

## So, how much would you like to know about sewage treatment?

The best site I can recommend, if you want to view some really informative videos about sewage treatment and reuse is the San Antonio Water Supply website on the subject: [https://www.saws.org/Your Water/Recycling/](https://www.saws.org/Your_Water/Recycling/)

I recommend watching the video titled "After the Flush."  
<https://vimeo.com/173104941>

So what are the parameters of the wastewater permits? Let's start with a pretty weak permit a (10/15/3)

The 10 refers to 10 parts per million of Biochemical Oxygen Demand (BOD). Sewage contains a lot of organic material (or food - like sugars and proteins) that break down or are consumed by bacteria (and these bacteria use a lot of oxygen as they eat this food). These bacteria can either do their thing in a sewage treatment plant (where lots of oxygen is added to the effluent) or in a creek or river. But either way, oxygen is required. And, if the oxygen is taken out of the river, well, let's just say that the fish suffer.

So, the first number in the parameters of a sewage treatment permit is very important. The difference between 10 parts per million of BOD and 5 parts per million (like a 5/5/2/1 plant would mandate) causes a huge amount of difference to the receiving stream.

Here's something I found through an Internet search.

"Carbonaceous biochemical oxygen demand or CBOD is a method defined test measured by the depletion of dissolved oxygen by biological organisms in a body of water in which the contribution from nitrogenous bacteria has been suppressed. CBOD is a method defined parameter is widely used as an indication of the pollutant removal from wastewater. It is listed as a conventional pollutant in the U.S. Clean Water Act."

So, some permits just talk about BOD, and some talk about CBOD.

The next number is the Total Suspended Solids (TSS) in the effluent. It refers to just how clean the water looks. The more dirt in the water, the more the turbidity (you can't see as far into it). So, a 10/15/3 permit will allow three times the suspended solids in the effluent as a 5/5/2/1 permit.

The third number refers (for simplicity) to Nitrogen. Nitrogen and Phosphorus are components of fertilizer. And you want to limit both of them if you want to keep algae from growing in your stream. And algae is a bad thing for lots of reasons, but mainly because when it decomposes it steals oxygen from the water - so it has a negative effect on the future dissolved oxygen in the receiving stream. A 10/15/3 permit allows 3 parts per million of Nitrogen whereas a 5/5/2/1 permit only allows 2 parts per million.

The final number in a 5/5/2/1 permit, the “1” refers to phosphorus, which is also in fertilizer. As I mentioned earlier, even water with 1 part per million of phosphorus is enough to cause nuisance algae if it is the primary source of water for a stream

So, it is obvious that a 5/5/2/1 permit is much better than a 10/15/3 permit. But sometimes a 5/5/2/1 permit is still not protective enough if the wastewater in the stream makes up most of the streamflow. Below is a news story that was produced by KVUE regarding the wastewater permit for a facility on the San Gabriel River:

<https://www.kvue.com/article/news/should-treated-wastewater-be-dumped-into-central-texas-waterways/269-588834547>

The main reason to get a 5/5/2/1 permit is because that level of treatment, coupled with some careful monitoring of harmful bugs in the effluent, allows for some serious reuse of the effluent.

Below are some quotes from the TCEQ reuse rules which can be found here:  
<https://www.tceq.texas.gov/assets/public/legal/rules/rules/pdflib/210c.pdf>

Texas Commission on Environmental Quality Page 1 Chapter 210 - Use of Reclaimed Water

SUBCHAPTER C: QUALITY CRITERIA AND SPECIFIC USES FOR RECLAIMED WATER

§§210.31 - 210.36

Effective November 26, 2009

§210.31. Applicability.

This subchapter applies to the reclaimed water producer, the reclaimed water provider and the reclaimed water user. This subchapter sets the specific uses, the quality standards, as well as the monitoring, record keeping, and reporting standards for reclaimed water.

Adopted January 8, 1997 Effective February 12, 1997

§210.32. Specific Uses of Reclaimed Water.

Numerical parameter limits pertaining to specific reclaimed water use categories are contained in §210.33 of this title (relating to Quality Standards for Using Reclaimed Water). These limits apply to reclaimed water before discharge to initial holding ponds or a reclaimed water distribution system. It shall be the responsibility of the reclaimed water producer to establish that the reclaimed water meets the quality limits at the sample point for the intended use in accordance with the monitoring requirements identified in §210.34 of this title (relating to Sampling and Analysis).

(1) Type I Reclaimed Water Use. This type of use includes irrigation or other uses in areas where the public may be present during the time when irrigation takes place or other uses where the public may come in contact with the reclaimed water. The following types of uses would be considered Type I uses: Individual homes.

- (A) Residential irrigation, including landscape irrigation at homes
- (B) Urban uses, including irrigation of public parks, golf courses with unrestricted public access, school yards, or athletic fields.
- (C) Use of reclaimed water for fire protection, either in internal sprinkler systems or external fire hydrants.
- (D) Irrigation of food crops where the applied reclaimed water may have direct contact with the edible part of the crop, unless the food crop undergoes a pasteurization process.
- (E) Irrigation of pastures for milking animals.
- (F) Maintenance of impoundments or natural water bodies where recreational activities, such as wading or fishing, are anticipated even though the water body was not specifically designed for such a use.
- (G) Toilet or urinal flush water.
- (H) Other similar activities where the potential for unintentional human exposure may occur.

(2) Type II Reclaimed Water Use. This type of use includes irrigation or other uses in areas where the public is not present during the time when irrigation activities occur or other uses where the public would not come in contact with the reclaimed water. The following are examples of uses that would be considered Type II uses.

- (A) Irrigation of sod farms, silviculture, limited access highway rights of way, and other areas where human access is restricted or unlikely to occur. The restriction of access to areas under irrigation with reclaimed water could include the following:
  - (i) The irrigation site is considered to be remote.
  - (ii) The irrigation site is bordered by walls or fences and access to the site is controlled by the owner/operator of the irrigation site.
  - (iii) The irrigation site is not used by the public during the times when irrigation operations are in progress. Such sites may include golf courses, cemeteries, and landscaped areas surrounding commercial or industrial complexes. The "syringing" or "wetting" of greens and tees on golf courses shall be allowable under Type II so long as the "syringing" is done with hand-held hoses as opposed to automatic irrigation equipment. The public need not be excluded from areas where irrigation is not taking place. For example, irrigation of golf course fairways at night would not prohibit the use of club house or other facilities located a sufficient distance from the irrigation.
  - (iv) The irrigation site is restricted from public access by local ordinance or law with specific standards to achieve such a purpose.
- (B) Irrigation of food crops where the reclaimed water is not likely to have direct contact with the edible part of the crop, or where the food crop undergoes pasteurization prior to distribution for consumption by animals.
- (C) Irrigation of animal feed crops other than pasture for milking
- (D) Maintenance of impoundments or natural water bodies where direct human contact is not likely.
- (E) Soil compaction or dust control in construction areas where application procedures minimize aerosol drift to public areas.
- (F) Cooling tower makeup water. Use for cooling towers which produce significant aerosols adjacent to public access areas may have special requirements.

(G) Irrigation or other non-potable uses of reclaimed water at a wastewater treatment facility.

(3) Any Type I reclaimed water may also be utilized for any of the Type II uses identified in paragraph (2) of this section.

Adopted January 8, 1997 Effective February 12, 1997

(1) for Type I reclaimed water uses, reclaimed water on a 30-day average shall have a quality of:

Figure: 30 TAC §210.33(1)

BOD5 or CBOD5	5 mg/l
Turbidity	3 NTU
Fecal coliform or E. coli	20 CFU/100 ml*
Fecal coliform or E. coli	75 CFU/100 ml**
Enterococci	4 CFU/100 ml*
Enterococci	9 CFR/100 ml**

\* 30-day geometric mean

\*\* Maximum single grab sample

(2) For Type II reclaimed water use, reclaimed water on a 30-day average shall have a quality of:

(A) for a system other than pond system:

Figure: 30 TAC §210.33 (2)(A)

BOD5	20 mg/l
or CBOD5	15 mg/l
Fecal coliform or E. coli	200 CFU/100 ml*
Fecal coliform or E. coli	800 CFU/100 ml**
Enterococci	35 CFU/100 ml*
Enterococci	89 CFU/100 ml**

\* 30-day geometric mean

\*\* Maximum single grab sample

(B) For a pond system:

Figure: 30 TAC §210.33(2)(B)

BOD5	
Fecal coliform or E. coli	
Fecal coliform or E. coli (not to exceed)	Enterococci
Enterococci	

\* 30-day geometric mean

\*\* Maximum single grab sample

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(B) For a pond system:

Figure: 30 TAC §210.33(2)(B)

BOD5	30 mg/l
Fecal coliform or E. coli	200 CFU/100 ml*
Fecal coliform or E. coli (not to exceed)	800 CFU/100 ml**
Enterococci	35 CFU/100 ml*
Enterococci	89 CFU/100 ml**

\* 30-day geometric mean

\*\* Maximum single grab sample

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So, you will notice, that type 1 reuse (which allows for reuse by individual residents - and allows the water to even be used for flushing toilets) requires a BOD of 5 parts per million. The same level as a 5/5/2/1 permit. So, requiring such a permit will allow for total reuse in the future. And that is what we need to demand - total reuse with purple pipe. Now is the time to do it. And it would double the use of every gallon of water they buy.

Reuse only makes sense.

Tom Goynes