NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

PUMPED WELL DRAIN

(No.)
CODE 532

DEFINITION

A well sunk into an aquifer from which water is pumped to lower the prevailing water table.

Scope

This standard applies to drilled or driven wells used for pumping ground water to lower the water table level in a given area. It does not apply to vertical drains, sometimes called drainage wells, constructed to discharge drain effluent into porous underground formations. Pumps, motors, or other appurtenances needed to pump water from the aquifers are not included.

This standard does not apply to test wells established for investigating purposes before the installation of a permanent well because they are considered temporary.

PURPOSES

To provide subsurface drainage by lowering the prevailing water table to a level that will provide minimum benefits to crop or soils by removing excess ground water and/or salts from the soil profile.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to areas that have a high water table and are in need of subsurface drainage, where pumping from wells is feasible. This requires a permeable aquifer at a depth and of such thickness and magnitude that, when pumped, will lower the water table to the desired degree.

An adequate outlet for the pumped drain water, considering its quantity and quality, must be available.

CRITERIA

Quantity of water

The amount of ground water to be pumped from the well or wells shall be that required to provide the desired drawdown in the area being drained.

Multiple well drains

If more than one well is used in the system, the coned of depression developed by each shall overlap to such an extent that the points of least drawdown will be at the desired level after drainage.

Depth and diameter

The well depth and diameter shall be of such that the amount of water that can be drawn from the aquifer is sufficient to maintain the desired drawdown throughout the crop-growing season. Gravel enveloped may be used in conjunction with screens to serve as a filter and to increase the effective diameter of the well.

Casing

All wells shall be cased with steel, concrete, plastic, asbestos-cement, or other material of adequate strength and durability. The casing shall have a diameter that is adequate to accommodate the required pumping equipment.

Screens

All wells shall be equipped with manufactured screen sections, well points, shop-perforated metal casing sections, or field-perforated sections meeting the criteria stated below.

The screen openings for aquifer material of near uniform size shall be slightly smaller that the average diameter of the aquifer material. For graded aquifer materials (of non-uniform gradation), the screen openings shall be of such that 25 to 40 percent of the aquifer material is larger than the screen opening.

A sufficient length of screen shall be provided to maintain the entrance velocity of water into the well at an acceptable level, preferably less than 1/10 ft/s.

The position of the screen in the well shall be governed by the depth of the aquifer below the ground surface and the thickness of the aquifer to be penetrated by the well.

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Quality of water

If the water from the well drain is to be used for human consumption, it shall meet all requirements of the state health department or other state agencies having jurisdiction. If the water has a high salt content or is not potable, means of disposal shall be planned and installed concurrently with the installation of the well, which will not adversely affect potable water sources and the environment.

CONSIDERATIONS

Water Quantity

1. Effects of the cone of depression on adjacent water uses and users.

2. Downstream effects of the pumped water.

Water Quality

1. Effects of the quality of pumped water on the surrounding environment, water uses, or water users.

2. Effects of well pumping on soil and water salinity.

3. Effects of discharges of pumped water on downstream water temperatures.

4. Temporary and long-term effects on the visual quality of downstream waters.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing well drains 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 by the Designer for use by the owner or other responsible for operating this practice. The plan should provide specific instructions for operating and maintaining the system to insure that it functions properly. It should also provide for periodic inspections and prompt repair or replacement of damage components.