

**A ROBUST OPTIMIZATION APPROACH TO SOLID WASTE COLLECTION  
PLANNING: LOCATION- ALLOCATION, AND SERVICE FREQUENCY**

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**ABSTRACT**

Due to population expansion and economic development, municipal solid waste management has become a critical issue. Organizations spend large sums each year for their waste disposal. The University of Missouri has its solid waste serviced by the City of Columbia. In this thesis, we develop a robust optimization approach to support solid waste collection planning at University of Missouri. The aim of this study is minimizing the cost of the university's annual solid waste disposal contract. In this research we try to choose the best locations for waste collection, assign waste generators to the potential collection centers, and determine the desired service frequency at collection sites. We solve the problem with two methods. First a deterministic model is proposed that considers a single point estimate for all input data. Then since the frequency of service at certain receptacle types was observed to vary in historical data, a robust optimization model is considered to find preferred solutions. GAMS/CPLEX software is used to solve the model under different scenarios and identify potential waste collection network designs.