

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**Pumping Plant for Water Control  
(No.)  
No. 533**

**Definition**

A pumping facility installed to transfer water for a conservation need, including removing excess surface or ground water; filling ponds, ditches or wetlands; or pumping from wells, ponds, streams, and other sources.

**Purpose**

To provide a dependable water source or disposal facility for water management on wetlands or to provide a water supply for such purposes as irrigation, recreation, livestock, or wildlife.

**Conditions Where Practice Applies**

Wherever water must be pumped to accomplish a conservation objective. It is especially applicable for maintaining critical water levels in existing swamps, marshes, or open water and for providing water sources for newly constructed wetlands and ponds.

***Federal, State, and Local Laws<sup>1</sup>***

***Design and construction activities shall comply with all federal, state, and local laws, rules, and regulations governing pollution abatement, health, and safety. The owner or operator shall be responsible for securing all required permits or approvals and for performing in accordance with such laws and regulations. NRCS employees are not to assume responsibility for procuring these permits, rights, or approvals, or for enforcing laws and regulations. NRCS may provide the landowner or operator with technical information needed to obtain the required rights or approvals to construct, operate, and maintain the practice.***

NRCS, October 1977

***Permits may be required from the following agencies:***

- 1. West Virginia Department of Health***
- 2. West Virginia Department of Agriculture***

**Planning Considerations**

Water Quantity

Effect of the pumping plant on upstream and downstream quantity.

Water Quality

1. Sediment production caused by erosion during construction.
2. Possible effects on surface and ground water of spilled fuels and lubricants used to operate and maintain the facility.

**Design Criteria**

The efficiency of units, type of power, quality of building, automation, and accessories installed shall be in keeping with the value and importance of the system, and shall accomplish the conservation and environmental objectives.

**Pump requirements.** The capacities, range of operating lifts, and general class and efficiency of equipment shall be determined from appropriate technical studies. The size and number of pumps and their performance requirements shall be determined on the basis of the conservation requirements of the system. The total head shall be determined for critical operating conditions, taking into account all

NRCS-WV, TG-IV, October 1996

hydraulic losses. Automatic controls shall be included in the plans as required.

**Power units.** The power units shall be selected on the basis of costs, operating conditions, conservation needs, and objectives, including need for automation. The power unit shall be matched to the pump and be capable of operating the pump effectively within the range of operating conditions. The horsepower requirements, pump efficiency, and total head on the pump shall be computed.

**Suction and discharge pipes.** The size of suction and discharge pipes shall be based on studies of efficiencies and effects on costs and operations. The arrangement and length of discharge pipe shall be based on the need for recovery of head through syphonic action, and for delivery of water in keeping with conservation and environmental objectives. Gates, valves, pipe connections, discharge bays, and other protective works shall be installed, as needed, for satisfactory plant operation.

**Building and accessories.** The design of the plant and associated housing, if required, shall consider the need for protecting equipment from the elements, malicious damage, and fire and the need for equipment maintenance and repairs. The appearance of the plant shall be in keeping with its surrounding environment and its importance or value.

The foundations shall be designed to safely support the loads imposed. Sheet piling or other measures shall be used, as required, to prevent piping beneath the foundation.

Pumps may be mounted in the open, on piling, or in a well or pit.

Suction bays (or sumps) shall be designed to conform to the hydraulic characteristics established by the pump manufacturer.

The discharge bay or connection with distribution system shall be ample to meet hydraulic and structural requirements. Provisions for repair or removal of pumps and engines shall be provided. Trash racks shall be provided, as needed, to exclude debris and trash from the pump.

All structural features and equipment shall provide adequate safety features to protect workers and the public against injury.

### **Considerations**

***Pumping plants for water control shall be planned as an integral part of the conservation plan and the applicable practices such as drainage, recreational measures, irrigation systems, and water management, grassland management, and wildlife management practices. Planning of such practices will be in accordance with existing standards.***

***Surveys and designs shall conform to basic procedures and criteria set forth in Chapters 1 and 14, Engineering Field Handbook, and Chapters 7 and 8, Section 15, National Engineering Handbook.***

***Requirements for pump drainage are in Section 16 of the National Engineering Handbook. Requirements for irrigation pumping are in Section 15 of the National Engineering Handbook.***

### **Plans and Specifications**

Plans and specifications for constructing pumping plants for water control shall be in keeping with this standard and shall describe the requirements for properly installing the practice to achieve its intended purpose.

***The rating and capacity of all pumps will be certified in writing by the manufacturer.***

***Work shall be performed in an orderly workmanlike manner.***

***Associated practices shall conform to the applicable standards and specifications.***

***Pumps shall be housed in accordance with the protection requirements of the installation. Permanent installations shall be protected from freezing.***

***Materials used shall be in accordance with standard commercial specifications.***

***Specifications will be developed from the NEH-20 Series, 700 Series, or other applicable material, as appropriate.***

### ***Operation and Maintenance***

***An operation and maintenance plan shall be developed. The operation and maintenance plan shall be provided to, and discussed with, the operator.***

***Items that should be considered in the plan are:***

- 1. Periodic inspections, at least annual, of the pumps, power units, pipes, and other components of the pumping plant.***
- 2. Periodic maintenance and testing of the facilities to ensure operating condition when needed.***
- 3. Prompt repair or replacement of any damaged or nonfunctional equipment.***

***<sup>1</sup>Bold italics is information added to the National standard by West Virginia.***