Wastewater Systems Security

Locked Fill Station Valves

Vandalism Prevention Design Checklist
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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
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

**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
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:
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