**Section 373.APPENDIX A Maximum Critical Length**

The maximum critical length of a receiving stream is the distance (downstream from the wastewater source) required at 7-day 10-year low flow to reestablish an instream BOD5 of 5 mg/l. The amount of time required to reestablish the 5 mg/l BOD5 is termed the critical time of travel. The maximum critical length can be estimated by computing the maximum critical time of travel, which can be approximated using the following equation:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| tc | ≤ | -1 | ln | (5) |
| Kc | Ef |

|  |  |  |
| --- | --- | --- |
| ln | = | natural logarithm function |
| Ef | = | BOD5 initially present in the stream |
| Kc | = | carbonaceous decay constant |
| tc | = | maximum critical time of travel |

This relationship assumes that BOD5 decays according to ordinary first order reaction kinetics.