



DEER CREEK WATER SYSTEM

CHALLENGE

WHEN WATER QUALITY WAS COMPROMISED AT CENTRAL OHIO'S VACATION SHOWPLACE, A THOROUGH INVESTIGATION AND SOLUTION WAS NEEDED TO RETURN THE WATER TO ODNR'S HIGH STANDARDS, AN ODNR TRADEMARK.

SERVICES

- Construction Inspection
- Environmental Engineering
- Field Inspection
- Mechanical Engineering
- Structural Engineering
- Survey

AWARDS



HONOR AWARD
American Council of Engineering
Companies (ACEC) of Ohio

DEER CREEK WATER SYSTEM

Referred to as central Ohio's vacation showplace by its operators – the ODNR (Ohio Department of Natural Resources) – Deer Creek State Park is a resort park featuring a lodge, cottages, campground, golf course,

swimming beach, and boating for outdoor enthusiasts among meadows and woodlands in the heart of Ohio's agricultural country.

When mechanical and operational problems at the park's water treatment plant were adversely affecting water quality and causing equipment difficulties at the park's facilities, ODNR contracted with ms consultants

to conduct investigations and supply solutions to return the water system to the high standards that are ODNR's trademark.

THE STUDY PHASE

ms coordinated field investigations and sampling to identify specific water quality parameters that required treatment. They completed two reports – one addressing the water treatment plant and the other looking at the elevated water storage tank. The water treatment plant report identified operational problems with mechanical equipment, increased labor costs, and inconvenience to park visitors due to the impact of hard water. The study recommended abandonment of the existing, older plant, and replacement with a

new facility. The project team completed an in-depth inspection of the elevated water storage tank and supplied recommendations for remediation of an existing lead-based paint problem and restoration of the tank. The two reports included operational recommendations and cost analysis of several alternatives. Under this phase, mechanical, survey, and field inspection staffers provided support on the project. As a result of the reports, ODNR proceeded with both recommendations.

WATER SYSTEM IMPROVEMENTS

ms prepared detailed plans and specifications for the construction of a new treatment facility immediately adjacent to the existing plant. A 1,536-square-foot structure with concrete floor, split face CMU (concrete masonry unit) walls, and a prefabricated truss roof with asphalt shingles houses process equipment, a laboratory for operational tests, and an electrical room. Treatment processes, which are designed for 100 gpm, included:

- a three-unit vertical pressure iron filter battery with $KMnO_4$ and combination air/water backwash;
- a two-unit zeolite softener battery with bypass to provide a blended water hardness of 100 ppm, as well as wet salt storage and a brine pump;
- sodium hypochlorite disinfection and three 1,500-gallon vertical pressure contact tanks with interior baffles;

- pH adjustment using sodium hydroxide solution; and
- iron filter backwash and softener regenerant waste directed to a waste equalization tank with corrosion-resistant pumps to limit discharge to the sanitary sewer system at 40 gpm.

The laboratory was equipped with workbenches, cabinetry, equipment for operational analyses, a double-bowl sink with acid neutralization sump, emergency eyewash/shower, and hot water heater. After the new treatment facility was operational, the existing plant building and equipment were demolished and a new asphalt drive and landscaping amenities were added.

WATER TANK EVALUATION AND REHABILITATION

ms consultants prepared an inspection report using no destructive testing other than hammer sounding and chipping. A total of 107 paint thickness readings were taken on the exterior of the tank. Both the interior and the exterior were tested for lead content.

Upon completion of the dry interior inspection, a recommendations and specs report was completed with the following items:

- painting and coating the interior and exterior surfaces of the tank and appurtenances, including piping and valving, conforming with OSHA requirements in regards to lead-based paint;
- installing fall protection system on all existing ladders after painting;

- providing for continuous supply of water at desired pressures during storage tank outage;
- removing and replacing of the existing polyurethane insulation on the 12-inch riser pipe from the valve vault to the bottom of the bell; and
- rehabilitating the base plate grout.