Neighborhood Planning for Community Revitalization

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St. Paul Community Geographic Information Systems (GIS)

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Conducted on behalf of Neighborhood Planning for Community Revitalization and the Center for Urban and Regional Affairs
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Executive Summary

The Center for Urban and Regional Affairs (CURA) at the University of Minnesota and Neighborhood Planning for Community Revitalization (NPCR) initiated the St. Paul Community GIS* project in September, 1998 to assist the City of St. Paul in responding to the information needs and requirements of its partner District Planning Councils (DPCs) and Community Development Corporations (CDCs). For nine months (September 1998 through June 1999) two graduate research assistants from the University of Minnesota's Masters in Geographic Information Systems program worked with the Hamline Midway Coalition, a DPC and Dayton's Bluff Neighborhood Housing Services, a CDC.

DPCs and CDCs have had long-standing and mutually beneficial relationships with St. Paul City government, having been partners with the City in its housing preservation, crime prevention, and quality of life improvement programs since the 1970's. Access to timely and accurate information about their target neighborhoods is important to the successful fulfillment of their responsibilities to the City.

This paper summarizes the findings of St. Paul Community GIS Project, and addresses the following questions:

- What types of uses do neighborhood groups have for geographic information?
- What capacities and resources do neighborhood groups possess for processing and analyzing geographic and tabular data?
- What problems exist with the current public data infrastructure?
- What opportunities are there for organizing and improving the delivery of information and/or analysis to neighborhood organizations?
- What are the relative benefits, costs and barriers to implementing these solutions?

Neighborhood based organizations presently use maps and spatial information extensively in their work. Five categories of usage were identified: reference, external communications, site or incident specific, targeting, and trend analysis. Each category provides value to the organizations work and has specific requirements for development, information availability, and technical support.

* GIS (geographic information systems) - the storing and manipulation of geographic information

GIS requires data, software, hardware and printers. GIS implementation capacity requires technical expertise and staff time for data management and map production. Neighborhood groups may find these requirements challenging due to their limited staff size, over commitment of staff time and limited investment in technical resources. Community based organizations, however, have several assets to support successful implementation of GIS: familiarity with using maps and spatial analysis, community generated data, and data quality control due to intimate local knowledge.

Access to St Paul public data can be a daunting task for neighborhood organizations because of lack of a clear directory to locate data, public policies or staff interpretations regarding what information can be shared with DPCs or CDCs, and cost of obtaining public data sets.

The study identified and analyzed a range of delivery models according to their GIS components, benefits and costs/obstacles to both neighborhoods and the City. Models range from a city/county nonprofit GIS consortium to the development of in-house GIS capacities within community organizations.

The report concludes that long-term solutions for neighborhood GIS access should facilitate neighborhood organizational ability to:

- Access city data sets for in-house analysis
- Analyze and map internal. Local data sets
- Implement a variety of product formats (e.g., paper maps, spreadsheets, overheads)
- Influence cartographic output (e.g., map design, data included in map)

A series of steps or "building blocks" will need to be taken over the next several years to create an efficient, effective neighborhood GIS system. A decision will need to be made eventually whether to create "in-house neighborhood GIS systems" or a "GIS center to serve neighborhoods". Both systems require clarification of data sharing and data access policies", citywide data and metadata standards, and dedicated city staff to address GIS concerns of CDCs, DPC and technical assistance providers.

A data handbook is proposed to provide, in simple non-technical language, a guide to obtaining and using spatial and non-spatial data obtained from the City and County departments. The development of the handbook is not contingent upon the implementation of Citywide data policies.

The development of the City of St. Paul's enterprise GIS in collaboration with CDCs and DPCs will assure the continued effectiveness of these organizations in carrying out City policies and programs and the vitality of St. Paul neighborhoods.

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I. Introduction

Community Development Corporations (CDCs) and District Planning Councils (DPCs) are private non-profit neighborhood scale organizations. Within the City of St. Paul, they have had long-standing and mutually beneficial relationships with city government, having been partners with the City in its housing preservation, crime prevention, and quality of life improvement programs since the 1970's.

To successfully implement such programs, CDCs and DPCs rely on timely, accurate information about their target neighborhoods. Such resources, however, are not easily accessible to most CDCs and DPCs. As documented by Blumner (1998) and Kellner (1997), critical pieces of information, such as composite parcel-level data on housing units, can be costly and difficult for a small organization to obtain on its own. When data is accessible, CDCs and DPCs may not be able to derive information from the data or perform the level of analysis needed to determine trends.

Difficulties in obtaining and analyzing data can be addressed effectively through the City of St. Paul's current enterprise geographic information system (GIS) planning efforts. This system will facilitate extensive and customized information analysis, bringing together disparate sources of property information now collected and maintained across many city departments. This is a major undertaking, resulting in an information system capable of greatly enhancing the City's data organization and analysis capacities.

Because of their critical community planning efforts, it is important that this wealth of information be available to CDCs and DPCs. These non-profit organizations are recognized in the City's Consolidated Plan as "one of the major vehicles for the preservation of neighborhood vitality" (St. Paul Consolidated Plan and Submission, p. 83). Access to information and analysis tools is not simply a question of CDC and DPC viability, but by proxy a matter of the effectiveness of the City's community planning efforts.

Community Organizations: Critical to St. Paul's Quality of Life

The City has formally created DPCs for citizen input and developed programs specifically to be carried out by CDCs. These non-profit, private organizations do not merely augment the City's community development initiatives: they are a critical component of larger, city-wide quality of

life goals and initiatives, particularly in the areas of crime and housing. St. Paul's Comprehensive Plan states that the city "relies on the non-profit sector to provide much of the initiative, direction, and direct project implementation in the development of affordable housing" (St. Paul Consolidated Plan and Submission, p. 83).

These relationships date back to the 1970's, when the City of St. Paul established 17 District Planning Councils, one in every St. Paul community. DPCs were designed to facilitate citizen involvement in city planning and policy review. The missions and methods of individual DPCs have evolved since that time; today, each has a unique outlook on the issues facing their communities and what methods are best used to improve the quality of life. Many have expanded their scope beyond City-funded programs to citizen-initiated programs and services. Regardless of the organization's size, all DPCs retain their original roles as primary facilitators of citizen participation for various city projects, and for implementing certain city priorities, such as community-based crime prevention programs.

Community Development Corporations (CDCs) also play a major role in the City's planning and community development efforts. CDCs in the early 1980's emerged to promote targeted housing and economic development. The City of St. Paul has looked to CDCs to implement a variety of programs, including affordable housing development, housing support services, and business corridor revitalization (St. Paul Consolidated Plan and Submission, 1995, p. 83).

The St. Paul Community GIS Project

To assist the City of St. Paul in responding to the information needs and requirements of its partner DPCs and CDCs, the Center for Urban and Regional Affairs (CURA) and Neighborhood Planning for Community Revitalization (NPCR) initiated the St. Paul Community GIS project in September, 1998. Housed at the University of Minnesota, CURA and NPCR strive to connect University resources to respond to community initiated proposals. These organizations have sponsored numerous projects related to neighborhood group data access and analysis (Kellner, 1997, Matthews, 1998, Craig and Elwood, 1998). The current project grew out of these and other efforts, when it became clear that a need existed to clearly articulate how St. Paul CDCs and DPCs presently used geographic data, and they could potentially use GIS and other data analysis methods.

To understand how maps and spatial information are used, and how capacity for such can be enhanced within community organizations, a participatory research model was developed. Two groups -- a District Planning Council and a CDC -- were chosen as pilot study sites. Within each organization, graduate students were assigned to a) assess the organizations' GIS capacities; b) create maps on an as-requested basis; c) suggest map applications as needs arose; and d) record reactions to GIS products. By working at the request of the neighborhoods, a realistic picture of GIS needs and capacities of each group was developed. An advisory committee, made up of community representatives, City of St. Paul staff, and academic researchers, met regularly to provide scope and direction to the project.

This paper summarizes the findings of St. Paul Community GIS Project, and addresses the following questions:

- What types of uses do neighborhood groups have for geographic information?
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A key finding of this research has been that neighborhood groups (CDCs and DPCs) already make use of spatial data through a variety of applications. Furthermore, access to GIS allows organizations to expand on and enhance their present analysis of data. Technical assistance and data acquisition, however, remain barriers. For the City to fully realize the benefits of well-informed, information-savvy community development partners, the needs of CDCs and DPCs must be considered in the development of its enterprise GIS.

II. Community Organization and GIS: Background

Neighborhood level GIS not only serves the needs of community groups but also adds value to the creation of a City GIS. Community organizations add value to geographic information systems by verifying data accuracy and bringing additional knowledge to place the information and analysis in the context of the community.

Previous researchers have investigated how Twin Cities neighborhoods used maps in their work. Will Craig and Sarah Elwood interviewed 50 neighborhood organizations in a 1998 study to learn how community organizations use maps in their work (Craig and Elwood, 1998). Craig's study provides a framework for understanding the ways in which community organizations make use of computer generated maps. NPCR, in association with an Urban GIS class at the University of Minnesota, annually engages students to produce GIS applications in response to neighborhood organizations.

Neighborhood groups presently use maps and spatial information extensively in their work. The type of questions a GIS might inform is a natural outgrowth of this current usage. As such, developing neighborhood responsive GIS delivery models must be based on contextual knowledge about what community-based organizations do, how they currently use maps, and how capacity is built for using GIS and maps.

Neighborhood groups, in many respects, are logical users of GIS. Analyzing geographic relationships is nothing new for neighborhood groups. They are geographically defined organizations, with missions involving improving the quality of life for a discrete area. Reflecting this geographic orientation are the questions they ask in the course of their work. For example: "Where are crimes occurring?", "Do students at the elementary school live in the neighborhood's deteriorated housing?", or "Where should our home improvement loans be targeted, to ensure maximum impact?".

Neighborhood groups also provide a unique perspective to spatial data. They often know information about houses not included in city and county databases. If a house is vacant, community members may know about it before the county assessor's department records the vacancy in its databases. Often, the first organizations learning about the vacancy are CDCs and DPCs, either through their community connections or by they themselves working in close proximity to the vacancy. The neighborhood group often knows the circumstances contributing to the vacancy, and if there are any parties interested in acquiring and/or taking occupancy of the property. Such information is vital to neighborhood organization, but can also be crucial for the city's efforts at housing rehabilitation.

Community organizations have other data collected in the course of their work that could

contribute to an enterprise GIS. Over the course of our work, we encountered in-house database detailing neighborhood housing grants and loans, a neighborhood conducted exterior condition survey, neighborhood group membership, and current and potential block group captains. Such information is not uniformly maintained amongst the city's CDCs and District Planning Councils. However, because each organization has the ability to develop its own information stores as it sees a need to do so, there exists a wide base of local knowledge reflective of each neighborhood's focus. Facilitating the process by which community groups can analyze these unique data sets within a GIS will greatly enhance the overall structure of a city GIS, not only for neighborhoods, but for governmental officials committed to effectively targeting available funds.

There has been significant prior work done on how St. Paul CDCs and DPCs access and use spatial data in their work. NPCR sponsored a 1997 Rondo Community Land Trust project to assess community access to St. Paul property data. The report (Kellner, 1997) detailed the difficulty community groups had in accessing property information, in part because it was housed in eight different agencies, each with different data formats and procedures for making data available. While Kellner's study did not directly address St. Paul's enterprise GIS development, its findings on data access in St. Paul illustrate not only the challenges facing CDCs and DPCs in accessing GIS data, but also underscore a fundamental challenge the City must overcome in developing its GIS infrastructure. A 1998 study by the St. Paul Local Initiatives Service Corporation (LISC) detailed the pervasive nature of the data access problems first detailed by Kellner, and pointed to the need for an integrated property information system for both the City of St. Paul and local Community Development Corporations (Blumner, 1998). As a result of this work, LISC provided eight CDCs with access to IRIS, a for-profit online property information service. DBNHS was one of these organizations, and has been able to query Ramsey County property records using this system.

Other projects highlight what St. Paul neighborhoods can do with access to GIS and geographic data. Recently, Hamline Midway Area Rehabilitation Corporation (H-MARC) developed a prototype for an Early Warning System to identify properties at risk of abandonment, informing housing strategies and tactics (Myott, 1998). Early Warning Systems have been developed in other neighborhoods in the Twin Cities and across the country (Mardock, 1997). Most use GIS to identify housing structures with multiple "warning signs" of abandonment of neglect, with variables are assigned weights based on the impact that factor has on housing abandonment. Such systems are very useful for neighborhoods seeking to identify where abandonment may

occur, but successful implementation will rely heavily on data availability and long-term access to updates.

The development of a major new system, such as the St. Paul Enterprise GIS, should draw on this set of research when considering how and why community groups can and should participate. We hope that the St. Paul Community GIS project will assist in that exploration and demonstrate how the City of St. Paul and its community organizations can continue and deepen their partnership to keep St. Paul a vital place in which to live and work.

In order to better identify the ways in which community groups can participate in St. Paul's enterprise GIS, the St. Paul Community GIS Project chose two representative neighborhood organizations: one District Planning Council and one Community Development Corporation. The research assistants then worked closely with each group for eight months, identifying potential GIS applications and producing maps and other products on an as-requested basis.

Dayton's Bluff Neighborhood Housing Services was the clear choice to participate as the CDC. They had a thorough database tracking all of their projects and investments dating from 1981. DBNHS staff used paper maps extensively in his work. DBNHS became strongly interested in the possibility of analyzing their in-house database after participating in the 1998 Urban GIS course.

The Hamline Midway Coalition was chosen largely on the basis of their experience in the Urban GIS course. A planner for the coalition had proven an enthusiastic participant, providing both direction and organizational insight to the students in their preparation of maps. There was some background in GIS within this organization, which we felt would be helpful in recognizing the potential for this technology. HMC also maintained a detailed database in-house, mostly a list of "contacts," but it would prove useful.

III. Neighborhood Uses for GIS

In order to provide useful information to neighborhood groups, we first needed an understanding of their existing uses for maps and spatial data, and how the capacity to use maps and data is built over time. To accomplish this we worked closely with HMC and DBNHS. Our main task was to provide maps for the groups, recording what maps the groups requested and how they were

used. As appropriate, we also suggested new applications of GIS. This method facilitated an understanding how CDCs and DPCs use maps, before and after intensive technical assistance.

Eventually, patterns emerged in terms of the types of maps and applications we were asked to produce. This was not a unique observation. Previous researchers (Craig and Elwood, 1998) also found that the maps community groups used tended to fall into certain categories, based on what they were using them for. We relied for the first months of this project on Craig and Elwood's paradigm of how neighborhood groups use maps (Craig and Elwood, 1998). Ultimately, we found it useful to devise our own descriptions for why the maps we created for DBNHS and HMC were requested and for what they were eventually used. We have grouped these applications into five distinct categories.

Reference: Increase efficiency and accuracy of day to day operations.
External Communications: Convey an organization's work, or factors affecting its work, with external entities.
Site or Incident Specific: Facilitate organizing, analysis, and/or decision-making around a discrete sub-section of larger geographic area.
Targeting: Tactical functions that employ an array of criteria to assist in operational decision-making.
Trend Analysis: Provide context for long range planning and program development.

Each category has a distinct goal and unique production requirements. It is helpful to describe the process for producing each category of maps. **Table 1** provides a summary of the benefits of and requirements for each application type.

Reference

Among the first maps requested by both HMC and DBNHS staff were parcel level reference maps. Specifically, the organizations wanted maps displaying the address for each parcel in the neighborhood. Without this information in a clearly readable form, the groups were not able to rapidly answer questions arising from citizen phone calls or visits. Both organizations had relied on incomplete or dated address maps in the past and had a strong desire to obtain updates to this information.

Address maps were some of the most useful maps developed over the course of this project.

Table 1: Neighborhood Applications for Geographic Information

Application Type	Example	Benefits	Requirements
Reference	Address Map Tabular Listing of Property Owners	Increased efficiency and accuracy of day to day operations.	Updates (Relatively Infrequent).
External Communications	Map to accompany grant application.	Strengthens ability to pursue external funding.	Maps must be very polished (Iterative Process) Data must be complete and accurate.
Site or Incident Specific	Map to negotiate new street improvement locations Tabular data indicating property owners within 250 feet of a 'disturbance' property.	Strengthens negotiating position. Facilitates issue specific organizing.	Flexibility of Map Scale and Map extent. Large Scale Data sets.
Targeting	"Neighborhood Early Warning Systems"	Provides concrete, defendable rationale for programmatic decisions. "Per-dollar" impact of programs more effective.	Integration of multiple data sets, (particularly "in house" tabular data)
Trend Analysis	Geodemographic Maps Crime Trend Surface Map	Provides context to neighborhood long range planning and program development.	Currency of information is important.

Several times during meetings at DNBHS, for example, we witnessed staff referring to the parcel-based address map hanging in their conference room for information on a property location, the lot dimensions, and the geography of adjacent properties. Clearly, the labeling elements were crucial to the utility of the map. By accident, we also provided DBNHS another large-format map of its funding by parcel, but neglected to label the streets. That map was displayed in DBNHS's conference room for an extended period of time. They often referred to the map's lack of street labels (the parcels were numbered, the streets were not named) as a major detriment to determining their locations.

Lack of map labels has diminished the utility of maps DBNHS has received in the past. On our first visit, the director of DBNHS showed us a land use map custom-make for him about two years ago. He thought the map was "great", but wasn't able to put it to much use. DBNHS had requested address labels on the map, but was told it was not possible to add them. The result was a map with seriously diminished utility. What might have become a crucial reference map for DBNHS was instead an interesting and somewhat helpful, but fundamentally flawed, document.

Often, reference maps with missing information were still of use to the organizations, with some diminishment of utility. DBNHS, for example, was frustrated that the assessor's data we had did not show "joined" parcels (e.g. two smaller properties combined to create a large lot, but retaining their respective PINS and boundaries in county records). Because staff were knowledgeable of the neighborhood and its housing history, however, they were able to "fill in" some of this information while using the maps. DBNHS demonstrated this repeatedly throughout the year: in several conversations, the staff would refer to a specific area on a map, mention "it doesn't really look that way", describe the difference, and then use the map's other data for additional reference.

External communications

From the beginning of this project, DBNHS was most concerned with obtaining maps for external communications purposes. The organization felt the ability to display descriptive maps of their neighborhood would effectively communicate the capabilities of the organization and would reap additional funding from external sources. DBNHS needed to convey what they have done in the neighborhood in terms of housing development, where they may want to do work, and what needs exist.

Producing maps for external communication illuminated a difference between these types of

maps and maps produced for organizational reference. Because external communication maps were *externally presented*, it was crucial that they be comprehensible to individuals outside the organization. Often, such maps were presented outside of the neighborhood, requiring the information be presented in a way someone with little knowledge of the neighborhood could understand. This meant that the process of "filling in gaps", as staff might do with a reference map, would likely not be desirable.

An example of this process is DBNHS's Capital Improvement Budget (CIB) application process. CIB is a biannual funding process of the city of St. Paul for community development projects. It is a major source of funds for DBNHS's revolving home improvement loan program. The application process includes a presentation to CIB's committee. The presentation was characterized by staff as "the most important thing we will use maps for in the next two years."

Creating suitable maps for the CIB presentation required consultation with DBNHS staff about the information they wished to portray via the maps. Some draft maps were deemed too "busy" for a five-minute presentation. For example, DBNHS hoped to use choropleth[1] maps depicting the percentage of homeowners in each block group and the number of individuals below 80% of median income. However, these maps were eventually dropped from the presentation because the idea they wanted to convey – the concentration of individuals below 80% of median income in tracts with lower owner occupancy rates – was going to require "too much verbal description" for the CIB presentation. An attempt to simplify the viewing of DBNHS program dollars by aggregating funding by block was also deemed as difficult to describe during such a short presentation.

The context of an external presentation is very important when determining what maps to produce. Only very simple, general maps, might be appropriate for the majority of presentations. Relying on a small set of maps, however, severely limits the effectiveness of using GIS for external communications. In a longer presentation, for example, DBNHS might have felt comfortable with allocating time for describing more complex and analytical maps, but these maps still need to be concise in how they convey information even if they contain multiple variables. Likewise, the format of a presentation to an audience of non-Dayton's Bluff residents, such as the CIB panel, differs greatly from the approach DBNHS would take in a forum for

[1] A choropleth map displays areas shaded based on attribute value. Choropleth maps are frequently used with census boundaries and data, but this cartographic technique can be applied to any division of land (e.g. state, county, census tract, parcel)

neighborhood residents.

Site Specific Maps and Data

HMC did not directly request site specific information, but through conversation it became apparent that they would benefit from maps and information of this type. The community organizer at HMC indicated that while she was responsible for organizing block clubs neighborhood-wide, she found that unless there was a rallying local issue, it was unlikely that a block would become effectively organized. To most effectively use her time, the organizer would frequently devote her efforts to a single neighborhood issue that had the potential to produce the most significant organizational impact.

At the time of our meeting the most pressing neighborhood issue was an industrial site's plan for major revisions to the makeup of their large land parcel. The proposed changes, including several new 'curb cuts' and new structures, would have a significant impact on the number of trucks traveling through residential streets in the site's immediate surroundings area. A set of detailed maps displaying the industrial lot helped HMC in suggesting alternative configurations for the parcel that would have less impact on residents of the neighborhood. Additionally, a printout of all residents adjacent to the site helped contact potential new block captains.

The site-specific maps are largely for operational work and as a result, frequently do not need to be as polished as maps created for external communications. However, they can easily cross into the external communications domain, when neighborhood committees and staff take the information they gathered during their research phase (e.g. the site-specific maps) and present their cases to neighborhood forums or public officials. Thus, while some details needed in decision-making can be "filled in" as discussed in the reference map examples, there is a great need for accurate and timely information. However, it is important that the area to be discussed is represented in adequate detail, requiring large-scale data, which can be expensive to maintain.

Targeting Applications

Recently several Twin Cities housing groups have produced "Neighborhood Early Warning Systems" which incorporate a wide array of data in attempting to identify properties which are at risk of becoming abandoned (Mardock, 1997; Myott, 1998). Because of this work, DBNHS had some initial interest in developing targeting type applications with geographic information. Perhaps due to the relative condition of the neighborhood's housing stock, DBNHS was more

interested in working to market their properties than in anticipating problem properties. DBNHS requested maps that would identify suitable lots based on a given annual income level. With this type of data, they could query the map based on the qualifications of a "walk in" client. In the end, the logistical complications inherent to determining "affordability" prevented these maps from being heavily used in the context of targeting.

HMC had less use for this type of application. There was discussion of using our datasets to target the location of a new community center in the neighborhood. Unfortunately, this was not really a complicated enough problem to warrant this type of technology. HMC's requirements for the site were: 1) It must be in the neighborhood, and 2) It must be cheap or free. This equation was not sufficiently complex to justify the use of GIS. On the other hand, a map of crime incidents (discussed in detail in the following paragraphs) was unintentionally used as a targeting application. The locations of current block captains were mapped, to a establish a prioritization of blocks for organization based on its exposure to crime activity.

Trend Analysis

HMC had a strong demand for trend analysis maps. These maps, intended to provide context for long range planning and program development, were to be used in their comprehensive planning and organizing functions. Over the past year, HMC has compiled a comprehensive plan for the Hamline-Midway neighborhood. During initial discussions, several maps displaying census information were requested to provide some context and background to the creation of the neighborhood's comprehensive plan.

There were also trend analysis maps created using the city's data sets. HMC staff had indicated that an interest in learning more about the general distribution of crime incidents in the neighborhood. Nine months of individual incidents were generalized in order to produce a surface portraying the concentrations of crime incidents in the neighborhood. The crime trend maps were of great interest to the staff and revealed surprising information about the general concentrations of crime. Because the generalized nature of this information, a high degree of accuracy is not necessary for this type of map, however a great interest was shown in determining the precise time frame of the trend surface portrayed.

In Table 1, we have outlined each of the application areas discussed above. In the column titled 'Benefits' we have outlined specifically how the neighborhood group would benefit from each

type of application. This benefit frequently is also a direct benefit to the City. The requirements column in the table details the particular data requirements of each application area. This can have a significant impact on the cost of being able to carry out an application.

IV. Neighborhood Capacity for GIS

A GIS is generally defined as a computer system for storing and manipulating geographic information. Key components include:

- **Data:** both geographic boundaries and tabular information
- **Software:** this can mean either a desktop GIS system (e.g. MapInfo, ArcView), or an Internet map server
- **Hardware:** computers with adequate graphics and processing capacities for the desired analysis
- **Printers:** the medium for translating digital geographic information into paper format

However, GIS implementation must be taken within the context of the non-computerized, existing organizational structures.

- **Technical expertise:** Does anyone in the organization know how to use GIS software? Who is comfortable with translating tabular address files into a geographic layer?
- **Staff time:** Does the organization's staff have enough time to make maps? Maintain a computer system? Obtain data from appropriate outlets?

By including the human part of a GIS in our analysis we are able to relate the processes of the organization to the processes of the computer system. Equipment alone never guarantees successful GIS implementation; beginning GIS users may find it prohibitively difficult to use GIS software and create maps without clearly defined research goals, training, or knowledge of basic geospatial concepts.

St. Paul's neighborhood groups can bring many assets to the citywide GIS system, including:

- **Familiarity with using maps and spatial analysis.** While they are a diverse group of organizations with unique histories, the vast majority use paper maps and spatial information extensively in their work. As discussed earlier, this is in part because the geographically centered missions of neighborhood organization. Researching and organizing around their core issues has necessitated utilizing census data, city building

permit data, and city crime data. Forward thinking projects, such as the pilot Neighborhood Early Warning Systems, could serve as inspirations for city departments that have not made extensive use of geographic data in the past.

- **Local data collection and quality control.** Most St. Paul community organizations also have collected their own data in the course of their work. Our two target groups assembled detailed information on neighborhood housing grants and loans, a neighborhood conducted exterior condition survey, neighborhood group membership, and current and potential block group captains. As the St. Paul enterprise GIS evolves, neighborhood groups might be able to play a formal role in data collection or data maintenance.

DBNHS is particularly commendable in its maintenance of an extensive Access database pertaining to its programs. Information on each *transaction* (a grant or loan given by DBNHS to a property) is available from 1980, including property owner, PIN, amount of loan/grant, interest rate of loan, and demographic. The database is used extensively to track outstanding loans, produce performance reports for grantors, and analyze home ownership trends in the neighborhood. In addition to this database, DBNHS also subscribes to the IRIS property information system. IRIS is a privately developed Internet system for obtaining property data, including Ramsey County Assessor's data. This system allows for single property look-up, as well as limited (less than 200 records) data downloading. The HMC office also has an existing data infrastructure, in the form of a FileMaker Pro database, which could be mapped on an ongoing basis.

Several characteristics of neighborhood organizations can adversely impact their ability to effectively use GIS:

- **Resource poor.** Neighborhood organizations do not have the same capital resources as larger non-profit or governmental organizations. While some groups are able to leverage their internal resources and funds, many find it difficult to do so, because of smaller size and lesser name recognition than larger community-based organizations. Because of their smaller budgetary size, their staffs are generally smaller as well, and as such the ability to keep someone on staff solely for technical and computer support is not realistic. At the risk of stating the obvious, this lack of resources also prevents neighborhood groups from purchasing the appropriate hardware and software to manipulate GIS data "in house." Notably, DBNHS has found federal funding to build some of their hardware

and software capabilities, but still may struggle to maintain adequate resources. HMC would not be able to run any commercial GIS package on the computer hardware present in their office.

- **Limited staff time.** Typically, staff at neighborhood organizations have very full calendars, exacerbated by the fact that the organizations generally are not financially secure enough to hire more than a skeleton staff. As a general rule, there are few or no administrative and technical staff persons available to the group. Often, especially in district planning councils, a community organizer will assume dual roles (e.g. as executive director and community organizer, or community organizer and administrator). This diminishes the likelihood that time might be spent implementing a GIS, or contributing as part of one.

- **Size constraints.** The small size of a neighborhood group's staff diminishes its ability to capitalize on possible efficiencies gained through GIS implementation. While some tasks will become more efficient, they will not facilitate the elimination of one job function in the office (which could theoretically be devoted to GIS and data analysis.)

V. Issues with Current St. Paul Public Data Infrastructure

Previous work (Kellner, 1997; Blumner, 1998) has established that St. Paul neighborhood groups have found acquiring the housing data needed for their work to be a difficult and time-consuming process. While Kellner's report focused on locating housing information for individual parcels, it does raise up a concern we had from the beginning about this project: if it can be difficult to locate data for an individual property, how readily would it be available for an entire neighborhood, and in a digital format?

Data Access and Availability

One of the St. Paul Neighborhood GIS Working Group members, Mark Vander Schaaf, was essential when it came to locating and acquiring data. As a staff member of the city's Planning and Economic Development (PED) department, Vander Schaaf possessed a thorough understanding of publicly-available datasets, GIS-specific data needs, and who was responsible for maintaining and distributing certain datasets.

There were times when Vander Schaaf's involvement in locating and obtaining digital data was

indispensable; where data simply would have been too time-consuming or costly to obtain without his assistance. An example of this is when we received a contact name from Vander Schaaf about obtaining a housing-related database from a city department. When we called the department requesting to speak with our contact, another worker handled our call instead. We were told that the request was "very unusual", and there was no guarantee that it would be available. If it were, it would likely cost at least $40 for a paper list. The data would not be available either in digital format or broken down by district planning council. A subsequent inquiry to the official Vander Schaaf suggested we speak with produced very different results. We were immediately told, "That's no problem--it is all public information". Within an hour of that discussion, we received a WordPerfect document containing a table of our requested data, broken down by district planning council.

This incident reminded us how crucial it can be for neighborhood groups to *know where to go for publicly held information.* Part of the ease we had in obtaining data was because we were well connected. Vander Schaaf was on our steering committee, and as such had an interest in the success of this project and of the participating neighborhood organizations. Getting data maintained by or stored at PED -- the bulk of our data needs -- was not difficult. Furthermore, his knowledge of whom to speak with about other data sets (e.g. historical housing values, city building permits) provided the necessary connections to obtaining information PED could not offer.

Neighborhood knowledge about data availability, however, isn't enough: city employees must know what data is publicly available from their department and what the procedures are for releasing this data. Development of citywide data sharing policies, and designation of contacts for publicly available data sets, can assist these efforts. In the previous example, the city worker may not have known the information used in their offices was public data, or even that is was easily transferable in digital format. Departments that have a "point person" in charge of answering queries about its publicly available data can avoid these misunderstandings

Without Vander Schaaf to call for advice on data requests, much of this project would have been slower and more frustrating, with more time spent tracking down the appropriate data source. We also would have encountered additional financial obstacles during this project. As neighborhood groups build greater capacity for using spatial data, it will be difficult for city staff to handle their requests as an informal part of their jobs. One way of addressing this issue is to produce at

minimum a data bibliography that could reproduce some of Vander Schaaf's expertise with respect to the repositories of existing data resources for neighborhoods. A GIS data handbook, containing contacts for spatial data sets as well as metadata records, can help the city relieve some of its increasing data request burdens as well as educate the public about what data is available and how it may be used.

This brought up a crucial question: what is a "city project"? There are varying interpretations of what CDC and DPC projects are. As discussed in this paper's introduction, the roles of both CDCs and DPCs as community planning agents are well defined in the City's Consolidated Plan. Based on this documentation, one could interpret that most *anything* community groups do could conceivably be classified "city project". However, others may expect a "city project" to be more directly tied to a specific city-administered program, such as CIB-funded projects. For example, a simple address reference map enables CDCs and DPCs to more efficiently carry out the City's desire to foster safe and livable communities. If such a map improves the effectiveness of a city-funded organization, and the City depends on the organization as its citizen participation arm, does this qualify as a "city project"?

VI. Delivery Models

"Hands on" assistance in the map production process had a major impact in how frequently maps and spatial information were used in the DBNHS and HMC offices. From our project, we found that some technical assistance and capacity-building mechanisms were vital to neighborhood groups when it came to producing and developing mapping applications. While both of our groups used maps and geographic information extensively in their work, neither fully knew the scope of digital data currently available from sources within the City, nor did they have the appropriate hardware or software available to them to produce maps on their own.

There has been some work done recently on building models for increasing neighborhood organizational GIS capacity. A group of geography researchers at the University of Minnesota recently wrote a paper detailing models for making GIS available to community organizations (Leitner, McMaster, Elwood, McMaster and Sheppard, 1998). They detailed six models, based on their experiences with Minneapolis neighborhood groups, for making GIS available to community organizations. We have chosen to adapt their work for this project, expanding upon and adding some scenarios we feel may be particularly useful and applicable to St. Paul

neighborhood organizations. Tables 2a and 2b draw largely on Leitner et al's paradigm, but will scrutinize possible local participants in building these models and the relative costs and benefits of these models to all parties.

The range of models presented here is in large measure for discussion only. We feel all are, as models, worthy of consideration. However, they are being presented in this section as delivery models only, not as recommendations.

Table 2a: Models for Delivery of Geographic Information System Components

	Model	Description	GIS Components Provided
A	**City/County Nonprofit GIS Consortium**	Establish organizational entity to include Ramsey County, City of St. Paul, and other cities in the county. Entity would be responsible for developing and maintaining GIS databases, selling data to private interests, and distributing publicly available data to non-profits and individuals.	• Personnel for organization and distribution of data. • Data
B	**Continue & Expand CURA/NPCR/Other GIS Research Assistantships**	Currently, NPCR and CURA hire several graduate and undergraduate students to conduct neighborhood-based research. Community groups apply to NPCR three times a year for a student researcher. These projects increasingly include a GIS component.	• Personnel for project management, data manipulation, map creation and analysis. • Hardware and Software (at University). • Provision of printed maps (e.g. SMM, Kinko's, University printers).
C	**Continue & Expand Community-Academic Partnerships (e.g. UNN, Action Research, Urban GIS Course)**	Several courses at local colleges and universities currently allow students to work on actual neighborhood-based projects to fulfill course requirements. Continuing to foster such courses, either via NPCR's University Neighborhood Network (UNN) or individual departments and instructors, may help increase neighborhood access to GIS for specified projects.	• Personnel for limited data manipulation, map creation and limited analysis. • Hardware and Software (at University) • Provision of printed maps at cost (e.g. SMM, Kinko's, University printers)
D	**Dedicate City Staff Time for CDC/DPC Map and Data Questions**	Establish "points of contact" within City departments for St. Paul District Planning Councils and CDCs, where maps and data can be obtained. Could also partition response by planning district. Ideally, such responsibilities will be formalized through job descriptions, etc.	• Personnel for distribution and data related questions. • Data. • Printed maps.

	Model	Description	GIS Components Provided
E	**City Support of a Neighborhood GIS Center**	The City of St. Paul could support the development of a neighborhood GIS center. A coalition of neighborhoods and the city, perhaps funded by user fees from the city and neighborhoods, could get together and warehouse the data together. Graduate students (or others) might staff such a center, providing maps and technical assistants to neighborhood groups on an as-needed basis.	• Personnel for project management, data distribution, map creation and analysis. • Hardware and Software • Data. • Printed maps. ("Full Service")
F	**City Support of a Nonprofit GIS Center**	The City of St. Paul could initiate a more formal arrangement with an existing nonprofit GIS Center (e.g. an organization that provides GIS assistance/data to neighborhood groups, such as Wilder or the Urban Coalition). In exchange for data and staff assistance, the nonprofit could assume some of the responsibilities of technical assistance and data sharing with DPC/CDCs.	• Personnel for project management, data distribution, map creation and analysis. • Hardware and Software • Data. • Printed maps. ("Full Service")
G	**Develop city- and countywide data documentation and data sharing policies.**	Develop standards for city staff about data sharing. Set clear and consistent policies on public data availability, media costs for obtaining such data, and format the data will be available in. Designate departments (and within those, individuals) responsible for distributing specific data sets and maintaining metadata. Since many data sets the city uses originate from the county, discussions should include county personnel as well.	• Data ready for non-departmental use

	Model	Description	GIS Components Provided
H	**Fund a graduate student through CURA/NPCR to deal with community data and GIS needs of neighborhood groups on an as-needed basis**	CURA/NPCR could hire a graduate research assistant specifically to assist neighborhood groups with using maps and obtaining spatial data. The student might be available for a variety of projects, mostly making maps on an as-requested basis. Additional support might include database development assistance (e.g. providing templates and basic Access or Filemaker training) and assistance with obtaining public data (e.g. parcels, census) for a neighborhood group with a longer-term project.	• Personnel for project management, data distribution, map creation and analysis. • Hardware and Software • Data. • Provision of printed maps at cost (e.g. SMM, Kinko's, University printers) ("Full Service")
I	**Set up GIS print room within existing city department (e.g. PED, Public Works).**	Make GIS maps and data available to neighborhood groups via a GIS print room. In Minneapolis, a print room exists which provides both "cookbook" and custom map products for a nominal fee. Users can access the print room by calling or visiting in person, and can be given advice on what can/cannot be mapped. A print room could also be assigned the responsibility of distributing publicly available data sets.	• Limited personnel for semi-automated map creation and printing. • Possibility of Data provision. • Printed Maps
J	**Implement an Internet Map Server for the City of St. Paul or Ramsey County**	Coordinate with Ramsey County to develop an Internet map and data server for access to parcel-level information.	• Limited Software (through the map server) • Data. • Could include functionality to email a print job to plotter in a "Map Room" type of facility.
K	**City Periodically distributes CD of data and data viewer for neighborhoods.**	The City of St. Paul distributes its publicly available data to district councils and CDCs on a CD-ROM. Delivery occurs regularly (e.g. every 6 months), and is packaged with a map browser (e.g. HUD's, MapExplorer).	• Limited Software (through "viewer application") • Data.

	Model	Description	GIS Components Provided
L	**Develop in-house GIS capacities within community organizations**	Many neighborhood groups have appropriate hardware in place, and will increasingly have GIS capable staff on hand, should time be available to create maps and analysis.	• Personnel • Hardware and Software

Modified and expanded from Leitner et. al, p. 16-18.

Table 2b: Cost and Benefits of Delivery Models

	Model	Benefits To Neighborhoods	Costs/Obstacles To Neighborhoods	Benefits To City	Costs/Obstacles To City
A	**City/County Nonprofit GIS Consortium**	• Centralized data location/distribution—easier for neighborhoods to know where to get data from • Consistent quality of data distribution, availability, costs • Central location for information on data quality, metadata, and source of data	• May institutionalize certain costs for community groups to obtain data, regardless of reason for needing it • Would consortium remain committed to ideals of data distribution and access for neighborhood groups? • Could take a very long time to implement.	• Streamlines city and county costs recovery and charging mechanisms • Costs can be recovered from data sale to private sector: single entity provides better negotiation unit.	• A collaborative effort requiring considerable commitment and coordination from multiple government and, possibly, non-profit entities
B	**Continue & Expand CURA/NPCR and Other GIS Research Assistantships**	• Current funding and processes already in place for NPCR assistantships. Existing resource, available for GIS-related projects immediately. • Since students are paid employees, products can be more substantial, including supporting research (e.g. not just a map, but an entire project)	• Limited pool of assistantships – GIS projects must compete for funds with other neighborhood-based projects. No guarantees on how many will be GIS-related. • Can't respond to one-time neighborhood map requests – everything is project-based.	• Reduces necessity for departmental staff to aid neighborhoods in data analysis and mapping tasks.	• Increases demand from neighborhoods for data products.

	Model	*Benefits* To Neighborhoods	*Costs/Obstacles* To Neighborhoods	Benefits To City	Costs/Obstacles To City
C	**Continue & Expand Community-Academic Partnerships (e.g. UNN, Action Research, Urban GIS Course)**	• Inexpensive to implement, no out of pocket costs except possibly for printed materials. • Course-based relationships beneficial to many parties—students, instructors, and neighborhood organizations • Improves neighborhood access to GIS expertise, support, and data collection	• "Contracts" out research to non-neighborhood interest, which may not fully understand neighborhood, appreciate needs. • Quality of work may be erratic, depending on experience and/or enthusiasm of students. Limited organizational role in choosing student to work on project. • No ability to complete follow-up work. • Courses or students addressing a particular neighborhood concern may be not be available when a neighborhood needs it, or at all.	• Reduces necessity for departmental staff to aid neighborhoods in data analysis and mapping tasks.	• Increases demand from neighborhoods for data products.
D	**Dedicate City Staff Time for CDC/DPC Map and Data Questions**	• Establishes a clear "point of contact" within current organizational structure for accessing and gathering information about spatial and non-spatial data. • Clearly establishes data distribution responsibilities of City employees within their current positions.	• Still may result in some confusion over where to turn for specific data items. • Data cost and accessibility not guaranteed to be uniform across departments. • Data costs to neighborhoods possibly increased by redundant staffing model.	• Small startup costs, many departments already provide this type of point of contact on an informal basis.	• Diffuse responsibility – confusion over "who does what" may result. • Demands many individuals across multiple departments to know how to access maps and advise on spatial data matters. • Depends on being able to mandate *time* from city staff, whether new or current.

	Model	*Benefits* To Neighborhoods	*Costs/Obstacles* To Neighborhoods	Benefits To City	Costs/Obstacles To City
E	**City Support of a Neighborhood GIS Center**	• Gives neighborhoods a single, central 'point of contact' for obtaining maps and data. • Flexible model. Neighborhoods could determine structure and mission of organization (what they really want/need from such a group).	• Funding of center would likely require significant grant writing and fundraising. Stability of funds would need to be secured. • Because of funding process, this would also not be an immediate solution.	• Neighborhoods can 'pool' their data requests and questions. Such centralization can save city staff time. • Would give the City a single distribution center for data. • Funding and staffing of center are not the direct responsibility of the city • Departments will no longer need to directly provide data to neighborhoods, will not need to provide assistance in mapping and data related tasks	• Additional layer of 'noise' added to the data quality feedback loop.

	Model	*Benefits* To Neighborhoods	*Costs/Obstacles* To Neighborhoods	*Benefits* To City	*Costs/Obstacles* To City
F	**City Support of a Nonprofit GIS Center**	• Neighborhoods have clear 'point of contact' for accessing spatial data and maps. • By working with nonprofits which currently provide GIS assistance, program could be expanded and enhanced quickly. • Technical assistance with data and maps readily available at all times. • May not be as expensive as funding a brand-new neighborhood GIS center (see above). • Because this non-profit center already has established funding and staff, it is more readily scalable as neighborhood needs change.	• City may be hesitant to share data with an organization which represents more than just neighborhood planning and development organizations.	• Funding and staffing of center are not the direct responsibility of the city • City departments will no longer need to directly provide data to neighborhoods, will not need to provide assistance in mapping and data related tasks	• Additional layer of 'noise' added to the data quality feedback loop.
G	**Develop city- and countywide data documentation and data sharing policies.**	• Once formulated, standards will be useful for years. • Clears up what departments are responsible for what data sets. • Neighborhoods and others know whom to contact about obtaining data, or with data questions.	• Requires inter-governmental coordination (e.g. city, county). • As more GIS data sets are created, policies will need to be reviewed and modified, requiring long-term commitment. • Data policies need to bear neighborhood concerns in mind when deciding on public data costs and availability.	• Once formulated, standards will be useful for years. • Clears up what departments are responsible for what data sets. • Neighborhoods and others know whom to contact about obtaining data, or with data questions.	• Requires inter-governmental coordination (e.g. city, county). • As more GIS data sets are created, policies will need to be reviewed and modified, requiring long-term commitment. • Data policies need to bear neighborhood concerns in mind when deciding on public data costs and availability.

	Model	*Benefits To Neighborhoods*	*Costs/Obstacles To Neighborhoods*	*Benefits To City*	*Costs/Obstacles To City*
H	**Fund a graduate student through CURA/NPCR to deal with community data and GIS needs of neighborhood groups on an as-needed basis**	• Provide much-needed technical assistance and mapmaking to neighborhood organizations. • Could address geocoding and internal database concerns of specific organizations. • May facilitate GIS capacity building within neighborhood organizations by following up on maps created, answering specific neighborhood questions, and holding occasional GIS workshops. • Could work well in tandem with a "Non-Profit GIS center" type of solution.	• While graduate student may be savvy at locating and obtaining data, his/her success ultimately depends on city/county cooperation (e.g. getting city-wide data sets in the first place) • Long-term funding uncertain; may be a mid-range solution to neighborhood GIS utilization. • Demand would likely limit student to working on short- and mid-range projects. Larger tactical projects may not receive assistance. • Because of high turnover rate for student staff, quality and capacity may be inconsistent.	• City removed from the data distribution process and user support	• City staff would still need to be available on a regular basis to the research assistant. • Less control and understanding of data usage by neighborhood groups.
I	**Set up GIS print room within existing city department (e.g. PED, Public Works).**	• Allows neighborhoods to access "cookbook' and customized maps of their neighborhood in a centralized location, with a customer-oriented approach. • Allows neighborhoods with little computer or GIS experience to obtain maps and immediately apply them to their work. • Centralizes the mapmaking process. Templates can be created (e.g. for addresses) which can be used repeatedly.	• Limited to databases maintained by the city (or which the city regularly obtains from other sources, such as the county). • Geocoding of organizational databases (e.g. DBNHS's program database) may not be available. • Iterative process of map creation not possible. Maps requested may not always reflect the information needs of the organization.	• Centralizes the mapmaking process. Templates can be created (e.g. for addresses) which can be used repeatedly. • Direct data feedback loop.	• Very high capital costs at startup. • Would require the addition of a number of expensive, technical staff members.

	Model	Benefits To Neighborhoods	Costs/Obstacles To Neighborhoods	Benefits To City	Costs/Obstacles To City
J	**Implement an Internet Map Server for the City of St. Paul or Ramsey County**	• Allows for 24-hour access to regularly updated city databases. • Ability to "explore" data without additional cost.	• Current technology not able to incorporate geocoding of neighborhood databases. (cite web page with geocoding) • Printed maps are frequently of a poor quality. • Some neighborhood groups do not maintain an internet connection, or connection may be too slow to work effectively with an IMS.	• Although start-up costs are high, a well-designed system will likely recover its costs. (Blumner, 1998)	• Significant upstart costs – who will fund initial development?
K	**City Periodically distributes CD of data and data viewer for neighborhood use.**	• Organizations receive regular updates of data. • MapExplorer provides ready means for groups to view data. Does not require additional assistance from outside the organization. • Does not require an internet connection.	• MapExplorer might not be "friendly" enough -- groups might not know what to do with data. • Doesn't account for "special" data sets, which may need distributing.	• Streamlines staff responsibilities for city -- who delivers data and when. Reduces data requests from CDCs and DPCs. • Requires little capital expenditure on the part of the city (CD recorder, CD-ROMS) or the neighborhood (CD-ROMs, utilize existing computer capacities).	• Requires city incorporating CD creation and distribution into its office procedures.
L	**Develop in-house GIS capacities within community organizations**	• Can be tailored to organizational needs. • Flexible and available for quick responses to neighborhood mapping and analysis needs.	• Expensive. Capital expenditures. Redundant equipment purchases. • Difficult to maintain long-term staff expertise. • Unnecessary duplication of effort across neighborhoods.	• Neighborhood groups would become better data feedback resources by virtue of their GIS knowledge.	• Would significantly increase demand for data and technical support.

Modified and expanded from Leitner et. al, p. 16-18.

VII. Benefit of Delivery Models to Neighborhood Needs

In the models presented above, there are many ideas for enhancing the capacities of CDCs and DPCs to use maps and geographic information. However, throughout our research, it is clear that considering models must be done in concert with considering neighborhood capacities and requirements.

Each model has its strengths and weaknesses. Many of these benefits are based on *desired outcomes*. For example, a neighborhood such as Dayton's Bluff with a high need to control the information it presents to the world will not be best served by a cookbook GIS solution. However, its needs for locating property and information about that property quickly and accurately may be best served by a parcel map of housing values with address labels.

In short, the effectiveness of any effort to increase neighborhood GIS capacities must be accompanied by a clear sense of the needs of said organizations. Thus, we will now return to our earlier-described paradigm of neighborhood applications.

- Reference
- External Communications
- Site or Incident Specific
- Targeting
- Trend Analysis

In the end, it is important to note that several of the models might not only enhance CDC and DPC capacities, but also enhance the city's ability to ensure its goals are accomplished. For example, St. Paul relies on its district planning councils to implement community crime prevention strategies. However, oftentimes community organizers don't have an existing means to learn empirically where the high crime areas of their neighborhood are. HMC staff, for example, were surprised when first shown the map of crime statistics in the neighborhood. Before seeing the trend maps, their understanding of crime trends was based on a trickle of block club calls and police reports. As it turns out, this information provided a very different picture of crime concentrations than the maps did. HMC was working towards an important goal of the city's -- keeping neighborhood safe -- and yet the organization didn't even have a map, or a well-organized summary -- of the locations of crimes reported. Such lack of information not only frustrates the ability of DPCs to conduct their work, but also compromises the effectiveness of important initiatives the city funds directly, and relies on community organizations to implement.

VIII. Recommendations

The fundamental rationale for our work is that with good information in hand, community groups will be more efficient and more effective in carrying out their missions. Accessing this information is crucial to ensuring CDCs and DPCs are able to continue making the sound neighborhood planning decisions on which the City of St. Paul relies. Because these organizations are partners with the City on many initiatives and programs, a major goal of the City's enterprise GIS planning efforts must be to ensure CDCs and DPCs have access to GIS maps and data to successfully complete their work.

We envision two distinct GIS delivery channels might be created in the long run to achieve this goal:

1. **Develop in-house neighborhood GIS capabilities.** We define this broadly as the ability of a neighborhood organization to create maps and analysis in-house, using tools such as desktop GIS software, an Internet map server, or desktop GIS map browser (e.g. ESRI's Map Explorer).
2. **Create a neighborhood GIS center.** Such a center may either be developed as an independent entity or within a currently existing organization.

Working towards an efficient, effective GIS system is an incremental process. Realistically, neighborhood GIS capacities will be developed over the course of several years. Data access, technology access, and spatial analysis skills are complex capacity-building issues, and will benefit from a modular system building process. This can be achieved by conceptualizing the delivery models outlined earlier in this paper as **building blocks**. Each building block represents a significant improvement in the current infrastructure for providing data and analysis capacities to community organizations, as well as representing a step towards the two larger long-term goals described above.

These building blocks are envisioned as interchangeable; some or all might be deployed to achieve one or several of the discussed delivery channels, as illustrated in **Figure 1.** On the diagram, steps involved in reaching the larger capacity goals are stacked in approximate order of occurrence. For example, the building blocks at the base of the pyramid are shared by each

solution; these are the foundation of any neighborhood-responsive GIS system, and must be addressed in order for any GIS delivery model to work efficiently. Early focus on these elements by city and county officials will ensure that a stable distribution structure is integral to the enterprise. Conducting these steps in conjunction with the city's CDC and DPC partners will raise awareness within the community about the system St. Paul plans to develop, as well as capacity for obtaining and using maps and spatial data in their community planning efforts. These actions will lay the foundation for clear and positive community-city GIS partnership in the future.

The most immediate of these building blocks that should be implemented is a well documented and understood citywide data sharing policy. Clear and consistent policies must be established for the distribution of public data. Such policies should address who is responsible for distributing data and what documentation should be included in a data delivery. Because of the crucial role DPCs and CDCs play within the City's planning process, all data policies should include provisions pertaining directly to the specific and distinct data rights of these entities.

Enterprise-wide data policies require substantial intra- and inter-departmental coordination. However, once formulated, these standards can last for years. The City of St. Paul would benefit from the increased security that its data is being distributed in a systematic, fair manner. Neighborhood groups would also benefit from such an arrangement, in that such a policy will clearly identify whom they need to contact for critical neighborhood data, and what responsibilities using that data requires.

In order for neighborhoods to maximize this benefit from a data access policy, they will need to have a greater understanding of the procedures required to obtain and use this data. A data handbook should be developed which would provide, in simple non-technical language, a guide to obtaining and using spatial and non-spatial data obtained from City of St. Paul departments. The development of a data handbook is not contingent upon the implementation of a City data access policy. In fact, the data handbook will be just as important in an environment within which policies are not consistent across departments. In either event, it is vital that a document be tailored to the specific needs and challenges faced by neighborhood organizations. An ideal handbook would detail sample GIS applications, GIS technical support resources, and contacts for obtaining spatial and non-spatial data.

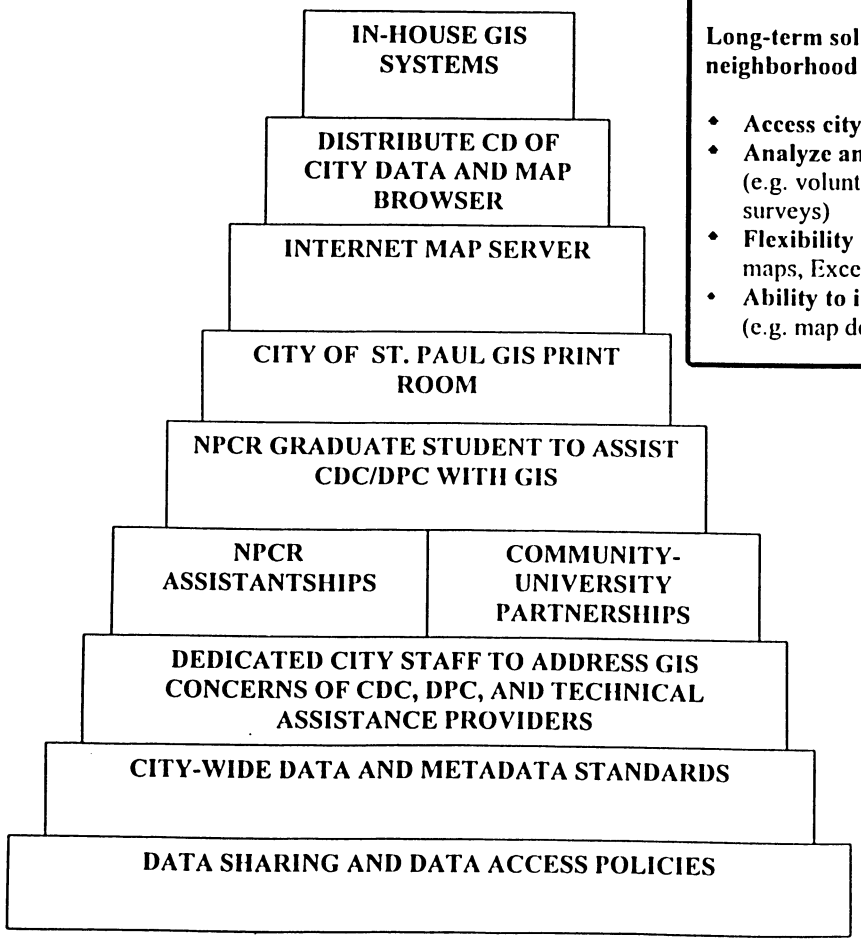
Another excellent initial step would be the development of a pilot application, accessible over the Internet, which all neighborhood groups could access and apply to their jurisdiction. This would be invaluable in creating city wide interest in map based analysis going a step beyond conventional paper-based reference maps. City development of such a system will also encourage neighborhood groups to incorporate more analysis in their decision-making, and serve notice that the City is an interested partner in the process of enhancing how information is used by neighborhood groups.

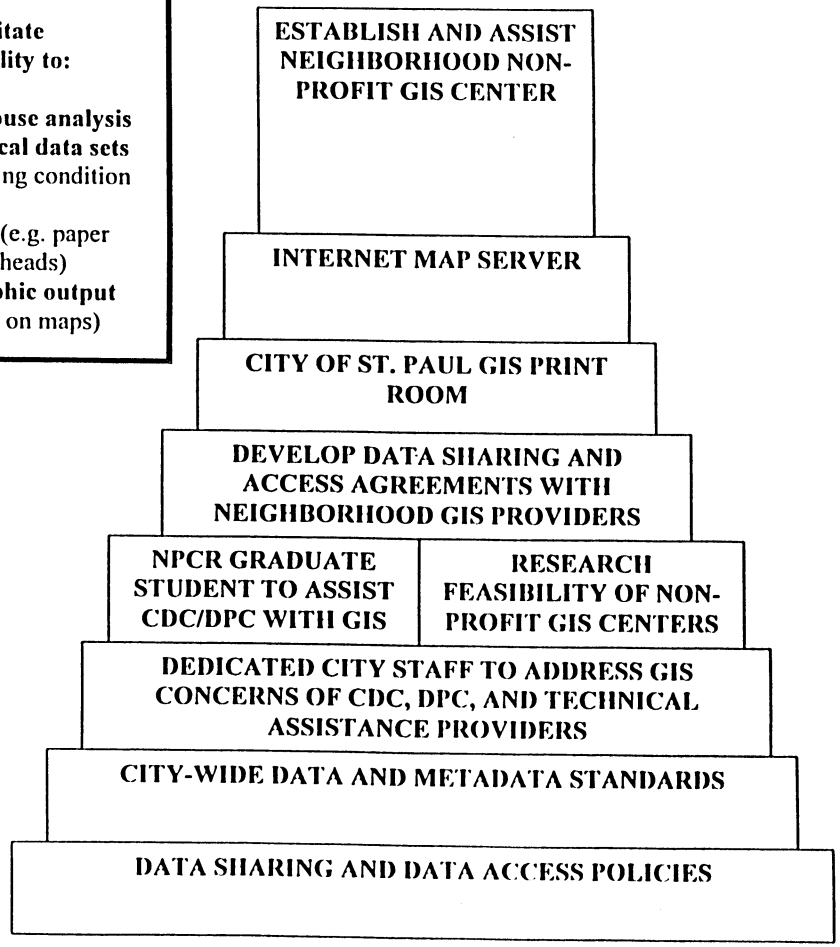
Which solutions are ultimately implemented depends largely on political and economic realities. We recognize that the City of St. Paul's enterprise GIS system will not be built with unlimited funds or resources. It is, however, imperative that neighborhood groups, the City, and non-profit GIS technical assistance providers continue to communicate and collaborate in the process of exploring options. The solution will not be simple, or free, to anyone. But incorporating CDCs and DPCs into the City of St. Paul's enterprise GIS system is not a luxury: it is imperative for the continued vitality of St. Paul's neighborhoods. The roles that these community organizations play within the city planning process - direct citizen participation, affordable housing developers, crime prevention specialists - are too critical to the well-being of St. Paul to afford unnecessarily inadequate information resources.

Comprehensive Solutions for Neighborhood GIS Access

Long-term solutions should facilitate neighborhood organizational ability to:

- **Access city data sets for in-house analysis**
- **Analyze and map internal, local data sets** (e.g. volunteer databases, housing condition surveys)
- **Flexibility of product format** (e.g. paper maps, Excel spreadsheets, overheads)
- **Ability to influence cartographic output** (e.g. map design, data included on maps)





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