

LOSS RAC Discussion Agenda & Record of Decisions

Issue Paper for Technical Subcommittee Meeting		Number of Members Present: _____	
Engineering / Design Topics		Topic Number: 8B	
		50% +1= _____	Two Thirds = _____
Topic Statement	Establish design flow requirements for non-residential development.		
Problem Statement	<p>The daily design flow serves at the starting point for a design. Design flow is a key determinant for sizing both the treatment and the soil dispersal (drainfield) components. It must be sufficiently conservative or have safety factors built in so that it accounts for periodic surges if and when they occur but still reflect the typical maximum expected daily flow. Some term the design flow as being an anticipated average peak flow. It is usually not the anticipated peak-peak daily flow. Safety factors get expensive as they get more conservative. For non-residential development, design flow is typically calculated using either charts giving flows per user/meal/room/etc., flows from similar establishments, and/or from estimated uses for each plumbing fixture.</p>		
Background	<ul style="list-style-type: none"> • Per the definitions from the small OSS rule (see reference section), design flow should incorporate both an operating capacity (an anticipated average daily flow) and a surge capacity (generally short-term surges lasting from a few minutes to a few hours to a day). This means the design flow used for sizing LOSS components should contain a peaking factor. • If a mistake is made calculating design flow problems may occur. If the design flow is lower than the actual flow, the potential for failure significantly increases. For some systems, if the design flow is much higher than the resulting actual flow, some treatment components (especially mechanical aerobic processes) may operate inefficiently. • Design flows for a LOSS to serve non-residential development will vary significantly, depending the specific type of development. Some types of development will be quite consistent throughout the day and week. Examples might include malls, grocery stores, offices and warehouses, schools (except for weekends or breaks). Other types of development will vary widely throughout the day, week, or season. Examples might include churches, restaurants, and RV parks. The design engineer must determine what strategy will be presented in the design to account for the variability. • As noted in the reference section, the LOSS foundation document, using data from the small OSS rule, direction from the initial LOSS rule process, and staff discussion suggests 120 gallons per bedroom per day as the starting point. Suggested are 2-bedroom minimums for multi-family housing, such as apartments or condominiums, and 3-bedroom minimums for a single-family housing development or a mobile home park. <p>Ecology’s “Orange Book” (see reference section) suggests using 100 gallons per person per day to determine design flows for residential sewer systems they review and approve. Official planning projections are to be used for determining an average number of persons per residence (frequently 2.3 to 2.5). The average number of persons per residence <i>times</i> the number of residences results in the daily design flow (plus an added inflow and infiltration factor). For conventional sewers, design flows around 240 gallons per residence are routine, regardless of anticipated residence sizes.</p>		

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LOSS Foundation Document

- **“Design Flow”** means the maximum volume of sewage a residence, structure, or other facility is estimated to generate in a 24-hour period. It incorporates both an operating capacity and a surge capacity for the system during periodic heavy use events. The sizing and design of the onsite sewage system components are based on the design flow. (From WAC 246-272A-0010)
- **“Operating Capacity”** means the average daily volume of sewage an OSS can treat and disperse on a sustained basis. The operating capacity, which is lower than the design flow, is an integral part of the design and is used as an index in OSS monitoring. (From WAC 246-272A-0010)
- Design flows for non-residential development should be determined using:
 - Flows from table below
 - Flows from other sources (such as Ecology’s “Orange Book”)
 - Comparable flows from at least three similar establishments
- Design flow should incorporate both specified operating and surge capacities.¹
- **Design flows for Facilities Other than Residential Development**

Reference /
Research

Type of Facility	Design Unit ²	Design Flow (GPD)
Schools with showers & cafeteria	per student	16
Schools without showers & with cafeteria	per person	12.6
Schools without showers & without cafeteria	per person	10
Boarding schools	per person	75
Motels/Hotels	per room	130
Restaurants ³	per seat	50
Truckstops/Interstate restaurants ³	per seat	180
Factories/Offices (with showers)	per person per 8-hr. shift	25
Factories/Offices (without showers)	per person per 8-hr. shift	15
Nursing Homes ³	per bed	200
Eldercare facilities/Retirement homes ³	per bed	100
Laundromats	per machine	500
Churches (without kitchen)	per seat	3
Churches (with kitchen)	per seat	5
Day care centers	per person	20
Picnic areas	per person	5
Campgrounds/RV parks with flush toilets only, no laundry or wet sewer hookup	per camp site/RV space	50
Campgrounds/RV parks with flush toilets, Laundry, no wet sewer hookup	per camp site/RV space	75
Campgrounds/RV parks with flush toilets, showers, wet sewer hookup, with/without showers ³	per camp site/RV space	120
Trailer dump stations ³	per dump	40
Resort cabin	per person	40
Bar/Cocktail lounge ³	per seat	20

¹ Primarily from “Criteria for Sewage Works Design”, Department of Ecology

² Does not include employees & staff, unless indicated

³ Indicates potential high waste strengths facilities requiring pre-treatment

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Questions	<p>1. Should design flows for non-residential development be determined per options in the LOSS foundation document (from small OSS rule, existing LOSS rule & guidance, last LOSS rule revision process?)</p> <ul style="list-style-type: none"> • Flows from table in reference section • Flows from other sources (such as Ecology’s “Orange Book”) • Comparable flows from at least three similar establishments <p>a. If YES, go to question #2.</p> <p>b. If NO, what should the criteria be? Then go to question #2.</p> <p>TRS Recommendation: YES. Reference the table for non-residential flows (keep the table in the RS&G) and other guidance such as the most recent edition or version of the Ecology Orange Book (Criteria for Sewage Works Design) and the EPA LOSS Manual.</p> <table border="1" style="margin-left: 20px;"> <tr><th colspan="3">Committee Vote</th></tr> <tr><th>GRN</th><th>YEL</th><th>RED</th></tr> <tr><td> </td><td> </td><td> </td></tr> </table>			Committee Vote			GRN	YEL	RED			
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<p>2. Should the design engineer be required to include both estimated operating and surge capacities per the language in the LOSS foundation document? YES or NO</p> <p>TRS Recommendation: Not addressed.</p> <table border="1" style="margin-left: 20px;"> <tr><th colspan="3">Committee Vote</th></tr> <tr><th>GRN</th><th>YEL</th><th>RED</th></tr> <tr><td> </td><td> </td><td> </td></tr> </table>			Committee Vote			GRN	YEL	RED				
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<p>3. Should some additional peaking or inflow and infiltration factor be added?</p> <p>a. If YES, what should the factor(s) be?</p> <p>a. If NO, that’s it.</p> <p>TRS Recommendation: NO.</p> <table border="1" style="margin-left: 20px;"> <tr><th colspan="3">Committee Vote</th></tr> <tr><th>GRN</th><th>YEL</th><th>RED</th></tr> <tr><td> </td><td> </td><td> </td></tr> </table>			Committee Vote			GRN	YEL	RED				
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