

## High Tunnel System Implementation Requirements

### Description

A High Tunnel System (HTS) is an enclosed plastic, polyethylene, fabric, or polycarbonate (end walls only) covered structure that protects crops from sun, wind, excessive rainfall, and/or cold.

### Improved Plant Productivity and Health

High tunnel systems extend the growing season by increasing soil and air temperatures, protecting crops against freezes and promoting vegetative growth. A HTS can extend the growing season to year-round production by modifying the growing environment. The grower can control temperature, moisture, and wind/sun exposure in high tunnel systems to minimize plant stress and maximize plant productivity.

### Requirements

- Crops must be grown in the natural soil profile, or in raised beds up to 12 inches in height.
- This practice does not apply to crops grown outside of the natural soil profile (on tables/benches, portable pots, hydroponics, etc.).
- Install high tunnels according to manufacturers' instructions.
- End walls must be constructed. Local building materials or a manufactured kit may be used.
- The HTS frame must be at least 6 feet in height at the peak of the structure. It should be tall enough to accommodate typical operations.
- The covering must have a min. 4-year lifespan. Use a minimum of 6 millimeter greenhouse grade, UV-resistant material for polyethylene covers.
- Seed all disturbed areas to control erosion.
- HTS are not greenhouses or low tunnel systems.
- HTS cannot be used to provide shelter/housing for livestock or to store supplies or equipment



*Improved plant productivity and health in a high tunnel system.*

- If the site is potentially impacted by zoning regulations or construction permitting, work with the regulatory authority early in planning and prior to contracting and construction.
- Before you dig and at least 2 working days prior to excavation, contact Indiana 811 by calling 811 or at [indiana811.org](http://indiana811.org) for location of underground utilities. Beware of overhead utilities.

### Site Selection:

- Lay out the structure location according to the site plan. The orientation of the tunnel is dependent on location, season and crops that will be grown. East-west orientation will optimize sun exposure and is beneficial in areas north of 40° latitude. In locations south of 40° latitude, consider north-south orientation for maximum ventilation during the summer.
- The natural slope should be less than 5%.
- Locate the structure near a viable water source for irrigation.
- High tunnels can create drainage and ponding issues under certain soil and/or landscape conditions. When needed, direct runoff away from the HTS by installing water management structures such as gutters, rock trenches, underground outlets or diversions.



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- Concentrated flow from the HTS may be captured and used for irrigation although this should not be the only source of irrigation water.
- To control the intensity or duration of sunlight, shade cloth may be used in place of, or in addition to, the installed cover.
- Provide a detention basin, storage reservoir, or stable outlet when runoff from tunnel covers empties onto the ground surface with potential to cause erosion.
- If tunnels are placed side to side, consider a minimum clearance of 10 to 20 feet for snow removal and cover installation.
- Purchase a structure capable of withstanding the local snow and wind conditions and follow manufacturers' recommendations on removal or management of the tunnel cover. A supplemental manufacturer's kit may be needed to provide additional structural support.

## Considerations

- Baseboards and hip boards should be treated lumber or rot-resistant wood. (Note: Check your organic system plan for acceptable materials.)
- Ventilation is important to moderate temperature and humidity within the tunnel. Remove or manipulate side covers to control internal temperatures and humidity. Installation of vents, fans, and/or temperature gauges should be considered and included in the manufacturer's design and recommendations.
- Refer to the Indiana High Tunnel Handbook (pages 8-14) for considerations when determining the best HTS for an operation.

## Management

- Consider managing the high tunnel system to maintain or improve soil health by following a soil health management system that creates a favorable habitat for soil microbes by:
  - \* Maximizing plant diversity;
  - \* Minimizing soil disturbance;
  - \* Keeping living roots growing year round;
  - \* Keeping soil covered with mulches and growing plants.

- Adequate crop rotation is important to prevent disease and pest pressure. Consider a movable HTS or multiple smaller tunnels.

## Operation and Maintenance

- Managing a tunnel requires intensive and vigilant attention.
- High tunnels are seasonal structures. Remove the cover prior to the "snow season" unless the structure has been designed for expected snow loads. At a minimum, snow should be removed to avoid weakening or collapsing the HTS.
- If gutters are installed, remove them prior to snow, ice or high wind events to prevent potential damage to the structure.
- Perform soil and water tests regularly to monitor nutrients and salt build-up.
- To prevent nutrient and/or salt buildup, occasionally remove the cover or move the tunnel to allow for seasonal flushing with rainfall.
- Periodically inspect the high tunnel and repair, reinstall, or replace components as needed to accomplish the intended purpose.
- Surface and subsurface drainage and other associated conservation practices must be maintained. Any drainage problems near the tunnel will be corrected.

## Additional Resources

- Indiana Field Office Technical Guide (FOTG) Standard (325) [High Tunnel System](#).
- [Indiana High Tunnel Handbook](#), Purdue Extension Service, HO-296, August 2018.
- [Crops – Greenhouse and Indoor Production Resources](#), Purdue Extension Service.
- [High Tunnels: Scheduling Fall & Winter Vegetable Production](#), Purdue CES, HO-330, March 2022
- [High Tunnel Series: Managing the Environment in High Tunnels for Cool Season Vegetable Production](#), Purdue CES, HO-297, February 2019.
- "Rainwater Catchment from a High Tunnel for Irrigation Use" video from Iowa State Extension [www.youtube.com/watch?v=XsxRZQR\\_7VU](http://www.youtube.com/watch?v=XsxRZQR_7VU)

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Name \_\_\_\_\_ Farm \_\_\_\_\_ Tract \_\_\_\_\_ Field \_\_\_\_\_  
Assisted by \_\_\_\_\_ Field Office \_\_\_\_\_ Contract # \_\_\_\_\_

## High Tunnel System Information

Manufacturer(s) \_\_\_\_\_  
Height (min 6') \_\_\_\_\_ Width \_\_\_\_\_ Length \_\_\_\_\_ Total Square Feet \_\_\_\_\_

Cover material (if polyethylene, use a minimum 6-mil greenhouse grade, UV-resistant material): \_\_\_\_\_  
\_\_\_\_\_

## Crop Rotation

A planned crop rotation should be followed to reduce the risk of pests and diseases. Crop rotation is not required but, at a minimum, a conservation crop rotation must be discussed with the producer and recorded.

Year 1: Spring _____	Summer _____	Fall _____	Winter _____
Year 2: Spring _____	Summer _____	Fall _____	Winter _____
Year 3: Spring _____	Summer _____	Fall _____	Winter _____
Year 4: Spring _____	Summer _____	Fall _____	Winter _____

## Planned Optional Systems

\_\_\_\_\_ Supplemental Heating System \_\_\_\_\_ Electrical System \_\_\_\_\_ Mechanical Ventilation System

## Planned Associated Conservation Practices

Such as but not limited to:

_____ Cover Crop (340)	_____ Microirrigation (441)	_____ Pollinator Planting (420)
_____ Mulching (484)	_____ Irrigation Reservoir (436)	_____ Critical Area Planting (342)
_____ Low tunnel system (821)	_____ Roof Runoff Structure (558)	_____ Crop Rotation (328)
_____ Soil Carbon Amendment (336)	_____ Diversion (362)	_____ Nutrient Management (590)

## Required

- All erosion due to HTS construction must be controlled. If applicable, see attached seeding specification sheet.
- High Tunnels funded through EQIP must be operated and maintained for the practice lifespan of five years.
- Attach a site plan map.

## Certification

This structure was constructed and installed using manufacturer's recommendations. I have read and understand the operation and maintenance requirements associated with this practice.

Participant: \_\_\_\_\_ Date: \_\_\_\_\_

**Attach a Site Map**