Brownfields Decision Support Tools for Communities

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Making better-informed decisions about brownfield redevelopment strategies and alternative proposals requires that planners and developers have access to information that is applicable, accurate, timely, and cost-effective.

A functional information system should have three component parts. First, it must provide access to data and information to address a wide variety of user needs. Second, it must provide access to a number of analytical tools that can manipulate the data to address local or site-specific needs. Third, it must provide access to expertise—written and verbal—to interpret the results of the analysis. Such resources are becoming more readily available via the Internet and from public and private vendors. While it would be difficult to identify and describe all the information technology tools that are potentially available, several have become more widely distributed that have been shown to meet the information discovery, access, and analysis needs of communities embarking upon a brownfields redevelopment program. A number of the more useful resources are provided in this section.

(1) Tools for Data/Information Discovery and Access

Until relatively recently, access to data and information has been the principal limiting factor in site analysis. With the ascendancy of Internet resources, data and information is both accessible and inexpensive. In addition to the data typically gathered about an individual brownfield site during the Phase 1 and 2 environmental site assessments, additional information regarding local economic and social conditions will be useful in the decision process. This information will be crucial in determining desirable and suitable alternative uses, and it will serve to inform the many stakeholders likely to be involved in—and affected by—the decision process.

Tools for locating and accessing environmental information include on-line search engines ranging from Alta Vista to Yahoo. Most of these are now readily accessible through built-in encyclopedic search applications provided by Internet browsers like Netscape and Explorer. The US Environmental Protection Agency-sponsored databases, analysis models, and search tools can be found at (http://www.epa.gov/epahome/Data.html). The EPA Envirofacts site (http://www.epa.gov/enviro/index_java.html) includes access to most of EPA's data holdings. At the state level, the Michigan Department of Environmental Quality (http://www.deq.state.mi.us/) provides information about contaminated sites listed under the Natural Resources and Environmental protection Act. Socioeconomic and demographic search capabilities are provided by organizations like CIESIN (http://www.ciesin.org/) Map servers on the Web allow the user to locate information about a defined area—local, regional, statewide, etc.—by point-and-click. An example of this is the National Priority List site developed by the Agency for Toxic Substances and Disease Registry (http://www.atsdr.cdc.gov/COM/findout.htm).

At the present time, information about available brownfield sites is not comprehensive nor is available for all areas in Michigan. This situation is rapidly changing, however. The Michigan Site Network being developed by Detroit Edison provides a listing of available commercial sites, including brownfields, in approximately two-thirds of Michigan counties. The MSN provides a significant amount of information on individual sites including location, condition, local services and infrastructure, presence and type of contamination, and remediation status. The Regional Online Brownfields Information Network, ROBIN (http://www.glc.org/robin/), is a regional clearinghouse of information on cleanup programs, financing and development resources, and technical assistance to communities.

At the national level, the US department of Commerce and the EPA are proposing an online nationwide brownfields exchange. This system is expected to be available in 2001. Another data development tool, the prototype Industrial Triage database and model, is being developed by Argonne National Laboratory (http://www.anl.gov/). Industrial Triage consists of a site inventory and an extension used to characterize available brownfields and other commercial properties. It is being tested in New Jersey, Georgia, and Illinois. The Phenix software offered by CRDC is a mechanism to organize information about an individual site.

(2) Tools for Data Analysis and for Information Generation

A number of computer-aided tools are available that allow rapid analysis of increasingly larger databases. These tools include

(a) Statistical Analysis. This includes both parametric and non-parametric approaches to allow consideration of socioeconomic and demographic factors, personal beliefs, and community goals, as well as the probabilities of risks to human health and ecosystems from site remediation and engineering.

(b) Modeling and Simulation. Models are representation of reality that are constructed, in part, to predict the outcomes of various planning and decision making scenarios, including pollution prevention and process control. Models operating in a computerized environment allow consideration of a wide variety of parameters and variables using large databases. There are conceptual and mathematical models covering virtually all environmental media, transport and dispersion mechanisms, and risk analysis and management scenarios. A number of these are accessible through the EPA (http://www.epa.gov/epahome/Data.html).

In general, consultants conducting Phase 2 and 3 environmental site assessments would incorporate environmental change models. In addition, Michigan State University (http://www.ltm.msu.edu/) is testing a land use and land transformation model at the regional level. The Land Transformation Model describes the

influence of land use change on ecosystem integrity and economic sustainability of large regions.

(c) Visualization. Computer-aided graphic and visualization tools, particularly geographical information systems (GIS), provide the ability to manipulate large datasets and view a variety of information resources about locations on a map. There are several commercial sources of visualization tools like MapObjects® from Intergraph Corporation (http://www.intergraph.com/dynamicdefault.asp) and ArcView® from ESRI (http://www.esri.com/). Local units of government must purchase these systems and the time and cost of training must be factored in, but the cost of hardware and software is becoming more accessible. An Interactive GIS is offered by MSU (http://www.iwr.msu.edu/landuse/data/analysis.htm - analy). The State-Wide system allows two major ways to access data, by county or by watershed. Many of the data sets are vector layers from MIRIS; they include roads, streams, lakes, political boundaries, etc.

An alternative visualization tool, Metroview CD, is available for most areas in Michigan and nationally. Developed by Veridian-ERIM International (http://www.erim-int.com/), Metroview CD provides a synoptic view of regional information and several manipulation tools found in a GIS without having to purchase a commercial GIS application. Another visualization tool, A Sense of Place, uses new techniques and computer technologies to map the local characteristics and features that compose a community's sense of place and to make this information useful to all citizens, businesses, and interest groups within each community. The Land Information Access Association (LIAA; http://www.liaa.org/) is developing these systems,

(d) Impact Assessment. Much of what are called impact assessment methodologies (matrices, checklists, scaling and weighting, surveys, focus groups) are available to decision makers. The environmental consultant can provide assistance in the use of these tools, but there needs to be mechanisms for training, public participation, advice on which tools are appropriate for the existing situation.

(3) Tools for Evaluation and Understanding

Recently, innovative, expert decision support systems have become available to the user community. Using GIS for information management and visualization, such systems provide a better understanding of the context and implications of alternative decisions. Applications like Smart Places®, developed by the Electric Power research Institute (http://www.epri.com/), CommunityViz®, developed by the Orton Family Foundation (http://www.orton.org/frameset.cfm), add the ability to play "what if" scenarios and encourage multiple stakeholder involvement. These applications are available at little or no cost to communities. With the addition of an electronics meeting application like MeetingWorks® (http://www.entsol.com/), stakeholders can interact electronically with each other's objectives and with the GIS database to set

program goals and criteria and see how closely their individual proposals meet these criteria. These tools are provided to communities through the Smart Growth Program at Michigan State University (517/353-9796).

Additional information resources are available through MSU through several links including the Land Use Program Index (http://www.iwr.msu.edu/landuse/index.htm) the MSU Extension Areas of Expertise Teams (http://www.msue.msu.edu/aoe/).

Commercially available tools include the Outcome Indicators Management (CIRES) and Vital Sign Indicators (VSI) model from the Midwest Research Institute (http://www.mriresearch.org), which monitors social, health, and economic conditions in organizations and communities that are interested in monitoring indicators (i.e., data) which are specific and significant to their local areas. The What if? PSS® (Planning Support System; http://www.What-if-PSS.com) is an interactive GIS-based system which supports all aspects of the land use planning process: conducting a land suitability analysis, projecting future land use demand, allocating this demand to suitable locations, and evaluating the likely impacts of alternative policy choices and assumptions. Another system, INDEX®, offered by Criterion (http://www.crit.com/), can perform spatial accounting with local indicators of growth to gauge not only what the positives and negatives are, but also where they are. INDEX® can be applied to a single neighborhood or an entire region with a scope of measurements that includes land-use, housing, employment, transportation, infrastructure, and the natural environment.

In addition to computer-aided systems, there are also on-line resources that can help decision makers and communities understand the social, economic, and environmental impacts of siting decisions with respect to sustainable development. Information about indicators of sustainable community development, including brownfields, is available through Hart Environmental Data (http://www.subjectmatters.com/indicators/). HED works with communities to develop indicators that measure progress toward a sustainable economy, society and environment. The Natural Step (http://www.naturalstep.org/), which offers a framework that guides businesses, communities, academia, government entities and individuals working to redesign their activities to become more sustainable. The Bellagio Principles, developed by the International Institute for Sustainable Development (http://iisd1.iisd.ca/measure/1.htm), address the ways corporations, non-government organizations, academics, communities, nations, and international organizations measure and assess progress.