

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**PRECISION LAND FORMING**

(acre)

**CODE 462**

**DEFINITION**

Reshaping the surface of land to planned grades.

**PURPOSES**

This practice may be applied as part of a resource management system to support one or more of the following:

- Improve surface drainage
- Provide land forming operations for drainage and erosion control
- Improve moisture conservation
- Help leaching uniformity
- Improve water quality through better erosion control

**CONDITIONS WHERE PRACTICE APPLIES**

This practice is appropriate on land that is suitable for the purpose required and where precision land forming is practical. Soils shall be of sufficient depth and of suitable textures so that after precision land forming is completed an adequate root zone remains to permit the planned use of the land and application of proper conservation measures, soil amendments, and fertilizer.

Precision land forming operations will be on the basis of a detailed engineering survey and layout. It does not include Land Smoothing (466), or Recreation Land Grading and Shaping (566), and Irrigation Land Leveling (464).

Precision land forming shall be planned as an integral part of an overall system to facilitate the conservation use of soil and water resources.

**CRITERIA**

Design and installation shall be based on adequate engineering surveys and soil investigations. If the land is to be formed for more than one purpose, it must be formed to meet requirements of the most restrictive purpose and crop.

All forming work must be designed within slope limits required for the proposed use and provide for the removal of excess surface water. If other conservation practices such as grassed waterways, drainage field ditches, and filter strips are needed to accomplish the stated purpose, they shall be included in plans for improvement.

**Slope requirements**

Slope may be uniform in the direction of flow or may increase or decrease.

Reverse grades in the direction of planned water flow shall not be permitted. Short level sections are permissible to meet field conditions. Cross slopes must be designed so that "breakthroughs" from rainfall runoff are held to a minimum.

**Slope to control erosion caused by runoff from rainfall**

Design field grades shall be such that erosion caused by runoff from rainfall can be controlled within the limits permissible for conservation farming. When benching between land-formed plots exceeds 1 foot, a permanent grassed area or border ridge must be left between the plots to help reduce the possibility of gully erosion.

**Surface drainage**

All precision land-forming systems shall include plans for removing or otherwise providing for control of excess water.

Designs must provide field elevation and field grades that will permit proper functioning of the planned drainage facilities.

**Borrow computations**

Earth excavation and fill material required for, or obtained from, benches, ditch pads, and roadways shall be considered part of the precision land forming design. Total cubic yards to be moved shall be included when balancing cuts and fills and determining borrow requirements.

**CONSIDERATIONS****Water Quantity**

1. Effects on the water budget, especially on volumes and rate of runoff, infiltration, deep percolation and evaporation.
2. Potential for changes in plant growth and transpiration resulting from the changes in the volume of soil water.

**Water Quality**

1. Effects on erosion and the movement of sediment and soluble and sediment-attached substances carried on by runoff.
2. Effects from the use and management of nutrients and pesticides on surface and ground water quality.
3. Short-term and construction effects of installation on downstream water resources.
4. Potential for earth moving to uncover or redistribute toxic materials, such as saline soils, and make them available to water or plants.
5. Downstream temperature changes.
6. Effects on the visual quality of downstream water resources

**PLANS AND SPECIFICATIONS**

Plans and specifications for precision land forming shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

**OPERATION AND MAINTENANCE**

An Operation and Maintenance plan must be prepared for use by the landowner or operator responsible for precision land forming operation and maintenance. The plan should provide specific instructions for operating and maintaining formed land to help insure proper system performance. Minimum requirements to be addressed in the Operation and Maintenance Plan are:

1. Avoid use of tillage equipment that leaves ridges or depressions that cannot be removed by subsequent tillage operations.
2. On cultivated land, periodically shape land areas to reestablish the installed field condition. Maintain good vegetative cover on all other areas.
3. Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.
4. Immediately repair any vandalism, vehicular, or livestock damage

List other items specific to this project on the Operation and Maintenance Worksheet.

**REFERENCES**

- USDA NRCS, Standard Drawings Handbook - Washington.
- USDA NRCS, National Engineering Field Handbook.
- USDA NRCS, National Engineering Handbook Series.
- USDA NRCS, Washington Technical Notes.