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Timely Consolidation of Wastewater Treatment Plants Can Save Jurisdictions Capital Costs, Study Shows

Jurisdictions can realize significant cost savings if they accommodate development with a mix of small wastewater treatment plants while growth is occurring and then consolidate those plants once build-out has been achieved, according to a new study published in the planning journal, *Environment and Planning B*.

The study noted, however, that the amount of savings is directly related to the timing of the consolidation. The optimal cost savings, the study reports, would accrue if the consolidation comes late in the process – after build-out has occurred and most, if not all, of the small plants are at or near treatment capacity.

The study, entitled “Economies of Scale in Wastewater Treatment and Planning for Urban Growth,” was written by Lewis D. Hopkins of the Department of Urban and Regional Planning at the University of Illinois at Urbana-Champaign and Gerrit J. Knaap and Xiaohuan Xu of the National Center for Smart Growth Research and Education at the University of Maryland. It was published in Volume 31 of *Environment and Planning B: Planning and Design*, 2004, pages 879-893.

The study was based on research of development patterns and sewage treatment capacity in the Chicago metropolitan region. It concluded that, “Carefully timed consolidation that takes place after development has occurred might yield present value savings on the order of \$170 million in capital costs. These potential savings are large enough that such strategies are worth

investigating in more detail when developing alternatives for particular urban development plans.”

The study, supported by a grant from the National Science Foundation, notes that the potential savings will vary among metropolitan areas “based on initial conditions, topography, rainfall patterns that affect peak flows from combined sewers, and many other attributes.” But it also suggests that “the estimates developed here suggest that in some cases, savings may be large and consolidation after build-out may be a good strategy.”

The research by Hopkins, Knaap and Xu attempted to answer the question: Can the pattern of urban growth allow jurisdictions to take advantage of potential economies of scale in the construction of needed wastewater treatment infrastructure by relying on fewer and larger treatment plants? The study concluded the answer was “yes,” as long as the consolidation of smaller plants into larger ones was correctly timed.

Areas that have accommodated development by relying on multiple small sewage treatment plants could save significant amounts of money by consolidating those plants once they reach capacity rather than by adding more small plants, the study concluded.

The researchers said these conclusions do not mean that jurisdictional plans that link the timing and provision of infrastructure with land use decisions are not useful. “It means that plans should not only focus on chunks of development as they occur, but also account for very long-term consolidation scenarios.”

To do that, the study says that development plans should recognize that some treatment plants and sites will be used for only short periods of time and that the additional land that will be needed due to eventual consolidation should be identified and reserved for that purpose years in advance. In addition, because some of the smaller plants will be abandoned through this strategy, new sewage interceptor lines will have to be built, for which rights-of-way should also be identified and reserved in advance.

“The conventional wisdom is that urban development can be more efficient by relying on infrastructure investments of efficient size with respect to

economies of scale and using available capacity before building new capacity,” the report states. “Our results are consistent with these principles, but they highlight the difficulties that arise when development does not start from a clean slate and demand is dispersed across a large area.”

To read the full study, go to

<http://www.envplan.com/epb/fulltext/b31/b3123.pdf>.