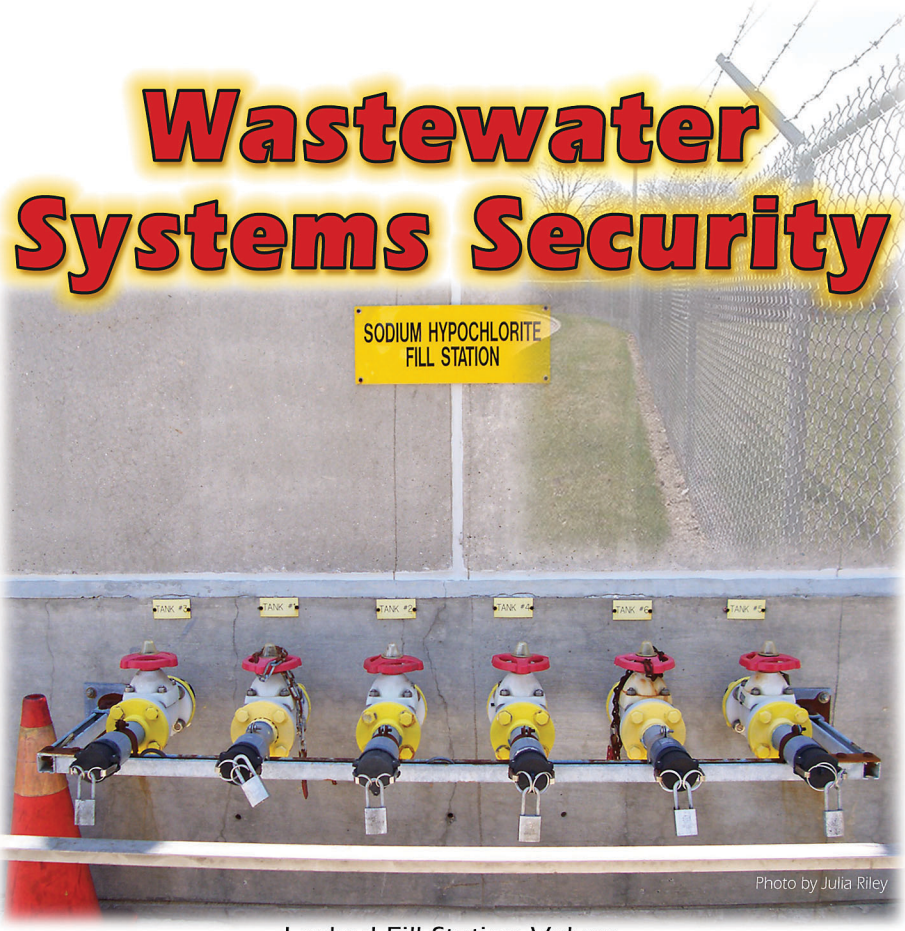
Wastewater Systems Security



Locked Fill Station Valves

Vandalism Prevention Design Checklist

Vandalism Prevention Design Checklist

Wastewater treatment systems can incorporate design elements that protect people, equipment, structures, and property. Wastewater utility decision-makers, consulting engineers, and designers will find this checklist useful in preventing and reducing vandalism.

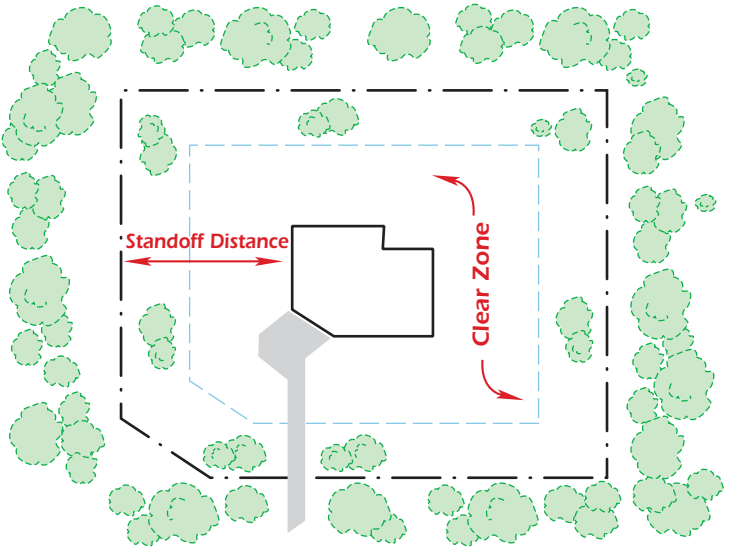
Perimeter Fencing:

- ❑ Provide a minimum "standoff distance" of 148 feet from the outside perimeter fence to critical facilities or buildings inside the perimeter fence
- ❑ Use fencing that resists climbing with 9 gauge or thicker wire:
  - Chain-link fencing with small mesh openings
  - Expanded metal mesh fencing
  - Climb-resistant security fencing
  - Ornamental iron fencing topped with curved pickets
- ❑ Fencing should be 7 feet or higher

- ❑ Top with one or two outriggers with one or more of the following:
  - Barbed wire strands
  - Razor tape
  - Concertina wire rolls
- ❑ Anchor fence posts in concrete footings
- ❑ Avoid opaque fencing, walls, or landscaping along perimeter that might provide hiding places for vandals

Clear-Zone Area (area from landscaping inside perimeter fence to building exterior):

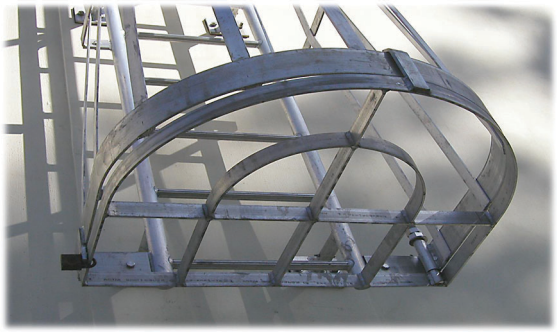
- ❑ Provide a "clear zone" of 50 to 100 feet
- ❑ Minimize landscaping and other features that provide concealment



Landscaping:

- ❑ Tree branches/leaves in parking lots should be at least 10 feet above the lot surface
- ❑ Interior shrubs and bushes should not be higher than 18 inches
- ❑ Avoid landscaping that may obstruct lighting when the plants reach mature height
- ❑ Use plant materials that prevent easy passage as boundary delineators (e.g. crown of thorns and other thorned shrubs, hollies, Spanish bayonet)

Buildings and Other Structures:



- ❑ Prevent creation of hiding places in blind pathways, outdoor storage yards, or unlocked utility vehicles
- ❑ Entrances to buildings should be well-lit, well-defined, and visible to public areas and patrol vehicles
- ❑ Restrict access from front entry point to inside offices
- ❑ Install an emergency alarm connected to a local police station or security firm in the reception area of large facilities
- ❑ Place elevators close to main entrances
- ❑ Design stairways without solid walls to create visibility
- ❑ Position all employee entrances next to employee parking
- ❑ Design interior windows and doors to provide visibility into hallways
- ❑ Place dumpsters, loading docks, poles, and ladders away from buildings so they cannot be used to gain access to roofs
- ❑ Place climb-resistant cages around exterior ladders
- ❑ Position restroom entrances to be observable from nearby offices or work areas
- ❑ Use non-flammable building materials
- ❑ Use non-removable bolts, hinges, screws and other attachments to prevent removal of locks, fittings and other items attached to surfaces
- ❑ Plan storage areas for vehicular access by patrol cars
- ❑ Locate waste gas burners at least 50 feet from other structures
- ❑ Connect alarms and monitoring systems to an uninterruptible power supply
- ❑ Install chemical piping below ground if possible

Signage:

- ❑ Use highly-visible signage
- ❑ Use building numbers rather than treatment process names to identify structures of buildings
- ❑ Minimize signage that would guide vandals to vulnerable assets
- ❑ Place signs high on buildings out-of-reach

Exterior Lighting:

- ❑ Install lighting on high posts or on building walls so fixtures are out-of-reach
- ❑ Illuminate exterior areas surrounding key assets, buildings and structures
- ❑ Provide sufficient lighting at all entrances to buildings
- ❑ Use scratch- and vandal-resistant finishes that prevent corrosion, bending or deforming
- ❑ Lock or conceal lighting fittings or controls
- ❑ Use lighting that:
  - Enables employees or people parking to note individuals at night at a distance of 75 feet or more
  - Allows employees to identify a human face at 33 feet
  - Is a minimum of 2.2 lux around key assets
  - Is at least 16 to 22 lux at entry and exit points
  - Has low-profile or recessed lenses
  - Uses vandal-resistant plastics such as polycarbonate instead of glass light fixtures
  - Is 54 lux and higher when additional lighting is required

Manholes, Sewers, Force Mains, and Pumping Stations:

- Secure manhole covers with straps, bolt-type locking devices, or pan locks on sewers located:
  - Along streams
  - Crossing streams
  - In remote recreational areas

- Reduce the number of manholes in remote areas by increasing the conventional distance (300 - 400 ft) between manholes if newer maintenance equipment is available
- Avoid exposed sanitary sewer pipe crossings by burying force mains or inverted siphons
- Secure air-release valves on bridge crossings with a metal enclosure or perimeter fence
- Restrict access to exposed force mains on bridges or other exposed locations with a fan-shaped fence with or without barbed wire where the pipeline begins its crossing
- Secure pumping stations by:
  - Installing them underground with a minimal amount of equipment above ground
  - Locating them where people can observe possible vandals and alert police

Access and Parking:

- ❑ Have no more than two designated and monitored entrances
- ❑ Position all pedestrian entrances next to vehicle entrances
- ❑ Control access with fences and gates
- ❑ Define vehicle entrances by using different paving materials and signage
- ❑ Place entrances and parking areas so they are visible to building occupants
- ❑ Avoid dead-end driveways and paths

Pipes, Valves, and Other Equipment:

- ❑ Locate critical pipes, valves and other equipment behind sturdy fencing or panels with tamperproof fastenings
- ❑ Provide locked security cages around exposed critical equipment, meters, and electrical transformers
- ❑ Use vandal-resistant locks on gates, valves, and switches

Also Consider Using These Types of Vandal-resistant Items:

- ❑ Composite plastics, glazed concrete masonry units or glazed ceramic tiles that resist graffiti, shattering, and scratches
- ❑ Additional alarms, locks, sensors, security cameras, and equipment to detect intruders
- ❑ Non-stick, no-mark polyurethane-based paints and coatings for internal or external surfaces
- ❑ Strong, exterior furnishings anchored to concrete if possible
- ❑ Doors that are difficult to penetrate, windows that are difficult to break, and facades that are more resistant to projectiles

The information in this brochure was developed from:

"Interim Voluntary Security Guidance for Wastewater/ Stormwater Utilties", by the American Society of Civil Engineers, American Water Works Association, and the Water Environment Federation. December 9, 2004. The full document can be downloaded from this web site:

http://www.wef.org/ConferencesTraining/TrainingProfessionalDevelopment/WaterSecurity/WEFSecurityGuidance.htm

"Optimizing Operation, Maintenance, and Rehabilitation of Sanitary Sewer Collection Systems," by New England Interstate Water Pollution Control Commission, December 2003. The full document can be downloaded from this web site:

http://www.neiwpcc.org/Index.htm?omrmanual.htm~mainFrame.

"Asset Based Vulnerability Checklist for Wastewater Utilities", by Association of Metropolitan Sewerage Agencies, January 2002.

http://www.amsa-cleanwater.org.

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