

PHRC Report #42: The Framework for an Integrated CAD-Based Information Management System for the Residential Building Industry

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BACKGROUND:

Residential land development is a complex, highly coordinated, and specifically planned undertaking. Successful residential land development requires an appreciation of the needs of society as well as those of the individual. The development of property requires the services of all of the professionals who are part of the development team. Members of the development team must coordinate activities during all phases of residential land development activities. This coordination of activities inherently leads to an integrated approach to project planning, design, and construction. Within the residential land development industry the ability to generate project information has never been greater, however, the sharing of this information between project participants has remained largely unchanged and is often still paper-based.

In order to assist the development team, various computer technologies have been integrated into the residential land development process. The technology of primary interest is that of Computer-Aided Design (CAD). CAD is currently used extensively within the residential subdivision process. Current CAD packages can be considered to be true design software systems. In fact, they have the potential to serve as the knowledge base of information storage and exchange. Project and design information can be identified and tracked electronically throughout the entire design and review process.

In order to attain the ultimate goal of more affordable housing, a clearer understanding of the entire scope and nature of residential land development activities is required. This involves defining the informational requirements for project planning and design, as well as determining the role of CAD in the integration of this information.

OBJECTIVES:

The overall objective of this research thesis is to answer some of the fundamental questions concerning residential land development, including:

- What exactly is the land development process, as practiced by developers, engineers, and builders?
- What information is required for site selection, analysis, and design?

- What is the format of this information and can it be transformed and integrated into electronic data using existing technologies that are not currently being used in residential land development?
- What is the framework for an integrated CAD-based information management system which uses electronic informational data for site selection, site analysis, and design?
- How does the integrated CAD-based information management system use electronic data and other forms of non-graphic information to produce the desired outcome, namely a set of project plans?

WHAT IT MEANS TO YOU:

This research effort will develop the practical means through which project planning and design information can be collected, organized, and processed for residential land development. CAD-based systems will serve as the engine which drives the information management system. CAD generated electronic drawings, along with their associated databases (both graphic and non-graphic), can potentially contain a vast amount of information which is essential for the planning and design of a land development project. The strategies, methods, and techniques used to interpret, process, and exchange this information are important factors for consideration when attempting to reduce the amount of time and resources allocated to residential land development. The ultimate goal of this scenario is to reduce the cost of the end product that is residential housing.

WHAT'S NEXT?

The final component of this research effort will focus on practical strategies and methods of employing CAD-based technologies to the residential land development process. The proposed research for the second year is divided into two phases. Phase II involves the development of CAD-based methods and design strategies which could be used by the development team during the design and review phases of the land development process. Phase III will apply these strategies and methods to an actual case study subdivision as it proceeds through the various stages of design and review. The results will be documented in a future PHRC Research Series Report.

The ultimate objective in this scenario is to develop practical methods and techniques for using CAD-based systems that will aid both project designers and review officials. It is anticipated that these techniques will provide an efficient means of transferring project information which could reduce the amount of time and resources that are currently allocated to the residential land development process, thus ultimately providing more affordable housing.