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EXECUTIVE SUMMARY

As part of the System Planning phase, Michael Baker Jr., Inc. (Baker), has conducted a City-wide survey of the data resources available for the development of the City of Suffolk's proposed Geographic Information System (GIS). Essentially, the data survey is an investigation into the availability, quality, and quantity of various geographic-based data sets maintained in either paper (hard copy) or electronic media (digital) format. These data sets are evaluated for their applicability for integration and/or conversion into the City's proposed GIS. The Data Survey will be used in conjunction with the Needs Assessment report to plan and implement the next phases (Management Plan and System Implementation Plan) of the proposed GIS. The data survey process consists of research (on-site and independent), compilation, and analysis. The combined results of each part serve to identify and evaluate the City's available data sources, and further help refine the understanding of the City's varied information needs.

Baker researchers and analysts conducted the Data Survey over an eight-week period beginning in early June 1998. A series of meetings were held with key personnel from several City departments and bureaus, including Public Utilities, Public Works, City Assessor's Office, Planning, Police, Fire, Emergency Communications, Economic Development, and Public Schools. While primary discussions were centered around the availability of data for integration into the GIS, City employees often re-emphasized specific applications pertinent to their department's GIS agenda. Dialogue during these meetings was positive and, in most cases, validated lists of hard copy and/or digital data available for integration into the GIS. Throughout the course of these meetings, Baker researchers gathered representative samples of existing data sets, and subsequently compiled the information into charts and source-information matrices summarizing the survey findings. Baker system analysts then used these source evaluation charts and source information matrices to quantify and qualify the identified data resources pertinent to the GIS. The focus of this effort was on evaluating the quantity and quality of the City's existing hard copy and digital geographic data sets, including maps, construction drawings, and tabular data that would be useful for the implementation of Suffolk's City-wide GIS.

The results of the Data Survey indicate the existence of a significant amount of data that may be converted from hard copy to digital format, as well as data that may be reformatted from existing digital tabular databases. The survey also revealed various data deficiencies that, in order to develop the data necessary for utilization in the proposed GIS, will require correction through field gathering techniques. Of the hard copy data resources evaluated, most appeared to be suitable for digital conversion, with the exception of various older, out-of-date record drawings. These data sets are less suited for conversion due to their lack of completeness and organization, and the inconsistent use of symbology. Of the digital data sources, most tabular data appears to be suitable for integration into the GIS. However, there is concern about the accuracy, completeness, consistency, and currency of certain digital data sources.

All of these identified data issues (completeness, accuracy, organization, currency, etc.) will be taken into consideration during the development of the Data Conversion Plan, which will be produced as part of the design phase of this project.

CHAPTER 1 - INTRODUCTION

As part of the System Planning phase, Michael Baker Jr., Inc., conducted a Data Survey (survey) of the potential hard copy and digital data resources available for the City of Suffolk's proposed Geographic Information System (GIS) implementation. The survey investigates the geographic data resources maintained by City departments, as well as other data sources available from outside agencies. The survey focuses on addressing each user departments' specific data resource requirements, as determined by the Focus Applications. The user departments and Focus Applications are identified in the Needs Assessment report. The report includes a description of the survey methodology, as well as a summary of the survey meetings and data resource issues identified as part of the Data Survey. The report concludes with the identification of the City's potential data sources; the features and attributes available from each source; and, when necessary, recommendations for obtaining and utilizing the specific data.

SURVEY DESCRIPTION

The Data Survey was conducted in order to develop an understanding of the geographic data resources that are available to support the specific needs and applications previously defined in the Needs Assessment. The survey process included:

- Meeting with the identified system users
- Performing on-site investigation and independent research into the existing data sources
- Developing information charts and matrices, and analysis of the compiled data.

To initiate the Data Survey, Baker researchers conducted a series of meetings with the personnel who maintain and/or use existing geographic data. The purpose of these meetings was to collect information about the availability, quality, quantity and accuracy of this data, as it relates to the support of the Focus Applications previously defined in the Needs Assessment. Baker researchers then compiled the meeting notes, and developed an inventory of the City's existing digital and hard copy geographic data sources. This information was compiled into a series of source charts and matrices. Utilizing the source charts and matrices, Baker staff performed an analysis of the identified data sources, in regards to their ability to meet the Focus Application requirements. The results of this analysis identified the primary, secondary,

and tertiary sources for the specified data, as well as various data deficiencies, which will need to be addressed during the data conversion phases of the implementation.

Since the objective of the Data Survey is to determine the City's geographic data resources, and their ability to support the Focus Applications, the work performed during the survey draws from and builds upon the knowledge gained from the Needs Assessment. As data is located, evaluated, or determined to be available, charts and matrices are developed to be used as a design resource during subsequent project phases and work tasks. The survey report serves as a resource for planning the approach for the data conversion, data development, and system implementation requirements.

DEPARTMENTS SURVEYED

Meetings with personnel representing the City's Departments of Public Utilities, Public Works, Planning, Economic Development, Police, Fire, Emergency Communications, City Assessor, and Public Schools were conducted during the months of June and July 1998. Minutes of each individual meeting are included in Appendix A. Since the data survey interviews were held only when clarification to the data provided in the Needs Assessment was required, not all departments participated in the data survey interviews.

SURVEY METHODOLOGY

Baker researchers informed each participant of the meetings' primary purpose - to determine what geographic data (hard copy and/or digital format) was available for integration into the City's proposed GIS. Data source listings, descriptions, and samples, for all pertinent data sets, were requested from each meeting participant during the interviews. These materials were collected, and later analyzed for content and their relationships to other identified data sources. Upon completion of identification and collection of the City's pertinent data sets, a series of source evaluation charts and matrices were developed in order to summarize the data sets in terms of: data management; data availability; and data needs. In instances where a particular data requirement was satisfied by more than one data source, each source was ranked, in the following manner, in accordance with its suitability:

- 1 – primary (the most suitable or only source)
- 2 – secondary (a supplemental data source)
- 3 – tertiary (an additional supplemental source)

CHAPTER 2 - ANALYSIS AND FINDINGS

OVERVIEW

This chapter summarizes, by department, the findings of the Data Survey meetings and associated research. The discussion is intended to provide an overview of each department's role in the management (development and maintenance) of the City's existing hard copy and digital geographic data. Additionally, the availability of data and the data needs, which were identified as part of the Data Survey process, are addressed. Departments which are not currently managing digital or hard copy data are not included as part of the discussion.

The following paragraphs summarize the survey meetings Baker staff facilitated with each interviewed employee (refer to Appendix A for the complete meeting minutes). These meetings focused on identifying the specific geographic data resources maintained by the interviewees' department. However, since each department, to varying degrees, relies on various data sets maintained by other City departments and outside agencies, these meetings often pointed Baker staff in other directions, which required additional research. The synergy, and cross-department research generated by these interviews enabled Baker and City staff to identify an exhaustive list of potential geographic data sources.

SURVEY MEETINGS SUMMARY

While the focus of the Data Survey meetings was to identify existing hard copy and digital data sources available for integration into the GIS, the discussions often re-emphasized and/or refined the specific applications and supporting data required by each department. In some cases, it was difficult for City personnel to completely list available data because they had encountered multiple data sources and/or had limited control over the management of data flow. In all meetings, discussion was generally positive and, in most cases, resulted in the identification of hard copy and/or digital data available for integration into the GIS, as well as the identification of data which is not currently available, but required.

SURVEY COMPILATION

At the conclusion of the first part of the Data Survey, the collected information was compiled and prepared for analysis. Source evaluation charts were created for each major data source. These charts, included in Appendix B, describe the various data sources in terms of their management responsibility, maintenance requirements, data availability, and suitability for conversion/migration. Meeting minutes and other pertinent information, gathered as part of the Needs Assessment and Data Survey preparation, contributed to the development of the source evaluation charts.

Upon completion of source evaluation charts, a series of source information matrices were developed to identify each potential data theme, and their corresponding source documents (digital and hard copy). The source information matrices are included in Appendix C. In addition to the data source columns included in the matrices, a series of "Needs Collected" columns are provided to identify information that may need to be collected during the future GIS implementation. These columns identify the most probable method of collection as either GPS location, aerial photography compilation, or other field collection.

SURVEY ANALYSIS

Baker system analysts utilized the previously developed source evaluation charts and matrices to ascertain both the quantity and quality of the City's existing hard copy and digital data resources as they pertain to incorporation into the proposed GIS. Data resources maintained by each of the City's participating GIS user departments were analyzed. The analysis identified existing data that may be suitable for conversion and integration with the GIS, as well as data that must be created, collected, or procured from an outside agency. Ultimately, this information will be used to refine application definitions; determine the data conversion methodology; and develop the required digital databases.

DATA SOURCES

This section identifies the various hard copy and digital data sources maintained by the various City departments, as well as certain outside agencies. The discussion is grouped by department and source type (hard copy and digital). “Hard copy” data refers to documents that are maintained in paper, linen, vellum, mylar, key card, microfilm, or similar format. “Digital data” refers to information that is stored in various electronic media forms such as computer diskettes, CD ROMs, magnetic tapes, and computer hard drives. The discussion will describe the different groups or categories of hard copy and digital data maintained by the various departments or agencies. The descriptions of the data are followed by an assessment of the data’s potential for conversion and integration into the City’s proposed GIS.

5th DISTRICT COURT SERVICE UNIT

The 5th District Court Service Unit does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City’s proposed GIS.

ASSISTANT CITY MANAGER – DEVELOPMENT**Hard Copy Data**

The Assistant City Manager - Development does not currently maintain any hard copy data sources that would be useful for the initial implementation of the City’s proposed GIS.

Digital Data

The department is currently in the process of developing an address-based computerized inventory of business and office/retail properties located within the City. This data could be linked to the proposed GIS via an industry standard outside database connection (ODBC) to provide certain attribute information required by a variety of Focus Applications, including: Strategic Building Mapping; Inspections Tracking; and Business Districts. A more detailed assessment of this data should be performed during the data conversion plan development.

ASSISTANT CITY MANAGER – OPERATIONS

The Assistant City Manager - Operations does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City's proposed GIS.

CIRCUIT COURT CLERK'S OFFICE

The Circuit Court Clerk's Office does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City's proposed GIS. However, the office is currently in the process of converting the manual land record indexing system to a digital environment.

These records, if properly indexed in an open platform system, could be easily accessed through an open database connection (ODBC) to provide the GIS users with a variety of historical parcel-based information. Since these types of parcel applications are not included in the City's Focus Applications, no further consideration will be given to the data source at this time.

CITY ASSESSOR

Many City departments, citizens, and outside agencies rely upon information maintained by the City Assessor. The majority of the Assessor's hard copy and digital data sources are critical for the proper development of the City's proposed GIS.

Hard Copy Data

The City's Tax Maps are used to record property boundaries and unique parcel identification numbers (tax map and lot number) for each real property parcel. Each parcel is mapped in relation to various physical and cultural features such as roads and hydrography. The geometric accuracy of the parcel lines is generally good, with the exception of some of the larger acreage parcels, which were originally mapped a number of years ago. The Tax Map documents are critical to the development of the City's proposed GIS. The features (real property parcels) that are represented on these maps will be converted to a digital format to form the cadastral (property layer) of the GIS, and will serve as the basis for implementing the majority of the identified Focus Applications.

The City Assessor maintains a working set of the Tax Maps. The working set is the most current set of hard copy tax map records. The Assessor's staff manually updates these records, on a daily basis, keeping track of all parcel splits and combines that occur to the City's real property. The Planning Department manually updates this working set of maps on an annual basis. These updates are performed to produce the City's ink-on-mylar record set of the Tax Maps. This record set is distributed to other departments and agencies to support their specific work flows. The updated record set of Tax Maps can quickly become outdated, as parcel changes are posted to the next working set of maps. For this reason, the working set, maintained in the Assessor's office, is the most accurate source of parcel geometry data.

Digital Data

The City Assessor maintains a computer assisted mass appraisal database on a local Novell file server. This software, APLUS CAMA is developed by HTE, Inc., and is not currently compatible with commercially available GIS software. HTE plans on releasing a Windows based, open architecture, version of this software in early 1999. The system is currently being beta-tested within other municipalities. The Assessor intends on upgrading to the new Windows version once the beta-testing is completed, and the software becomes commercially available.

The APLUS CAMA system is used to track a variety of parcel-based information, which is used by the Assessor for the performance of appraisals. The zoning information, maintained in this database, is considered to be approximately ninety percent accurate. The address information is supplied from the Neighborhood Development Services Inspection division, and is not always up to date. The City's current addressing work flow is such, that it often takes several months or more to post to the APLUS CAMA system. Data from the APLUS CAMA system is regularly uploaded to the City's Master Real Estate database.

The Master Real Estate database is maintained on the City's AS400 mainframe system, and is accessed by numerous departments requiring parcel information. The Master Real Estate database is a computerized version of the City's land book and is updated daily by the City Assessor's Office. It

is used to maintain all real property data for all parcels within the City, supports a variety of queries, and maintains data on delinquent taxes, taxes due, and building permits.

The data maintained in the APLUS CAMA and Master Real Estate databases will be valuable in the support of numerous, parcel-based, Focus Applications, including:

- Address Assignment
- Business Districts
- Census Analysis
- Community Development
- Emergency Dispatch
- Existing Land Use Map
- General Plan Map
- GIS Viewer
- Housing Development
- Housing Inventory
- Inspections Tracking
- Neighborhoods
- Property Assessment Maps
- Public Facilities Mapping
- Real Property Analysis
- Strategic Building Mapping
- Strategic
Parcels/Mapping/Search
- Subdivision Boundary
Map
- Utility Mapping
- Zoning Category Analysis
- Zoning Map

CITY ATTORNEY

The City Attorney does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City’s proposed GIS.

CITY MANAGER’S OFFICE

The City Manager’s Office does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City’s proposed GIS. However, the Office is currently maintaining a Home Consortium database, which is used to track expenditures and other project activities. While this database is only twenty-five percent complete, it may be used to provide added functionality to various Focus Applications, including

- Census Analysis
- Community Development
- Housing Development
- Housing Inventory
- Inspections Tracking
- Neighborhoods
- Real Property Analysis
- Strategic Building Mapping
- Strategic Parcels/Mapping/Search

COMMISSIONER OF THE REVENUE

The Commissioner of the Revenue does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City's proposed GIS.

COMMONWEALTH'S ATTORNEY

The Commonwealth's Attorney does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City's proposed GIS.

ECONOMIC DEVELOPMENT

While the hard copy and digital data sets maintained by Economic Development are not critical to the initial development of the proposed GIS, they will offer additional functionality to various Focus Applications.

Hard Copy Data

Economic Development maintains perspective aerial photography and commercial building site plans and specifications for various parcels and buildings throughout the city.

The perspective aerial photography is produced at a scale such that the subject building or parcel is portrayed in relation to the surrounding physical and cultural features. This photography is maintained for numerous sites throughout the City, and is utilized to market prospective sites to businesses and industries, which the City would like to attract. The photographs are labeled to show major thoroughfares and neighboring businesses.

The commercial building site plans and specification sheets describe pertinent features about a particular site, including: location, building size, amenities, utilities, parking, zoning, occupancy, local amenities, lease rates, leasing contacts, etc. Similar to the perspective photography, this data is used to market buildings to prospective businesses and industries.

While the photography and site plan data is not needed for the initial development of the proposed GIS, it will provide added functionality to some of the Focus Applications, including: GIS Viewer; Emergency Dispatch; Strategic Parcels/Mapping/Search; Real Property Analysis; Strategic Building Mapping; Business Districts; and Community Development.

Digital Data

The Economic Development department maintains a ProCure database for the purpose of storing and tracking available commercial site statistics. ProCure is a Microsoft Access database that has been used by Economic Development for approximately six months. All available building sites are cataloged in the database, along with some major undeveloped commercial sites. It is estimated that approximately forty percent of all available commercial sites are entered into the database. Economic Development is not completely dedicated to keeping this system on-line, and would consider implementing a different system. This data set may be utilized to populate the GIS database with some of the feature and attribute information necessary to support the Strategic Building Mapping application. This could be performed by either incorporating the existing ProCure database into the proposed GIS database, thereby eliminating the need for Procure; or by simply linking the ProCure database via an ODBC connection. The second alternative would require the continued maintenance of ProCure.

FINANCE

Finance does not currently maintain any digital or hard copy data sets that would be useful for the initial implementation of the City's proposed GIS. However, several of Finance's digital databases could be normalized, and linked to the GIS. This would provide Finance with the capability of producing cartographic outputs of their statistical data sets.

In addition, Finance maintains infrastructure asset information that would benefit the implementation of an automated asset valuation/scheduling system. Since these applications are not included as part of the Focus Application group, further consideration of this data will not be performed at this time.

FIRE DEPARTMENT

The Fire Department does not currently maintain any digital or hard copy data sets that would be useful for the initial implementation of the City's proposed GIS. However, several of the Fire Department's digital databases could be normalized, and linked to the GIS to provide added functionality to several Focus Applications, including: GIS Viewer; Emergency Dispatch; Strategic Parcels/Mapping/Search; and Inspections Tracking.

Hard Copy Data

The Fire Department maintains a variety of different hand drafted road map products. These are used in-house by the Fire Department staff for the purpose of locating different areas and facilities. The data set is 75 percent complete. It is likely that the proposed GIS will ultimately eliminate the need for the Fire Department to maintain this data set.

Digital Data

The Fire Department maintains the following digital data sources:

- Cameo Database
- Fire Vision Software
- Emergency Information System (EIS)
- Hazardous Materials Database

The Fire Department utilizes the Cameo database to track information about various hazardous chemicals, which are stored throughout the City. The database is about 10% complete. Upon the completion of this database, the Fire Department could implement a link to the GIS, which would provide a mapping component to the database's existing functionality.

The Fire Department has received a grant to develop a hazardous materials database. A field collection effort will be implemented, in the near future, for the purpose of collecting the information required to populate the database. By law, specific information pertaining to the location of hazardous materials may not be distributed to users outside of the Fire Department.

Emergency Operations Division is also in the process of implementing an Emergency Information System (EIS), developed by Essential Technologies, Inc. The system is compatible with ESRI's ArcView and MapInfo GIS platforms.

The Fire Department utilizes a management software package called Fire Vision to manage their fire incident reporting. This incident database is used to track the history of incidents to which the fire department responds. While the data maintained in the Fire Vision database is not needed for developing the proposed GIS, a link between it and the GIS would enhance the application's reporting and analysis capabilities by adding a graphic/mapping component.

In addition to the previously listed data sets maintained by the Fire Department, there are several other data sets, maintained by outside agencies, which the Fire Department relies heavily on for the performance of their duties. Each of these digital databases and/or maps can be linked to the proposed GIS to provide the Fire Department with increased mitigation, response, and planning capabilities.

Examples of these additional data sets are as follows:

- Hurricane Surge maps
- Radiation Zone Exposure map
- EIS - Tiger Raster Line files
- Marplot 3.0 database
- Cameo 3.0 maps
- Marplot 3.0 maps

FLEET MANAGEMENT

Fleet Management does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City's proposed GIS.

INFORMATION TECHNOLOGY

Information Technology does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City's proposed GIS. However, the Inventory and Fixed Assets databases maintained by Information Technology could be migrated to a digital format, and linked to the proposed GIS. These activities would enable Information Technology to map the locations of fixed assets throughout the City. These issues are not currently within the scope of the City's proposed GIS implementation.

LIBRARY

The City's Library does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City's proposed GIS.

NEIGHBORHOOD DEVELOPMENT SERVICES

Neighborhood Development Services (NDS) maintains a variety of digital and hard copy data sets that are critical to the development of the City's proposed GIS, and its use by various City departments and outside agencies. The successful implementation of nearly all Focus Applications is dependent upon an accurate and complete parcel addressing database. It is currently NDS's responsibility to assign addresses to new parcels throughout the City. This information is then reported to the City Assessor, where it is added to the Master Real Estate and the APLUS CAMA databases.

Hard Copy Data

NDS maintains various plats and maps, building plans and reports, permit applications, a rental database, zoning maps, routing maps, approved site plans, and subdivision maps. Each of these hard copy data sets is critical to the performance of NDS's, as well as other departments' duties. Many of the features and attributes required for the initial development of the City's proposed GIS are included, to varying degrees, in these data sets.

Various subdivision plats and maps, which are submitted to Planning, are used by NDS for reviewing and processing parcel information. This hard copy data set consists of over 500 documents, produced at varying scales (1" = 20' to 1" = 100'). Such information as plat numbers, subdivision names, lot dimensions, and lot numbers are included on these sheets. NDS adds parcel addresses and lot specific notes to the sheets. The plats and maps are regularly maintained (current), and the parcel/lot information is considered to be very accurate. This data set will be valuable for assigning parcel address attributes, which are not currently available from the Assessor's Real Estate database. In addition, specific lot notes, which may add value to the Parcel Mapping or Real Property Analysis applications, may be obtained from these documents.

NDS maintains the City's hard copy zoning map set. This map set is used as an aid in developing and enforcing the City's zoning ordinances. The zoning maps are an overlay to the Assessor's Tax Maps, and include approximately 125 varied scale sheets. These maps are updated approximately once per month, or up to twenty times per year. While the Assessor's Real Estate database contains parcel zoning information, which is approximately 80 percent accurate, the zoning maps are the most accurate source of zoning information. The zoning maps are adequate for graphical conversion into the proposed GIS. They will also serve as a useful reference for normalizing the zoning information maintained in the Real Estate database.

A series of subdivision boundary maps is maintained by NDS, and archived by Planning. This map set consists of approximately 300 to 400 individual maps, produced at 1" = 20' and 1" = 50'. The map set is used to delineate subdivision boundaries, and includes specific subdivision and borough names. The data set is very accurate and well maintained. These maps are adequate for graphical conversion into the proposed GIS.

A rental database, used for tracking information pertinent to the City's new Rental Occupancy Program, is maintained by NDS. This hard copy database provides legal lot descriptions, property locations, account numbers, owner information, appraisal data, inspection data, zoning information, and lot sizes for rental properties located throughout the city. Approximately one year's worth of data is digitally maintained. This data set will be useful for obtaining parcel attribute information during the development of the proposed GIS.

NDS maintains over 7,000 permit applications. The applications contain parcel ownership information; account numbers; tax map, lot, and parcel information; zoning information; and permit issuance/approval information. While this data is not critical to the initial GIS implementation, the permit application/tracking process is well suited to a GIS supported application.

Hard copy building plans are used tracking and processing building plan information. NDS currently maintains approximately 7,000 such plans. The plans are maintained at varying scales, and offer the following information:

- permit numbers
- building foot prints
- elevations
- mechanical details
- architectural details
- structural details
- plumbing details

This data is not critical to the initial system implementation. However, this data set lends itself to a digital document management system integrated with the GIS.

Digital Data

NDS tracks and communicates inspection and code enforcement information utilizing the Bright & Associates Inc. system (AS400). The inspection information is posted into this system for use by other City departments, such as the City Assessor and Finance Department. NDS is developing an RFP for implementation of a new inspections system designed to replace the current workflow. The same information that is communicated to these other departments now will still need to reach them with this new system.

Site plans, which are submitted for Planning and NDS approval are tracked utilizing a DOS based program. The current application provides access to address, location, zoning, construction, and assessment information for each site plan. While this data is not critical to the initial GIS implementation (the same data may be obtained from other reliable sources), the application may be migrated to the proposed GIS to provide increased functionality.

PARKS AND RECREATION

Parks and Recreation maintains the following hard copy and digital data sources, which may be of benefit to the initial development of the City's proposed GIS.

Hard Copy Data

The Park and City maps, maintained by Parks and Recreation are not required for the initial implementation of the City's proposed GIS. However, these map products may be used as a reference during the development of the GIS base map, and associated data layers. The Park maps are used by Parks and Recreation to determine the general locations and layouts of all City park amenities. The maps are hand drafted, and their geographic accuracy is questionable. These maps may serve as a good source of data for attributing certain public facilities such as ball parks and courts, trails, etc.

The City maps, maintained by Parks and Recreation, are used for determining and tracking program delivery areas throughout the City. These maps may also serve as a good source of data for attributing certain public facilities. However, implementation of the City's proposed GIS will most likely render both the Park and City map products unnecessary, as the data will be accessible electronically through the GIS.

Parks and Recreation maintains a hard copy Facilities database. This data set is utilized to track all City recreation facility rental information. While this data does not support the initial implementation of the proposed GIS, conversion to a digital database linked to the GIS will enhance the reporting and tracking capabilities of Parks and Recreation.

PERSONNEL

Personnel does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City's proposed GIS.

PLANNING

The Planning Department maintains numerous hard copy and digital data sets that are critical to the successful implementation of the City's proposed GIS.

Hard Copy Data

The following hard copy data sets, maintained by Planning, have been identified as potential GIS data sources:

- Tax Maps
- Zoning Maps
- Zoning and Subdivision Variances
- Special Use Permits
- Chesapeake Bay Preservation Act (CBPA) Maps
- Soil Survey Maps
- Telecommunication Tower Maps
- Historic Preservation Maps

Planning manually updates the Assessor's Tax Maps on an annual basis. These updates are performed to produce the City's Tax Map record set. Refer to the discussion under the City Assessor section for more information on this critical data set.

Planning also performs the manual ink-on-mylar updates to the City's Zoning Maps. These maps are an overlay of the Tax Maps, and when used in conjunction with the zoning information maintained in the Assessor's Real Estate database, can be utilized to generate the data necessary to compile the zoning layer within the proposed GIS. In addition to delineating the various zoning boundaries, these maps identify the parcels that have associated special permit records, zoning variances, and subdivision variances. The Zoning Maps are comprised of three different scaled map sets – 1"=100' (downtown area), 1"=200' (insets), and 1"=600' (base set). This data set is well organized and easily accessible, and the condition of the line work and clarity of information is considered to be adequate

for digital conversion into the GIS. The information contained in the Zoning Maps is needed to support the following Focus Applications:

- Property Assessment Maps
- Real Property Analysis
- Housing Development
- Subdivision Boundary Map
- Business Districts
- Community Development
- Census Analysis
- Strategic Parcels/Mapping/Search
- Strategic Building Mapping
- Zoning Map
- Neighborhoods
- Zoning Category Analysis
- Existing Land Use Map
- General Plan Map

Planning uses a set of the Department of Conservation's Chesapeake Bay Preservation Area (CBPA) maps. These maps delineate the Chesapeake Bay Resource Protection and Management Areas. This data set is comprised of approximately fifteen 1"=2,400' scaled maps. The data contained within these hard copy maps is required to support a variety of Focus Applications that deal with the development of land throughout the City. This data set is well worn, and a more current set should be obtained for digital conversion into the proposed GIS.

The United States Department of Agriculture (USDA) Soil Survey maps, and associated tabular data, are considered, by Planning, to be an important data source. While not required for the initial implementation of the City's proposed GIS, incorporation of this data will greatly improve the Planning Department's overall ability to service their internal and external clients. Due to the complexity and sheer volume of the data contained in this set, conversion to a digital, GIS compatible format, will require considerable effort. USDA is currently in the process of converting their soils data to a digital, GIS compatible, format. However, it is not known, at this time, when the Suffolk area data will be converted.

The zoning and subdivision variances and special use permits provide a great deal of historical data on each of the associated parcels. These files are maintained in numerous file cabinets and bound books stored within the Planning Department. Incorporation of this data into the GIS will add functionality to numerous Focus Applications including Property Assessment Maps, Strategic

Parcels/Mapping/Search, Real Property Analysis, Strategic Building Mapping, Zoning Map, Zoning Category Analysis, and Existing Land Use Map.

The Planning Department utilizes copies of the Federal Emergency Management Agency's (FEMA) flood zone maps, as well as copies of the United States Geological Survey's (USGS) 1:24,000 topographic maps. The FEMA maps are used to delineate areas that lie within the various flood plains. The USGS maps are used to determine ground elevations and other topographic characteristics. These data sets may be useful reference material during the conversion of the City's base map. However, the proposed base map accuracy will exceed that of these two sources. Upon the implementation of the GIS base map, the City will have access to more accurate digital topographic and flood zone data, thereby rendering these existing data sets obsolete.

The telecommunications tower maps delineate the various tower locations throughout the City. These locations can be readily transferred into the GIS, thereby rendering the existing hand drafted maps obsolete.

All historical landmark properties located throughout the City are identified on the historic preservation maps. Similar to the telecommunication maps, this information can be transferred to the GIS, thereby rendering the existing hand drafted maps obsolete.

Digital Data

The following digital data sets, maintained by Planning in a variety of different database and spreadsheet programs, have been identified as potential GIS data sources:

- Conditional Use Permits (CUP) Database
- Street List Database
- Subdivision List Database
- Minor Subdivision Database
- Family Transfer Database

- Communication Tower Database
- Plan Tracking Database

Each of these data sets are currently maintained in a format (Lotus and Microsoft Access) that can be readily migrated or linked to the proposed GIS database. The data is complete, well maintained, and reliable.

The data maintained in the CUP database identifies the CUP number, tax map and lot number, the conditional use description, and the date of issuance for all conditional use permits issued within the City.

The database tracks this information for permits issued from 1966 to the present. Incorporation of this data into the proposed GIS will add functionality to many of the Focus Applications.

The street list database is used to track information on all streets located within the City of Suffolk. The fields maintained in this Lotus spreadsheet identify the street name, route number, subdivision location, tax map location, and street type (private, public, proposed, or paper). This data set will prove very useful during the implementation of the proposed GIS as it provides many of the attributes needed to compile the street data layer.

The subdivision list database is used to track all major subdivisions and boroughs located throughout the City. This Lotus spreadsheet provides the street name, subdivision name, borough name, map sheet, and status (public, private, proposed, paper) for each of the City's subdivisions or boroughs. This data set will be useful for the initial implementation of the City's proposed GIS as it offers the attribution necessary to support Subdivision Boundary Map Focus Application.

The minor subdivision database provides information on the division of land holdings into smaller lots (less than five). Planning has maintained this Lotus spreadsheet since 1996. The fields that are populated include owner name, tax map and lot number, number of new lots, and date of subdivision.

Incorporation of this data into the proposed GIS will support numerous Focus Applications including Property Assessment Maps, Address Assignment, Strategic Parcels/Mapping/Search, and Real Property Analysis.

The family transfer database is utilized to track land holding transfers among family members. Tracking these transfers is critical since there is a limit on the number of times a property can transfer within a family. Planning maintains two versions (Lotus and Access) of this database. This data set has been maintained since the mid-1980s. While this data set is not required for the initial implementation of the City's proposed GIS, the data stored within it supports a critical function. By migrating this data, or otherwise linking it to the GIS will enhance Planning's reporting and tracking capabilities by providing quick and efficient access to the data, as well as offering a mapping component.

Planning's communication tower database is used to track information on the various communication towers located on various parcels throughout the City. This database is maintained to support the conditional use permit renewal process. This Lotus spreadsheet tracks the following tower information:

- tower identification number
- owner type (private or public)
- tax map and lot number
- school site (yes or no)
- structure type
- date constructed
- co-locator
- co-locator height
- co-locator reference
- owner name
- location (street address or intersections)
- land ownership
- tower use
- height (feet)
- date approved
- co-locator use
- co-locator date approved

While this data set is not required for the initial implementation of the proposed GIS, incorporation of this data will provide Planning with the ability to quickly and efficiently access the data necessary to process the conditional use permits.

The plan tracking database is used to track the status of a variety of outstanding plans in process throughout the City. While this data set is not required for the initial GIS implementation, it can be incorporated or linked with the GIS to offer Planning an automated means of tracking/mapping outstanding plans.

POLICE DEPARTMENT

The Police Department maintains certain hard copy and digital data sets that will be useful for the initial implementation of the City's proposed GIS.

Emergency Communications is in the process of implementing an Emergency Information System (EIS). The system, which is currently being purchased, utilizes TIGER street network data. While this data does not meet the overall accuracy requirements specified for the City's GIS, it can be utilized until the appropriate data is collected. Generally, the EIS can be linked to the proposed GIS to provide additional functionality, and improve its geographic accuracy. The EIS software is compatible with ESRI's ArcView and MapInfo's GIS software.

The Police Department manually analyzes crime statistics and other information to support the strategic pursuit of crime offenders. The least common denominator to which data can be shared is at the traffic zone level. During the meeting, the Police Department provided maps of the police precinct and section boundaries. These boundaries are used in dispatching and reporting of incidents. The maps will be useful as reference sources during the development of the GIS database.

Hard Copy Data

The following hard copy data sets, maintained by Police, have been identified as potential GIS data sources:

- Patrol Districts & Sector Zone Map
- Incident Report Form

The patrol districts and sector zone map shows delineate the various patrol districts and reporting areas set forth by the Police Department. The Police Department uses these boundaries to break the City down into manageable areas, thereby enabling the department to more efficiently utilize its limited resources. The precinct boundaries maintained in this data set may be digitally converted into the proposed GIS.

The incident report form includes a data entry field for indicating the reporting area for district and sector. A variety of other fields on this form tie the incidents to specific parcel addresses. This information is entered into a state record check system that is discussed in the following section. While this data set does not support the initial implementation of the proposed GIS, converting it to a digital format will permit a linkage to the GIS. This will offer the Police Department more reporting and analytical capabilities by providing a tie to other maintained geographic data sets.

Digital Data

The following digital data sets, maintained by Police, have been identified as potential GIS data sources:

- VCIN State Record Check System
- Vision Computer Aided Dispatch (CAD)
- Vision Record Management Software (RMS)

The various data sets maintained by the Police Department contain a variety of sensitive information that, by law, cannot be distributed at a detailed level. The greatest level of detail at which the Police Department's information can be shared is at the traffic zone level.

The VCIN State Record Check System is updated daily by the Police Department. All incidents are recorded in the system to communicate information to other jurisdictions throughout the state of Virginia. The data, which is entered into this system, is obtained from the previously detailed hard copy incident report. While this data is not required for the implementation of the proposed GIS, it

may be linked to the system to provide the Police Department with added data maintenance, reporting, and analysis functionality.

The Vision CAD and RMS software packages provide enhanced E911 interfacing. CAD is used by the Police Department's Communications Center (911 Center) for dispatch of the Police and Fire Departments. RMS is used for internal incident report tracking. Currently the two software packages do not interact because the CAD software is a Windows NT version and the RMS package is a DOS version. The department is investigating an upgrade to these systems that would make them GIS compatible. The addresses maintained in these systems may be used to develop and check the address database, which is required by the proposed GIS. Linking these systems to the GIS will greatly increase the department's dispatching and routing capabilities by adding a map product interface.

PUBLIC SCHOOLS

Suffolk Public Schools maintains various hard copy and digital data sets that, if incorporated with the proposed GIS, will offer significant benefits to Public Schools, as well as other City departments.

Hard Copy Data

Public School's Transportation Unit maintains a Public School District map, which delineates the City's various school districts. This map clearly identifies the districts for the City's two high schools, three middle schools, and eleven elementary schools. This hard copy data set can be readily converted to digital format for inclusion in the proposed GIS to support a variety of Focus Applications including Housing Development, Neighborhoods, Zoning Category Analysis, Community Development, and Census Analysis.

Digital Data

Public Schools maintains the Student Information Management System (SIMS) and Transportation Information Management System (TIMS) databases.

The SIMS database stores a variety of information concerning the enrollment of Suffolk's approximately 11,000 students. While the data maintained in the this database is not needed for the initial GIS development, linking it to the GIS via an ODBC connection would greatly enhance Public School's reporting and analysis capabilities by adding a graphic/mapping component.

The TIMS (also known as EDULOG) database is utilized to maintain information about the City's 130 different school bus routes. The database contains a variety of impedance information (speed limit, traffic flow direction, railroad crossing hazards, etc.), which Public Schools uses to maximize the efficiencies of its school bus routes. This same impedance data is required to support GIS routing applications, such as Emergency Routing. The City should be able to migrate this impedance data into the proposed GIS.

PUBLIC UTILITIES

Personnel within each of the Department of Public Utilities' (DPU) various divisions maintain a variety of hard copy and digital data sets that are critical to the development of the City's proposed GIS. In addition to the data maintained by DPU, several data sets maintained by various external consultants were obtained and evaluated as part of the data survey.

Hard Copy Data

Each of the following geographic data sets contains certain information, which is either needed for the initial implementation of the City's GIS, or is required to support specific DPU applications:

- Sanitary sewer facility maps
- Water facility maps
- Utilities Record Drawings
- Treatment Plant Piping Drawings
- Water Sampling Collection Point Map

Each of these map/drawing sets are utilized by a variety of City departments, external agencies, contractors, and consultants in the performance of their work tasks. The incorporation of the data maintained in these record data sets into a comprehensive GIS, such as the one proposed by the City, will ensure rapid access to the most accurate and current landbase and utility infrastructure data available for Suffolk. However, the accuracy and currency of some of these data sources is problematic, as described in the following paragraphs. Therefore, direct conversion of these sources into a digital format will not adequately support the desired functionality of the City's proposed GIS. Additional data conversion/development techniques will need to be implemented in order to obtain accurate data for use in the GIS.

DPU's water and sewer facility maps were developed to represent the sizes, materials, and locations of the water and sewer facilities and associated appurtenances. The water and sewer facilities are mapped in two independent drawing sets. Each set (water and sewer) is comprised of approximately forty 1" = 400' scale map sheets. While both sets utilize the same grid and coordinate system (VA State Plane), they were each developed from a different base map. Neither set has been updated in the past three years, and their accuracy is questionable. Common landbase features such as edge of pavement, building footprints, property lines, hydrography, etc. are felt to be inaccurate, and are not coincident between the two map sets. The graphical locations of the water, sewer and planimetric features are not considered accurate, and DPU staff relies upon the limited off-set dimensioning of the features, included on the map sheets. The condition of the line work on each map set is considered to be fair.

Since the planimetric features and photo-recognizable utility facilities will be captured from aerial photography, the City need not rely upon the water and sewer facility maps for the conversion of this information. These sources should suffice as reference data sets for the confirmation of the existence of photo-recognizable utility features (manholes, hydrants, etc.) during the photogrammetric compilation process. In addition, these map sets may be useful for verifying water and sewer main sizes. However, since the water and sewer facility maps are not adequate for determining the accurate locations of the utility infrastructure, additional data collection techniques will need to be employed for the accurate capture of this information.

The Public Utilities Engineering Division maintains a large quantity of utility as-built drawings that are developed by the City's various engineering consultants. These drawings are used to identify the "as-built" constructed condition of the City's utility infrastructure. Accurate as-built configurations and dimensions are supplied by the contractors to the consultants. The consultants then update the utility design plans to convey the as-built conditions. The organization and quality of these drawings was found to be problematic. The as-builts that were evaluated were found to be in varying stages of completeness. Of the as-builts which were evaluated, most were found suitable for scanning into a digital format. In some cases, the as-builts are the only available source for identifying detailed information about the City's utility facilities, but they have not been kept up to date. In general, the majority of the as-built drawings were found to be suitable for conversion. Although, the changes to the infrastructure since the as-builts were submitted by the contractors and consultants will need to be evaluated.

The Robert G. House Water Treatment Plant personnel maintain two different sets of treatment plant piping drawings. These drawings are used to identify plant, as well as yard piping, in and around the water treatment plant. Each set, produced individually by different consultants, is felt to be somewhat inaccurate and, at times, difficult to interpret. These issues have been the source of past difficulties in treatment plant operations. The need for combining these drawing sets into a single digital mapping/schematic product has been expressed by DPU treatment personnel. While this information is not critical to the initial implementation of the City's proposed GIS, it is critical to the performance of the treatment plant personnel's work tasks. Since these drawings are frequently used in plant trouble shooting situations, incorporation of the data into the proposed GIS would offer significant benefits. The data is fairly accurate, and the current piping drawings lend themselves to digital conversion.

Water treatment plant personnel also maintain a single thematic map product used to identify and track the City's water quality sampling collection point locations. Each of the mapped collection points has an associated digital data set, which is further described in the following section. The accuracy of the base map features is questionable. However, water treatment plant personnel are confident about the relative locational accuracy of the sampling points. These sampling point locations can be easily transferred into the proposed GIS, with the appropriate database linkages

provided to ensure DPU personnel quick access to the necessary accurate data. While this data is not critical to the initial implementation of the City's proposed GIS, incorporation of it into the GIS will greatly enhance its usability.

Digital Data

Each of the following digital data sets contains certain information, which is either needed for the initial implementation of the City's GIS, or is required to support specific DPU applications:

- Operations Work Order Database
- Water Distribution System Engineering Model
- Sanitary Sewer Master Plan
- Customer Service Database
- Water Treatment Plant Databases

DPU's operations and maintenance personnel currently maintain a fairly robust work order database. This database is maintained in Microsoft Access, and has been in use for approximately one year. Prior to implementing this database, DPU stored the work order in a dBase database. The dBase data has not been migrated to the Access database. The dBase database contains a considerable amount of historical information, which may prove valuable to DPU personnel in the performance of their operations and maintenance duties. Incorporation of these data sets into the proposed GIS will offer DPU staff a powerful tool for the development of an automated work order management system.

Malcolm Pirnie, Inc is currently developing the City's water distribution system engineering model. The model, which is being developed using Cybernet (ODBC compliant) software, has not yet been delivered to the City. This is a skeletalized model of the City's water distribution system, modeling pipes eight inches and larger, with some critical six inch pipes included. Malcolm Pirnie is utilizing consumption data, obtained from the Customer Service database, to place the demands throughout the model. The consumption data is reported in the Customer Service Node File database at the Census Tract and Hampton Roads Planning District Commission traffic zone levels. This data is output to a Microsoft Access database, which is linked to the Cybernet model. DPU will utilize this model to

project future system demands, and perform “what if” modeling scenarios to determine system performance under certain conditions. A link between the proposed GIS and the Cybernet water model will permit the automation of several modeling/reporting work flows. The attribute (size, material, etc.) data maintained in the model is considered accurate, and may be useful in developing the required GIS pipe feature database tables. The graphic component of the distribution model, which was developed from 1:24,000 scale USGS mapping, only offers a schematic representation of the distribution infrastructure, and may not be of benefit in the initial GIS implementation.

URS – Greiner, Inc. is currently developing a sewer master plan for the City. To date, they have completed the Route 17 corridor portion of the plan. Several digital data sets, which will be of benefit to the proposed GIS, are being developed as part of this master plan. These include:

- GPS coordinates for sewer structures
- Various attributes for sewer structures
- AutoCAD mapping of selected planimetric, contour, and sewer information

In support of the sewer master plan mapping, URS – Greiner developed sub-centimeter GPS ground control along the Route 17 corridor. A GPS survey will be conducted on every manhole within the City’s sewer collection system. As part of these surveys, the following information is being collected, and stored in a Quattro Pro database:

- GPS rim elevation
- GPS coordinates (VA State Plane northings/eastings)
- Manhole/connecting pipe inverts
- Connecting pipe sizes
- Digital photographs

URS – Greiner is also developing 1’=100’ scale planimetric base mapping as a part of the sewer master plan. These products, stereo-compiled from existing 1996 aerial photography and augmented with GPS collected data, are being produced in AutoCAD format. Mapped features include 2’ contours, spot elevations, building footprints, edge of pavement, bridges, hydrography, existing sewer

infrastructure, and proposed sewer infrastructure. URS – Greiner has followed the USGS layering standard in the development of these maps. To date, comprehensive base mapping has been developed for the area north of Bennett Creek Park Road.

While these digital mapping products only provide minimal coverage for the City's service area, they are extremely beneficial for the initial development of the proposed GIS. This data can be directly imported into the proposed GIS data model with minimal modifications/adjustments. Utilizing these maps for the GIS development can maximize the City's investment in this data collection effort.

The Robert G. House Water Treatment Plant personnel maintain several digital databases to support their operations. Lake levels are collected daily, and stored in a Lotus spreadsheet. The division also collects and stores real-time supervisory and data acquisition (SCADA) readings on system pressures, storage tank levels, flow rates, etc. via the City's WonderWare SCADA system. Water quality information, collected through bottle samples, from the City's monitoring locations is stored in a Microsoft Access database. While not critical to the City's initial GIS implementation, all of these digital data repositories provide system operating data which is required to support the planned utility engineering applications.

DPU's Customer Service personnel maintain a variety of information pertaining to the City's water customer accounts. This information, maintained on the City's mainframe database, is updated on a daily basis. Water bills are generated based on the meter reading data, which is collected and entered into this system. This digital database contains certain information, such as customer name, mailing address, account number, traffic/census zone, and consumption data that will be useful for the City's initial GIS implementation.

PUBLIC WORKS

Department of Public Works (DPW) Engineering, Operations, and Customer Service personnel maintain various hard copy and digital data sets that will prove useful for the City's proposed GIS implementation. This information is routinely distributed to other City departments, outside agencies, contractors, and consultants. The majority of the information collected and maintained by DPW is hard copy data and

will need to be converted to a digital format for use in the GIS. Field data collection will be required for the capture of various infrastructure features and associated attributes. Such features include street signs, pavement markings, parking meters, traffic lights, and storm drainage.

Hard Copy Data

The Department of Public Works maintains the following hard copy data sets:

- Planimetric maps
- drainage maps
- cemetery maps
- cemetery index cards
- shop work orders
- trash collection route maps
- residential and city-owned building floor plans

All of these data sets are currently maintained in hard copy format. The majority of DPW's map sets have not been regularly maintained, and their currency is not easily determinable. However, for areas of the City that have not undergone significant change since the original development of the source documents, this should not be an issue. Identification of such areas, as well as areas where the existing source data is inadequate should be performed as part of the forthcoming GIS Data Conversion Plan development. Data deficiencies will need to be corrected via field data capture, or some other means of secondary data development.

The City's planimetric and drainage maps only cover the 2.2 square mile downtown district, which DPW is responsible for maintaining. The Virginia Department of Transportation maintains the remainder of the City's transportation and drainage infrastructure, and associated source data (maps, drawings, and databases). There is currently an effort under way, which, if successful, will result in the City assuming more control over the transportation and drainage infrastructure throughout the rest of the City. This will result in DPW assuming more data maintenance responsibilities as well.

Approximately fifteen to twenty 1"=100' scale planimetric and drainage maps, produced pre-1981, cover the 2.2 square mile downtown district. The locations of features on the drainage maps are estimated to be 80-percent accurate, with the corresponding elevations approximately 50-percent

accurate. Both the planimetric and drainage map documents appear to be worn. Many of the features included in these map products are required for the development of the GIS base map, as well as additional thematic layers. While these data sets may be useful for verifying the existence, and general location, of the visible planimetric features, the primary compilation source should be the digital orthophotography. Planimetric features, such as the street centerline, are required to support the majority of the Focus Applications.

DPW is responsible for maintaining the two municipal cemeteries located within the City. A map of the plot layout and plot numbers, as well as index card files for each plot is maintained by DPW. Each index card identifies the owner, plot number, section, funeral home, birth date, date of death and burial date. DPW is in the process of migrating this hard copy data into a digital Microsoft Access database. This effort has been estimated at five percent complete to date. It will be useful for DPW to have quick access to this data, through the GIS. Additionally, this data will support a variety of Focus Applications, including Public Facilities Mapping, Community Development, Existing Land Use Map, and General Plan Map.

DPW's Operations and Maintenance division maintains a variety of shop work orders. These paper document work orders identify:

- responsible shop (meter, sign, signal, or paint)
- date of work order
- location of work
- sketch or diagram
- completion time
- work completed by
- overtime used
- priority of work
- traffic order number
- type of work performed
- start time
- time used
- date completed

DPW staff is currently planning an automated work order system to replace the existing paper system. This planned system (CarteGraph) is discussed in detail in the following section. The existing work order data does not offer any benefits in the initial development of the proposed GIS.

DPW developed the City's existing trash collection routes approximately five years ago. ADC map sheets and detailed route descriptions are maintained in three-ring binders. Migration of this route information into the proposed GIS will afford DPW the opportunity to easily create more efficient routes, and ultimately improve their trash collection work flow. Conversion of this data will not support any of the identified Focus Applications. However, the completed implementation of the street centerline impedance data, required for the Emergency Routing application, will support a trash routing application with little additional effort.

DPW stores paper copies of the floor plans for many of the residential and City-owned buildings. Conversion of these data sources, into digital imagery, will enable enhancements to various Focus Applications, including: GIS Viewer; Emergency Dispatch; Strategic Parcels/Mapping/Search; Real Property Analysis; Strategic Building Mapping; Housing Development; Public Facilities Mapping; Inspections Tracking; Community Development; Housing Inventory; and Census Analysis.

Digital Data

The Department of Public Works maintains the following digital data sets.

- Special Trash Collection Work Order System
- Cemetery Plot Database
- Proposed Operations & Maintenance Work Order System

The Special Trash Collection Work Order System has been in operation for approximately one year. The system was produced by ECOTRAN (Washington, D.C.). The customized system operates within a DOS version of Microsoft Access. The database is used to store the date, last name of owner, street number, street name, telephone number, trash description (tree limbs, appliances, furniture, and other type), and any special instructions. This data does not offer any benefits in the initial development of the proposed GIS.

The cemetery plot database is currently about 5% complete and is developed in Microsoft Access. Information is entered from the cemetery plot index cards indicated in the prior hard copy section.

DPW regularly fields calls from citizens researching various burial locations. It will be useful for DPW to have quick access to this data, through the GIS. Additionally, this data will support a variety of Focus Applications, including Public Facilities Mapping, Community Development, Existing Land Use Map, and General Plan Map.

DPW Operations and Maintenance is currently in the process of implementing the CarteGraph Software Suite computerized work order system, developed by CarteGraph Systems, Inc. DPW plans to utilize the WORKdirector, SIGNview, and SIGNALview modules of this work order system. This software is compatible with ESRI's ArcView GIS software. This data does not offer any benefits in the initial development of the proposed GIS. However, an interface between the City's GIS, and the CarteGraph work order system would prove beneficial to DPW.

REGISTRAR

The Registrar utilizes and/or maintains a variety of hard copy and digital geographic based data sets. While these data sets are not critical to the successful implementation of the City's proposed GIS, they may be utilized to aid in the system implementation, and further enhance its functionality, as described below.

Hard Copy Data

The Registrars Office maintains a series of Voting District maps in hard copy format. These maps, which are current and easily accessible, may be used as the primary source for converting the City's political district boundary information to a digital format.

Digital Data

The Registrar maintains a variety of voter registration related digital databases, each of which includes an address field. These databases may be utilized as a reference for the development of a normalized address database, which is required for the City's GIS implementation.

SHERIFF

The Sheriff's Department does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City's proposed GIS.

SOCIAL SERVICES

Social Services does not currently maintain any digital or hard copy data sources that are required for the initial implementation of the City's proposed GIS. However, several of the department's hard copy and digital data sets can be integrated with the City's GIS to enhance the department's work flows, and reporting and analysis capabilities. It should be noted that much of the data maintained by Social Services is sensitive in nature and, by law, cannot be distributed to other departments or agencies.

SUFFOLK HEALTH DEPARTMENT

The Suffolk Health Department does not currently maintain any digital or hard copy data sources that is required for the initial implementation of the City's proposed GIS. However, several of the department's hard copy and digital data sets can be integrated with the City's GIS to enhance the department's work flows, and reporting and analysis capabilities.

The various data sets maintained by the Health Department contain a variety of sensitive, personal, client information that should not be made available to users outside of the Health Department.

TREASURER

The Treasurer does not currently maintain any digital or hard copy data sources that are required for the initial implementation of the City's proposed GIS. The Treasurer does maintain a Tax database that, if normalized and linked to the proposed GIS, would provide added functionality to a variety of Focus Applications.

VIRGINIA COOPERATIVE EXTENSION

Virginia Cooperative Extension does not currently maintain any digital or hard copy data sources that would be useful for the initial implementation of the City's proposed GIS. However, the Extension Service does maintain a variety of data sets, including farmland maps, and planting data that can be integrated with the City's GIS to provide added functionality in support of Extension's farming and environmental work processes.

EXTERNAL DATA SOURCES

As part of the Data Survey, Baker researchers investigated a variety of externally data resources maintained by the region's utility service providers, neighboring localities, and state and federal agencies. The purpose of this investigation was to identify and evaluate currently available external data resources that could provide the City with cost savings/sharing opportunities, or otherwise provide added functionality to the proposed GIS. The investigation identified numerous data resources that could benefit the City's proposed GIS implementation.

Virginia Natural Gas (VNG) is currently in the process of developing their own enterprise-wide GIS. As part of this effort, they have acquired 1" = 400', 3-foot ground resolution, aerial photography for the southern portion of the City of Suffolk. VNG has agreed to allow Suffolk to use this photography to develop digital orthophotography, and compile the necessary landbase and planimetric features. In return, VNG would like to obtain Suffolk's hard copy tax maps and property records, to be used for the development of their own cadastral coverage for the Suffolk service area.

Virginia Power is also currently developing an enterprise-wide GIS. It currently appears that Virginia Power could benefit more from Suffolk's GIS implementation, than Suffolk could from Virginia Power's. Virginia Power's landbase, street centerline, and tax district boundaries are not maintained at a scale or accuracy sufficient to support Suffolk's proposed city-wide, parcel based GIS. Virginia Power's facilities are mapped to an accuracy of between 50 to 200 feet. Virginia Power would like to receive parcel features, address attributes, landbase and planimetric features, subdivision/neighborhood/place name attributes, and additional right-of-way data from Suffolk's GIS.

An arrangement between Suffolk, Virginia Power and Virginia Natural Gas should be developed such that the City receives the digital data necessary to incorporate both utility companies' plant feature coverages into the citywide GIS. This will enable Suffolk to add functionality to the proposed GIS to support numerous city-wide planning and design applications.

A summary of all external data sources identified as part of the Data Survey is included in the following table:

| Agency | Data |
|--|---|
| Hampton Roads Planning District Commission | <ul style="list-style-type: none"> • 10 meter SPOT Panchromatic from March 1995 • National Wetland Inventory, 1:24,000 scale • Tiger Data |
| Farm Services Agency | <ul style="list-style-type: none"> • 1994 NAPP photography, 1:40,000, currently in the process of rectifying it. |
| Virginia Power | <p>Currently digitizing their paper maps to ArcInfo: Coordinate System: Virginia State Plane</p> <p>November 1999 – completion date for implementation March 1999 – completion date for Suffolk</p> <ul style="list-style-type: none"> • Maps were derived from orthophotos (land and facilities) • Landbase derived from maps (EOP) • street centerlines from ETAC • have tax district boundaries (county, city, state, too) <p>Power lines are broken into:</p> <ul style="list-style-type: none"> • Distribution – 69,000 volts & less: accuracy is not quite as good as transmission lines. • Transmission – 69,000 volts & greater: currently in Microstation (graphics only, not GIS), but very accurate – they are collecting the towers with GPS now. • Accuracy approx. 50-200 ft. with the Transmission being considerably better than the distribution side <p>Easements were “assumed” and derived out from the centerlines according to the type of road.</p> <p>Virginia Power would like access to the following information from Suffolk’s GIS:</p> <ul style="list-style-type: none"> • Parcels • Street addressing • Landbase (better? Or more features?) • Subdivision and place names • Other ROW’s |

| Agency | Data |
|----------------------|---|
| Virginia Natural Gas | <p>They are currently implementing a Smallworld AM/FM system Coordinate System: UTM, Zone 17 extended</p> <p>March 1999 completion date for conversion Digital Orthos:</p> <ul style="list-style-type: none"> • Collected in “Primary” and “Secondary” Areas • Primary – 1’ pixel resolution, +/- 5’ accuracy, 176 mi² coverage in Suffolk • Secondary – 1 meter pixel resolution, +/- 10’ accuracy, 196 mi² • Areas not covered are: NE corner and the swamp <p>Landbase will be derived from the orthos:</p> <ul style="list-style-type: none"> • Centerlines • Assumed ROW’s • Geocoded address files <p>Suffolk’s facilities are currently in AutoCad, to be converted by March 1999.</p> <p>VNG would like access to the City’s tax maps, and addressing database for the development of their own GIS.</p> |
| Isle of Wight | <p>ArcInfo based:</p> <ul style="list-style-type: none"> • Parcel data • Centerlines with addressing • Planimetrics were compiled from aerial photos, visible utilities were captured, so they have some water, etc. (400’ scale) <p>Planning to get digital orthos soon. Aerial photos are of unknown origin, date, resolution – no data available.</p> |
| City of Portsmouth | <p>ArcInfo based:</p> <ul style="list-style-type: none"> • Water and Sewer at Planimetric scale • Centerlines • Modified Tiger Data • Impervious storm water |

| Agency | Data |
|---------------------------------------|---|
| City of Chesapeake | <p>May have some overlapping photography on west side – ½ foot resolution.</p> <p>Following coverage’s will fall mainly in the disputed border area of Pughsville:</p> <ul style="list-style-type: none"> • Water & Sanitary Sewer – from 100–200 scale maps • Storm Sewer – pulled from imagery and field captured with 1 meter GPS – very accurate • Possibly some 2’ contour topo • Possibly some parcel info (from tax maps) <p>All Arc coverage’s</p> |
| Union Camp Corporation | <p>ArcInfo based:</p> <ul style="list-style-type: none"> • Parcels (Union Camp property) • Soil types • Tree stand type (pine versus oak, etc.) • GPS located some roads (not complete) and make up for the difference with USGS 1:100,000 mapping • Some SPOT 10 meter imagery <p>For parcels – COGO from survey maps (not tax parcels) and then QC’d with 1 meter GPS – still not perfect, but getting closer every day.</p> <p>Planning on buying rectified/registered USGS digital contour mapping</p> <p>Have some aerial photography (rectified) from fed agency that flies agricultural areas</p> <p>Union Camp is looking for “good” road mapping and are willing to “share/trade” for them.</p> |
| FEMA | <p>There is currently no data available for Suffolk.</p> |
| Virginia Department of Transportation | <p>County mapping series contains:</p> <ul style="list-style-type: none"> • State maintained roads only (no city streets) • Cartographic features as shown on county mapping series (RR, churches, schools, water features (lakes) etc.) are from Tiger data. • 1:24,000 • 30’ accuracy |

DATA SOURCE SUMMARY

The overall Data Survey compilation and analysis results indicate that the City maintains a significant amount of hard copy and digital data suitable for conversion and integration into the proposed GIS. With the exception of several as-built drawing sets, the majority of the hard copy data sources investigated appear to be suitable for conversion into a digital format. All of the digital data sources investigated appear suitable for integration with the proposed GIS. Accuracy, completeness, and currency of the data are issues that will need to be addressed, to varying degrees, for all hard copy and digital data sources prior to conversion and integration into the proposed GIS.

CHAPTER 3 - CONCLUSIONS

INTRODUCTION AND ASSUMPTIONS

This chapter addresses the specific data resources required for developing the City's proposed GIS. The data resource requirements are presented from a category specific perspective. Data conversion issues associated with each data source are also addressed.

The first task associated with GIS data conversion and development is the creation of an appropriate digital base map. The base map accuracy requirements are determined, in large part, by the required accuracy levels of the various themes (parcels, transportation, utilities, zoning, etc.) and applications (network analysis, dispatching, etc.) the base map must support.

The conclusions and recommendations presented in this chapter are based on the following assumptions:

- The City will choose to develop digital orthophotography
- The City will choose to develop planimetric mapping (as defined in the Landbase Definition section of the Needs Assessment document)
- All existing digital data (database and graphic) can be converted to a standard format

The Source Information matrices, provided in Appendix C, identify the source documents required to develop the primary GIS layers (base mapping, parcel, utility, and transportation) and to support the Focus Applications selected as a part of the Needs Assessment.

CONCLUSIONS

Analysis of the various data sets, previously presented in Chapter 2, identified currently available data that can be used to develop the City's proposed GIS. This analysis also identified various data deficiencies that, based on the base mapping and Focus Application requirements, will need to be addressed in order to ensure a successful GIS implementation. The following sections present a discussion of the currently available data which should be utilized in the City's initial GIS

implementation. The source-information matrix, presented in Appendix C, summarizes the primary, secondary, and tertiary GIS data sources, as they relate to each of the Focus Applications. The matrix also indicates where data deficiencies currently exist, and identifies three (GPS locate, field survey, and digital orthophotography) recommended methods of data collection.

BASE MAPPING

A successful GIS implementation is dependent upon a complete and accurate base map product, which will adequately support the system's current and planned uses. All other GIS data layers are built upon, and referenced to the base map. The Landbase Definition section of the Needs Assessment report specifies an appropriate base map for the City of Suffolk. Based upon the requirements of this Landbase Definition, it has been determined that the City does not currently maintain sufficient data to support the development of the necessary base map.

While the City, as a by-product of the Sewer Master Plan, has obtained a stereo-compiled landbase that does meet the minimum base mapping specifications, the coverage is limited to less than one third of the City's total land area. Additionally, the aerial photography that was used to develop the current digital landbase was obtained in 1996. Given the relatively low cost of acquiring aerial photography and recent growth in the City, the City should plan on obtaining new aerial photographs covering the entire limits of the utility service area. This will ensure the base map is developed from the most current information available. Existing (Spring 1998) aerial photography, which was produced by Virginia Natural Gas could be utilized for developing the base map for those portions of the City which do not receive municipal water or sewer service.

PARCEL MAPPING AND ADDRESSING

The parcel mapping for the City of Suffolk is current, and generally ready for conversion. The existing hard copy tax maps should be easily converted to a vectorized digital data model that will be referenced and fit to the base map. However, one noted deficiency with this data set concerns the larger older parcels, which may not be accurately represented on the existing tax maps. Many of these older parcels have not been accurately surveyed, and their geometric representation on the tax maps may be in error.

Since the majority of these large land parcels follow cultural features such as waterways, tree lines, fence lines, etc., they may be adjusted to “best fit” the accurate base mapping.

Each parcel within the City limits has been assigned a unique parcel identification number (PIN), which is delineated on the tax maps, as well as in the Master Real Estate and Computer Aided Mass Appraisal (CAMA) databases. Each PIN is related to a unique parcel address within the Assessor’s databases. These addresses should become the standard GIS address database. All other data sets that involve an address should be verified against this database, with all addressing inconsistencies being corrected during parcel conversion activities.

Boundary features, such as political/voting districts, neighborhoods/subdivisions, business districts, police precincts, census groups, school districts, utility service areas, etc. are generally associated with groups of parcels. Numerous existing hard copy and digital data sources, maintained by various departments, can be utilized to digitally convert these features into the GIS. In some cases, the digital data sets will support the attribution of the parcels, thereby resulting in the automatic generation of the boundary features.

UTILITY MAPPING

The City’s utility mapping is characterized by numerous deficiencies. The water and sewer planimetric maps have not been updated in numerous years, and the confidence level in their accuracy is marginal. The planimetric base map features, to which the utilities are referenced, do not meet the accuracy needs of the GIS. For these reasons, a variety of alternative data collection and compilation methods should be investigated. A combination of photogrammetric compilation, as-built conversion, and GPS collection methods should prove sufficient for developing the utility data layers.

The sewer master plan that was discussed in the above base mapping section contains digital sewer mapping for approximately one-third of the City. The existing sewer structures in this area have been accurately located using GPS technology and a significant amount of feature attributes have been stored in a digital database. The remaining two-thirds of the City’s sewer structures, and the City’s entire water

infrastructure, will need to be captured into the GIS utilizing one or more of the methods described in the previous paragraph.

Each data collection method has a variety of associated pros and cons. Of the three data compilation methods, as-built conversion will be the most cost effective. As-built record drawings of the City's utility infrastructure accurately represent areas of utility development, but need to be organized and indexed in order to be used effectively. Also, complete coverage of the City's utility infrastructure is not likely to be available from the existing as-built drawings. Service areas which have been added, or improved, without as-built documentation will need to be compiled using an alternative method, such as photogrammetric compilation or GPS data collection.

Utilizing the digital orthophotography to photogrammetrically capture visible utility features is only effective when the subject features are readily recognizable from the photography. Features such as manholes, catch basins, pump stations, above ground storage tanks, drop inlets, etc. typically fall within this category. Often times, these features need to be painted, or otherwise marked, prior to capturing the photography in order to render them discernable. Features that are hidden, or obscured, by vegetative cover will not be discernable from the photography.

GPS field location of features results in a very accurate data model. Current GPS technology permits the capture of features within centimeters of their actual location. Feature attributes, such as size, model number, depth of cover, inverts, etc., can be simultaneously captured, and loaded directly into the GIS. This data collection method can be utilized to capture all features. However, certain field conditions such as heavy leaf coverage, or tall buildings may hinder this process.

A hybrid approach to utility feature data collection is recommended. First, capture all possible features from the orthophotography, during the base map compilation. Secondly, compile any missing features from the as-built record drawings, tying them into the accurately positioned photo-compiled points. GPS data collection should be used to capture any missing features, as well as those that prove to have been inaccurately captured using the other two methods.

TRANSPORTATION MAPPING

The most accurate method of capturing the street centerline features is from photogrammetric compilation. Attributes such as street name and type can be captured from various existing hard copy and digital data sets. Street impedance attributes are available from the TIMS database, maintained by public schools. Other transportation features, such as bus stops will need to be GPS field collected for accurate representation in the GIS.

APPENDIX A - MEETING MINUTES

Meeting Minutes

Location: Assessor's Office

Subject: Assessors Office Data

City Personnel: Maria Kattmann, Sid Daughtrey

Baker Personnel: Michael Anderson, Ed Singer

Date: 6/4/98

Time: 9 AM

Several sources of information were provided to Baker that the Assessor's Office either uses or maintains.

- Hard Copy Tax Maps
- Real Estate Database
- Delinquent Tax Database
- Building Permits Database
- Site Plans for Buildings

The Tax Maps are updated manually by the Planning Department. A working set is stored in the Assessor's Office and is the most up-to-date set of maps. Annually, copies of the Tax Maps are distributed to the various departments and agencies within the City of Suffolk.

The Real Estate Database is the only information that the Assessor's Office maintains. They utilize a CAMA software package called Appraisal Plus CAMA (A-Plus) for their appraisals. The package has the Marshall & Swift (blue book) value built into the software. The A-Plus software is a product of a company referred to as HTE. Jerry Huff is the point of contact at HTE. The phone number is 1-800-727-8088 ext. 3327. The fax number is (407) 304-1025. The information stored in the A-Plus database is downloaded into the AS400 Mainframe to distribute the information to other departments.

I briefly spoke with Jerry Huff of HTE and he indicated that the Aplus software currently was developed using MEB Cobol and is not ODBC compliant. They are currently in development to achieve this compliance.

Meeting Minutes

Location: Planning Department Building
Subject: Data Sources for Planning
City Personnel: Jeryl Phillips, Beverly Parker, & Cindy Taylor
Baker Personnel: Michael Anderson
Date: 6/19/98
Time: 9 AM

Several sources of information were provided to Baker that the Planning Department either uses or maintains.

- Hard Copy Tax Maps
- Hard Copy Zoning Maps
- Soils Survey
- CBPA Maps
- Conditional Use Permits Database
- Street List Database
- Minor Subdivision Database
- Family Transfers Database
- Communication Tower Database
- Major Subdivision Rezoning Records
- Conditional Rezoning Records

Currently, the Planning Department updates the hard copy tax maps once per year before they are distributed. The zoning designations are marked on the updated tax maps to produce the zoning map. Subdivision variances and BZA (zoning appeals) location designation are also marked on the zoning maps. The historic permit documents that are filed by citizens are stored in file folders in the Planning Department.

The soils survey is provided by the Department of Conservation in Richmond to the City of Suffolk. The Planning Department is interested in this information as a GIS layer as well as the Chesapeake Bay Preservation Act (CBPA) polygons and national wetlands.

The Planning Department stores many useful databases for the GIS. The Conditional Use Permits (CUP) database has information that dates back to 1966. It stores the CUP number, tax map & lot number, the conditional use, and the date of issuance.

The street list database (Lotus format) is 95% complete and stores each street name, it's status (private, public, proposed, paper), tax map location, and route number or subdivision that it is located in. There are duplicate street names in a few instances.

The minor subdivision database (Lotus format) stores the owner name, tax map & lot number, number of new lots, and the date it occurred. The database has been maintained since 1996. A minor subdivision occurs when land holding is subdivided in less than 5 lots.

The family transfers database stores the owners name, map & lot number, number of lots, and date of transfer. Two different formats of this database (Lotus and Access formats) are stored and the information dates back to the mid-1980s. This database is important to include in the GIS because there is a limitation on the number of times a property can be transferred within a family.

The communication tower database (Lotus format) is the final database that the Planning Department maintains and it is 95-100% complete. The tower identification number, owner, owner type (private or public), location, tax map number, land ownership, school site (yes or no), use, structure type, height in feet, date erected, date approved, reference, co-locator, co-locator use, co-locator height, co-locator date approved, co-locator reference are all field that are stored in the database. Annually, each owner must renew their conditional use permit.

Meeting Minutes

Location: Police Department
Subject: Data used by Police Department
City Personnel: Captain Richard Hurd, Lieutenant Debra George, Sergeant Blakeney
Baker Personnel: Michael Anderson
Date: 6/23/98
Time: 9 AM

Several sources of information were provided to Baker that the Police Department either uses or maintains.

- Hard Copy Police Precinct Map
• Hard Copy Incident Report
• Vision CAD
• Vision RMS

The Police Precinct Map divides the City into 6 precincts. Each precinct is further subdivided into sectors. The precincts are labeled by characters (A-F) and the sectors are labeled by numbers. The following is a breakdown of sectors per precinct:

Table with 2 columns: Precinct, # of Sectors. Rows: A (30), B (15), C (12), D (14), E (14), F (11)

The hard copy incident report stores detailed information. The information is entered into the VCIN state record system.

The Police Department currently uses the Windows NT version of Vision CAD (Computer Aided Dispatch) and a DOS version of Vision RMS (Resource Management Software). The 911 call information is downloaded in the Vision CAD system. The Vision RMS and Vision CAD modules currently do not communicate with each other. The Vision CAD software uses address ranges and landmark information (businesses, offices, etc.) for locations. The desire to have exact address locations is desirable.

Meeting Minutes

Location: Emergency Operations
Subject: Data Sources for Emergency Operations
City Personnel: Captain Jeff Messinger
Baker Personnel: Michael Anderson
Date: 6/19/98
Time: 3:30 PM

Several sources of information were provided to Baker that Emergency Operations either uses or maintains.

- Emergency Information System (EIS)
- Cameo Database
- Hazardous Materials Database

Emergency Operations is in the process of purchasing an Emergency Information System (EIS) produced by Essential Technologies, Inc. This system is compatible with ESRI's ArcView and MapInfo GIS platforms. James City County is a current user of this particular EIS.

The Cameo database is a database that is 10% complete.

The Fire Department has received a grant to collect the hazardous material locations within the City of Suffolk. The information collected through this effort can be reported in the GIS as a yes or no field for a particular location. By law, no floor plans of industrial sites can be distributed because of unique industrial processes.

Meeting Minutes

Location: Department of Public Works

Subject: Data in DPW

City Personnel: Robert Lewis, Donald Long, Sheril Davenport

Baker Personnel: Michael Anderson

Date: 6/22/98

Time: 9AM

Within the Department of Public Works (DPW), several sources of information exist.

- Hard Copy Planimetric Maps
- Hard Copy Drainage Maps
- Hard Copy Traffic Engineering Work Order
- Trash Collection Routing
- Recycling Areas Map
- ECOTRAN Work Order System
- Cemetery Database

DPW is only responsible for the 2.2 square mile downtown district for street and drainage maintenance. Therefore, existing planimetric and drainage mapping only encompasses the downtown district. VDOT maintains the remainder of the city.

Currently, the Division of Traffic Engineering has a hard copy work order form that schedules work to be completed by the meter, sign, signal, or paint shops. A priority is assigned to the each work order. In the near future, ?, an automated work order system, will be used by Traffic Engineering. The system is a product of Cartegraph Systems and a representative can be reached at (800) 688-2656 or (319) 556-8120. Three of the modules (Work Director, Sign View, and Signal View) of the system will be purchased.

A map of recycling areas was provided. It is a standard City map with the designated streets marked with a highlighter. An organization called Southeastern Public Service Authority (SPSA) pick up the recyclables.

The trash collection routes are detailed in several three-ring binders by descriptive text. The city is broken into several zones and a thematic map of these zones was displayed on the wall. Each zone contains a three-ring binder. These routes were determined about 5 years ago and may need to be revisited.

A special trash collection work order system is used by DPW. The system was developed by EcoTran. It utilizes a Microsoft Access database.

A Microsoft Access database of cemetery plots is currently being developed. The database is about 5% complete. The city has 2 cemeteries that it manages. A map of each cemetery was displayed on the wall in DPW office.

Floor plans for many of the residential and City buildings are stored in DPW. Bill Cooper maintains the filing of these floor plans.

Meeting Minutes

Location: Department of Public Utilities Engineering Division

Subject: Data in DPU

City Personnel: Sid Kitterman, Columbus Grant

Baker Personnel: Michael Anderson

Date: 6/23/98

Time: 1:30PM

The Department of Public Utilities (DPU) Engineering Division provided some data sources.

- Water and Sewer Utility Maps
- Water Model
- Asbults

The water and sewer utility maps are all 1"=400' scale mapping. Only the main line information is contained on the maps. The maps are about 70% complete.

The water model was produced by Malcolm Pirnie and has not been provided to the city yet. It utilizes a software package called Cybernet. Jim Pimblett of Malcolm Pirnie is the point of contact for detailed information about the model.

Numerous asbuilt drawings are stored in the DPU Engineering building. The format and content of the asbults vary. Some AutoCAD files could be requested from each consultant.

Meeting Minutes

Location: Department of Public Utilities Operations & Maintenance Division

Subject: Data in DPU Operations

City Personnel: William Rockwell

Baker Personnel: Michael Anderson

Date: 6/24/98

Time: 2PM

The Operation & Maintenance Division of the Department of Public Utilities (DPU) currently maintains:

- Digital Work Order System

The current, digital work order system was developed by William Rockwell. It is a stand-alone system at the Operation & Maintenance facility. The original system was a Dbase program, but has been a Microsoft Access database for the past year. The data in the original system database was not carried into Microsoft Access.

Meeting Minutes

Location: Department of Public Utilities Water Treatment Plant Operations

Subject: Data in DPU Water Plant

City Personnel: Lynda Shaw, Tom Werner

Baker Personnel: Michael Anderson

Date: 6/26/98

Time: 9PM

The Bob House water treatment plant houses some DPU data sources

- Water Quality Collection Sites Map
- Water Quality Database
- WonderWare SCADA System
- Lake Level Database
- Water Plant Piping Plans

A thematic map of the water quality collection sites was provided. There are 40 collection sites within the city. The collection sites support the water that is distributed from the Bob House water treatment plant and the 6 community well systems. Two sampling bottles are collected at each sites to test for chemical and bacteria. The results are logged into a Microsoft Access database. The Portsmouth water treatment plant, located in Suffolk, is operated separately by the City of Portsmouth.

The WonderWare SCADA system is in operation at the Bob House water treatment plant. Tank levels and various pressure and flow readings are stored and compiled in this system.

Lake levels are collected at several investigation points. These levels are logged into a Lotus database.

There are two sets of water plant piping plans. A 1980 set that was produced by HDR contains 71 sheets. Another set produced in 1989 by EDR has 44 sheets. A need to bring these two set into one was identified. For the 6 community well systems, about 15 to 20 drawings exists that detail the well houses.

Meeting Minutes

Location: Department of Economic Development

Subject: Data in Economic Development

City Personnel: Lynette Brugeman, Kristi Ritter

Baker Personnel: Michael Anderson

Date: 7/9/98

Time: 9:30AM

The Department of Economic Development houses many data sources about available business sites or buildings for sale or lease.

- Procure Database
- Hard Copy Available Site Information
- Hard Copy Available Building Information
- Perspective Aerial Photos

The ProCure software has been utilized for the past 6 months. It uses a Microsoft Access database. The database stores information about 33 potential business locations. All buildings are in the database, but not every site is contained. It is about 40% complete.

Hard copies of the available building and sites information were provided. These forms provide descriptive text about each location. Some of the sheets contain perspective aerial photos and site plans.

Meeting Minutes

Location: City of Suffolk Public schools

Subject: Data used in the Public schools

City Personnel: Lisa Tarkington

Baker Personnel: Michael Anderson

Date: 6/9/98

Time: 11:45AM

The Suffolk School System has several sources of information.

- EDULOG Bus Routing Software
- School Zone Map

The City is broken into 2 high school districts (Lakeland & Nansmond River), 3 middle schools, and 11 elementary schools. 11,000 students attend school in Suffolk. There are 130 bus routes.

The EDULOG system is built on street intersection nodes and address ranges between those nodes. The system contains some paper streets and alley in which a bus cannot travel. The school system currently uses the Dos version of EDULOG. A Windows version of the software will be on the market in the fall of 1998. The system utilizes impedances such as speed limit, street directions, hazards, etc. for the routing of school buses. Mickey Michaels with ITRE at (919) 515-9999 can answer technical questions about the software.

APPENDIX B - SOURCE EVALUATION CHARTS

Source Evaluation Chart

Source Name: Tax Maps
Project: AM/FM/GIS

Date: 6/4/98
Researcher: Michael P. Anderson

| | | | | | | | | | | | | |
|--|----------------|--|--|-----------|----------------|-----------|--------------|--|--------------------------|--|----------------------|--|
| Data Collection Responsibility: City Assessor | | | | | | | | | | | | |
| Data Maintenance Responsibility: City Assessor posts daily updates to the working set. Planning Department produces the annual record set. | | | | | | | | | | | | |
| Current Procedure to Access the Source: Paper document contained in a flat file. | | | | | | | | | | | | |
| Overall Applicability to the Project: Very high, because it is the most accessible and accurate source of parcel mapping information. | | | | | | | | | | | | |
| <p>Features/Attributes Available from the Source:</p> <table> <tr> <td>R/W line</td> <td>Property lines</td> <td>Unique Property Identification Numbers</td> <td>Hydrology</td> </tr> <tr> <td>Property hooks</td> <td>Railroads</td> <td>Street names</td> <td></td> </tr> <tr> <td>Certain Plat Information</td> <td></td> <td>Revision Information</td> <td></td> </tr> </table> | R/W line | Property lines | Unique Property Identification Numbers | Hydrology | Property hooks | Railroads | Street names | | Certain Plat Information | | Revision Information | |
| R/W line | Property lines | Unique Property Identification Numbers | Hydrology | | | | | | | | | |
| Property hooks | Railroads | Street names | | | | | | | | | | |
| Certain Plat Information | | Revision Information | | | | | | | | | | |
| Quantity of Documents: approximately 400 maps | | | | | | | | | | | | |
| Currency of the Source: Working set is the most current. | | | | | | | | | | | | |
| Accuracy of the Source: Some of the large parcels have not been surveyed so they are not very accurate. The other parcels that have been surveyed are fairly accurate. | | | | | | | | | | | | |
| Coordinate System: State Tax Department Coordinate System | | | | | | | | | | | | |
| Scale(s): 1"=100' in Downtown, 1"=200' insets, 1"=600' base | | | | | | | | | | | | |
| Any Freehand Sketching: Working set is freehand. Finalized set is ink on mylar. | | | | | | | | | | | | |
| Readability: Congested, but readable. | | | | | | | | | | | | |
| Dimensioning: No parcel dimensioning. | | | | | | | | | | | | |

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| Degree of Scrubbing Necessary to Prepare the Source: Maybe some updates to the working set. |
| Quality of Source Edge Matching: Edge matching is good between 1"=600' & 1"=100' base maps but, the insets are not edge match well. |
| Consistency of the Symbolism: Very consistent |
| Output Symbolism Changes: None |

Source Evaluation Chart

Source Name: Computer Assisted Mass Appraisal Database
(Aplus – dBase)

Date: 6/4/98

Project: AM/FM/GIS

Researcher: Michael P. Anderson

| |
|--|
| Data Collection Responsibility: City Assessor |
| Data Maintenance Responsibility: City Assessor |
| Current Procedure to Access the Source: Desktop PC access through the LAN, DOS application, will have a Windows version in 1998-1999. |
| Overall Applicability to the Project: High |
| <p>Attributes Available from the Source:</p> <p>Account Number PIN Owner Name Mailing Address Site Address Use Code Subdivision Building Attributes Zoning Building dimensions Various Appraisal Data</p> |
| Number of Records: 30,000 parcel records |
| Currency of the Source: Up-to-date |
| Accuracy of the Source: The zoning and usage information is not 100% accurate. These are fields that should be maintained by the Planning Department. |

Source Evaluation Chart

Source Name: Real Estate Master File (AS400 Mainframe)

Date: 6/4/98

Project: AM/FM/GIS

Researcher: Michael P. Anderson

| | | | | |
|--|----------------|-----------------|-----------------|--------------------|
| Data Collection Responsibility: City Assessor | | | | |
| Data Maintenance Responsibility: City Assessor | | | | |
| Current Procedure to Access the Source: Desktop PC access through the LAN, Mainframe application to distribute data to other departments. | | | | |
| Overall Applicability to the Project: High (Real Property Analysis) | | | | |
| Attributes Available from the Source: | | | | |
| Account No. | Account Status | Owner Name | Mailing Address | Property Address |
| Map | Duplex(?) | Zone | Appraisal Code | Deed Book |
| Page | Nghbrhd Code | Lot(L)/Acres(A) | Lot/Acre Amount | Legal Descriptions |
| Various Appraisal Data | | | | |
| Number of Records: 30,000 parcel records | | | | |
| Currency of the Source: Up-to-date | | | | |
| Accuracy of the Source: The zoning and usage information is not 100% accurate. These are fields that should be maintained by the Planning Department. | | | | |

Source Evaluation Chart

Source Name: Delinquent tax Database (AS400 Mainframe)

Date: 6/4/98

Project: AM/FM/GIS

Researcher: Michael P. Anderson

| |
|--|
| Data Collection Responsibility: Treasurer's Office |
| Data Maintenance Responsibility: Treasurer's Office |
| Current Procedure to Access the Source: Desktop PC access through the LAN, Mainframe application. |
| Overall Applicability to the Project: Medium |
| Attributes Available from the Source: Account Number Owners Name Address Payment History |
| Number of Records: 30,000 parcel records |
| Currency of the Source: Up-to-date |
| Accuracy of the Source: Very accurate |

Source Evaluation Chart

Source Name: Sanitary Sewer Facility Maps
Project: AM/FM/GIS

Date: 6/23/98
Researcher: Michael P. Anderson

| |
|--|
| Data Collection Responsibility: DPU Engineering |
| Data Maintenance Responsibility: DPU Engineering |
| Current Procedure to Access the Source: Paper document contained in a flat file. |
| Overall Applicability to the Project: Medium, because it is the most accessible source of sanitary sewer mapping information. |
| Features Available from the Source: Sanitary sewer main lines Some pipe size diameters Some pipe materials |
| Quantity of Documents: approximately 40 maps |
| Currency of the Source: About 3 years behind in updates. |
| Accuracy of the Source: Not very accurate (general vicinity of actual location) |
| Coordinate System: State Coordinate System |
| Scale(s): 1"=400' |
| Any Freehand Sketching: Some markings were freehand. |
| Readability: Faded and worn. |
| Dimensioning: Some offset dimensioning. |
| Degree of Scrubbing Necessary to Prepare the Source: Extensive, because source is out-of-date. |

| |
|--|
| Quality of Source Edge Matching: Questionable |
| Consistency of the Symbolism: Questionable |
| Output Symbolism Changes: Necessary |

Source Evaluation Chart

Source Name: Water Facility Maps
Project: AM/FM/GIS

Date: 6/23/98
Researcher: Michael P. Anderson

| |
|--|
| Data Collection Responsibility: DPU Engineering |
| Data Maintenance Responsibility: DPU Engineering |
| Current Procedure to Access the Source: Paper document contained in a flat file. |
| Overall Applicability to the Project: Medium, because it is the most accessible source of water facility mapping information. |
| Features Available from the Source: Water main lines Some pipe size diameters Some pipe materials Hydrants Main line valves |
| Quantity of Documents: approximately 40 maps |
| Currency of the Source: About 3 years behind in updates. |
| Accuracy of the Source: Not very accurate (general vicinity of actual location) |
| Coordinate System: State Coordinate System |
| Scale(s): 1"=400' |
| Any Freehand Sketching: Some markings were freehand. |
| Readability: Faded and worn. |
| Dimensioning: Some offset dimensioning. |
| Degree of Scrubbing Necessary to Prepare the Source: Extensive, because source is out-of-date. |

| |
|--|
| Quality of Source Edge Matching: Questionable |
| Consistency of the Symbolism: Questionable |
| Output Symbolism Changes: Necessary |

Source Evaluation Chart

Source Name: Utilities Record Drawings
Project: AM/FM/GIS

Date: 6/23/98
Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: DPU Engineering |
| Data Maintenance Responsibility: DPU Engineering |
| Current Procedure to Access the Source: Paper document contained in a flat file. |
| Overall Applicability to the Project: High, because it contains new construction information for the past 3 years. |
| Features Available from the Source: Sewer and water utilities |
| Quantity of Documents: approximately 200 maps |
| Currency of the Source: Most current information. |
| Accuracy of the Source: Survey accuracy |
| Coordinate System: State Coordinate System |
| Scale(s): varies |
| Any Freehand Sketching: None |
| Readability: Congested, but readable. |
| Dimensioning: Some offset dimensioning. |
| Degree of Scrubbing Necessary to Prepare the Source: Some because it is congested. |

Quality of Source Edge Matching: Good within a project, but not between multiple projects.

Consistency of the Symbolism: Varies between contractors and consultants

Output Symbolism Changes: Standardization needed.

Source Evaluation Chart

Source Name: Treatment Plant Piping Drawings
Project: AM/FM/GIS

Date: 6/26/98
Researcher: Michael P. Anderson

| |
|--|
| Data Collection Responsibility: DPU Treatment Plant |
| Data Maintenance Responsibility: DPU Treatment Plant |
| Current Procedure to Access the Source: Paper document. |
| Overall Applicability to the Project: Low, because it is only for Treatment Plant maintenance. |
| Features Available from the Source: Water lines Some pipe size diameters Some pipe materials |
| Quantity of Documents: 2 sets from 2 different consultants. |
| Currency of the Source: Has not changed. |
| Accuracy of the Source: Somewhat accurate |
| Coordinate System: None, in reference to the treatment plant building. |
| Scale(s): Varies. |
| Any Freehand Sketching: None. |
| Readability: Worn in some locations. |
| Dimensioning: Yes. |
| Degree of Scrubbing Necessary to Prepare the Source: None |

Quality of Source Edge Matching: Good

Consistency of the Symbolism: Varied between the 2 consultants.

Output Symbolism Changes: Standardization needed and the two set of drawings together to make one set.

Source Evaluation Chart

Source Name: Water Sampling Collection Point Map
Project: AM/FM/GIS

Date: 6/26/98
Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: DPU Water Treatment Plant |
| Data Maintenance Responsibility: DPU Water Treatment Plant |
| Current Procedure to Access the Source: Paper document drawn using CADD. |
| Overall Applicability to the Project: Medium, because it is the only source of the water sampling collection points. |
| Features Available from the Source: Water Sampling Collection Points |
| Quantity of Documents: 1 map |
| Currency of the Source: Good. |
| Accuracy of the Source: Not very accurate (general vicinity of actual location) |
| Coordinate System: State Coordinate System |
| Scale(s): City map |
| Any Freehand Sketching: None |
| Readability: Good. |
| Dimensioning: None |
| Degree of Scrubbing Necessary to Prepare the Source: None |

| |
|---|
| Quality of Source Edge Matching: None, only 1 map. |
| Consistency of the Symbolism: Good |
| Output Symbolism Changes: None |

Source Evaluation Chart

Source Name: DPU Work Order Database (Access)

Date: 6/24/98

Project: AM/FM/GIS

Researcher: Michael P. Anderson

| | | | | | | |
|--|--------------------------------------|----------------------|----------------------|-----------------------------|----------------|--|
| Data Collection Responsibility: DPU Operations and Maintenance | | | | | | |
| Data Maintenance Responsibility: DPU Operations and Maintenance | | | | | | |
| Current Procedure to Access the Source: Stand alone Desktop PC in the Operations and Maintenance facility (not networked). | | | | | | |
| Overall Applicability to the Project: Medium, only source of historic maintenance records for DPU. | | | | | | |
| <p>Attributes Available from the Source:</p> <table> <tr> <td>Unique Work Order Number – key field</td> <td>Data_in</td> <td>Address Intersection</td> </tr> <tr> <td>Work Performed (Codes) Crew</td> <td>Date_completed</td> <td></td> </tr> </table> | Unique Work Order Number – key field | Data_in | Address Intersection | Work Performed (Codes) Crew | Date_completed | |
| Unique Work Order Number – key field | Data_in | Address Intersection | | | | |
| Work Performed (Codes) Crew | Date_completed | | | | | |
| Number of Records: About 20 different fields, 3300+ records. Has been populating for about the past year in Microsoft Access. | | | | | | |
| Currency of the Source: Up-to-date in Microsoft Access. A previous dBase work order database was used, but was not migrated into Microsoft Access. | | | | | | |
| Accuracy of the Source: Most reliable source of information. | | | | | | |

Source Evaluation Chart

Source Name: Sanitary Sewer Master Plan Condition
Assessment Database

Date: 8/10/98

Project: AM/FM/GIS

Researcher: Michael P. Anderson

| | | | | | | | | |
|--|-------------------------|---------------------------------|-----------------|---------------|---------------------------|----------------|---------------------------------|--|
| Data Collection Responsibility: DPU Engineering (URS developed) | | | | | | | | |
| Data Maintenance Responsibility: DPU Engineering | | | | | | | | |
| Current Procedure to Access the Source: QuattroPro database of condition assessment. The data has not been delivered to the City yet. | | | | | | | | |
| Overall Applicability to the Project: High, because manhole inspection information for all manholes for Rt. 17 corridor. | | | | | | | | |
| Attributes Available from the Source: <table border="0"> <tr> <td>Unique structure number</td> <td>Manhole diameter</td> <td>Inspection date</td> <td>Manhole Depth</td> </tr> <tr> <td>GPS x, y, & z coordinates</td> <td>Digital images</td> <td colspan="2">Condition assessment attributes</td> </tr> </table> | Unique structure number | Manhole diameter | Inspection date | Manhole Depth | GPS x, y, & z coordinates | Digital images | Condition assessment attributes | |
| Unique structure number | Manhole diameter | Inspection date | Manhole Depth | | | | | |
| GPS x, y, & z coordinates | Digital images | Condition assessment attributes | | | | | | |
| Number of Records: About 350 structures | | | | | | | | |
| Currency of the Source: Up-to-date as of early 1998. | | | | | | | | |
| Accuracy of the Source: Very accurate, field collection of information. | | | | | | | | |

Source Evaluation Chart

Source Name: Sanitary Sewer Master Plan Base Mapping
Project: AM/FM/GIS

Date: 8/10/98
Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: DPU Engineering (URS collected) |
| Data Maintenance Responsibility: DPU Engineering |
| Current Procedure to Access the Source: AutoCAD data that has not been delivered to the City yet. |
| Overall Applicability to the Project: High, because it is stereo compiled digital mapping for the Rt. 17 corridor. |
| Features Available from the Source: 2' contours buildings pavement edges bridges hydrography etc. |
| Quantity of Documents: 40 AutoCAD files |
| Currency of the Source: Up-to-date as of early 1998. |
| Accuracy of the Source: Very accurate because it was stereo-compiled from aerial photography. |
| Coordinate System: State Plane Coordinate System |
| Scale(s): 1"=100' |
| Any Freehand Sketching: None |
| Readability: Good. |
| Dimensioning: None |
| Degree of Scrubbing Necessary to Prepare the Source: None |

Quality of Source Edge Matching: Very good

Consistency of the Symbolism: Good

Output Symbolism Changes: None, they followed USGS base map layering structure.

Source Evaluation Chart

Source Name: DPU Customer Service Database

Date: 6/23/98

Project: AM/FM/GIS

Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: DPU |
| Data Maintenance Responsibility: DPU Customer Service |
| Current Procedure to Access the Source: Access from the Mainframe. |
| Overall Applicability to the Project: Medium |
| Attributes Available from the Source: Account Number Owner Name Mailing Address Site Address Water consumption data Census tract |
| Number of Records: Approximately 10,000 customer accounts |
| Currency of the Source: Up-to-date |
| Accuracy of the Source: Moderate |

Source Evaluation Chart

Source Name: DPU Water Treatment Plant Databases
Project: AM/FM/GIS

Date: 6/26/98
Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: DPU Water Treatment Plant |
| Data Maintenance Responsibility: DPU Water Treatment Plant |
| Current Procedure to Access the Source: Stand-alone system at the Treatment Plant (not networked). |
| Overall Applicability to the Project: Medium |
| Attributes Available from the Source: Daily lake levels Treatment Plant Operational Statistics Water Quality Sampling Results |
| Number of Records: Not exactly known. |
| Currency of the Source: Updated daily |
| Accuracy of the Source: Very accurate |

Source Evaluation Chart

Source Name: DPW Planimetric Maps
Project: AM/FM/GIS

Date: 6/22/98
Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: DPW Engineering |
| Data Maintenance Responsibility: DPW Engineering |
| Current Procedure to Access the Source: Mylars stored in a flat file |
| Overall Applicability to the Project: High applicability, but Low value. The planimetric mapping is maintained for the 2.2 square mile downtown area only. |
| Features Available from the Source: Contours (2-foot) Buildings Pavement Edges Bridges Hydrography etc. |
| Quantity of Documents: 15-20 sheets |
| Currency of the Source: Not updates since the 1980's. |
| Accuracy of the Source: Moderate. |
| Coordinate System: VA State Plane Coordinate System |
| Scale(s): 1"=100' |
| Any Freehand Sketching: None |
| Readability: Very little. |
| Dimensioning: None |
| Degree of Scrubbing Necessary to Prepare the Source: None |

| |
|---|
| Quality of Source Edge Matching: Good. |
| Consistency of the Symbolism: Good |
| Output Symbolism Changes: None |

Source Evaluation Chart

Source Name: DPW Drainage Map
Project: AM/FM/GIS

Date: 6/22/98
Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: DPW Engineering |
| Data Maintenance Responsibility: DPW Engineering |
| Current Procedure to Access the Source: Mylar in a flat file |
| Overall Applicability to the Project: High applicability, but Low value. The planimetric mapping is maintained for the 2.2 square mile downtown area only. |
| Features Available from the Source: Drainage Pipes Culverts Drainage Ditches Catch Basins Drop Inlets etc. |
| Quantity of Documents: 15-20 sheets. |
| Currency of the Source: Not updated. |
| Accuracy of the Source: Low. |
| Coordinate System: VA State Plane Coordinate System |
| Scale(s): 1"=100' |
| Any Freehand Sketching: None |
| Readability: Low. |
| Dimensioning: None |
| Degree of Scrubbing Necessary to Prepare the Source: Extensive |

| |
|--|
| Quality of Source Edge Matching: Good |
| Consistency of the Symbolism: Good |
| Output Symbolism Changes: None. |

Source Evaluation Chart

Source Name: Cemetery map
Project: AM/FM/GIS

Date: 6/22/98
Researcher: Michael P. Anderson

| |
|--|
| Data Collection Responsibility: DPW |
| Data Maintenance Responsibility: DPW |
| Current Procedure to Access the Source: Paper map |
| Overall Applicability to the Project: Low |
| Features Available from the Source: Cemetery plots Plot number Cemetery boundary |
| Quantity of Documents: 2 |
| Currency of the Source: Very old map |
| Accuracy of the Source: Low |
| Coordinate System: None |
| Scale(s): None |
| Any Freehand Sketching: None |
| Readability: Good. |
| Dimensioning: None |
| Degree of Scrubbing Necessary to Prepare the Source: Some |

| |
|--|
| Quality of Source Edge Matching: Not applicable |
| Consistency of the Symbolism: Good |
| Output Symbolism Changes: None. |

Source Evaluation Chart

Source Name: DPW Cemetery Plot Index Cards and Database

Date: 6/22/98

Project: AM/FM/GIS

Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: DPW |
| Data Maintenance Responsibility: DPW |
| Current Procedure to Access the Source: The index cards are in a filing cabinet and the database is in Microsoft Access. |
| Overall Applicability to the Project: Low |
| Attributes Available from the Source: Owner Funeral Home Plot Number Section Cemetery Name Birth Date Death Date Burial Date |
| Number of Records: Not exactly known. |
| Currency of the Source: Cards are current and the database is 5% complete. |
| Accuracy of the Source: Accurate |

Source Evaluation Chart

Source Name: DPW Special Trash Collection Work Order System

Date: 6/22/98

Project: AM/FM/GIS

Researcher: Michael P. Anderson

| | | | |
|--|----------------------|-----------------------|------------------|
| Data Collection Responsibility: DPW Customer Service and Operations | | | |
| Data Maintenance Responsibility: DPW Customer Service and Operations | | | |
| Current Procedure to Access the Source: Networked System between the Customer Service and Operations locations. | | | |
| Overall Applicability to the Project: Low | | | |
| Attributes Available from the Source: | | | |
| Date | Last Name of Citizen | First Name of Citizen | Telephone Number |
| Trash Description | Special Instructions | | |
| Number of Records: Not exactly known. | | | |
| Currency of the Source: Updated daily | | | |
| Accuracy of the Source: Accurate | | | |

Source Evaluation Chart

Source Name: DPW Shop Work Orders
Project: AM/FM/GIS

Date: 6/22/98
Researcher: Michael P. Anderson

| | | |
|--|----------------------|------------------------|
| Data Collection Responsibility: DPW Operations | | |
| Data Maintenance Responsibility: DPW Operations | | |
| Current Procedure to Access the Source: Paper form. | | |
| Overall Applicability to the Project: Low | | |
| Attributes Available from the Source: | | |
| Shop to perform work | Priority of the work | Date of Work Order |
| Traffic Order Number | Location | Type of Work Performed |
| A diagram if necessary | Start time | Time Completed |
| Time Used | Work Completed by | Date Completed |
| Any Overtime? | | |
| Number of Records: Not exactly known. | | |
| Currency of the Source: Updated daily | | |
| Accuracy of the Source: Accurate | | |

Source Evaluation Chart

Source Name: DPW Trash Collection Routing
Project: AM/FM/GIS

Date: 6/22/98
Researcher: Michael P. Anderson

| |
|--|
| Data Collection Responsibility: DPW Operations |
| Data Maintenance Responsibility: DPW Operations |
| Current Procedure to Access the Source: Route book in each of the collection trucks. |
| Overall Applicability to the Project: Low |
| Attributes Available from the Source: Sequenced directions Route Number Collection Stops |
| Number of Records: Not exactly known. |
| Currency of the Source: Has not been updated since it was originally determined. |
| Accuracy of the Source: The drivers may have found some shortcuts, etc. |

Source Evaluation Chart

Source Name: Zoning Maps
Project: AM/FM/GIS

Date: 6/19/98
Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: Department of Planning |
| Data Maintenance Responsibility: Department of Planning |
| Current Procedure to Access the Source: Zoning Map book on front desk. |
| Overall Applicability to the Project: Medium |
| <p>Features Available from the Source:</p> <p>Zoning boundaries and designations Special Permit Records Zoning Variances Subdivision Variance</p> |
| Quantity of Documents: approximately 400 maps |
| Currency of the Source: Updated annually. |
| Accuracy of the Source: Good |
| Coordinate System: State Tax Department Coordinate System |
| Scale(s): 1"=100' in Downtown, 1"=200' insets, 1"=600' base |
| Any Freehand Sketching: Yes |
| Readability: Good. |
| Dimensioning: None |
| Degree of Scrubbing Necessary to Prepare the Source: Some |

| |
|--|
| Quality of Source Edge Matching: Good |
| Consistency of the Symbolism: Good |
| Output Symbolism Changes: None. |

Source Evaluation Chart

Source Name: Chesapeake Bay Preservation Area (CBPA)
Maps

Date: 6/19/98

Project: AM/FM/GIS

Researcher: Michael P. Anderson

| |
|--|
| Data Collection Responsibility: State Department of Conservation |
| Data Maintenance Responsibility: State Department of Conservation |
| Current Procedure to Access the Source: Department of Planning has an old copy in a drawer at their front desk. |
| Overall Applicability to the Project: Low |
| Features Available from the Source: CBPA boundaries and designations Base mapping information |
| Quantity of Documents: approximately 15 maps |
| Currency of the Source: Appeared to be old (no date on document). |
| Accuracy of the Source: +- 40 feet |
| Coordinate System: State Coordinate System |
| Scale(s): 1"=2400' |
| Any Freehand Sketching: No |
| Readability: Good. |
| Dimensioning: None |
| Degree of Scrubbing Necessary to Prepare the Source: None |

| |
|--|
| Quality of Source Edge Matching: Good |
| Consistency of the Symbolism: Good |
| Output Symbolism Changes: None. |

Source Evaluation Chart

Source Name: Conditional Use Permit (CUP) Database
Project: AM/FM/GIS

Date: 6/19/98
Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: Department of Planning |
| Data Maintenance Responsibility: Department of Planning |
| Current Procedure to Access the Source: Spreadsheet is accessible on a computer in the Planning Department. |
| Overall Applicability to the Project: Low |
| Attributes Available from the Source: Date of Issuance Unique CUP Number Conditional Use Description Tax Map & Lot Number Location |
| Number of Records: Approximately 500 records. |
| Currency of the Source: Information is update upon issuance of the conditional use permit. |
| Accuracy of the Source: Very |

Source Evaluation Chart

Source Name: Street List Database
Project: AM/FM/GIS

Date: 6/19/98
Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: Department of Planning |
| Data Maintenance Responsibility: Department of Planning |
| Current Procedure to Access the Source: Spreadsheet is accessible on a computer in the Planning Department. |
| Overall Applicability to the Project: Low |
| Attributes Available from the Source: Street Name Route Number or Subdivision Location Tax Map Location Type (private, public, proposed, or paper) |
| Number of Records: Approximately 1375 records. |
| Currency of the Source: Information is update upon opening or closing of a street. |
| Accuracy of the Source: Very |

Source Evaluation Chart

Source Name: Minor Subdivision Database

Date: 6/19/98

Project: AM/FM/GIS

Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: Department of Planning |
| Data Maintenance Responsibility: Department of Planning |
| Current Procedure to Access the Source: Spreadsheet is accessible on a computer in the Planning Department. |
| Overall Applicability to the Project: Low |
| Attributes Available from the Source: Subdivision Name Borough Tax Map Location Census Tract |
| Number of Records: Approximately 175 records. |
| Currency of the Source: Information is update when a new subdivision is developed. |
| Accuracy of the Source: Very |

Source Evaluation Chart

Source Name: Family Transfer Database
Project: AM/FM/GIS

Date: 6/19/98
Researcher: Michael P. Anderson

| |
|--|
| Data Collection Responsibility: Department of Planning |
| Data Maintenance Responsibility: Department of Planning |
| Current Procedure to Access the Source: Database is accessible on a computer in the Planning Department. |
| Overall Applicability to the Project: Low |
| Attributes Available from the Source: Date of Transfer Owner Tax Map & Lot Number Location Number of Lots |
| Number of Records: Approximately 500 records. |
| Currency of the Source: Information is update upon issuance of transfer. |
| Accuracy of the Source: Very |

Source Evaluation Chart

Source Name: Communication Tower Database
Project: AM/FM/GIS

Date: 6/19/98
Researcher: Michael P. Anderson

| | | | | | | | | | | | | | | | | | | |
|---|-----------------------------|--------------------------------|--------------------------------|---|----------------------|----------|----------------|-------------------------|-----------------|----------------|----------------|------------------|---------------|------------|----------------|-------------------|--------------------------|----------------------|
| Data Collection Responsibility: Department of Planning | | | | | | | | | | | | | | | | | | |
| Data Maintenance Responsibility: Department of Planning | | | | | | | | | | | | | | | | | | |
| Current Procedure to Access the Source: Spreadsheet is accessible on a computer in the Planning Department. | | | | | | | | | | | | | | | | | | |
| Overall Applicability to the Project: Low | | | | | | | | | | | | | | | | | | |
| <p>Attributes Available from the Source:</p> <table> <tr> <td>Tower Identification Number</td> <td>Owner</td> <td>Owner Type (private or public)</td> </tr> <tr> <td>Location (Street Address or Intersection)</td> <td>Tax Map & Lot Number</td> <td>Location</td> </tr> <tr> <td>Land Ownership</td> <td>School Site (yes or no)</td> <td>Use Description</td> </tr> <tr> <td>Structure Type</td> <td>Height in Feet</td> <td>Date Constructed</td> </tr> <tr> <td>Date Approved</td> <td>Co-locator</td> <td>Co-locator Use</td> </tr> <tr> <td>Co-locator Height</td> <td>Co-locator Date Approved</td> <td>Co-locator Reference</td> </tr> </table> | Tower Identification Number | Owner | Owner Type (private or public) | Location (Street Address or Intersection) | Tax Map & Lot Number | Location | Land Ownership | School Site (yes or no) | Use Description | Structure Type | Height in Feet | Date Constructed | Date Approved | Co-locator | Co-locator Use | Co-locator Height | Co-locator Date Approved | Co-locator Reference |
| Tower Identification Number | Owner | Owner Type (private or public) | | | | | | | | | | | | | | | | |
| Location (Street Address or Intersection) | Tax Map & Lot Number | Location | | | | | | | | | | | | | | | | |
| Land Ownership | School Site (yes or no) | Use Description | | | | | | | | | | | | | | | | |
| Structure Type | Height in Feet | Date Constructed | | | | | | | | | | | | | | | | |
| Date Approved | Co-locator | Co-locator Use | | | | | | | | | | | | | | | | |
| Co-locator Height | Co-locator Date Approved | Co-locator Reference | | | | | | | | | | | | | | | | |
| Number of Records: Approximately 45 records. | | | | | | | | | | | | | | | | | | |
| Currency of the Source: Information is updated upon issuance of the conditional use permit for the tower. | | | | | | | | | | | | | | | | | | |
| Accuracy of the Source: Very | | | | | | | | | | | | | | | | | | |

Source Evaluation Chart

Source Name: ProCure Database
Project: AM/FM/GIS

Date: 7/9/98
Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: Department of Economic Development |
| Data Maintenance Responsibility: Department of Economic Development |
| Current Procedure to Access the Source: Database is accessible on a computer in the Department of Economic Development. |
| Overall Applicability to the Project: Low |
| <p>Attributes Available from the Source:</p> <p>Property Name Tax Code Agent Region Tax District Location Zoning Address Flood Plain Acreage Owner Owner Address Owner Telephone Sale Price Building Specifications Transportation Specifications (Rail, Roads, Waterways) Utilities Availability (Electric, Gas, Water, Sewer, Telephone)</p> |
| Number of Records: Approximately 50 records. |
| Currency of the Source: Information is updated daily and about 40% of available sites are in the database. |
| Accuracy of the Source: Good |

Source Evaluation Chart

Source Name: NDS Subdivision Plats
Project: AM/FM/GIS

Date: 6/4/98
Researcher: Michael P. Anderson

| | | | | |
|--|--------------|------------|-----------|--------------|
| Data Collection Responsibility: Planning Department | | | | |
| Data Maintenance Responsibility: Provided by Planning specifically for NDS. | | | | |
| Current Procedure to Access the Source: Paper maps of subdivision plats. | | | | |
| Overall Applicability to the Project: Absolutely necessary. | | | | |
| Features/Attributes Available from the Source: <table border="0"> <tr> <td>Plats</td> <td>Lot Number</td> </tr> <tr> <td>Addresses</td> <td>Subdivisions</td> </tr> </table> | Plats | Lot Number | Addresses | Subdivisions |
| Plats | Lot Number | | | |
| Addresses | Subdivisions | | | |
| Quantity of Documents: over 500 | | | | |
| Currency of the Source: current within a couple of weeks | | | | |
| Accuracy of the Source: Very Accurate | | | | |
| Scale(s): vary between 1"=20' to 1"=100' | | | | |
| Any Freehand Sketching: Yes. Few hand written notes (i.e. lot notes, numbering) | | | | |
| Readability: Good. | | | | |
| Dimensioning: Yes but inconsistent parcel dimensions. | | | | |
| Quality of Source Edge Matching: Edge matching is good but there are no standards between subdivisions. | | | | |
| Consistency of the Symbolism: None | | | | |
| Output Symbolism Changes: None | | | | |

Source Evaluation Chart

Source Name: NDS Zoning Maps
Project: AM/FM/GIS

Date: 6/4/98
Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: Neighborhood Development Services (overlay to the Tax Assessors Map) |
| Data Maintenance Responsibility: NDS. |
| Current Procedure to Access the Source: Paper and mylar maps. |
| Overall Applicability to the Project: Very High. |
| Features/Attributes Available from the Source: Zoning Boundaries Subdivision Variances Zoning Variances |
| Quantity of Documents: over 125 |
| Currency of the Source: Updated as needed (generally updated once per month) |
| Accuracy of the Source: Good |
| Scale(s): vary between 1"=200' (Downtown areas) and 1"=600' (standard) |
| Any Freehand Sketching: Yes there is a lot of freehand sketching |
| Readability: Better than average |
| Dimensioning: No |
| Quality of Source Edge Matching: Edge matching is no very good. |
| Consistency of the Symbolism: Symbolism that describes zoning maps is hand drawn and not properly cross referenced |

Source Evaluation Chart

Source Name: NDS Rental Database
Project: AM/FM/GIS

Date: 6/4/98
Researcher: Michael P. Anderson

| | | | | | | | | | | |
|---|-------------------------|-----------------|--------------------------|----------------|-------------|-------------------------|-----------------------------|--------------------|-----------------|--|
| Data Collection Responsibility: Neighborhood Development Services | | | | | | | | | | |
| Data Maintenance Responsibility: Neighborhood Development Services | | | | | | | | | | |
| Current Procedure to Access the Source: hardcopy database | | | | | | | | | | |
| Overall Applicability to the Project: Very High. This database is utilized by City Council. | | | | | | | | | | |
| <p>Features/Attributes Available from the Source:</p> <table> <tr> <td>Legal Descriptions</td> <td>Account Numbers</td> </tr> <tr> <td>Rental Occupancy Program</td> <td>Appraisal Data</td> </tr> <tr> <td>Owners Name</td> <td>Inspections information</td> </tr> <tr> <td>Location of rental property</td> <td>Zoning information</td> </tr> <tr> <td>Lot information</td> <td></td> </tr> </table> | Legal Descriptions | Account Numbers | Rental Occupancy Program | Appraisal Data | Owners Name | Inspections information | Location of rental property | Zoning information | Lot information | |
| Legal Descriptions | Account Numbers | | | | | | | | | |
| Rental Occupancy Program | Appraisal Data | | | | | | | | | |
| Owners Name | Inspections information | | | | | | | | | |
| Location of rental property | Zoning information | | | | | | | | | |
| Lot information | | | | | | | | | | |
| Quantity of Documents: 1 year of digital records with all else in paper form. | | | | | | | | | | |
| Currency of the Source: very current | | | | | | | | | | |
| Accuracy of the Source: very accurate | | | | | | | | | | |
| Quality of Source Edge Matching: Edge matching is no very good. | | | | | | | | | | |

Source Evaluation Chart

Source Name: NDS Subdivision Maps
Project: AM/FM/GIS

Date: 6/4/98
Researcher: Michael P. Anderson

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| Data Collection Responsibility: The Planning Department is responsible for archiving these maps. |
| Data Maintenance Responsibility: Neighborhood Development Services |
| Current Procedure to Access the Source: Hand drawn maps |
| Overall Applicability to the Project: Very High. |
| Features/Attributes Available from the Source: Subdivision Plans Subdivision Name Borough Name |
| Quantity of Documents: approximately 300 - 400 |
| Currency of the Source: Very current |
| Accuracy of the Source: 95% accurate |
| Scale(s): vary between 1"=20' to 1"=50' (engineering) |
| Any Freehand Sketching: None. |
| Dimensioning: Limited dimensions on drawings. |
| Quality of Source Edge Matching: Dependent upon the contractor. |
| Consistency of the Symbolism: No standards. |

Source Evaluation Chart

Source Name: Permit Applications

Date: 6/4/98

Project: AM/FM/GIS

Researcher: Michael P. Anderson

| |
|---|
| Data Collection Responsibility: Neighborhood Development Services |
| Data Maintenance Responsibility: Neighborhood Development Services |
| Current Procedure to Access the Source: Paper applications. |
| Overall Applicability to the Project: Very high. |
| Features/Attributes Available from the Source: Ownership information Date of issuance Tap map ID Tax location Account Number Parcel Number Zoning Information |
| Quantity of Documents: over 7000 applications |
| Currency of the Source: Very current |
| Accuracy of the Source: Very Accurate |
| Readability: Good. |

Source Evaluation Chart

Source Name: NDS Building Plans
Project: AM/FM/GIS

Date: 6/4/98
Researcher: Michael P. Anderson

| | | | | | | | | |
|---|------------------------|---------------------|--------------------------|------------------------|-------------|-----------------------|----------------------|------------------------|
| Data Collection Responsibility: NDS and Planning Department | | | | | | | | |
| Data Maintenance Responsibility: NDS | | | | | | | | |
| Current Procedure to Access the Source: Hard copy paper maps | | | | | | | | |
| Overall Applicability to the Project: Very High | | | | | | | | |
| <p>Features/Attributes Available from the Source:</p> <table> <tr> <td>Permit Number</td> <td>Building Footprints</td> </tr> <tr> <td>Architecture Information</td> <td>Mechanical Information</td> </tr> <tr> <td>Floor plans</td> <td>Elevation Information</td> </tr> <tr> <td>Plumbing Information</td> <td>Electrical Information</td> </tr> </table> | Permit Number | Building Footprints | Architecture Information | Mechanical Information | Floor plans | Elevation Information | Plumbing Information | Electrical Information |
| Permit Number | Building Footprints | | | | | | | |
| Architecture Information | Mechanical Information | | | | | | | |
| Floor plans | Elevation Information | | | | | | | |
| Plumbing Information | Electrical Information | | | | | | | |
| Quantity of Documents: over 7000 | | | | | | | | |
| Currency of the Source: Very current | | | | | | | | |
| Accuracy of the Source: Very Accurate, but contractors have options. | | | | | | | | |
| Scale(s): 24 x 36 blue line | | | | | | | | |
| Any Freehand Sketching: Occasionally | | | | | | | | |
| Readability: Very Good. | | | | | | | | |
| Dimensioning: Yes on the building plans | | | | | | | | |
| Consistency of the Symbolism: vary by architect. | | | | | | | | |

APPENDIX C - SOURCE INFORMATION MATRICES