APPENDIX D

WATER AND SEWER INFRASTRUCTURE

NYSDEC DESIGN STANDARDS FOR WASTEWATER TREATMENT WORKS

DEC
PUBLICATION

Division of Water

Design Standards for Wastewater Treatment Works

1988

Intermediate Sized Sewerage Facilities

New York State/Department of Environmental Conservation

CONTENTS

6) Repeat the test a minimum of three times, until the time for the water to drop one inch for two successive tests yields approximately equal results. The last test will then be taken as the stabilized rate for percolation. If different results are obtained from separate pits in the same general area, the slowest percolation rate is used in design.

NOTE: A percolation test whose results are inconsistent with the soil evaluation shall be disregarded, and the percolation test(s) shall be performed again.

DESIGN FLOW

Information on flow rate is necessary for the design of effective wastewater treatment and disposal systems. The wastewater flow rates of existing facilities can often be measured. Table 3 can be used as a basis for the design of sewage treatment and disposal facilities for new developments, and for existing establishments when the hydraulic loading cannot be measured. Alternatively, water-usage data can be used to estimate wastewater flow, if it is available for an establishment. Adjustments should be made for infiltration, and for water that will not reach the sewer (ex., boiler water).

For commercial establishments variations in flow may be extreme. In these cases it is necessary to examine the significant delivery period of the wastewater and base the peak design flow upon this information to prevent an excessive rate of flow through the treatment system. It may be desirable to include an equalization basin prior to the treatment system.

Section 15-0314 of the Environmental Conservation Law mandates the use of water-saving plumbing facilities in new and renovated buildings. Hydraulic loading, as determined from reference to Table 3 may be decreased by 20 percent in those installations serving premises equipped with certified water-saving plumbing fixtures. A combination of new and old fixtures can be considered on a pro rata basis.

New toilets which use as little as 0.5 gallons of water per flush are becoming available on the market and the reduction of wastewater flow attributable to these and other new technologies shall be considered on a case-by-case basis. The reduction allowance shall depend in part upon the ability of the builder or owner to ensure adequate maintainance and/or replacement in kind when necessary.

Table 3. Expected Hydraulic Loading Rates

Type of Facility	Flow Rate Per Person (gal./day)	Flow Rate Per Unit (gal./day)
Airports		
(per passenger)	3	
(per employee)	15	

Table 3. Expected Hydraulic Loading Rates (cont'd)

Type of Facility	Flow Rate Per Person (gal./day)	Flow Rate Per Unit (gal./day)
Apartments	75	
1 bedroom		150
2 bedroom		300
3 bedroom		400
Bathhouse - per swimmer	10	
Boarding House	75	
Bowling Alley		75
(per lane - no food)		
(with food - add food service value)		
Campgrounds (Recreational Vehicle - per site)		
Sewered Sites		100
Central Facilities		
Served Sites, 300' radius		100
Peripheral Sites, 500' radius		75
Subtractions from above		
No Showers		25
Dual Service (Central Facilities and sewered facilities overlapping the central)		25
Campground (summer camp)		
Central Facilities	50	
Separate Facilities		
Toilet	10	
Shower	25	
Kitchen	10	
Campground Dumping Stations		
Per Unsewered Site		10
Per Sewered Site		5
Camps, Day	13	
Add for lunch	3	
Add for showers	5	
Carwashes, assuming no recycle		
Tunnel, per car		80
Rollover, per car		40
Wandwash, per 5 minute cycle		20
Churches - per seat		3
(with catering - add food service value)		

Table 3. Expected Hydraulic Loading Rates (cont'd)

Type of Facility	Flow Rate Per Person (gal./day)	Flow Rate Per Unit (gal./day)
Clubs		
Country		
Per Resident Member		75
Per Non-resident Member		25
Racquet (per court per hour)		80
Factories		
Per person/shift	25	
Add for showers	10	
Food Service Operations (per seat)		
Ordinary Restaurant		35
24-hour Restaurant		50
Restaurant along Freeway		70
Tavern (little food service)		20
Curb Service (drive-in, per car space)		50
Catering, or Banquet Facilities	20	
Hair Dresser (per station)		170
Hospitals (per bed)		175
Hotels (per room)		120
add for banquet facilities, theatre, night club, as applicable		
Homes		
1 bedroom		150
2 bedroom		300
3 bedroom		400
4 bedroom		475
5 bedroom		550
Institutions (other than hospitals)	125	
Laundromats (per machine)		580
Mobile Home Parks		
Less than 5 units: use flow rates for homes		
Twenty or more units		
per trailer		200
double wide		300
Five to twenty units - use prorated scale		
Motels		
Per Living Unit		100
With Kitchen		150

Table 3. Expected Hydraulic Loading Rates (cont'd)

Type of Facility	Flow Rate Per Person (gal./day)	Flow Rate Per Unit (gal./day)
Office Buildings		
Per Employee	15	
Per Square Foot		0.1
Dentist--per chair/day		750
Parks (per picnicker)		
Restroom only	5	
Showers and Restroom	10	
Schools (per student)		
Boarding	75	
Day	10	
Cafeteria - Add	5	
Showers - Add	5	
Service Stations		
Per toilet (not including car wash)		400
Shopping Centers (per sq. ft. - food extra)		0.1
per employee	15	
per toilet		400
Swimming Pools (per swimmer)	10	
Sports Stadium	5	
Theatre		
Drive-in (per space)		3
Movie (per seat)		3
Dinner Theatre, Individual (per seat)	20	
with hotel	10	

TREATMENT CONSIDERATIONS

Detailed data regarding the character and quantity of the wastewater flow is necessary to facilitate the effective design of wastewater treatment and disposal systems.

Many commercial/institutional facilities generate wastewater similar in character to residential wastes. For other facilities consideration of the waste-generating sources will allow an estimate of the character of the wastewater. This will also serve to indicate the presence of any problem constituents in the wastewater such as high grease levels from restaurants and lint fibers from laundromats.

NYCDEP VOLUME CALCULATION MATRIX

COMPARISON OF EXISTING AND WITH-ACTION VOLUME

CSO SUBCATCHMENT AREA:[1]

EXISTING

		Area = 1,855,025 sf (42.59 ACRES)				N/A				
		SITE A				N/A				SITE A
RAINFALL VOLUME (in)	RAINFALL DURATION (hr)[3]	RUNOFF VOLUME DIRECT DRAINAGE (MG)[4]	RUNOFF VOLUME TO CSS (MG)	SANITARY VOLUME TO CSS (MG)	TOTAL VOLUME TO CSS (MG)	RUNOFF VOLUME TO RIVER (MG)	RUNOFF VOLUME TO CSS (MG)	SANITARY VOLUME TO CSS (MG)	TOTAL VOLUME TO CSS (MG)	TOTAL VOLUME TO CSS (MG)
0.00	3.80	0.00	0.00	0.06	0.06				0.00	0.06
0.40	3.80	0.34	0.00	0.06	0.06				0.00	0.06
1.20	11.30	1.03	0.00	0.19	0.19				0.00	0.19
2.50	19.50	2.14	0.00	0.33	0.33				0.00	0.33

With-Action

	Area = 1,855,025 sf (42.59 ACRES)					N/A				
		SITE A				N/A				SITE A
RAINFALL VOLUME (in)	RAINFALL DURATION (hr)[3]	RUNOFF VOLUME TO RIVER (MG)[4]	RUNOFF VOLUME TO CSS (MG)	SANITARY VOLUME TO CSS (MG)	TOTAL VOLUME TO CSS (MG)	RUNOFF VOLUME TO RIVER (MG)	RUNOFF VOLUME TO CSS (MG)	SANITARY VOLUME TO CSS (MG)	TOTAL VOLUME TO CSS (MG)	TOTAL VOLUME TO CSS (MG)
0.00	3.80	0.00	0.00	0.08	0.08				0.00	0.08
0.40	3.80	0.37	0.00	0.08	0.08				0.00	0.08
1.20	11.30	1.12	0.00	0.24	0.24				0.00	0.24
2.50	19.50	2.34	0.00	0.41	0.41				0.00	0.41

[1] If the proposed project crosses over several different CSO subcatchment areas, the above summary table should be completed for each CSO sub-catchment area.

[2] If proposed project includes a phased implementation plan or discrete sites, assess volumes using additional cells above (e.g., Site B).

[3] Based on ***Intensity/duration/Frequency Rainfall Analysis, New York City and the Catskill Mountain Water Supply Reservoirs,*** Vieux & Associates, Inc., April 4, 2006. The 24-hour rainfall volume is based on average rainfall intensity over 24-hours (inch/per) times 24 hrs. (Duration information provided by T. Newman & P. Jadhav, HydroQual).

[4] The volume (calculated in WS2) of stormwater runoff from any portion of the proposed project site draining to a separate storm sewer or as overland flow directly to a waterbody should be entered here.