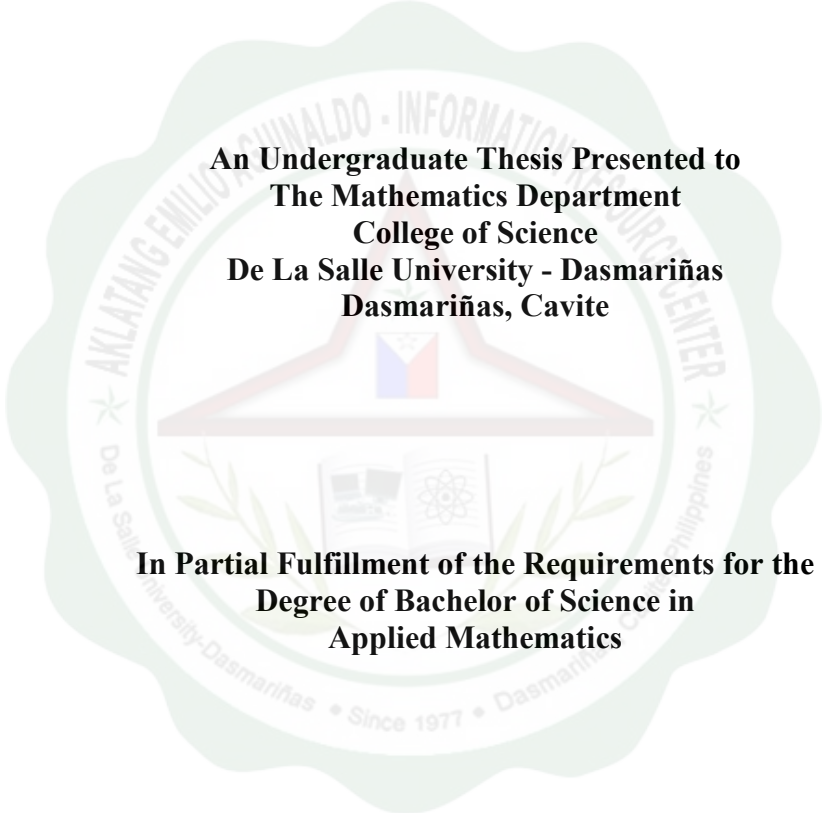


**MINIMIZING THE COST OF GARBAGE COLLECTION
IN DASMARIÑAS, CAVITE
(SHORTEST PATH MODEL)**

The seal of De La Salle University - Dasmariñas is a circular emblem with a scalloped border. It features a central shield with a blue and red design, flanked by two figures. Below the shield are two open books. The text around the seal includes "AKLATANG EMILIO AQUINALDO - INFORMATION RESOURCE CENTER" at the top, "De La Salle University - Dasmariñas" on the left, "Dasmariñas, Cavite" on the right, and "Since 1977" at the bottom.

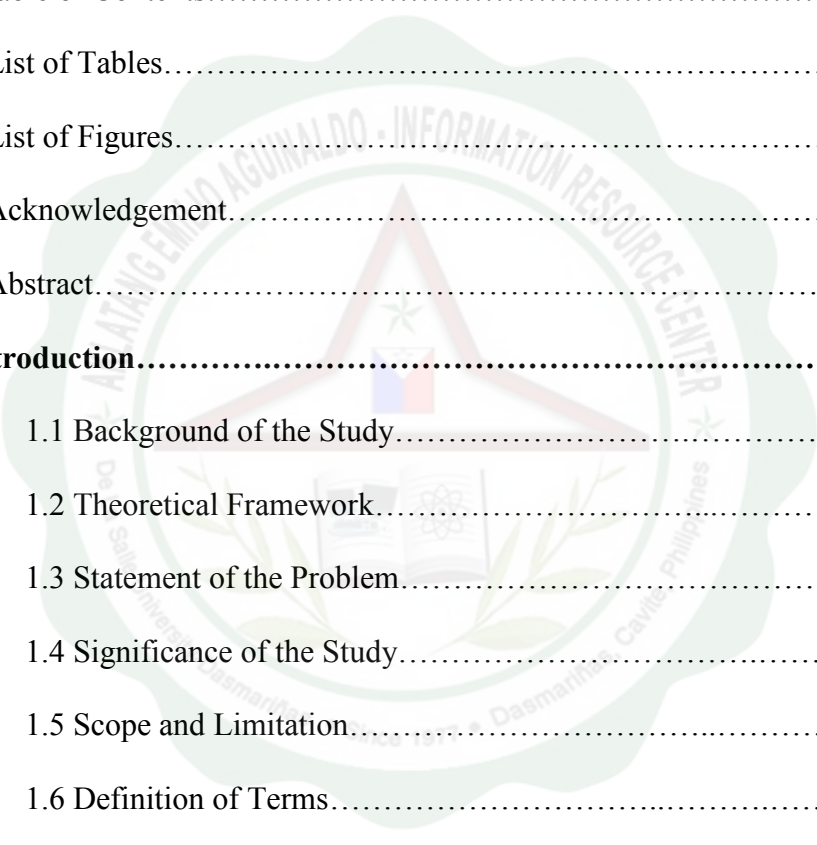
**An Undergraduate Thesis Presented to
The Mathematics Department
College of Science
De La Salle University - Dasmariñas
Dasmariñas, Cavite**

**In Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in
Applied Mathematics**

**Maria Cristina L. Malicsi
John Joseph C. Parra**

January 2008

Table of Contents



Approval Sheet.....ii

Table of Contents.....iii

List of Tables.....v

List of Figures.....vi

Acknowledgement.....vii

Abstract.....ix

1. Introduction..... 1

 1.1 Background of the Study.....1

 1.2 Theoretical Framework.....2

 1.3 Statement of the Problem.....5

 1.4 Significance of the Study.....5

 1.5 Scope and Limitation.....6

 1.6 Definition of Terms.....7

2. Review Related Literature.....9

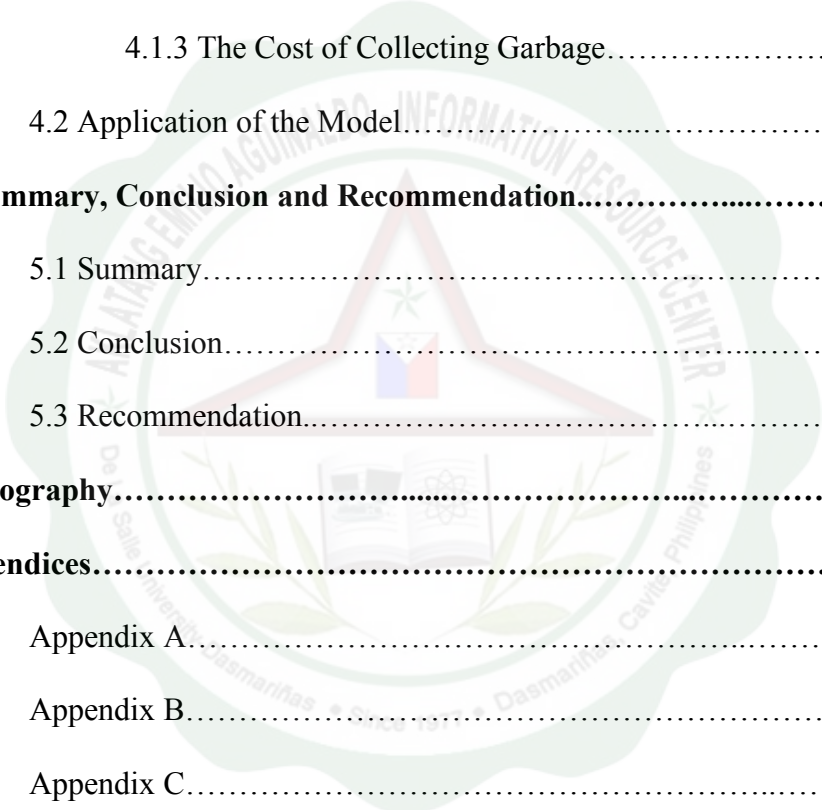
 2.1 Theoretical Literature.....9

 2.2 Conceptual Literature.....14

3. Methodology.....19

 3.1 Research Method/Procedure.....19

 3.2 Time and Place of the Study.....20



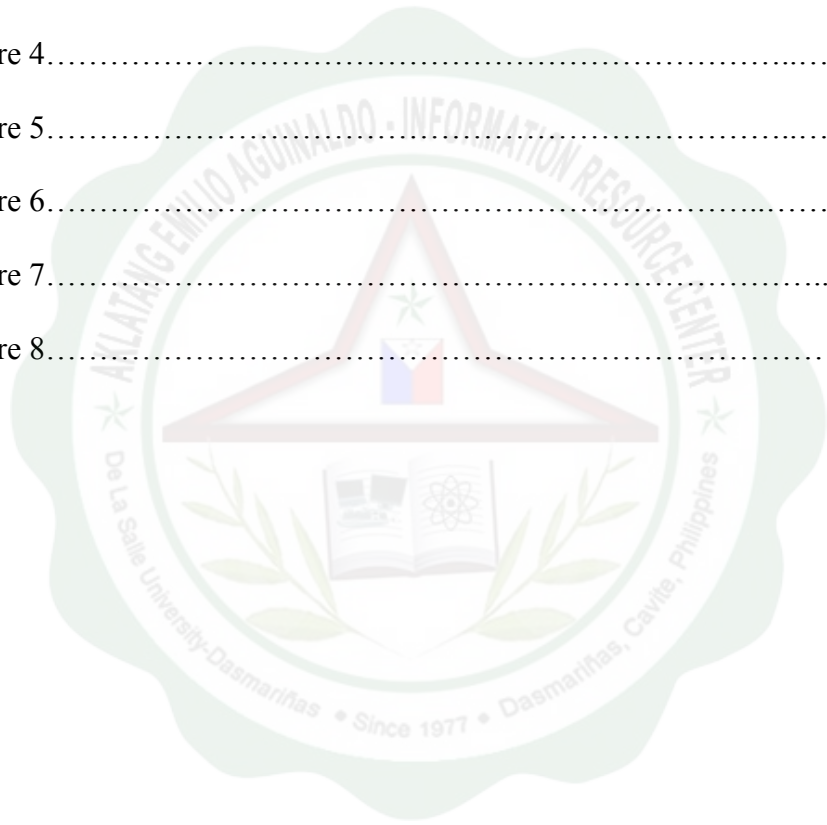
4. Presentation Interpretation and Analysis of Data.....	21
4.1 Presentation of Data.....	21
4.1.1 The Daily Demand.....	21
4.1.2 The Daily Route Distance.....	24
4.1.3 The Cost of Collecting Garbage.....	25
4.2 Application of the Model.....	26
5. Summary, Conclusion and Recommendation.....	51
5.1 Summary.....	51
5.2 Conclusion.....	52
5.3 Recommendation.....	52
Bibliography.....	55
Appendices.....	57
Appendix A.....	58
Appendix B.....	68
Appendix C.....	104
Appendix D.....	105
Appendix E.....	106
Curriculum Vitae.....	107

List of Tables

Table 1.....	22
Table 2.....	25
Table 3.....	26
Table 4.....	34
Table 5.....	36
Table 6.....	38
Table 7.....	39
Table 8.....	40
Table 9.....	41
Table 10.....	42
Table 11.....	43
Table 12.....	44
Table 13.....	45
Table 14.....	46
Table 15.....	47
Table 16.....	48
Table 17.....	49
Table 18.....	49

List of Figures

Figure 1.....	3
Figure 2.....	10
Figure 3.....	11
Figure 4.....	13
Figure 5.....	27
Figure 6.....	30
Figure 7.....	33
Figure 8.....	50



ABSTRACT

Objective of the Study

To create a system of garbage collection in Dasmariñas, Cavite at minimum cost in terms of gasoline and labor expenses including the driver's and helper's fee.

Scope and Limitations

This study was limited to Dasmariñas, Cavite where 65% of the areas of the said municipality were observed. The researchers considered 59% or 10 out of 17 trucks are operating in the said municipality. Approximate distance in kilometers of the possible routes obtained from Google Earth was utilized. Some unavailable data including the number of trips per truck and daily route in a day were gathered thru interviews of the garbage truck's drivers. The study focused on the routes of the garbage trucks to verify the shortest path and to obtain the minimum cost of collection.

Methodology

This research applied the following steps: data gathering, data analysis, formulation of the networking model and scheduling of trucks. Most of the data used by the researchers were obtained from the Environmental Sanitation Unit (ESU). The following data were acquired: map of Dasmariñas, the number of dump trucks, statistics of garbage's volume monthly and from previous year, truck's number of trips, schedule and route of collection. They conducted interviews to verify and gather additional data which are the following: the current daily schedule,

daily number of trips and map of the garbage collection. The information gathered was analyzed by the researchers and formed a networking model in terms of the shortest path model. Finally, new schedule of collection were determined.

Summary of Results:

1. This study formed a shortest path model which has minimized cost of expenses for garbage collection in Dasmariñas. From its current weekly cost of P100, 240.98, it was decreased to P95, 021.88.
2. This research presents the new schedule formed from acyclic algorithm.

Conclusion

The researchers were able to minimize the cost of garbage collection system in Dasmariñas, Cavite using the solution for the Shortest-Route Problem. The solution showed the minimized route which can be used by the ESU and computation of the minimized cost involved. The new schedules were also showed.

Recommendation

The researchers would like to recommend by the municipality government that much attention must be given for the improvement of the garbage collection in Dasmariñas to avoid one of the possible threat to the health of the people and the environment. For the improvement of the current system, allocating appropriate budget is recommended to conduct researches related to garbage collection such as determining the volume of garbage collected in the area. Furthermore, the researchers highly recommend that proper monitoring of the schedule be observed,

especially the expenses involved. Because based on this study, they observed that the available information in garbage collection system given by the ESU is insufficient. Since Dasmariñas is a fastest growing municipality and also based on the researchers' observation, Maximum-Flow Model can be applied to maximize the places collected. Thus, the continuation of the study is recommended by extending the scope and limitations of the study thru creating one road network of Dasmariñas.

