2009 INFRASTRUCTURE FACT SHEET

ASCE American Society of Civil Engineers

Aging systems discharge billions of gallons of untreated wastewater into U.S. surface waters each year. The Environmental Protection Agency estimates that the nation must invest $390 billion over the next 20 years to update or replace existing systems and build new ones to meet increasing demand.

WATER AND ENVIRONMENT

FACTS ABOUT WASTEWATER

WATER AND ENVIRONMENT

WASTEWATER

2009 GRADE

D-

RAISING THE GRADES

SOLUTIONS

THAT WILL WORK **NOW**

- ★ **INCREASE** funding for water infrastructure system improvements and associated operations through a comprehensive program;
- ★ **CREATE** a Water Infrastructure Trust Fund to finance the national shortfall in funding of infrastructure systems under the Clean Water Act and the Safe Drinking Water Act, including stormwater management and other projects designed to improve the nation's water quality;
- ★ **RETAIN** traditional financing mechanisms, such as appropriations from general treasury funds, issuance of revenue bonds and tax exempt financing at state and local levels, public-private partnerships, state infrastructure banks, and user fees on certain consumer products;
- ★ **EXPAND** innovative financing mechanisms, including broad-based environmental restoration taxes.

A = Exceptional
B = Good
C = Mediocre
D = Poor
F = Failing

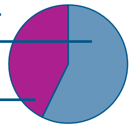
AMERICA'S INFRASTRUCTURE G.P.A. **D**

ESTIMATED 5-YEAR FUNDING REQUIREMENTS FOR **DRINKING WATER AND WASTEWATER**

Total investment needs
$255 BILLION

Estimated spending
$146.4 BILLION

Projected shortfall
$108.6 BILLION



CONDITIONS

Since 1972, Congress has directly invested more than $77 billion in the construction of publicly owned treatment works and their related facilities. State and local governments have spent billions more over the years. Total nonfederal spending on sewer and water between 1991 and 2005 was $841 billion. Nevertheless, the physical condition of many of the nation's 16,000 wastewater treatment systems is poor due to a lack of investment in plants, equipment, and other capital improvements over the years.

In 2008, the U.S. Environmental Protection Agency (EPA) reported that the total investment needs of America's publicly owned treatment works as of January 1, 2004, were $202.5 billion. This reflects an increase of $16.1 billion (8.6%) since the previous analysis was published in January 2004.[2]

In 2002, the Congressional Budget Office (CBO) estimated that for the years 2000 to 2019, annual costs for investment would need to be between $13 billion and $20.9 billion for wastewater systems.[4]

Many systems have reached the end of their useful design lives. Older systems are plagued by chronic overflows during major rainstorms and heavy snowmelt and are bringing about the discharge of raw sewage into U.S. surface waters. The EPA estimated in August 2004 that the volume of combined sewer overflows discharged nationwide is 850 billion gallons per year. Sanitary sewer overflows, caused by blocked or broken pipes, result in the release of as much as 10 billion gallons of raw sewage yearly, according to the EPA.[2]

Federal funding under the Clean Water Act State Revolving Loan Fund (SRF) program has remained flat for more than a decade. Federal assistance has not kept pace with the needs, yet virtually every authority agrees that funding needs remain very high. The U.S. must invest an additional $181 billion for all types of sewage treatment projects eligible for funding under the Act, according to the most recent needs survey estimate by the EPA and the states, completed in August 2003.[4]

In September 2002, the EPA released a detailed gap analysis, which assessed the difference between current spending for wastewater infrastructure and total funding needs. The EPA Gap Analysis estimated that over the next two decades the U.S. must spend nearly $390 billion to replace existing wastewater infrastructure systems and build new ones. The total includes money for some projects not currently eligible for federal funds, such as system replacement, which are not reflected in the EPA State Needs Survey.[5]

According to the Gap Analysis, if there is no increase in investment, there will be a roughly $6-billion gap between current annual capital expenditures for wastewater treatment ($13 billion annually) and projected spending needs. The study also estimated that if wastewater spending increases by only 3% per year, the gap would shrink by nearly 90% (to about $1 billion annually).

The CBO released its own gap analysis in 2002, in which it determined that the gap for wastewater ranges from $23 billion

RAISING THE GRADES CASE STUDIES

SAN DIEGO, CA ★ North City Water Reclamation Plant

The City of San Diego imports approximately 90% of its water supply. To meet future water demands and decrease dependence on imported water, the city constructed the North City Water Reclamation Plant to provide reclaimed water for irrigation, landscaping and industrial use. This state-of-the-art facility can treat up to 30 million gallons of wastewater per day, and distribute the reclaimed water to customers through 79 miles of distribution pipelines. Reclaimed pipelines, sprinkler heads, meter boxes and other irrigation equipment are color-coded purple to distinguish reclaimed water pipes from drinking water systems. The treatment facility is powered by methane piped from the Miramar Landfill and MBC digesters. *Photo courtesy of the City of San Diego.*

to $37 billion annually, depending on various financial and accounting variables.[4]

RESILIENCE

Construction, operation and maintenance, and reconstitution of service of wastewater infrastructure is expensive, and the monetary and societal costs incurred when this infrastructure fails are high. Aging, underdesigned, or inadequately maintained systems discharge billions of gallons of untreated wastewater into U.S. surface waters each year.

The nation's wastewater systems are not resilient in terms of current ability to properly fund and maintain, prevent failure, or reconstitute services. Additionally,

Sanitary sewer overflows, caused by blocked or broken pipes, result in the release of as much as 10 billion gallons of raw sewage yearly, according to the EPA.

the interdependence on the energy sector contributes to the lack of system resilience that is increasingly being addressed through the construction of dedicated emergency power generation at key wastewater utility facilities.

Future investments must focus on updating or replacing existing systems as well as building new ones to meet increasing demand; on improved operations processes, including ongoing oversight, evaluation, and asset management on a system wide basis; and watershed approaches to look more broadly at water resources in a coordinated systematic way.

CONCLUSION

If the nation fails to meet the investment needs of the next 20 years, it risks reversing public health, environmental, and economic gains of the past three decades.

The case for increased federal investment is compelling. Needs are large and unprecedented; in many locations, local sources cannot be expected to meet this challenge alone and, because waters are shared across local and state boundaries, the benefits of federal help will be disseminated throughout the nation. Clean and safe water is no less a national priority than are national defense, an adequate system of interstate highways, and a safe and efficient aviation system. Many other highly important infrastructure programs enjoy sustainable, long-term sources of federal backing, often through the use of dedicated trust funds; under current policy, water and wastewater infrastructure do not. ★

TABLE 6.1 ★ Design Life of Water Systems

COMPONENTS	YEARS OF DESIGN LIFE
Collections	80–100
Treatment Plants—Concrete Structures	50
Treatment Plants—Mechanical and Electrical	15–25
Force Mains	25
Pumping Stations—Concrete Structures	50
Pumping Stations—Mechanical and Electrical	15
Interceptors	90–100

SOURCE Clean Water and Drinking Water Infrastructure Gap Analysis Report, p. 11, EPA 816-R-02-020, September 2002

RAISING THE GRADES CASE STUDIES

MARYSVILLE, WA ★ Pervious Paving

The City of Marysville, Washington, installed pervious paving stones instead of traditional asphalt at its Ash Avenue park-and-ride facility. Besides making the stop a much more attractive place to catch the bus, the paving stones allow stormwater to pass through and soak into the ground. The project also allowed for more parking spaces to be built because a stormwater pond was no longer needed. *Photo courtesy of Mutual Materials and UNI-GROUP U.S.A.*

RAISING THE GRADES CASE STUDIES

WASHINGTON, D.C. ★ Sewer Separation Project

About a third of the District of Columbia is served by a single pipe that carries both wastewater and stormwater runoff. During dry weather, wastewater flows to the Blue Plains treatment plant. But during rain events, both the stormwater and wastewater from the Anacostia area flow in the same pipe, which is not big enough to handle the flows of very large storms. To prevent the combined water from backing up into homes and streets, the combined sewer system dumps the mixture into the Anacostia River. Though the untreated wastewater is diluted by stormwater, allowing this mixture to enter the river is no longer considered an acceptable solution.

To improve the health of the Anacostia River, the Washington Area Sewer Authority (WASA) is working with homeowners and businesses to separate their combined pipe into two separate pipes. DC WASA performs the separation at no charge to customers. *Photo courtesy of Washington Area Sewer Authority.*

SOURCES

1 U.S. Conference of Mayors, *Who Pays for the Water Pipes, Pumps and Treatment Works? —Local Government Expenditures on Sewer and Water (1991–2005)*, 2007, www.usmayors.org/urbanwater/07expenditures.pdf.

2 U.S. Environmental Protection Agency, *Clean Watersheds Needs Survey 2004 Report to Congress*, January 2008, www.epa.gov/owm/mtb/cwns/2004rtc/toc.htm.

3 U.S. Environmental Protection Agency, *Clean Watersheds Needs Survey 2000 Report to Congress*, January 2004, www.epa.gov/owm/mtb/cwns/2000rtc/toc.htm.

4 Congressional Budget Office, *Future Investment in Drinking Water and Wastewater Infrastructure*, May 2002, www.cbo.gov/ftpdocs/34xx/doc3472/Water.pdf.

5 U.S. Environmental Protection Agency, *The Clean Water and Drinking Water Infrastructure Gap Analysis*, September 2002, www.epa.gov/OWM/gapreport.pdf.

6 G. Tracy Mehan, Testimony before the Subcommittee on Water Resources and Environment, U.S. House Transportation and Infrastructure Committee, February 2009, http://transportation.house.gov/hearings/hearing.aspx.

RAISING THE GRADES CASE STUDIES

UNITED STATES ★ Natural Infrastructure

In Philadelphia; Chicago; Portland, Oregon; and Milwaukee, water managers are trying to implement green infrastructure solutions or low-impact development practices. A number of these techniques are in use, including green roofs, rain barrels, rain gardens, vegetated curb extensions, porous pavement, urban reforestation, and even constructed or restored wetlands or wet meadows. The aim of these practices is to retain water on site, allowing for infiltration and evapotranspiration, thereby reducing runoff and allowing for removal of unwanted pollutants.[4]

Increasingly, communities are relying on the "natural infrastructure" as a least-cost approach to protecting surface water quality, which can generate multiple benefits such as habitat preservation, carbon sequestration, and aesthetics. Utilizing such green or natural infrastructure means less hard or gray infrastructure and reduced energy intensity, too. This trend is spreading with respect to wastewater and stormwater management in more and more utilities and communities across the country. This is especially true with respect to "urban wet weather" issues, which involve CSOs, stormwater runoff, and conventional point-source or end-of-the-pipe discharges. Increasingly, communities are meeting these challenges through a watershed approach which employs green or nonstructural approaches in tandem with traditional hard or gray infrastructure.

UNITED STATES ★ Water and Wastewater Agency Response Networks (WARN)

The WARN system created a network of water and wastewater utilities to respond to and recover from emergencies. The purpose of a WARN is to provide a response method for water and wastewater utilities that have sustained or anticipate damages from natural or human-caused incidents. WARN helps utilities communicate so they can provide and receive emergency aid and assistance in the form of personnel, equipment, materials, and other associated services as necessary from other water and wastewater utilities. The program began in early 2006 and by September 2008, 31 states were participating in WARN.