

R. Bradley Tombs
319 Laurel Court
Pt. Pleasant Beach, NJ 08742
732-892-5159

March 2, 2005

Ms. Laura L.S. Kimberly, PCII Program Manager
PCII Program Office
Department of Homeland Security
245 Murray Lane, SW, Building 410
Washington, DC 20528-0001

Re: Robert Bradley Tombs v. Brick Township Municipal Utilities Authority
New Jersey Docket Number: GRC06786-04S
PCII Tracking Number: 041124-000484
Homeland Security Issues and FOIA request

Dear Ms. Kimberly,

I am in receipt of your February 24, 2005 correspondence concerning the above reference matter wherein you state, "*Absent specific information indicating that the certifications are not true, they are presumed to have been made in good faith.*" The rule does not prohibit a citizen from commenting or seeking a redress of grievances regarding a submission seeking CII Act protection. Also, one would presume that if such a submission was knowingly deceptive or used to conceal records customarily in the public domain, the DHS would welcome any supporting facts or prima facie evidence. Please consider the following:

1. Information subject to public disclosure pursuant to State Public Record Acts, including New Jersey's OPRA law that predates CII Act (February 20, 2004) represents information "customarily in the public domain" according to the PCII Program Office.
2. One can hardly dispute that information made available in paper format constitutes information "customarily in the public domain." A request for map information was made on April 18, 2003, predating CIIA jurisdiction. The attached BTMUA's May 9, 2003 response confirms that the "information" was offered in paper format. Again, in response to my complaint filed with the New Jersey Government Records Council [the agency responsible for overseeing OPRA complaints], the BTMUA Executive Director Kevin F. Donald wrote, "Any and all paper (hard) copies of information are available at any time." This was accompanied by Mr. Donald's November 13, 2003 signature below the GRC's required affirmation [penalty for any deliberate misstatements of fact]. Among the several knowing misstatements made by Mr. Donald, the claim of "proprietary in that the factual information cannot be separated from the GIS program that coordinates the information" should be easily verified by independent federal employees who commonly use GIS programs, such as the USGS staff. GIS, or geospatial datasets are separate and can be accessed independently by more than one GIS software user, and easily copied. This is one example of a consistent pattern of deception by Mr. Donald and his attorney.
3. This same information that was customarily in the public domain since 1993 when originally acquired by the BTMUA, is now concealed from the public because the BTMUA's submission is "presumed to be in good faith." The BTMUA has sold this information type to other entities. Attached is a signed agreement between the BTMUA and Borough of Point Pleasant Beach dated April 4, 1995 detailing one example of the contents of the information type BTMUA ~~know~~ seeks to shroud from the public, referred to as "base maps in DWG (AutoCAD) format." I have received topographic base map information from Point Pleasant Beach and have received this type of information from other public sources. One can hardly dispute that topographic base map information is a "type of information customarily in the public domain," and customarily required

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on State and Federal Agency applications including public infrastructure developments. BTMUA has used this information type, and the actual information, on State permit applications. This is the same information type that is "bundled" with other information types, many or all of which are information types customarily in the public domain that is now concealed from the public in violation of the CII Act and our civil liberties.

4. Attached is a copy of an affidavit from Kevin Donald, BTMUA Executive Director specifying the information types submitted seeking CII Act protection, including information types "customarily in the public domain" as noted above. The "Requirements for Protection" mandates a certification that "the information is not of a type customarily in the public domain." It is hard to believe that such a certification was made. In fact, in the BTMUA attorney's December 14, 2004 correspondence Ms. Diana Anderson claimed, "BTMUA does not now, and never has, claimed that *all* of the information ... will be protected by the DHS," **and in the same paragraph** stated "it is not any single piece of information that is potentially subject to 'protection' but rather the entirety of the database, and the format of the database." Ms. Anderson even acknowledges that information customarily in the public domain were submitted to the DHS by stating, "Although portions of the information contained in the database may be available from various sources and may therefore be in the public domain," and somehow claims that "the totality of the information is ... not in the public domain." Even the most naïve reviewer should conclude that these claims reek of "bad faith." This is just another example of a myriad of deception perpetrated by BTMUA and their attorney. I would be more than happy to detail other deception by the BTMUA and their attorney if necessary.

I trust that you now have specific information indicating that the required certifications were either not submitted or are not true, and thus there can no longer be a presumption of good faith. Can you please confirm whether a submitter who is non-responsive or knowingly deceptive to "affirming their understanding ..." would no longer carry the presumption of good faith? According to the Programs letter, *the rule requires submitters to make a number of certifications, including affirming their understanding that any false representations on their submission may constitute a violation of 18 U.S.C. 1001 and be punishable by fine and imprisonment.* Prosecuting these corrupt individuals is necessary for this standard to have any meaning.

I can only hope that the PCII Program Office is not so naïve to believe that DHS submissions are immune from corrupt government individuals and their attorneys. I am available to provide additional information and discuss this matter with the Program. The PCII Program Office's requirement to processing this submission "as soon as practicable" is much appreciated as the judge has stayed my State case pending a DHS determination. Thank you for your attention to this matter.

Sincerely,



Brad Tombs



Homeland Security

February 24, 2005

Mr. R. Bradley Tombs
319 Laurel Court
Pt. Pleasant Beach, NJ 08742

Dear Mr. Tombs:

This letter responds in part to your request for information under the Freedom of Information Act (FOIA) and your complaint about the possible misuse of the Critical Infrastructure Information (CII) Act of 2002. Your FOIA request has been forwarded to the Information Analysis and Infrastructure Protection Directorate Disclosure Office. That Office will respond directly to you under separate cover. The remainder of this letter addresses your complaint regarding the misuse of the CII Act.

Your complaint states that officials of Brick Township Municipal Utilities Authority made a fraudulent submission to the Department of Homeland Security (DHS) as a means of preventing release of CII under New Jersey State law. Because the CII Act prohibits the disclosure of both information submitted under the CII Act and the identity of submitters, we cannot discuss a submitter's identity or the content of a submission. However, we can discuss the process for ensuring that critical infrastructure information which becomes PCII meets the requirements of the CII Act and its implementing rule, 6 Code of Federal Regulations Part 29.

To ensure that information submitted to DHS under the CII Act qualifies for protection, the implementing rule has established a validation process that includes a determination of whether the information submitted meets the definition of Critical Infrastructure Information. In addition, because some of the information required to validate a submission can only be obtained from the submitter, the rule requires submitters to make a number of certifications, including affirming their understanding that any false representations on their submission may constitute a violation of 18 U.S.C. 1001 and be punishable by fine and imprisonment. Absent specific information indicating that the certifications are not true, they are presumed to have been made in good faith.

If, after information has been validated as PCII, the Protected CII Program Manager discovers that the information did not meet the requirements for protection under the CII Act, the Program Manager has the authority to remove the CII Act protections from the information.

We believe the processes established by the rule to validate information submitted and remove PCII protections for information subsequently determined not to have qualified for protection are sufficient to discourage persons or entities from submitting information to circumvent Federal, State and local laws.

Sincerely,

A handwritten signature in black ink, appearing to read "Laura L.S. Kimberly".

Laura L.S. Kimberly
PCII Program Manager

CARLUCCIO, LEONE, DIMON, DOYLE & SACKS, L.L.C.

A Professional Limited Liability Company

COUNSELLORS AT LAW

The Law Center of Ocean County

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Toms River, NJ 08753

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56 Schoolhouse Road, Whiting, NJ 08759

(732) 350-3400 Fax: (732) 350-0603

Please Reply to: Toms River

©Also admitted in NY
†Also admitted in MA
±Also admitted in DC
§Also admitted in PA
⊕Rule 1:40 qualified Mediator
▽Registered Guardian
⊕Member of NAELA, National
Academy of Elder Law Attorneys
ΔCertified Elder Law Attorney

Richard K. Sacks 1999-2002

December 14, 2004

Honorable Jeff S. Masin
Office of Administrative Law
Quakerbridge Plaza
Building 9
Quaker Bridge Road
P.O. Box 049
Mercerville, New Jersey 08625-0049

RE: TOMBS v. BRICK TOWNSHIP MUNICIPAL UTILITIES AUTHORITY
OAL DOCKET NO. GRC 06786-2004S

Dear Judge Masin:

Kindly recall that the undersigned represents the Brick Township Municipal Utilities Authority with regard to the above-referenced matter. Enclosed herewith please find a receipt dated November 24, 2004 signed by the Office of Protected Critical Infrastructure Information, Department of Homeland Security acknowledging receipt of the 2 Maxtor External Hard Drives containing the BTMUA GIS information. The receipt is attached as Exhibit A.

I am in receipt of Mr. Tombs correspondence dated November 24, 2004 indicating that he opposes my request for a stay, as well as Your Honor's response to my request. I respectfully submit that Mr. Tombs is uninformed in his assertion that the Department of Homeland Security lacks jurisdiction in this matter. As previously stated, information submitted to the PCII Program Office is deemed "protected" when it is received by the PCII Program Office in accordance with the terms of the Critical Infrastructure Information Act, and the Department of Homeland Security, 6 CFR Part 29. It would seem to be the most prudent course of action to simply wait until the Office of Protected Critical Infrastructure Information has the ability to review the information submitted by the BTMUA and make a determination of same.

CARLUCCIO, LEONE, DIMON, DOYLE & SACKS, L.L.C.

December 14, 2004

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I have extensively reviewed Mr. Tombs correspondence of September 11, 2004, a copy of which is enclosed herewith for your review as Exhibit B. I am uncertain whether this is a request for discovery, or simply a list of items that Mr. Tombs believes are responsive to the Government Records Council's questions. It is important to note that Mr. Tombs filed a Complaint with the Government Records Council claiming that he sought to obtain a "digital base map on CD-ROM", see, copy of Complaint attached hereto as Exhibit C. Although Mr. Tombs claims that he made such a request on April 9, 2003, my records indicate that he made a request on April 18, 2003, and that the request was not for a "digital base map" as he claimed on his Complaint. Instead, Mr. Tombs requested a "digital copy (.dwg) format of the Brick MUA's GIS topographic mapping data", see, copy of April 18, 2003 correspondence, attached hereto as Exhibit D. There is a vast difference between a "digital base map", as the Complaint alleges, and all of the mapping data on the BTMUA GIS system.

The Government Records Council has asked Mr. Tombs for clarification of his first request. Instead, Tombs has provided a list of additional information that he desires. Mr. Tombs' September 11, 2004 "discovery" demand now lists fifteen (15) separate items in response to the Government Records Council's first question, "What documents are being sought by the Complainant". None of these documents were previously requested from the BTMUA, either in the April 18, 2004 request, or in the Complaint filed with the Government Records Council. The September 11, 2004 correspondence has very little, if anything, to do with Tombs initial request for either a digital base map or the digital copy of the GIS mapping data.

The GIS database that has been created and is used by the BTMUA is the sole single source of the information contained in the database. The data was gathered from a variety of different sources, and is updated on a daily basis. Mr. Tombs can certainly request data from each of those sources. The BTMUA does not now, and never has, claimed that *all* of the information contained in the GIS database will be protected by the DHS. Instead, the BTMUA claims that the infrastructure information pertaining solely to the BTMUA, is protected. As Your Honor has requested, I have prepared an Affidavit for Kevin Donald, the Executive Director of the BTMUA as to the exact claim made. (See, affidavit attached hereto as Exhibit E). As set forth therein, it is not any single piece of information that is potentially subject to "protection" but rather the entirety of the database, and the format of that database.

Although portions of the information contained in the database may be available from various sources and may therefore be in the public domain, the totality of the information is available only to the BTMUA and is not in the public domain. This concept

CARLUCCIO, LEONE, DIMON, DOYLE & SACKS, L.L.C.

December 14, 2004

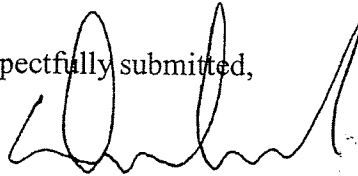
Page -3-

is best explained by way of an analogy that I have often used. If you have a family member arriving at Newark Airport, you are more than welcome to call the airline on which your family member is arriving, and ask if the flight is on time. You cannot, however, call Newark Airport and get the arrival and departure times for every upcoming flight for the next year. Moreover, you cannot expect Newark Airport to download their arrival and departure database in digital format so that you could change same, and reproduce it as if the changes had been made by Newark Airport.

Finally, there is a misconception being perpetrated by Mr. Tombs that all of the information he is requesting has been offered to him on paper, but not in a digital format, and that the BTMUA's objection is not to the request, but to the format. Paper copies of all the infrastructure information, such as sewer lines, pump stations, water distribution lines, etc., would not be made available to any individual. Mr. Tombs would be able to purchase paper maps of the entire Township of Brick if he so desired, but cannot receive the totality of the GIS database in a paper print out.

In accordance with the Code of Federal Regulations, and the information set forth above, it is respectfully submitted that the BTMUA GIS information is "protected" as that term is used by the Department of Homeland Security. Until such time as the DHS makes a determination regarding the BTMUA GIS, any further hearings in this matter should be stayed. Thank you for your attention in this matter.

Respectfully submitted,



DIANA L. ANDERSON

DLA/dal

Enc.

cc: X Robert Bradley Tombs
Kevin Donald, BTMUA
Greg Hannah, BTMUA
Rich Garnett, BTMUA

RECORD OF RECEIPT

Date of receipt:

04/12/24

Description of property received:

2 Maxtor External Hard Drives

Delivered by (Print):

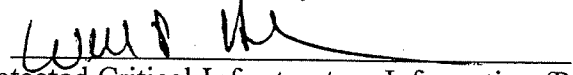
Diana Anderson

(Signature):

Received by (Print):

Bill Hyjek

(Signature):



Office of Protected Critical Infrastructure Information (PCII)
Department of Homeland Security

Principal Purposes: To provide a receipt for transfer of controlled material.

Routine Uses: To document transfer of material from a hipper or courier to a member of the PCII Office.

CARLUCCIO, LEONE, DIMON, DOYLE & SACKS, L.L.C.
 9 Robbins Street
 Toms River, New Jersey 08753
 (732) 797-1600
 Attorney for Defendant

ROBERT TOMBS

OFFICE OF ADMINISTRATIVE LAW

Agency Reference No: 2003-123

Plaintiff,

vs.

DOCKET NO. GRC 06786-2004S

BRICK TOWNSHIP MUNICIPAL
 UTILITIES AUTHORITY,

Defendants.

AFFIDAVIT

COUNTY OF OCEAN :
 : ss.
 STATE OF NEW JERSEY :

I, KEVIN DONALD, Executive Director of the Brick Township Municipal Utilities Authority, hereby certify and state the following:

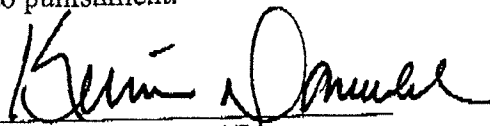
1. The Brick Township Municipal Utilities Authority GIS Information, hereinafter referred to as "BTMUA GIS," has been voluntarily submitted to the U.S. Department of Homeland Security for purposes of the Critical Infrastructure Information Act of 2002 on November 24, 2004.

2. The BTMUA GIS database contains all of the information pertaining to the potable water treatment and distribution system, and the sanitary sewer collection system for the customers who receive services from the BTMUA. This critical infrastructure information is the primary focus of the submission and request for protection. The BTMUA GIS database is the only single database that contains all of the following information in one place: water booster stations, fittings, storage tanks, hydrants, intakes, interconnects, valves, pipe wells; sanitary sewer fittings, valves, force mains, pipe casings, pump stations, manholes, pipes; storm sewer basins, catch basins, flared end sections, outfalls, manholes, storm pipes; property information such as block corners, condominiums, easements, parcels, property corners, bridges, buildings, bulkheads, cemeteries, athletic courts, dams, contours, docks, driveways, public facilities, fire districts, lakes, map sheet index, obscured, parking areas, pools, rivers, road

centerlines, edge of road, emergency shelters, shoreline, shrubs, streams, storage tanks, trailers, wooded areas; watershed monitoring sites and sample sites. It also contains color orthophotography, and topographic base maps.

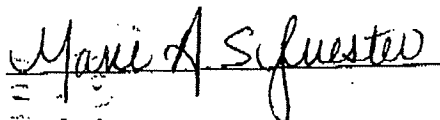
3. The totality of the BTMUA GIS database, in a digital format, is information that is not customarily in the public domain. Digital information is not available to the general public.

4. I certify that the foregoing statements made by me are true. I am aware that if any of the foregoing is willfully false, I am subject to punishment.



KEVIN DONALD

Sworn to and Subscribed
before me this 14th
day of December 2004.



MARIE A. SYLVESTER

MARIE A. SYLVESTER
Notary Public, State of New Jersey
No: 2048446 - Monmouth County
My Commission Expires June 17, 2008

BRICK
THE BRICK TOWNSHIP



UTILITIES
MUNICIPAL UTILITIES AUTHORITY

1551 Highway 88 West • Brick, New Jersey 08724-2399
(732) 458-7000 • FAX (732) 458-7725
www.brickmua.com

KEVIN F. DONALD
Executive Director

May 9, 2003

Mr. Brad Tombs
319 Laurel Court
Point Pleasant, New Jersey 08742

Dear Mr. Tombs:

I am in receipt of your request for information. Please be advised that we cannot furnish you the information as a public record in the manner in which you have requested it. We can reproduce a 24 x 40 map of Brick Township with various information on it. The standard cost for such a document is \$5.00. If you wanted particular parts of Brick Township shown on such sized sheet that can also be done for the same cost at \$5.00. Please be aware that it would take 160 sheets to cover the entirety of Brick Township. Given that the information and pricing is somewhat different than you indicated, I wanted to tell you what was available so that you can make a determination as to what you wish to have.

I will await your response in this regard.

Sincerely,

Kevin F. Donald
Executive Director

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Asst. Sec./Treas.

ALTERNATES

SUSAN RESCH

GREGORY S. KAVANAGH

KFD/mas



PART 1 – Identifying Information

1. GRC Complaint # to which you are responding: 2003-123
2. Name of Complainant: Brad Tombs
3. Custodian's name: Kevin F. Donald
Title: Executive Director
4. Public Agency the Custodian is employed by: Brick Township Municipal Utilities Authority
Address: 1551 Highway 88 West

City: Brick, NJ 08724
5. Custodian's Office Phone Number: 732-458-7000 x237
Fax Number: 732-458-7725
E-mail (if applicable): kdonald@brickmua.com
6. Name of Custodian's legal counsel: John Paul Doyle, Esq.
Address: 9 Robbins Street
Toms River, NJ 08753
Phone: 732-797-1600
Fax: 732-797-1637
E-mail:

PART 2: ABOUT THE OPRA COMPLAINT

7. Attach a copy of the OPRA records request on which this Complaint is based and any subsequent amendments, extensions of time, clarifications or changes to it submitted by the requester to the Custodian. Please mark these attachments: "Item 7."



8. On what date did the Custodian receive the request described in the Complaint and, if applicable, each subsequent amendment, clarification or change to it?

August 21, 2003

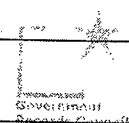
9. List the government records or parts thereof that the requester seeks in the Complaint that the Custodian claims were provided or made available to the requester and the date each record was provided or made available.

Any and all paper (hard) copies of information are available at any time.

10. List each record or part thereof that the requester seeks in the Complaint that was not provided or made available, and explain why. Attach all materials you want the Council to consider in deciding this case. You may include witness affidavits, certifications or legal arguments. Note: **Do not provide any record or information you claim is privileged or not accessible under OPRA.** If necessary you may provide a general description of the record.

GIS information in digital format. The BTMUA is not required to keep these records in a digital format

(see attached explanation)



11. If you have not already done so, indicate here whether the Council should dismiss the Complaint without further investigation for one or more of the following reasons:

- The GRC lacks jurisdiction over the matters raised in the Complaint;
- There is no factual basis for claims in the Complaint or the relief requested;
- The claims raised in the Complaint are frivolous.

Attach a written statement marked "Item 11" setting forth all facts and argument in support of your claims.

By signing this Statement, I affirm:

- That I am the Custodian of Records for the Public Agency holding the records sought in the OPRA Complaint described above, or am authorized to respond on behalf of the Custodian of records;
- That the documents attached hereto are true copies of all documents sent or received by the records Custodian or staff;
- A copy of this Statement will be sent to the Complainant upon mailing of this Statement to the GRC; and
- That the foregoing is true to the best of my knowledge and belief and that I am subject to penalty for any deliberate misstatement of fact in this document.

Signature: Kevin F. Donald

Printed Name: Kevin F. Donald

Position: Executive Director

Date: November 13, 2003



There are a number of reasons why the Brick Township Municipal Utilities Authority (hereinafter "BTMUA") is not obligated to supply the requested information to Mr. Tombs. First, Mr. Tombs has demanded that the information be supplied to him on a computer disk (CD). Paper copies of the maps comprising the data stored on the CD have been offered to Mr. Tombs. The requested format of the information is considered to be "proprietary" in that the factual information cannot be separated from the GIS program that coordinates the information. Second, if a CD of the GIS information is provided, a person would have the ability to change the data contained in the disk, and then print out that changed version of the information. The changed information would appear that it was coming directly from the BTMUA, and was authorizing by the BTMUA. The third, and possibly most important reason, is the concern of protection of the BTMUA facilities as a "critical infrastructure".

The National Strategy for the Physical Protection of Critical Infrastructures and Key Assets, issued in February of 2003, lists the primary focus of critical infrastructure protection efforts as the "protection of the Nations 17,000 public water systems" and includes "treatment facilities, pumping stations, aqueducts, and transmission pipelines." The National Strategy report focuses on four areas of concern of potential infrastructure attacks:

- Physical damage or destruction of critical assets, including intentional release of toxic chemicals
- Actual or threatened contamination of the water supply
- Cyber attack on information management systems or other electronic systems; and
- Interruption of services from another infrastructure

The treatment facilities, information systems, and distribution lines of the BTMUA are all clearly "critical infrastructures" as that term is used in the National Strategy report. Specifically mentioned, is the concern for protecting the information management systems.

Municipal utilities and infrastructures are also considered "critical assets" as that term is used in the "New Jersey Domestic Security Preparedness Act" signed on October 4, 2001. The Act provides, in part, for the establishment of the Domestic Security Preparedness Task Force, and gives the Task Force the authority for the adoption of standards, guidelines and protocols. Those standards, guidelines and protocols are designed to preserve, protect and sustain the critical assets of the States' infrastructure. The Task Force is also directed to establish and "Infrastructure Advisory Committee", including representatives of gas, water, and electric utilities. The activities of the Task Force are not subject to the provisions of the Open Public Meetings Act. N.J.S.A. 47:1A-1 et seq.

Case Study 4: The Brick Township Parcel Map

INTRODUCTION

The Brick Township road to parcel mapping and GIS has been a long one. The promotion of the GIS concept began in 1987 when the Ocean County Board of Taxation mandated revaluation of the township. This procedure required the submittal of an up-to-date set of municipal tax maps to the State of New Jersey Local Property Branch of the Division of Taxation.

The County Tax Administrator stated in the mandate cover letter "... we strongly recommend that you invest in the computerization of the appraisal data that is collected during this revaluation and a system be implemented to maintain this data on an ongoing basis." Brick Township applied this recommendation to the mapping process as well as the assessment data.

AUTOMATION OF THE TAX MAPS

In April of 1987, a complete set of municipal tax maps was submitted to the Division of Taxation. The revaluation mandate required the municipality to "take all necessary steps to update the tax maps in accordance with the instructions issued by the Director" (of the Division of Taxation) to meet the regulations in effect at the time.

The tax maps were originally prepared in the mid-1950's and approved by the State of New Jersey at that time. No map revisions had been submitted for review/approval since. The Division of Taxation's initial review of the "current" maps issued a response stating that they had "discovered numerous deviations from the Tax Map regulations" and required "that all necessary revisions be made to the entire set before resubmitting for final inspection." The "set" consisted of 220 sheets.

At this point GIS became a real consideration for the township. Officials authorized a middle-of-the-road approach from the options presented for consideration. These ranged from manually redrafting the entire set of tax maps to meet regulation standards, to full GIS capable base/parcel mapping.

In December of 1987, a small portion of the township was automated as a pilot study to finalize system configurations and staff needs.

The advantages of computerized mapping were obvious. Consistent standards and a continual revision process had been dreams in the past. "Tagging" of assessors' records to computerized map parcels seemed almost euphoric. Building toward GIS was the goal. The pilot study Feasibility Report and Final Findings recommended that the municipality join with other municipalities and private enterprise to establish an ongoing program to develop multipurpose GIS.

In June of 1988, the township received delivery, installation and training of the initial computerized mapping system. This consisted of a 386/25 P.C. with 120 MB hard drive, high resolution graphics, a 36" x 48" digitizer and an 8pen plotter. Digitizing of the entire set of municipal tax maps then began, continually working with Division of Taxation officials to insure compatibility with regulation standards. However, at this point each map was digitized independently with no georeferencing or edgematching.

In an effort to accelerate the program, and meet the revaluation mandate deadline, a second similar P.C. was authorized for acquisition and installed in December of 1988.

A Systematic Development Plan was prepared for the Automated Mapping Program to move toward GIS. In

September of 1989, authorization was given for acquiring three additional P.C. units to utilize mapping data with existing record attributes in the Planning Board, Land Use and Engineering offices.

In July 1991 the Division of Taxation issued approval of the computerized tax maps for revaluation purposes.

The tax mapping revision/maintenance process has operated on a continual basis since that time. Cost to develop \$200,000.

GIS BASE MAPPING DEVELOPMENT

In attempting to create a township wide composite of tax map sheets to create both an index and a street map, the limitations for GIS base map utilization were quickly realized. Various funding mechanisms, cooperative efforts and other agency participation options were evaluated in order to assist with the continuation/development of the mapping program out of the tax map environment into the GIS world.

In realizing the tremendous need and potential, the Utility Authority took the lead role from this point forward for township wide GIS development. Agreements were prepared between both township and Authority for GIS/Mapping development. Multiagency cooperative efforts were established from the local to the federal level. Accurate base mapping and utility infrastructure management were the priorities. Parcel mapping was a "natural," as the digital tax mapping already existed.

The twenty-six square miles of Brick Township were prepared for digital photogrammetric base mapping. Global Positioning System technology was utilized to establish precise geodetic mapping control monumentation throughout the township. A natural color aerial overflight was completed in April of 1993. The Brick Township Municipal Utility Authority (BTMUA) partnered with four other participating agencies to share the base mapping development costs both public and private. They were: The Township of Brick, The County of Ocean, New Jersey Bell Telephone Co., and New Jersey Natural Gas Co. Cost to develop \$300,000.

Digital topographic mapping was prepared to meet National Map Accuracy Standards at a hard copy output scale of 1" = 100' (1:1200) with 2' contour intervals. All mapping was developed within the latest horizontal and vertical datum standards (NAD 83 and NAVD 88). The New Jersey State Plane Coordinate System was utilized for geographic orientation. The digital data was delivered on a single CDROM in AutoCad Drawing format, comprising 195 "sheet files" covering the entire township.

PARCEL MAPPING DEVELOPMENT

The importance of a township-wide parcel map coverage was recognized by the BTMUA and the Township. The parcel map "layer" was to hold parcel map information in a contiguous township-wide coverage in NAD 83. The geographic data were to be held in topological data structures, thus allowing for spatial analyses. The parcels' attribute data were to come from the tax assessor's MODIV database.

After researching and evaluating several different methods for digital parcel map creation, BTMUA selected and approved the following procedure:

- ArcCAD software from ESRI was selected for the project. ArcCAD was selected because of its capability to work directly with AutoCAD, and add GIS functionality to it.
- The digital tax maps (in CAD format) were to be utilized as graphics data source
- The tax maps were to be geo-referenced to match the digital base map

- The tax maps were then to be converted from CAD drawing files to PC ARC/INFO coverages with topology

At this point the need for hardware arised. The BTMUA acquired a 486DX66 PC with 32 MB of RAM and 3 GB storage space, and a HP 650C inkjet plotter. The Township and the consultants acquired similar hardware.

The process of converting the CAD tax maps into a geo-referenced GIS coverage was neither quick, nor easy. Here are several steps along the way:

- In an ArcCAD session, a tax map file and a base map file were brought together simultaneously. The tax map file appeared in the origin of the map, whereas the base map file was in its proper coordinate position.
- All elements of the tax map (entities) were moved to their proper location. Generally, about five to ten adjustments were needed to ensure a proper fit.
- Not all layers in the tax map were considered important for the parcel map. Thus, the title block, secondary lot lines, north arrows, street names, etc., were not displayed (frozen.)
- A deliberate ArcCAD procedure was developed to convert the block and lot lines into parcel polygons, and to carry over the block and lot numbers from the tax map as attribute data associated with the polygons. Because of the introductory character of this document, we will not explain the procedure in full detail. The procedure includes data format conversion, correcting topological errors (normally and naturally abundant in CAD files,) and numerous topological overlays. As a result, every parcel/polygon in the coverage was identified with its block and lot number. We will see later why that was important, and what exceptions we had to make.
- When two or more tax maps/coverages were brought together, a series of procedures known as "edgematching" had to be performed.

Following the same script, three different GIS teams started to build the parcel map coverage, working on specifically assigned areas. Those teams were the BTMUA GIS team, the Township's GIS, and their GIS consultants -- the firm of Owen, Little & Associates, Inc. The project is still under way, and we look forward to reporting its successful completion in next year's NJ GIS Resource Guide.

WHAT REMAINS TO BE DONE?

Once all tax map files are properly converted, i.e., when the parcel map coverage is built, for it to be useful it has to carry the MODIV database. We have designed and tested the following procedure for the process of associating the two databases:

Every polygon in the parcel map coverage is uniquely identified by its block and lot number. So is every record in the MODIV database (there are some exceptions here, for example, multiple condominiums on one parcel. We will deal with those later.) Using some basic relational database management techniques, we will generate a field in each database storing the value of each record's/polygon's "unique identifier." Then, we will merge the two databases based on the value in that specific field. Ideally, every parcel/polygon will receive its MODIV data.

Of course, in the real world there are errors -- computer errors and human errors. It is expected that there will be 10 to 15% discrepancies in the databases, which will result in mismatches. Luckily, because of GIS's power,

those mismatches are very easy to identify. Still, at least 3,000 records (from an entire database of 30,000) will have to be revisited one by one, and the source of discrepancies identified and corrected. While tedious, this process will provide very important data check and feedback to the agency where the error occurred.

There is a special isolated case of multiple mismatches that will undoubtedly occur, with no errors involved. This is the case of multiple property ownership, condominiums being the classic example. Normally, a GIS expects a one-to-one relationship between spatial and non-spatial data. That means that one parcel has one owner, which is not always the case.

Several approaches can be taken to circumvent the issue of multiple property records tied to one parcel. One is to store the condominium footprints in a different coverage and relate the condominium property records to that coverage. Both coverages can be displayed together, and this data management trick will be transparent to the end user. That approach was used for the Brick GIS. Another approach is to establish a one-to-many relationship between two tabular databases, and display both at all times.

SPATIAL ACCURACY AND PRECISION

The digital base map was used to georeference the digital tax map files in a process we call "visually best-fitting." After testing several flavors of this process, the BTMUA decided to do best-fitting on a block by block basis, if necessary. Naturally, that kind of fit is not perfect (yields about 5 ft precision at best.) It was determined though, that this process will give the best return for cost, time and effort invested. Higher precision could be attained by best-fitting on a lot by lot basis, but that approach was considered too time-consuming and costly.

- Estimated cost based on the shared method (already having the data in digital format) -- \$2.00 per parcel

CONCLUSION

The parcel map coverage is a "live" database. It is dynamic, as many of its components change over time -- ownership records change, subdivisions occur, etc. The spatial component of the coverage is also live and open to fine-tuning and adjustment. A survey of a property can, and should be used to update and improve the spatial accuracy of the parcel map layer. The same applies for property corners' coordinates collected by BTMUA's GPS unit.

A complex set of dynamic databases such as the township's parcel map coverage has to be maintained and updated on a regular basis. Procedures have to be developed for all updates, and their relationship to the tax map updates.