tunnels and engage in conversation with their municipality, and suggestions for municipal officials on interpreting or crafting new ordinances/regulations on permitting and taxing these structures. It is the perspective of the Maine Department of Agriculture, Conservation and Forestry (DACF) that in most instances, tunnels should be assessed by municipalities as equipment or temporary structures and not as permanent buildings.

Definitions

Different farms and suppliers use varying terminology in describing these structures. Here are some common terms for the sake of this document, but parties are encouraged to make sure they're "speaking the same language" when it comes to tunnels and greenhouses.

Low or Caterpillar Tunnel – Typically a steel frame structure covered (or "skinned") by a polyethylene or plastic sheet. These tunnels are almost always unheated and used as three-season structures. Though the steel frame may remain in place year-round, the coverings are often removed, so no snow-load accumulates on the structure. These are often 8-12' tall and narrower than other tunnels. Farmers often relocate these structures on a regular basis, whether to provide seasonal protection to crops for a short period of time or to rotate different protected crops throughout their fields to lower pest and disease pressure. These could also be referred to as hoophouses, poly-tunnels or coldframes.

High Tunnel – Also typically fabricated out of steel tubing covered with poly or plastic, High tunnels are typically unheated and used for crop production or livestock housing. These are four-season structures designed to withstand snow-load. These tunnels are often 15-20' tall, between 16' and 35' wide, and can be built to any length. They are commonly built in Maine at 32' wide by 72' or 96' long. The end walls can be framed with steel or wood and covered with different sheathing materials: from rigid polycarbonate to plywood. High tunnels and poly-covered greenhouses in Maine often use two sheets of material to cover the greenhouse and run a small fan to inflate the area between each sheet – this provides additional structural rigidity and buffets the structure from harsh winds. These structures are also commonly called hoophouses, poly-tunnels, or coldframes.

Greenhouse – Typically a steel frame structure (though wooden framed greenhouses are not uncommon), covered with flexible poly, rigid polycarbonate sheets, or glass. The distinction between greenhouses and tunnels is often determined by the covering (glass can be used on greenhouses, not high tunnels) and the presence of a heat source or other utilities beyond a water source for irrigation. Growers commonly install a furnace (propane, oil, or wood-burning) as a heat source to allow for crop or seedling production in the early spring or late fall or to provide minimal heat for winter growing. Electricity can be run to install fans and supply automated controls for ventilation, heat, and irrigation. These are also four-season structures designed to withstand snow-load. Small greenhouses used for propagation or storage may be as little as 50 sq. ft, but larger production houses can be joined together with gutters to cover acres of land in one single structure.

Suggestions for Municipalities

These structures often straddle definitions of what is a permanent structure and what is temporary equipment. How these structures are treated in permitting and assessment often comes down to the interpretation of existing ordinances by town officials.

The easiest way to address any potential issue raised by constructing these structures is by proactively introducing clarifications to code and ordinance – clearly identifying where a town wants to exempt

structures from certain requirements and where the town wants these structures to proceed through conventional permitting or site plan review processes.

As municipal staff and officials proceed through interpretation or drafting of an ordinance, DACF staff encourage the following considerations:

Defining as Temporary Structures

- These structures are often considered temporary by municipalities and other states in the Northeast. Steel posts driven into the ground may be removed without material damage or impact to the surrounding real estate. A farmer would be able to remove the tunnel and return the footprint to its original state. Often, the presence or absence of external utilities is a major factor in designating these as structures vs. temporary equipment: if no fuel/electricity is run to the tunnel, the case for defining them as temporary is compelling.
- **EXAMPLE:** The Town of Bowdoinham has differentiated between “Greenhouses” and “Hoop-houses or High tunnels” in the Town’s Land Use Ordinance.¹ Greenhouses, with a “permanent foundation or anchoring system,” require approval from Code Enforcement or the Planning Board. High Tunnels, with no permanent footings, are allowable without a permit.

DACF encourages municipalities to define high tunnels and greenhouses that could be reasonably relocated or removed without material damage to the soils on the property as “temporary” structures whenever possible.

Reducing Permitting Fees and Requirements

- Typical permitting fees are often cost-prohibitive for the development of these structures. Assigning a similar fee for building permits, site plan review, and other requirements on a per square foot basis could add up to 20-50% of the cost of the structure itself. If there is latitude available to municipal staff and assessors, BAFRR encourages flexibility with the assignment of fees or the creation of an alternative fee schedule and/or permitting requirements for agricultural buildings and structures as discussed above.
- **EXAMPLE:** Assuming construction takes place in an approved zone, Bowdoinham’s Land Use Ordinance allows for a farm seeking to build greenhouses with an aggregate footprint of less than 10,000 ft² to proceed simply with permission from the Code Enforcement Officer. Above the 10,000 ft² threshold, the project must proceed through full site plan review.²
- **EXAMPLE:** The City of Auburn established a reduced building permit fee for new agricultural buildings as a way to help promote farming. The fee of \$25 plus \$.07 per square foot is

¹ Town of Bowdoinham: Land Use Ordinance, https://www.bowdoinham.com/sites/default/files/town-document/Land%20Use%20Ordinance_amended_6-12-19.pdf (pg. 26-27).

² Town of Bowdoinham: Land Use Ordinance, https://www.bowdoinham.com/sites/default/files/town-document/Land%20Use%20Ordinance_amended_6-12-19.pdf (pg. 64).

smaller than that of other commercial buildings. This reduced fee recognizes the lower cost of inspection services that are required of agricultural buildings.³

Additional Considerations

- Engineer-stamped drawings are not required for farm buildings per [32 MRSA Ch. 3A, §226 2.B.](#)
- Buildings that house livestock or harvested crops are not required to meet technical building codes per [10 MRSA Ch. 1103 §9722, sub-§6.](#)
- The Maine Uniform Building & Energy Code must be enforced in municipalities with a population of 4,000 residents or more. Municipalities with under 4,000 residents are able to create their own permitting requirements if in compliance with all other state laws and regulations.⁴

Crafting ordinances that accommodate these structures facilitate the development of viable agricultural businesses, returning benefits many times over in local economic activity, community food security, community viewshed, habitat preservation, natural resource stewardship, and more.

In sum, municipalities are encouraged to consider these structures as they would other pieces of farm equipment and not as permanent buildings. Supporting viable, profitable farm business creates myriad benefits for communities and often yields a greater return on municipal investment than other developments with similar footprints.⁵ DACF staff are happy to discuss individual scenarios with farmers or municipal officials: please see the Resources section of this guide for contact information.

Resources and Contact Information

Alex Redfield – general questions on tunnels/greenhouses and intersection with municipal ordinances

Farm Viability and Farmland Protection Specialist
Maine Dept. of Agriculture, Conservation and Forestry
Bureau of Agriculture, Food and Rural Resources
alexander.redfield@maine.gov
(207)592-0640

³ City of Auburn: Code of Ordinances, Appendix A – Fees and Charges, Building permit—commercial, https://library.municode.com/me/auburn/codes/code_of_ordinances?nodeId=PTIICOOR_APXAFECH

⁴ MUBEC Rules, Ch. 1§4 “Administration”, available online at <https://www.maine.gov/dps/fmo/building-codes/mubec-rules>

⁵ Farmland Information Center: “Cost of Community Services Study”, https://farmlandinfo.org/wp-content/uploads/sites/2/2019/09/Cost_of_Community_Services_Studies_AFT_FIC_201609.pdf

Thacher Carter – questions on farm-friendly municipal policy

Municipal Policy Associate
Maine Farmland Trust
tcarter@mainefarmlandtrust.org
(207) 338-6575 ext. 409

Jason Lilley – questions on farm operation and sustainable agriculture

Sustainable Agriculture Professional
UMaine Cooperative Extension
jason.lilley@maine.edu
(207)781-6099